5-YEAR REVIEW

Short Form Summary

Species Reviewed: ʻAkiapōlāʻau (*Hemignathus wilsoni*)

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, Hawaiʻi

Name of Reviewer(s):

Jay Nelson, 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 ʻakiapōlāʻau (*Hemignathus wilsoni*) (USFWS 2020, entire). The evaluation by Jay Nelson, 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/1816*)

Review Analysis:

Please refer to the Revised Hawaiian Forest Birds Recovery Plan (USFWS 2006, entire) and the previous 5-year reviews for the ʻakiapōlāʻau published on August 7, 2020; August 18, 2015, and August 27, 2010 (available at *http://ecos.fws.gov/ecp/species/1816*) 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 ʻakiapōlāʻau as endangered.

The ʻakiapōlāʻau is a Hawaiian honeycreeper that occurs only on the island of Hawaiʻi. Its most remarkable feature is the extraordinary bill, which has a long, sickle-shaped upper mandible and a short, straight lower mandible that is only half as long as the upper. Males are larger and heavier than females and have a slightly longer bill. Adult males have a bright yellow head and underparts, a greenish back and wings, and black lores or

eye stripe. Adult females differ in color from the male, with a yellowish-white chin, throat, and upper breast that contrasts with a pale yellowish-gray lower breast and belly (USFWS 2006, p. 2-96). The ʻakiapōlāʻau is mainly insectivorous using its short lower mandible to rapidly tap branches to locate prey beneath tree bark or in wood and its long curved upper mandible to extract insect larvae and spiders from crevices or insect borings. Tree species preferred for foraging include koa (*Acacia koa*), kōlea (*Myrsine* spp.), māmane (*Sophora chrysophylla*), and naio (*Myoporum sandwicense*) (USFWS 2006, pp. 2-97 and 2-98).

New status information:

- The ʻakiapōlāʻau occurs as three disjunct populations in the north and central Windward Hawaiʻi and Kaʻū regions on the island of Hawaiʻi (Gorresen et al. 2009, p. 119; Kendall et al. 2023a, p. 420; Kendall et al. 2023b, p. 7).
- Scott et al. (1986) estimated the entire population of ʻakiapōlāʻau in the late 1970s and early 1980s at 1,496 $\pm$ 318 (95% CI) birds distributed in five disjunct populations located in the north and central Windward, Kaʻū, Kona, and Mauna Kea regions (Camp et al. 2009, p. 50). Estimated total population in 2009 was approximately 1,900 birds (Camp et al. 2009, p. 4). The species was likely extirpated in the early 2000s from the Mauna Kea and Kona regions (Gorresen et al. 2009, pp. 118-119). Current total population is approximately 1,900 birds (Kendall et al. 2023a, p. 425) based on the most recent population estimate of approximately 1,163 birds in north Windward region (Kendall et al. 2023a, p. 425); approximately 691 $\pm$ 410 birds in Kaʻū region in 2008 (Judge et al. 2024, p. 16), and the small population in the Kūlani-Keauhou study area (central Windward region). Recent surveys of the Kaʻū region in 2010, 2016 and 2019 all failed to yield enough detections to provide an updated estimate of the population in this area (Judge et al. 2024, p. 16). Similarly, more recent data on the population trends and population size of ʻakiapōlāʻau for the central Windward (Kūlani-Keauhou) region is unavailable.
- For the Hakalau Forest National Wildlife Refuge Complex (HFNWRC), Hakalau Forest Unit (HFU), north Windward region, which is comprised of three units (or forest stratum), Kendall et al. (2023a, p. 421) found population trends were inconclusive in the open canopy forest stratum at 1,400-1,920 m (4,593-6,299 ft), decreasing in the closed forest stratum at 1,450-1,750 m (4,757-5,741 ft) elevation, and strongly increasing in upper elevation reforested pasture lands stratum at 1,600-2,000 m (5,249-6,562 ft) elevation. Available information did not indicate whether range contraction was occurring concomitant with declining trends in the closed-forest strata. For the three units combined, ʻakiapōlāʻau had an inconclusive population trend in 2019 (Kendall et al. 2023a, p. 416).
- In the Kaʻū region the species' range has contracted from 6,000 hectares (ha) in 1980, to 4,730 ha in 2019, or range contraction of 21%. Almost all detections in Kaʻū after 2002 are above 1,400 m (4,593 ft) elevation (Judge et al. 2024, p. 74). This retreat upslope into highest elevation forest areas suggests avian disease which is prevalent at lower elevations is likely driving species' range contraction (USFWS 2020, p. 2).
- Analysis of forest birds survey information from 1990 to 2022 for the Puʻu Waʻawaʻa Forest Bird Sanctuary and Puʻu Waʻawaʻa Forest Reserve, and survey information from 1987 to 2019 for HFNWRC, Kona Forest Unit (KFU), show ʻakiapōlāʻau is no

longer present on leeward Hawai‘i. There were no detections of ‘akiapōlā‘au at Pu‘u Wa‘awa‘a Forest Bird Sanctuary, north Kona, from 1990 to 2022 (Kendall et al. 2023b, p. 7). Last detection of ‘akiapōlā‘au at HFNWRC/KFU, central Kona, was in 1995 (Kendall et al. 2023a, p. 420).

- The last detection of ‘akiapōlā‘au in the māmane forests in the Mauna Kea region was in 2004 (Camp et al. 2009, p. 51).

New threats:

- Please see August 7, 2020, 5-year Status Review for discussion of habitat sustainability and threat from avian disease (USFWS 2020, pp. 2-3).
- Rapid ‘Ōhi‘a Death (ROD): ROD is a disease caused by the fungal pathogens, *Ceratocystis lukuohia* and *Ceratocystis huliohia*, that rapidly kills individual ‘ōhi‘a trees as well as groups of trees (Barnes et al. 2018, entire). Since its first detection on the island of Hawai‘i in the Puna District around 2010 (Keith et al. 2015, entire), ROD has spread across the island and killed an estimated over 1 million ‘ōhi‘a trees on the island of Hawai‘i (USDA 2024). ROD and ROD suspected trees currently overlap virtually all habitat occupied by ‘akiapōlā‘au (BIISC 2023, p. 2; Fig. 1). ROD therefore poses a substantial continuing and increasing threat to ‘akiapōlā‘au through widespread destruction of ‘ōhi‘a trees, which the species uses for nesting and foraging and which constitute the primary canopy tree of much of their habitat.
- Avian malaria also poses an increasing threat to the remaining ‘akiapōlā‘au populations as the populations contract from the lower elevations of its former range (Judge et al. 2024, p. 75). This pattern is seen across Hawai‘i as forest bird populations are increasingly exposed to disease as temperatures warm and mosquitoes spread upslope (Fortini et al. 2015, entire; Paxton et al. 2018, entire; Paxton et al. 2022, entire; Neddermeyer et al. 2023, entire; Siedl 2023, pp. 11-45). For ‘akiapōlā‘au, these range contractions have been linked to an increase in disease at middle elevations. Gaudioso-Levita et al. (2015, p. 1) found that avian disease prevalence decreased with increasing elevation and geographically from east to west in the Ka‘ū region. Substantial prevalence of avian malaria in birds and mosquitoes at roughly 1,219 m (4,000 ft) elevation strongly suggests avian disease is the primary factor driving ‘akiapōlā‘au range contraction at lower elevations in Ka‘ū. Although significant prevalence of avian disease was found in disease tolerant or resistant birds at high elevations, it is likely transfer of disease to ‘akiapōlā‘au is not occurring at higher elevations because no or very few mosquito vectors were detected at survey stations at the higher elevation study sites (Gaudioso-Levita et al. 2015, p. 23). Similarly, at HFNWRC/HFU, forest birds were sampled for blood parasites, adult mosquitoes trapped, and surveys conducted for larval mosquito habitat at three sites during 2012 and compared with similar data collected between 1998 and 1999 (LaPointe, entire). The study found long term changes in precipitation may have a more profound effect on local transmission of malaria than temperature as extended drought at HFU was associated with a decrease in feral pig activity and pig-associated larval mosquito habitat but increases in stream-associated larval mosquito habitat (LaPointe et al. 2016, p. 1).

New Management Actions:

- Threat Management –
  - Avian Disease. Continued public hunting and construction of ungulate fencing and removal of feral ungulates in the Kaʻū Forest Reserve and The Nature Conservancy (TNC) Preserves in Kaʻū will help diminish available larval habitat in forested areas. In central Kaʻū, the high prevalence of natural ground and rock pools, as well as, feral pig created hapuʻu (*Cibotium glaucum*) tree fern cavities makes reduction of larval habitat more difficult than some other habitats. Grassy puddles along infrequently used ranch roads were found to be the main source of larval habitat in Kahuku (southwest Kaʻū region). Larval habitat along roads should be eliminated by grading abandoned roads to prevent standing water.
  - Rapid ʻŌhiʻa Death: It has been shown that feral ungulates are an effective vector in transferring ROD from infected trees to uninfected or only lightly ROD-infested forest areas (Hughes et al. 2023, entire). An experiment conducted from 2019-2022, comparing two equally sized areas across the fenced boundary of Hawaiʻi Volcanoes National Park, found virtually no incidence of ROD in the area without feral ungulates but widespread presence of ROD in the area with feral ungulates (UH News 2023, entire). This evidence suggests there is substantial benefit of fencing and removal of feral ungulates in preventing the spread of ROD.
- Habitat restoration – Reforestation has been ongoing at HFNWRC/HFU since the 1980s in areas of former pasturelands from 1,600-2,000 m (5,249-6,562 ft) elevation. In the two decades since the refuge opened in 1985, volunteers and refuge officials have replanted more than 271,000 koa trees on about 5,000 acres (NBC News, June 23, 2005). Examination of changes of tree cover from 1990 to 2024 from satellite images show a 49.1% increase in forest cover in planted areas (Nicoll et al. 2024, p. 12). The population trend for ʻakiapōlāʻau in 2019 at HFNWRC/HFU was strongly increasing in these reforested pasture lands. From this, habitat restoration by planting koa and other native forest trees in high elevation deforested areas is highly beneficial to ʻakiapōlāʻau. [See below, Recommendations for Future Actions: Habitat and natural process management and restoration – reforestation of high elevation grassland adjacent to protected forest areas for further discussion of the importance of restoration of native forest in high elevation areas.]

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

Date	No. Adult Wild Individuals	Downlisting Criteria Identified in Recovery Plan	Downlisting Criteria Completed?
1967 (listing)	Rare	No recovery plan developed yet.	N/A
1977 Hawaii Forest Bird Survey (first population estimate, Scott et al. 1986)	1,496 ± 318 (95% CI)	No recovery plan developed yet.	No

1983 (first recovery plan)	Approximately 1,500 birds	Improve habitat conditions; decrease threat of avian disease; monitor populations;	Partially
2006 (revised recovery plan)	Approximately 1,500 birds	Viable populations exist in Hāmākua, Kulani/Kīlauea/Keauhou, Ka‘ū, south Kona, and māmane forest on Mauna Kea.	Partially
		Viability of the populations is demonstrated through either a) quantitative surveys that 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 that shows each population or the metapopulation has an average growth rate (lambda, λ) 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 with the next 15 consecutive years for any reason.	No
		Sufficient habitat in recovery areas is protected and managed to achieve Criteria 1 and 2 above.	No
		The threats that were responsible for the decline of the species have been identified and controlled.	No
2010 (5-year review)	Approximately 1,500 birds	Viable populations exist in Hāmākua, Kulani/Kīlauea/Keauhou, Ka‘ū, south Kona, and māmane forest on Mauna Kea.	Partially
		Viability of the populations is demonstrated through either a) quantitative surveys that show that the number of individuals in	No

		each isolated population or in the metapopulation has been stable or increasing for 15 consecutive years, or b) demographic monitoring that shows each population or the metapopulation has an average growth rate (lambda, λ) 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 with the next 15 consecutive years for any reason.	
		Sufficient habitat in recovery areas is protected and managed to achieve Criteria 1 and 2 above.	No
		The threats that were responsible for the decline of the species have been identified and controlled.	No
2015 (5-yr review)	Approximately 1,500 birds	Viable populations exist in Hāmākua, Kulani/Kīlauea/Keauhou, Kaʻū, south Kona, and māmane forest on Mauna Kea.	Partially
		Viability of the populations is demonstrated through either a) quantitative surveys that 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 that shows each population or the metapopulation has an average growth rate (lambda, λ) 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 with the next 15	No

		consecutive years for any reason.	
		Sufficient habitat in recovery areas is protected and managed to achieve Criteria 1 and 2 above.	No
		The threats that were responsible for the decline of the species have been identified and controlled.	No
2020 (5-yr review)	Approximately 1,500 birds	Viable populations exist in Hāmākua, Kulani/Kīlauea/Keauhou, Kaʻū, south Kona, and māmane forest on Mauna Kea.	Partially
		Viability of the populations is demonstrated through either a) quantitative surveys that 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 that shows each population or the metapopulation has an average growth rate (lambda, λ) 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 with the next 15 consecutive years for any reason.	No
		Sufficient habitat in recovery areas is protected and managed to achieve Criteria 1 and 2 above.	No
		The threats that were responsible for the decline of the species have been identified and controlled.	No
2025 (5-year review)	1,900 birds (Kendall et al. 2023a, p. 425)	Viable populations exist in Hāmākua, Kulani/Kīlauea/Keauhou, Kaʻū,	Partially

		south Kona, and māmane forest on Mauna Kea.	
		Viability of the populations is demonstrated through either a) quantitative surveys that 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 that shows each population or the metapopulation has an average growth rate (lambda, λ) 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 with the next 15 consecutive years for any reason.	No
		Sufficient habitat in recovery areas is protected and managed to achieve Criteria 1 and 2 above.	No
		The threats that were responsible for the decline of the species have been identified and controlled.	No

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

Threat	Listing Factor	Current Status	Conservation/Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, E	Ongoing	Partial: Some habitat areas fenced.
Invasive introduced plants	A, E	Ongoing	Partial: Some habitat areas managed primarily fencing feral ungulates that spread seeds of invasive plants.
Rapid ʻŌhiʻa Death	A	Increasing	Partial: Research has shown the importance to exclude feral ungulates from areas not yet infected or only lightly infected by ROD in slowing ROD spread.

Invasive predators	C	Ongoing	Partial: Some rodent control ongoing within portions of the species' range.
Avian Disease	C	Increasing	Partial: Ungulate control reduces mosquito breeding sites. Applications of Incompatible Insect Technique mosquitoes and *Bacillus thuringiensis israelensis* (*Bti*) on other islands may provide an example for use on the island of Hawai‘i. Research has shown the importance of monitoring to document fine scale temporal and site-specific changes in presence of mosquitoes and prevalence of avian disease for developing most appropriate management responses to threat of avian disease.
Low numbers	E	Ongoing	Partial: Habitat management resulting in population increase at HFNWRC/HFU reforested area.
Habitat degradation	A, E	Increasing	Partial: Forest protection at middle elevations and reforestation in some high elevation areas are beneficial in protecting the species from avian disease and expanding its range at higher elevations. Incidence of ROD however has increased dramatically throughout the species range and tens of thousands of ‘ōhi‘a trees affected.

Syntheses:
Surveys and population estimates indicate ‘akiapōlā‘au population trend is inconclusive in HFNWRC/HFU, north Windward region, however species is extirpated from south Kona and māmane forest on Mauna Kea (Kendall et al. 2023a, p. 7; Kendall et al. 2023b, p. 7; Gorresen et al. 2009, pp. 118-119). The species has been shown to respond positively with increasing population density in reforested pasture lands and higher densities of koa trees. Although the species population appears stable overall, its range is contracting in Ka‘ū region and recent surveys have failed to detect sufficient individuals to assess the population size. In addition, the species is extirpated from two regions it used to inhabit and the status of the species in the Kūlani-Keauhou area in central windward Hawai‘i has not been assessed recently. Ongoing threats are not being sufficiently managed throughout all of the species' range and all populations (Table 2). Threat from avian disease has increased as indicated by downward population trends in closed-forest areas in north Windward region (Kendall et al. 2023a, p. 421) and the disappearance of ‘akiapōlā‘au from lower elevation areas in the Ka‘ū region (Judge et al. 2019, p. 75). Threat from ROD has also increased. In 2015, ROD was only present in the Puna District on Kīlauea Volcano (Keith et al. 2015, entire), but by 2023, it had spread

throughout all high-elevation ʻōhiʻa forest on Mauna Loa and Mauna Kea volcanoes impacting all ʻakiapōlāʻau's habitat (BIISC 2023, p. 2; Fig. 1).

Downlisting and delisting objectives are provided in the recovery plan for Hawaiian Forest Birds (USFWS 2006, III Recovery Section, pp. 2-6). To be downlisted, viable populations or metapopulations of ʻakiapōlāʻau must exist in Hāmākua (north Windward region), Kūlani/Kīlauea/Keauhou (central Windward region), Kaʻū (Kaʻū region), south Kona (Kona region), and māmane forest on Mauna Kea, and viability of the populations is demonstrated through either a) quantitative surveys that 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 that shows each population or the metapopulation has an average growth rate (lambda, λ) not less than 1.0 over a period of at least 15 consecutive years; total population size is not expected to decline by more than 20 percent within the next 15 consecutive years for any reason; there is sufficient habitat in recovery areas protected and managed representing the ecological, morphological, behavioral, and genetic diversity of the species; and the threats that were responsible for the decline of the species have been identified and controlled. For ʻakiapōlāʻau to be delisted due to recovery the above downlisting criteria need to be satisfied for at least 30 consecutive years. Given declining population trends in closed-canopy forest in the north Windward region, range contraction in Kaʻū region, and extirpation from south Kona and māmane forest on Mauna Kea in recent decades, ʻakiapōlāʻau continues to meet the definition of endangered as it remains in danger of extinction throughout its range. In addition, avian malaria and ROD are not being adequately controlled or managed. ROD has spread to all habitat areas occupied by ʻakiapōlāʻau and avian malaria is observed in ʻakiapōlāʻau's forest habitat at highest elevations.

Recommendations for Future Actions:
The recovery strategy for ʻakiapōlāʻau centers on protection, restoration, and management of native high elevation forests in the north and central Windward, Kaʻū, and south Kona regions and māmane forest on Mauna Kea.

- Surveys / inventories –
    - Continued monitoring of ʻakiapōlāʻau is important to determine the species' response to management actions, effects of habitat degradation, and population status.
    - Continued monitoring of site-specific changes in presence of mosquitoes and prevalence of avian disease is important to document fine scale temporal and spatial changes of avian disease and effects on ʻakiapōlāʻau.
    - Continue efforts to map changes in the distribution of ROD across the island of Hawaiʻi and changes in ROD presence in ʻakiapōlāʻau habitat.
- Habitat and natural process management and restoration –
    - We recommend continued habitat management in areas where the species currently exists (USFWS 2006, entire) and areas the species has been recently extirpated. Invasive plants such as Himalayan ginger (*Hedychium gardnerianum*) and strawberry guava (*Psidium cattleyanum*) and non-native ungulates are

degrading ʻakiapōlāʻau habitat. Continue control of introduced invasive plants and exclusion/removal of ungulates that spread seeds of invasive plants.
    - Hawaiian forest birds susceptible to avian disease may become extinct following a drastic reduction in disease-free habitat, but ultimately forest might expand into higher elevations maintaining disease-free refugia for some species. Acquisition and management of transmission-free high-elevation habitat is crucial to the preservation and restoration of native Hawaiian forest birds (Lapointe et al. 2009, entire). As a long-term contingency for ecosystem adaptation, we recommend securing deforested and pasture lands on Hawaiʻi at high elevations adjacent to protected refugia and managing these areas for forest growth to provide suitable habitat for ʻakiapōlāʻau and other Hawaiian forest birds.
- Ungulate monitoring and control – Continue ungulate control. ʻAkiapōlāʻau are currently restricted to the windward forests of north and central Windward and Kaʻū regions. However, ungulate removal should continue in south Kona region and māmane forests on Mauna Kea to maintain and improve habitat in these areas for ʻakiapōlāʻau and other Hawaiian forest birds. Ungulate removal is ongoing and new fence construction and repairs to existing fencing are planned throughout HFNWRC, Hawaiʻi Volcanoes National Park, The Nature Conservancy Preserves in Kona and Kaʻū, State of Hawaiʻi Natural Area Reserves, the Mauna Kea Forest Reserve & Game Management Area, and other State Forest lands. However, it is important that fencing and ungulate control be conducted in all areas where populations of ʻakiapōlāʻau exist and in lower elevation areas where ʻakiapōlāʻau are disappearing to minimize damage caused by feral ungulates to forest and forest understory and prevent creation of wallows and other standing sources of water where mosquitoes can lay their eggs (LaPointe et al. 2009, entire).
- Predator monitoring and control – Research to determine impacts of rats (*Rattus* spp.) on ʻakiapōlāʻau is needed and control of small mammalian predators if necessary.
- Biosecurity – Implement a statewide interagency biosecurity plan to prevent spread of ROD on the island of Hawaiʻi and to other Hawaiian Islands, and prevent the introduction of other threats that may affect ʻakiapōlāʻau and its forest habitat. An effective biosecurity plan requires a comprehensive approach that includes:
    - Pre-border policies and processes to prevent invasive species from making their way to the state of Hawaiʻi.
    - Border policies and processes that support inspecting incoming items to ensure minimal risk of pest entry into the state.
    - Post-border policies and processes that support detecting and responding to new incursions of invasive species and controlling established invasive species wherever possible.
- Disease monitoring and control – Identification of resistance or tolerance to avian diseases within the population is an important recovery strategy. Disease control using traditional and new methods is critical.
    - Studies to examine potential genetic resistance by ʻakiapōlāʻau to avian disease have not been conducted but are important in order to identify any potential resistance or tolerance to avian disease.
    - Much of currently occupied ʻakiapōlāʻau habitat on the island of Hawaiʻi is managed as native ecosystems mostly free of ungulates. However, some habitat

areas at elevations below 1,350 m (4,429 ft) are not managed for feral ungulates, where mosquitoes may be common. Removal of ungulates from lower elevation areas will help reduce mosquito densities in these areas and encroachment of mosquitoes from lower elevations into higher elevation areas.

- Surveys of mosquitoes and disease prevalence is needed throughout the species' current range and lower elevation areas where species is disappearing.
- Hawaiian honeycreepers are likely vulnerable to avian diseases such as West Nile virus, that have not been introduced to Hawai‘i but which have the potential to become established in the Hawaiian Islands (LaPointe et al. 2009). The U.S. Geological Survey, National Wildlife Health Center, Honolulu Field Station collaborates with the USFWS and State of Hawai‘i in surveillance and interdiction efforts to detect and prevent the establishment of new avian diseases into the state, including surveillance for West Nile virus (USGS 2025). Continued support for this program is critical to prevent West Nile virus and other avian diseases from entering the State of Hawai‘i.
- Landscape-scale mosquito control — Over the last 5-years there has been substantial movement toward development and implementation of landscape-scale control of the introduced southern house mosquito (*Culex quinquefasciatus*) that transmits avian disease to Hawaiian forest birds. In 2022 an Environmental Assessment (EA) was published for broad-scale mosquito control in conservation areas on east Maui using the Incompatible Insect Technique (IIT) (HALE 2022, entire), and first use of IIT on east Maui using male *C. quinquefasciatus* mosquitoes treated with *Wolbachi*a is ongoing. Please see August 27, 2020, 5-year Status Review (USFWS 2000, p. 3) for a more detailed description of the IIT technique. A similar EA was finalized for Kaua‘i in 2023 (HDLNR/USFWS/SWCA 2023) and IIT applications began on that island in 2025 (HDLNR 2025a). Depending upon results of the IIT application on other islands, landscape-scale mosquito control using IIT may be an important tool to protect ‘akiapōlā‘au from avian disease, particularly with continued habitat degradation as mosquitoes move upslope into highest elevation areas on the island of Hawai‘i (USFWS 2020, p. 2).
- Control of mosquitoes and their breeding sites is needed using traditional methods including application of *Bacillus thuringensis israelenis* (*Bti*), a bacterial larvicide, and has been used on a landscape-scale on other Hawaiian Islands (HDLNR 2025b). Ungulate exclusion and ungulate removal are essential to reduce mosquito breeding sites. Grade dirt roadways where puddles form causing mosquito breeding sites as applicable.

- Captive propagation protocol development — Recovery of ‘akiapōlā‘au is achieved most effectively currently through *in situ* management techniques such as habitat management. Captive propagation technology however may need to be developed for ‘akiapōlā‘au as a potential tool to help reestablish populations in areas from which the species has been extirpated.

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
ʻAkiapōlāʻau (*Hemignathus wilsoni*)

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: Jay Nelson, 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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