

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** Ou (*Psittirostra psittacea*)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; Initiation of 5-year Status Reviews of 44 species in Oregon, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 78(24):8185-8187.

### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

### **Name of Reviewer(s):**

Jay Nelson, Fish and Wildlife Biologist, PIFWO

Michelle Bogardus, Maui Nui and Hawaii Island Team Manager, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

### **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 May 5, 2015. The review was based on a review of current, available information since the last 5-year review for ou (USFWS 2009). The evaluation by Jay Nelson, Fish and Wildlife Biologist, was reviewed by the Island Team Manager, followed by the Plant Recovery Coordinator. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

### **Background:**

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species at: [http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public).

### **Review Analysis:**

Please refer to the previous 5-year review for ou (*Psittirostra psittacea*) published on July 31, 2009 (available at: [http://ecos.fws.gov/docs/five\\_year\\_review/doc2541.pdf](http://ecos.fws.gov/docs/five_year_review/doc2541.pdf)) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of ou.

The ou is a heavy-bodied Hawaiian honeycreeper endemic to the islands of Hawaii and Kauai. The upper parts are dark olive-green, and the under parts are a lighter olive-green grading to whitish on the undertail coverts. The wings and tail are a darker brownish olive. Ou are sexually dichromatic, males having a bright yellow head that contrasts sharply with the back and breast, and females having an olive-green head similar in color to the back (USFWS 2006).

New status information:

- Surveys for Hawaiian forest birds using the variable circular-plot method as previously conducted by Scott *et al.* (1986) were conducted in forest areas on Hawaii and Kauai from 2010-2012 in areas with historical occurrence of ou (R. Camp, U.S. Geological Survey, pers. comm. 2015). Ou were not detected during these surveys.
- Elphick *et al.* (2010) estimated the extinction of the ou to have occurred in 1990 on Hawaii and 1993 on Kauai using a method by which the predicted probability of extinction increases as a function of the time since a species was last observed. Using 1987 as the last reliable observation record for ou on Hawaii Island, and 1989 on Kauai, the authors determined the year 1998 for Hawaii Island and 2002 for Kauai as the upper 95% confidence bound for species extinction on the two islands. This approach for establishing extinction probability however is problematic when applied to extremely rare species such as ou that are potentially distributed over a large area because the absence of observation records may be the result of inadequate survey effort and the few if any visits by qualified observers to remote areas where rare and potentially extinct species may still exist.
- Scott *et al.* (2008), a reference not included in the previous 5-year review, estimated the number of 8-minute variable circular-plot surveys needed to be 9,812 on Hawaii Island, and 1,692 on Kauai to determine with 95% confidence the absence of ou on Hawaii Island and Kauai. In 2008, only 357 variable circular-plot surveys had been conducted on Hawaii Island and 140 surveys on Kauai in areas where ou might still exist. A 27-fold increase in survey effort using the variable circular-plot survey methodology on Hawaii and a 12-fold increase on Kauai therefore would be required to determine with 95% confidence the absence of ou in areas of suitable habitat for the species.

New threats:

- Climate change destruction or degradation of habitat – Hawaiian honeycreepers are known to be highly susceptible to introduced avian disease, particularly avian malaria (*Plasmodium relictum*) (Atkinson *et al.* 1995; Atkinson *et al.* 2000; Yorinks and Atkinson 2000; Banko and Banko 2009). According to some climate change projections, temperature increases could present an additional threat specific to Hawaiian forest birds by causing an increase in the elevation below which regular transmission of avian malaria occurs, potentially reducing the remaining suitable habitat for these species. In Hawaii, the threshold temperature for transmission of avian malaria has been estimated to be 13 degrees Celsius (55 degrees Fahrenheit), whereas peak *P. relictum* prevalence in wild mosquitoes occurs in mid-elevation forest where the mean ambient summer temperature is 17 degrees Celsius (64 degrees Fahrenheit) (Benning *et al.* 2002). Benning *et al.* (2002) used GIS simulation to show that an increase in temperature of 2 degrees Celsius (3.6 degrees Fahrenheit), which is within the range predicted by some climate models (*e.g.*, IPCC 2013; ICAP 2010), would result in 100 years in a nearly 100 percent decrease in the land area for ou on Hawaii and Kauai where malaria transmission currently is only periodic. Lia *et al.* (2015) assessed how global climate change will affect future malaria risk for native Hawaiian bird populations and expect high elevation areas to remain mosquito

free only to mid-century due to combined factors of increased rainfall and increasing temperatures. If climate change were to reduce the remaining suitable habitat for ou as predicted, it would likely contribute to the extinction of this species over time.

New management actions:

- Surveys / inventories – Forest bird surveys were conducted on Hawaii Island and Kauai in 2010-2014, but no birds were detected.

### **Synthesis:**

We applied a standard of demonstrated species absence at the 95% confidence level to recommend species status change from unknown to “delisting” due to extinction. This standard means we assumed a species is potentially extant until survey or other information shows the species is absent with 95% confidence from suitable habitat and areas it was known to have occupied historically during the roughly last half century. Scott *et al.* (1986) estimated two small populations of ou in 1976-1981, one of  $400 \pm 300$  (95% CI) birds on Hawaii Island, the other  $3 \pm 6$  (95% CI) of birds in the Alakai Plateau on Kauai. Reynolds and Snetsinger (2001) were confident in 1994-1996 of the species extirpation from South Kona on Hawaii Island; however, search effort was insufficient in Kau, Upper Waiakea, and Pua Makaala to be confident of the species absence from these areas. Based on detection probabilities, the authors believed the ou to be extinct on Kauai in areas where they searched (Reynolds and Snetsinger 2001). However they were unable to search approximately 800 hectares (1,980 acres), or 14 percent, of suitable habitat on Kauai in private lands. We believe the status of the ou is “unknown.” Search effort on Hawaii Island in the Kau, Puna, and Hamakua regions in 1994-1996 was insufficient to determine species absence from these areas at the 95% confidence level and approximately 14 percent of suitable habitat for ou on Kauai was not searched during the Hawaii Rare Bird Search. There are instances where rare Hawaiian birds have been rediscovered after they were presumed extinct or have been found in larger populations than expected (Reynolds and Snetsinger 2001). The very large area (approximately 30,000 hectares (75,000 acres) (Camp *et al.* 2009) on Hawaii Island with suitable habitat, and the many remote areas within this that are only rarely visited by qualified observers, increase the potential that a small population of ou could still exist on Hawaii Island. On Kauai, the extremely rough terrain and frequent wet weather make surveys difficult, and numerous steep valleys create many small pockets of habitat where the species could still exist. In addition, some areas of suitable habitat on Kauai where ou could still exist have not been searched for this species since the early 1970’s.

### **Recommendations for Future Actions:**

- Surveys / inventories
  - One of the most important recovery actions for the ou is to intensively and systematically search areas of forest habitat where the species occurred historically (USFWS 2006). Statewide surveys of Hawaiian forest bird populations are conducted along widely spaced transects (Scott *et al.* 1986) and do not cover all areas where extremely rare Hawaiian forest birds are most likely to be. Additionally, these surveys do not spend the lengths of time

needed to maximize the probability that extremely rare Hawaiian forest birds will be detected or rediscovered. Therefore, we recommend that an intensive search for ou be conducted on Hawaii and Kauai using similar methodologies as those employed during the Hawaii Rare Bird Search 1994-1996 (Reynolds and Snetsinger 2001).

- In addition, we recommend that autonomous recording units, or ARUs (Fitzpatrick 2002; Wallace 2010), be deployed in suitable habitats for this species. These field recording units record vocalizations of forest birds. The tapes are then analyzed using computer programs to determine if the target species is present in the area. Use of this technology would greatly increase the amount of search time for this species.
- Threats – disease control research –
  - Of particular concern to the continued survival of many Hawaiian forest birds (particularly Hawaiian honeycreepers) is avian disease. Existing tools and approaches have proved largely ineffective in addressing this problem given mosquito dispersal distance and the abundance of mosquito breeding sites in most wet native forest habitats (LaPointe *et al.* 2009). Opportunities are emerging however based on new genetic tools as part of the fields of synthetic biology and genomic technology that have the potential to assist Hawaiian forest birds in developing genetic resistance to avian disease (LaPointe *et al.* 2009). In addition, recent progress has been made with the development of genetically modified mosquitoes for disease control. Several of these techniques have achieved proof-of-principle in laboratory studies, while other transgenic insect techniques, including self-sustaining technologies to achieve long-term transmission control are anticipated to advance to field testing in the near future. We encourage continued research in the fields of genomic technologies and genetically modified mosquitoes for disease control and their field application as a conservation strategy for Hawaiian forest birds.
- Habitat and natural process management and restoration –
  - Ou would benefit in the long-term from habitat restoration to assist other endangered birds on Hawaii and Kauai. We therefore recommend continued habitat management in areas where the species may still exist (USFWS 2006).
  - 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). As a long-term contingency against a warming scenario, we recommend securing deforested and pasture lands on Hawaii at high elevations adjacent to protected refugia and managing these areas for forest growth to provide suitable habitat for ou and other Hawaiian forest birds.
- Captive propagation for reintroduction and genetic storage – Should ou be rediscovered we recommend the Rare Bird Discovery Protocol in the revised recovery plan for Hawaiian forest birds (USFWS 2006) be followed with regard

to decisions for whether to attempt to establish a captive population for propagation and reintroduction or to manage rediscovered population(s) *in situ*.

**Table 1. Trends in status of ou since listing.**

<b>Date</b>	<b>Number wild individuals</b>	<b>Number released</b>	<b>Key Recovery Actions</b>	<b>Actions Accomplished</b>
1967 (listing)	Very rare	0	See below	
1968-1973 (Kauai Island forest bird surveys)	62 ± 41 (SE)	0	See below	
1976-1981 (Hawaii Forest Bird Survey)	Hawaii: 400 ± 300 (95% CI) Kauai: 3 ± 6 (95% CI)	0	See below	
1983 (first recovery plan)		0	Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat;	Improve habitat conditions – Yes Decrease threat of avian disease – No Systematically search area of suitable forest habitat – Yes
1987 (Hawaii last confirmed detection)	1	0	See above	See above
1989 (Kauai last confirmed detection)	2	0	See above	See above
2006 (revised recovery plan)	Unknown	0	Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat;	Improve habitat conditions – Yes Decrease threat of avian disease – No Systematically search area of suitable forest habitat – No

Date	Number wild individuals	Number released	Key Recovery Actions	Actions Accomplished
2009 (5-year review)	Unknown	0	Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat;	Improve habitat conditions – Yes Decrease threat of avian disease – No Systematically search area of suitable forest habitat – No
2015 (5-year review)	Unknown	0	Improve habitat conditions; decrease threat of avian disease; systematically search area of suitable forest habitat;	Improve habitat conditions – Yes Decrease threat of avian disease – No Systematically search area of suitable forest habitat – No

**Table 2. Threats to ou and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, E	Ongoing	Partially, some habitat areas fenced
Invasive introduced plants	A, E	Ongoing	Partially, some habitat areas managed
Low numbers	E	Ongoing	None
Climate change	A, E	Increasing	Partially, reforestation of some high elevation areas

**References:**

See previous 5-year review for a full list of references (USFWS 2009).

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**U.S. FISH AND WILDLIFE SERVICE  
SIGNATURE PAGE for 5-YEAR REVIEW of  
Ou (*Psittirostra psittacea*)**

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
- No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: \_\_\_\_\_

 Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office

Maie M Bluegman

Date 2015-08-20