5-YEAR REVIEW

Short Form Summary

Species Reviewed: Hawaiian Duck (*Anas wyvilliana*)

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, Hawai`i

Name of Reviewer(s):

Annie Marshall, Fish and Wildlife Biologist, (PIFWO)
Marie Bruegmann, Recovery Plant 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 March 6, 2013. The review was based on a review of current, available information since the last 5-year review for the Hawaiian Duck (USFWS 2009) as well as information from the revised recovery plan (USFWS 2011) and updates obtained from researchers currently working on this species. The evaluation, coordinated by Annie Marshall, Fish and Wildlife Biologist, was reviewed by the Recovery Plant Coordinator before submission to the Field Supervisor for approval.

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 (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the Recovery Plan for Hawaiian Waterbirds, Second Revision (USFWS 2011) and the previous 5-year review for the koloa maoli or Hawaiian Duck published on July 31, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2535.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 Hawaiian Duck as endangered.

The Hawaiian Duck, typically referred to as koloa, is endangered and although it is still said to occur statewide, genetic information indicates that, except on Kauai, most of the koloa seen are actually koloa-mallard hybrids (USFWS 2011) due to hybridization with

feral mallards (*Anas platyrhynchos*). The current status for the koloa is provided in Table 1 below. Threats to the species continue, including hybridization.

New status information:

- There are still believed to be less than 2,000 pure koloa remaining statewide, and that most of these occur on Kauai, although more recent observations suggest that there are koloa-mallard hybrids on Kauai as well (USFWS 2011).
- New DNA evidence indicates that the koloa is descended from an ancient hybridization event between the mallard and the Laysan duck (*Anas laysanensis*) (Lavretsky *et al*. 2015).
- A recent study on koloa behavior determined that social activities occurred more frequently in managed wetlands for waterbirds than in taro cultivated wetlands while resting was more common in taro cultivated wetlands (Malachowski 2013). Overall, the study suggested that both managed and cultivated wetlands may play an important role in fulfilling fundamental daily and seasonal resource requirements of the koloa, although the increased range of activities and foraging tactics used in managed wetlands may indicate greater habitat diversity in the managed wetlands (Malachowski 2013).

New threats:

- There are no new threats known at this time. The threat of hybridization continues to be the most important issue preventing recovery of this species and is increasing (USFWS 2011).

New management actions:

- Climate change degradation of habitat – Climate change is believed to pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2015.

Synthesis:

Downlisting, and delisting objectives are provided in the recovery plan for Hawaiian waterbirds (USFWS 2011). To be downlisted, all core wetlands and at least 50 percent of supporting wetlands must be protected and managed in accordance with management practices outlined in the 2011 recovery plan, a population viability analysis (PVA) has been conducted incorporating survey data from both montane streams and lowland wetlands, to determine the population size necessary for long-term viability of the species. The statewide surveyed number of koloa has shown a stable or increasing trend and has not declined below 2,000 birds (or an alternative target based on the PVA) for at least 5 consecutive years, and there are multiple self-sustaining breeding populations,

including multiple populations present on at least Kauai/Niihau, Oahu, Maui, and Hawaii. And finally, the threat of hybridization with feral mallards must be removed from all islands.

The downlisting goals for this species have not been met (Table 1), not all threats are being managed, and some threats may be increasing, especially hybridization (Table 2). Therefore, the Hawaiian Duck meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Habitat and natural process management and restoration – Protect all core and at least 50 percent of supporting wetlands. Develop management plans for core and supporting wetlands.
- Other threat monitoring and control – Develop and implement a Statewide humane feral mallard and hybrid duck removal plan.
- Outreach and education – Conduct a public information and awareness program regarding the mallard-koloa hybridization problem and the need for a feral mallard and hybrid duck removal program. Incorporate outreach and public education efforts to generate interest in saving the koloa.
- Biosecurity legislation – Strengthen quarantine rules and regulations to restrict in-state production and commerce of mallards and closely related ducks that threaten the persistence of the koloa. Ensure new stocks of mallards and closely related ducks are not brought into the state.
- Predator / herbivore monitoring and control – Continue predator control and implement improved methods as they become available.
- Invasive plant monitoring and control – Remove nonnative, invasive plants and improve altered wetland hydrology as appropriate.
- Disease monitoring and control – Continue to monitor for botulism and if detected, implement actions to minimize the immediate threat. Research and develop new tools to prevent botulism related mortality.
- Surveys / inventories – Continue annual statewide waterbird counts. These data are not analyzed for other than basic status of the species. Directed analysis of the waterbird count data could identify correlations, including use of specific wetlands, time of year, and state of the wetlands, that could improve our ability to manage for the koloa as well as the endangered waterbirds.
- Habitat quality monitoring – Research and survey montane stream habitat for koloa. Determine the best way to accurately estimate koloa use of montane stream habitats and incorporate this methodology into the state-wide waterbird surveys.

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

Date	No. adult wild individuals	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria

			Completed?
1967 (listing)	26 counted (USFWS 1985)*	No recovery plan developed yet.	N/A
1985 (recovery plan, USFWS 1985)	184 koloa counted during 1984 winter count (USFWS 1985)*	1. Provide and maintain populations of at least 2,000 koloa in the habitats and with the island distribution existing in 1976.	No
		2. The preservation and enhancement of primary habitat areas on all islands indicate the species' habitats have become legally secure and their populations become self-sustaining.	No
		3. The annual winter and midsummer population censuses indicate these populations are maintaining their minimum numbers, as stated in the primary objective of the recovery plan, for 3 consecutive years.	No
2009 (5-year review)	<2,200 pure Hawaiian Ducks (Engilis *et al*. 2002)	1. Provide and maintain populations of at least 2,000 koloa in the habitats and with the island distribution existing in 1976.	No
		2. The preservation and enhancement of primary habitat areas on all islands indicate the species' habitats have become legally secure and their populations become self-sustaining.	No
		3. The annual winter and midsummer population censuses indicate these populations are maintaining their minimum numbers, as stated in the primary objective of the recovery plan, for 3 consecutive years..	No
2011 (recovery plan, second revision)	<2,200 pure Hawaiian Ducks (Engilis *et* al. 2002)	1. All core wetlands are protected and managed in accordance with management practices outlined in recovery plan.	No
		2. At least 50 percent of all supporting wetlands are protected and managed in accordance with management practices outlined in recovery plan.	No
		3. A population viability analysis (PVA) has been conducted incorporating survey data from both montane streams and lowland wetlands, to determine the population size necessary for long-term viability of the species. The statewide surveyed number of Hawaiian Ducks has shown a stable or increasing trend and has not declined below 2,000 birds (or an alternative target based on the PVA) for at least 5 consecutive years.	No
		4. There are multiple self-sustaining	No

		breeding populations, including multiple populations present on at least Kaua`i/Ni`ihau, O`ahu, Maui, and Hawai`i.	
		5. The threat of hybridization with feral Mallards is removed from all islands.	No
2015 (5-yr review)	<2,200 pure Hawaiian Ducks (Engilis *et* al. 2002)	1. All core wetlands are protected and managed in accordance with management practices outlined in recovery plan.	No
		2. At least 50 percent of all supporting wetlands are protected and managed in accordance with management practices outlined in recovery plan.	No
		3. A population viability analysis (PVA) has been conducted incorporating survey data from both montane streams and lowland wetlands, to determine the population size necessary for long-term viability of the species. The statewide surveyed number of Hawaiian Ducks has shown a stable or increasing trend and has not declined below 2,000 birds (or an alternative target based on the PVA) for at least 5 consecutive years.	No
		4. There are multiple self-sustaining breeding populations, including multiple populations present on at least Kaua`i/Ni`ihau, O`ahu, Maui, and Hawai`i.	No
		5. The threat of hybridization with feral Mallards is removed from all islands.	No

Table 2. Threats to the Hawaiian Duck and ongoing conservation efforts.

Threat	**Listing factor**	**Current Status**	**Conservation/ Management Efforts**
Loss and degradation of wetland habitat	A	Ongoing	Partial: Restoration efforts in place for some wetlands
Alteration of hydrology	A	Ongoing	Partial: Restoration efforts in place for some wetlands
Invasion of habitat by non-native plants	A	Ongoing	Partial: Restoration efforts in place for some wetlands
Alien predators	C	Ongoing	Partial: Predator control measures in place for some wetlands
Avian Disease	C	Ongoing	Partial: Monitoring of wetland areas and removal of carcasses for botulism outbreaks
Hybridization	E	Ongoing	Partial: Some education efforts being implemented. Efforts to develop key to distinguish between hybrids and koloa. Additional sampling efforts for

			hybrids on O`ahu.
Contaminants	E	Ongoing	No
Human Disturbance	E	Ongoing	Partial: Education of personnel on islands
Small population size/genetic diversity loss/stochastic vulnerability	E	Ongoing	Partial: Habitat restoration to increase population size.
Climate change and sea level rise	A, E	Increasing	No

*Census data from annual Hawaiian Waterbird Count reflects only lowland wetland habitats for koloa (USFWS 1985).

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references not listed in that document are provided below.

Lavretsky, P. A. Engilis, Jr., J.M. Easide, and J.L. Peters. 2015. Genetic admixture supports an ancient hybrid origin of the endangered Hawaiian Duck. Journal of Evolutionary Biology 28: 1005-1015.

Malachowski, C.P. 2013. Hawaiian Duck (*Anas wyvilliana*) behavior and response to wetland habitat management at Hanalei National Wildlife Refige on Kaua`i. Thesis, Oregon State University. 89 pp.

U.S. Fish and Wildlife Service. 1985. Recovery plan for the Hawaiian waterbirds. U.S. Fish and Wildlife Service, Portland, Oregon. 99 pages.

U.S. Fish and Wildlife Service. 2011. Recovery plan for Hawaiian waterbirds, second revision. U.S. Fish and Wildlife Service, Portland, Oregon. xx + 233 pages.

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.

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U.S. FISH AND WILDLIFE SERVICE
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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

Appropriate Listing/Reclassification Priority Number, if applicable:_____

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

Maine M Bluegmann Date 2015-07-23