5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Chasiempis sandwichensis ibidis* (O‘ahu ‘elepaio)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

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

Name of Reviewer(s):

Jason Chow, Biological Intern, PIFWO
Aaron Nadig, Vertebrate Recovery Biologist, PIFWO
Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team Manager, PIFWO
Megan Laut, Vertebrate Recovery Coordinator PIFWO
Marie Bruegmann, Acting Recovery Program Lead, 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 October 24, 2010. The review was based on a review of current, available information since the last 5-year review for *Chasiempis sandwichensis ibidis* (USFWS 2009). The evaluation of Jason Chow, Biological Intern was reviewed by the Vertebrate Recovery Biologist, Island Team Manager, Vertebrate Recovery Coordinator, and Acting Recovery Program Lead. 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 (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the previous 5-year review for *Chasiempis sandwichensis ibidis* published on July 31, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2539.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 *C. sandwichensis ibidis*.

The O‘ahu ‘elepaio is a small monarch flycatcher found only on the island of Oahu. The current status and trends for *Cyanea koolauensis* are provided in the tables below.

New status information:

- Over the past five years, the overall trend of O‘ahu ‘elepaio in the Oahu Army Natural Resource Program (OANRP) recovery area is increasing (Table 1). This could be due to effective predator and disease control. Over the past 40 years, the geographic range of O‘ahu ‘elepaio has declined by about 75 percent, and since the last five-year review (USFWS 2009) has declined from 5,451 hectares (13,464 acres) to 5,187 hectares (12,817 acres) from 2011 to 2012. O‘ahu ‘elepaio have continued to decline in Waikane, Kahana, and Waiahole Valleys; however, they were rediscovered in Waimano and Waimalu Valley. In the Waianae Mountains, the O‘ahu ‘elepaio range declined by 50 percent from 1975 to the 1990s, and has continued to decline at the same rate (VanderWerf *et al.* 2013).

Table 1. Abunance of *Chasiempis sandwichensis ibidis* in OANRP recovery areas: Schofield Barracks Military Reservation, Ekahanui Gulch in Honouliuli Forest Reserve, Moanalua Valley, and Palehua.

	2012	2011	2010	2009	2008
Single	46	39	19	24	19
Pairs	137	124	94	101	71
Fledglings	65	97	39	57	37
Total	385	384	246	283	198

New threats:
Avian malaria and pox - Although the survival of O‘ahu ‘elepaio with pox-like lesions is 4 to 10 percent lower than survival of O‘ahu ‘elepaio with no pox symptoms, the difference is small enough to support the idea that O‘ahu ‘elepaio are building an immunity to avian poxvirus. The threat of the avian poxvirus on O‘ahu ‘elepaio is declining; however, monitoring is still necessary to ensure that O‘ahu ‘elepaio in fact are building immunity to the virus (VanderWerf 2009).

New management actions:

- Predator / herbivore control:
    - In 2009, tests on rodent control proved that survival of females were higher with rodent control than without. Rodent control also affected fecundity, with a higher annual fecundity and higher nest success (VanderWerf 2009).
    - In a 16 year study by VanderWerf, the height of O‘ahu ‘elepaio nests in trees increased 50 percent, from 7.9 to 12.0 meters (25.9 to 39.4 feet). This is due to the predation heights of the black rat (*Rattus rattus*) occurring to a maximum height of 7.4 meters (24.3 feet). Most O‘ahu ‘elepaio nests are higher than 7.4 meters (24.3 feet) to avoid predation. Nests less than 3 meters (9.8 feet) off the ground produced offspring less frequently, while higher nests had an increased success over time. This suggests that nest-building behavior has evolved through natural selection by predation. It is not yet known if the black rat will change its hunt

strategies and move to greater heights (VanderWerf 2012). OANRP staff currently conduct a majority of the recovery efforts for O‘ahu ‘elepaio. OANRP is required to monitor a minimum of 75 O‘ahu ‘elepaio pairs, with a majority of those pairs being of the Schofield Barracks West Range. Currently, OANRP conducts monitoring and predator control at Schofield Barracks Military Reservation, Ekahanui Gulch in Honouliuli Forest Reserve, Moanalua Valley, and Palehua. They are not currently working in Makaha Valley and Waikane Valley (US Army Garrison 2012). In a recent population survey done by VanderWerf and others, it was found that populations increased in some areas where no rodent control was taking place. They concluded that this could be due to a change in O‘ahu ‘elepaio nesting behavior (VanderWerf et al. 2013).

- Population viability monitoring - Reduction in fledgling success from 2011 to 2012 (Table 2) may have been a result of the late onset of winter weather, thus a late start of the breeding season (one month late). There were also heavy rainstorms in March 2012 which resulted in nest failures and high mosquito populations (US Army Garrison 2012).

Table 2. Summary of rodent managed O‘ahu ‘elepaio pairs done by OANRP from 2008-2012 (US Army Garrison 2012).

Year	Managed Pairs	Success Active Nests	Family Groups	Fledglings
2012	97	38	22	65
2011	94	47	34	96
2010	87	18	15	39
2009	81	29	24	60
2008	74	25	20	56

Synthesis:
According to the recovery plan (USFWS 2006), viable populations must exist in Waikane/Kahana, Southern Koolau Mountains, Southern Waianae Mountains, Schofield Barracks West Range, and Makaha/Waianae Kai recovery areas. The recovery areas of Waikane/Kahana, Southern Koolau Mountains, and Makaha/Waianae Kai are not being managed or monitored. It is not known if there are any populations in those areas.

The downlisting goals for this species have not been met (Table 3), since the number of individuals in each isolated population have not been stable or increasing for 15 years. Little is known on the status of O‘ahu ‘elepaio outside of the OANRP recovery areas. Threats have been identified, but have not yet been adequately controlled (Table 4). Therefore, *Chasiempis sandwichensis ibidis* 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 - Protecting remaining forest habitat on Oahu is fundamental to the survival and recovery of the O‘ahu ‘elepaio. Although O‘ahu ‘elepaio are adaptable, they are forest birds and require some form of forest in which to forage and nest. Suitable habitat for recovery of O‘ahu ‘elepaio includes wet, mesic, and dry forest consisting of native and/or introduced plant species, but higher population density can be expected in closed canopy riparian forest with a continuous canopy and dense understory.
- Predator / herbivore control - Control rodents over a larger areas. Rodent control programs should be continued and expanded by whatever methods are available. Ground-based methods of rodent control using snap traps and diphacinone bait stations have been effective on a small scale, but are labor intensive. Recovery of the O‘ahu ‘elepaio likely will require large-scale rat control, which can be achieved more efficiently through aerial broadcast methods. Alternatively, a strategy of constructing predator proof fencing around areas with a high density of O‘ahu ‘elepaio nests could be developed although costs maybe unfeasible at this time.
- Threats research - No areas of Oahu are of sufficient elevation to be free from disease carrying mosquitoes, and all populations of O‘ahu ‘elepaio appear to be affected by disease. Reducing mosquito numbers by removing breeding sites or treating them with larvicides would be extremely difficult due to the abundance of breeding sites. The best long-term method of reducing the threat from disease may be to investigate disease resistance or tolerance and its genetic basis. If disease-resistant or tolerant birds can be identified, translocation or captive propagation and release of these birds might help populations recover more quickly and perhaps obviate the need to control mosquitoes. Controlling rodents also may lessen the threat from disease by providing birds that have greater natural immunity a greater chance of reproducing, thereby increasing the proportion of resistant birds more quickly).
- Population viability monitoring - To determine whether the overall recovery strategy is effective and whether the recovery criteria have been met, it will be necessary to conduct range-wide population surveys and monitor demography of populations. Standard survey routes should be established to determine distribution and measure population density. Surveys should be conducted at least once every five years to address whether the recovery criteria have been met, and annually if possible to more closely examine population trends and assess efficacy of management actions. Demographic monitoring will require mist-netting, banding, and resighting of birds to measure survival rate, nest searching to measure reproductive success, and data analysis. Setting a goal of demographic persistence highlights the need for monitoring and helps ensure that threats have been adequately managed and population increases are not transient. Surveys should also be conducted in the recovery areas of Waikane/Kahana, Southern Koolau Mountains, and Makaha/Waianae Kai to determine if there are any populations of ‘elepaio in those areas.
- Captive propagation for genetic storage and reintroduction - Captive propagation and release of O‘ahu ‘elepaio are not necessary for recovery at this time because the number of O‘ahu ‘elepaio remaining in the wild is relatively large and

recovery can be achieved more cost-effectively through habitat management. Moreover, the threats that caused the decline of O‘ahu ‘elepaio have not been corrected in most areas, and no suitable release sites are currently available. Captive propagation and/or rear and release of O‘ahu ‘elepaio may become necessary in the future if habitat management alone proves insufficient to allow recovery, and would be especially valuable if genetically disease-resistant birds can be identified for use as breeding stock.

- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.

Table 3. Status and trends of *Chasiempis sandwichensis ibidis* from listing through current 5-year review.

Date	**Estimated Number**	**Downlisting Criteria identified in Recovery Plan**	**Downlisting Criteria Completed?**
2000 (listing)	1,980	Identification of recovery areas	No
		Protection of recovery areas and remaining forest from development and fire	No
		Control of alien nest predators, especially rats	Partially
		Research on disease resistance and transmission	No
		Captive propagation	No
		Stable or increasing populations over a period of 15 years	No
2001 (critical habitat)	1,980	Identification of recovery areas	Partially
		Protection of recovery areas and remaining forest from development and fire	Partially
		Control of alien nest predators, especially rats	Partially
		Research on disease resistance and transmission	No
		Captive propagation	No
		Stable or increasing populations over a period of 15 years	No
2006 (recovery plan)	unknown	Identification of recovery areas	Yes
		Protection of recovery areas and remaining forest from development	Partially

Date	Estimated Number	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
		and fire	
		Control of alien nest predators, especially rats	Partially
		Research on disease resistance and transmission	Partially
		Captive propagation	No
		Stable or increasing populations over a period of 15 years	No
2009 (5-yr review)	unknown	Protection of recovery areas and remaining forest from development and fire	Partially
		Control of alien nest predators, especially rats	Partially
		Research on disease resistance and transmission	Partially
		Captive propagation	No
		Stable or increasing populations over a period of 15 years	No
2013 (5-yr review)	1,261	Protection of recovery areas and remaining forest from development and fire	Partially
		Control of alien nest predators, especially rats	Partially
		Research on disease resistance and transmission	Partially
		Captive propagation	No
		Stable or increasing populations over a period of 15 years	No

Table 4. Status of threats to *Chasiempis sandwichensis ibidis* from listing through current 5-year review.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Rodents – predation	C	Ongoing	Partially; OANRP recovery sites have rodent control
Avian malaria – disease	A, E	Ongoing	Partially; some individuals have shown resistance to the disease
Habitat protection	A, E	Ongoing	Partially; recovery areas are established and being monitored

Climate change	A, E	Increasing	None

References:
See previous 5-year review for a full list of references. Only references for new information are provided below.

U.S. Army Garrison, Hawaii. 2012. 2012 status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 232 pages + appendices. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2012_YER/2012_YER_edited.pdf.

[USFWS] U.S. Fish and Wildlife Service. 2006. Revised recovery plan for Hawaiian Forest Birds. U.S. Fish and Wildlife Service, Portland, Oregon. 622 pages.

[USFWS] U.S. Fish and Wildlife Service. 2009. *Chasiempis sandwichensis ibidis* (Oahu Elepaio) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu. 16 pages. Available at http://ecos.fws.gov/docs/five_year_review/doc2539.pdf.

VanderWerf, E.A. 2009. Importance of nest predation by alien rodents and avian poxvirus in conservation of Oahu elepaio. The Journal of Wildlife Management 73:737-746.

VanderWerf, E.A. 2012. Evolution of nesting height in an endangered Hawaiian forestbird in response to a non-native predator. Conservation Biology 26:905-911.

VanderWerf, E.A, M.T. Lohr, A.J. Titmus, , P.E. Taylor, M.D. Burt. 2013. Current distribution and abundance of the O‘ahu ‘elepaio (*Chasiempis ibidis*). The Wilson Journal of Ornithology 125(3):600-608.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Chasiempis sandwichensis ibidis*
(O'ahu 'elepaio)

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

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Date 2013-08-08