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TE-146777, 2009 Annual Report
Permittee: Arleone Dibben-Young

Monitoring avian botulism (*Clostridium botulinum* Type C) outbreaks at the County of Maui's Ohiapilo Pond Bird Sanctuary and Kaunakakai Wastewater Reclamation Facility, Molokai, Hawaii, and recovery of Hawaiian Stilt (*Himantopus mexicanus knudseni*) and Hawaiian Coot (*Fulica alai*) following rehabilitation from botulism

Introduction

When the County of Maui closed its Kalamaula Landfill in 1993, it was discovered that the operations had extended into wetlands. The Environmental Protection Agency (1994) ordered mitigation enhancement of wetlands adjacent to the landfill as viable and permanent habitat for the Hawaiian Stilt (*Himantopus mexicanus knudseni*) and Hawaiian Coot (*Fulica alai*), both endangered species, and migratory waterbirds (Brown & Caldwell 1997). The Ohiapilo Pond Bird Sanctuary (9.82 hectares) was completed in November 1999, and was designed to allow the wetland to dry completely during summer months. In April 2003, the first suspected avian botulism outbreak occurred when the water level fell and caused an unexpected die-off of unintentionally introduced fish. Bird carcasses and maggots collected from fish during subsequent botulism outbreaks tested positive for *Clostridium botulinum* Type C. The factors leading to the outbreaks are being studied as recommended in the U.S. Fish and Wildlife Service Recovery Plan for Hawaiian Waterbirds Second Draft of Second Revision (2005), which discusses avian botulism under Reasons for Decline and Current Threats, and recommends Ohiapilo Pond as one of the sites where research into the disease "… might reveal patterns that could be used to avoid environmental conditions that lead to outbreaks." In 2009, the EPA (2009) recommended the filling of the manmade canal, which acts as a reservoir for year-round tilapia reproduction, as when completed, will eliminate habitat for fish and reduce the likelihood of future avian botulism outbreaks due to fish die-offs.

Methodology

This study uses banding/auxiliary marking to 1) determine connectivity of Molokai's coastal wetlands by visually tracking marked bird movements, 2) will improve management of avian botulism outbreaks at Ohiapilo Pond Bird Sanctuary, the Kaunakakai Wastewater Reclamation Facility, and other nearby coastal wetlands, 3) and monitor birds recovered from botulism.

In 2009, eighteen Hawaiian Coots were banded and auxiliary marked with a neck collars, and fourteen Hawaiian Stilts were banded and colored leg bands applied. No injuries or deaths occurred, although a Hawaiian Stilt banded in 2008 died from a leg injury that was not banding-related.

Hawaiian Coot Neck Collar Research

In 2007, six neck collar designs with 7/8" ID were tested for six months on a non-releasable Hawaiian Coot held under USFWS Permit 12275-0 prior to the use of the neck

collars on wild birds. Other than mild feather wear, no adverse physical or behavioral effects were observed. Post-banding monitoring of collared birds demonstrated they could easily place the lower mandible under the collar while preening and remove the bill without difficulty.

At the onset of the study it was believed that one size of neck collars would fit all Hawaiian Coot. This assumption proved wrong when several large males were encountered, thus, two larger collar sizes were made: the 1” ID was used successfully and the 1-1/8” ID collars discarded as over-sized and too easily removed over the head.

During the second year of the study it was thought that the neck diameter of a molting coot was reduced, thus, it was advised that a neck band not be placed on a bird in molt to avoid placement of a collar size that could be too small. After additional birds were banded this supposition was determined to be incorrect when mass was found to fluctuate throughout the year (Table A) and minimally influence collar size.

A neck gauge (similar to a banding leg gauge) was made of 3/8”-thick brass sheet metal, but reliable measurements could not be obtained due to trachea diameter, neck flexibility and skin folds, so the device was scraped.

Hawaiian Coot 1116-25104			***Hawaiian Coot 1116-25111***		
12/27/2007	*565*		*1/13/2008*	*495*	
2/15/2008	*545*		*7/18/2008*	*475*	
11/16/2008	*690*		*11/16/2008*	*480*	
7/18/2009	*620*		*3/27/2009*	*452*	
10/21/2009	*549*	*Molting*	*6/15/2009*	*495*	*Molting*
11/10/2009	*585*		*10/21/2009*	*489*	
			11/10/2009	*485*	
			12/11/2009	*474*	
Hawaiian Coot 1136-00488			***Hawaiian Coot 1136-00492***		
7/18/2008	*555*		*11/16/2008*	*608*	
11/28/2009	*435*		*7/18/2009*	*550*	
7/19/2009	*475*		*10/21/2009*	*539*	
10/21/2009	*469*		*11/10/2009*	*535*	
12/11/2009	*409*		*12/11/2009*	*549*	

Table A
Mass fluctuation

To date, a 2” length of 7/16” diameter wood dowel pushed between the neck and collar (Photo, left) has been the best means to determine which of the two collar sizes will fit correctly and provide room for weight fluctuations and swallowing of large food items. The current protocol is if the dowel fits snugly when a 7/8” ID collar is used, then the collar is the correct size. However, if the dowel must be forced into the space between the collar and neck when fitted with a 7/8” ID collar, then a 1” collar is used. A Hawaiian Coot banded and collared in 2007, which had initially received a 7/8” ID collar (removed 2/15/2008 as possibly fitting too snug) was recollared 7/18/09 with a 1” ID design. The larger collar was a better fit, but was lost within a few weeks. The bird was recaptured 10/21/09 and fitted with colored leg bands. A 1” collar was found to fit comfortably on an 839 gram male.

Feather wear due to the neck collar use is mild and no skin irritation or inflammation has been observed. Recaptured birds with the condition are photo-documented (left).

Hawaiian Coot Movements

Although marked Hawaiian Coots were observed at Ohiapilo Pond Bird Sanctuary and the Maunaloa Wastewater Treatment Plant, the majority of the 885 observations of marked birds on the island of Molokai in 2009 were at the Kaunakakai Wastewater Reclamation Facility. The rock rubble berm (Photo below, Randi Rhodes baiting two walk-in traps on berm) separating the two settling ponds enables viewing of collared and color-banded birds while loafing.

On three occasions (9/28/09, 10/4/09, and 10/22/09) the band (108670789) was read with a Questar telescope on a Hawaiian Coot banded by S. Fretz on 12/24/08 at James Campbell NWR on Oahu. Two other Oahu-banded Hawaiian Coot were observed loafing together on 9/25/09, and a third Oahu-banded bird was seen on 9/28/09. At least two Maui-banded birds were sighted: a white shield coot on 9/25/09 and 10/29/09, and a red-shield coot on 9/25/09, 9/28/09, 10/8/09, 10/10/09, and 10/15/09. Three Hawaiian Coots banded and marked on Molokai were observed at Kealia Pond NWR on 14 January 2009 by the permittee. A collared coot was reported by a Molokai resident crossing the Maunaloa Highway on foot on the Kaunakakai Stream bridge on 12/20/09.

Pododermatitis (Bumblefoot)

Pododermatitis, an inflammatory and degenerative condition of the avian foot commonly known as bumblefoot, has been noted on a number of birds at the Kaunakakai Wastewater Reclamation Facility when handled during banding activities. Of the 30 after hatch year Hawaiian Coot banded during the past three-years, thirteen, or 43%, were inflicted with bumblefoot when banded, thus it is suspected to be a chronic condition of resident birds at the facility (Photos below). A standard bolt and screw gauge is used to measure ulcerations (Photo right, small 5/16” ulceration).

Molt: Timing and duration

Data collected by multiple recaptures of marked birds will facilitate determining timing of molt and duration of flightlessness (Photos below), however more data is needed for analysis.

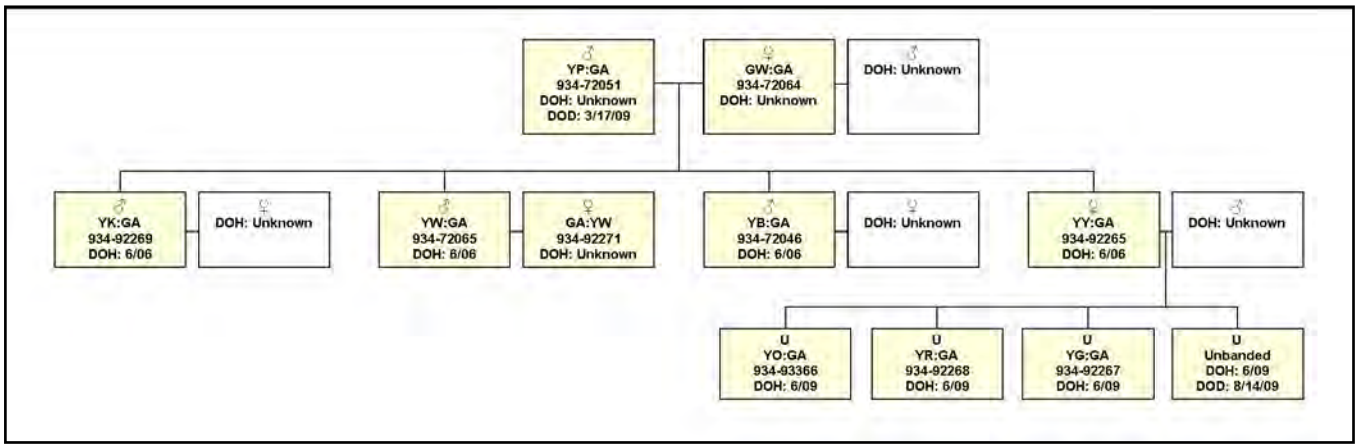
Birds in molt are easily visible at the Kaunakakai Wastewater Reclamation Facility. When the settling ponds are approached the coots typically fly from the south pond over the top of the berm to land in the north pond: Birds in molt swim to the berm and tend to flap their wings as they walk across.

Hawaiian Stilt Movements

Banded Hawaiian Stilts were observed on Molokai island 634 times during 2009, including four birds banded by M. Nishimoto at Kealia Pond NWR, Maui. Of special interest is RG:AK, an adult male recovered from botulism at Kealia Pond NWR, banded and released on 11/21/2003 following rehabilitation, observed 5/4/09 at Ohiapilo Pond and 7/31/09 at the Kaunakakai Wastewater Reclamation Facility. YB:KA banded in 6/4/2004 was observed 4/10/09 at Ohiapilo Pond. YK:AK banded 6/3/2008 was present at Ohiapilo Pond 10/8-12/30/09, and observed with YB:AK 12/28 -12/30/09, banded at Kealia Pond NWR on the same day. At least one stilt banded sometime during 1999-2000 at Kanaha Pond State Wildlife Sanctuary by F. Duvall with a metal band only (A-:--, adult male) was observed at the Kaunakakai wastewater facility on 7/3/09, and either the same or a different bird(s) (A-:--, adult male) at the Kualapuu Wastewater Treatment Plant on 8/19/09 and at Palaauwai on 9/17/09.

Three generations of Hawaiian Stilt have now been captured in the Puuhala walk-in trapping site (Table B) and color-banded.

Table B.
Three generations of banded Hawaiian Stilts



Molokai Censuses

Molokai sites known to be frequented by Hawaiian Coot and Hawaiian Stilt were censused from January 1 – December 31, 2009, and include Kamahuehue Pond mudflats, Kauanui (Molokai Sea Farms aquaculture prawn farm), Kaunakakai Stream, Kaunakakai Wastewater Reclamation Facility, Kawela Plantation Unit III catchment ponds, Koheo Wetland, Kualapuu Reservoir, Kualapuu Wastewater Treatment Plant, Maunaloa Wastewater Treatment Plant , Ohiapilo Pond Bird Sanctuary, Palaauwai (Molokai Sea Farms aquaculture shrimp farm), and Puuhala.

Sincerely,

Arleone Dibben-Young

Literature Cited

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