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**Paiko Lagoon State Wildlife Sanctuary**

**Waterbird Report, 2019**

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## Introduction

Paiko Lagoon State Wildlife Sanctuary is a coastal wetland located on the south shore of Oahu, Hawaii. This wetland was established as a sanctuary in 1974. Historically, Paiko Lagoon was part of a large network of coastal estuary wetlands in East Honolulu, which created an interface between the Koolau Range and Maunalua Bay. Today Paiko Lagoon is the only extant wetland within the Maunalua Bay coastal environment. Various migratory shorebirds and waterbirds use this wetland including the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*). Paiko Lagoon is managed to increase endangered waterbird abundances and provide habitat for migratory birds.

## Methods

**Survey.**—A census technique was employed to count all waterbirds present using the direct count method. Waterbird surveys were conducted using consistent observation points to maintain consistency amongst different observers. When conducting waterbird surveys observers survey the man-made Pond area to the east of the gate entrance (Figure 1). Next, the lagoon was surveyed by observing birds in between the sandbar and peninsula (usually mudflat). The sandbar and lagoon area are counted next by walking as far west as possible on the piece of land that juts toward the lagoon from the inside most projection.

On each visit, overall wetland condition (i.e., water level, vegetation cover, human impact, and shoreline condition) and weather (i.e., rainfall, wind speed, and cloud cover) were recorded for each basin or pond. Chicks and fledglings were recorded separately for each of the endangered wetland birds and all banding information observed was recorded.

**Habitat Use.**—Microhabitat was assessed for all the endangered birds encountered.

Microhabitat was identified as: *open mudflat*, *vegetation*, *0–3" water*, *3–6" water* and *>6" water*. Specific nesting activities measured include: pairing, territory, and survival rates of chicks to fledgling stage. *Open mudflat* is defined as exposed or bare soil with no emergent vegetation; *vegetation* is emergent vegetation with small pockets of mudflat or water present; *0–3" water* is water no deeper than the tarsal-tibiotarsal joint (i.e., joint visible) for stilts and walking in water for coots and gallinules; *3–6" water* is deeper than the tarsal-tibiotarsal joint (i.e., joint not visible) for stilts and swimming for coots and gallinules; and *>6" water* is such that no part of the leg is visible in stilts, for coots and gallinules depth of water must be estimated by reading the nearest water gauge.

**Fledging success.**—Each endangered waterbird's fledging success was measured using this formula: (# of observed fledglings/# of observed chicks) x 100 = % fledging success.



Figure 1. Map of Pond and Lagoon at Paiko Lagoon State Wildlife Sanctuary on Oahu, Hawaii. The solid yellow dot marks the start of the survey and follows along the yellow dotted line and ends at the yellow x.

## Results

A total of 35 waterbird surveys were conducted in Paiko Lagoon State Wildlife Sanctuary in 2019. Mean abundances (range) in 2019 for Hawaiian stilt were 3.1 (0–11) individuals (Figure 2). Waterbird diversity ranged from 2–6 species in Paiko Lagoon reaching the maximum in April and September.

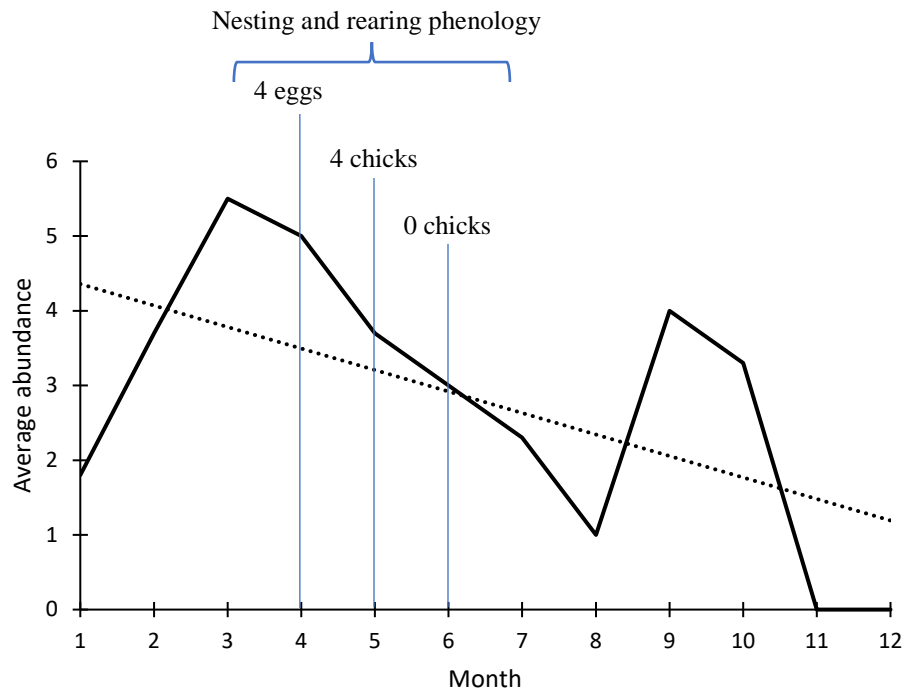


Figure 2. Average stilt abundance by month in 2019 at Paiko Lagoon State Wildlife Sanctuary on Oahu, Hawaii. The dotted line is the trendline for the monthly average stilt abundance in 2019. The blue lines indicate the nesting and rearing phenology of egg laying, chick hatching, and chick mortality.

Stilts were observed more commonly in the lagoon section of the sanctuary (average 2.4 stilts per survey) when compared with the pond area (average 1.9 stilts per survey; Figure 3).

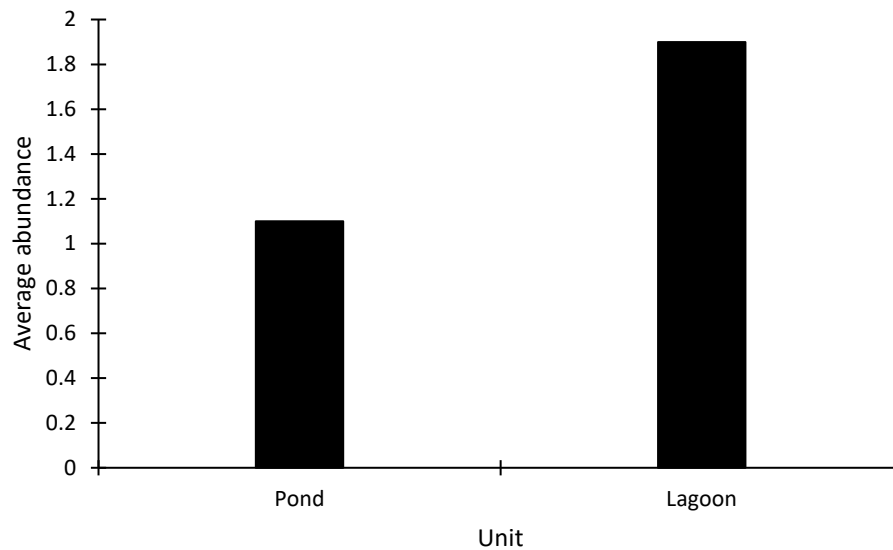


Figure 3. Average abundance of stilts in the Pond and Lagoon units at Paiko Lagoon State Wildlife Sanctuary on Oahu, Hawaii.

The Hawaiian Stilt was found in open mudflat and 0–3” water in 93% of the observations (Figure 4).

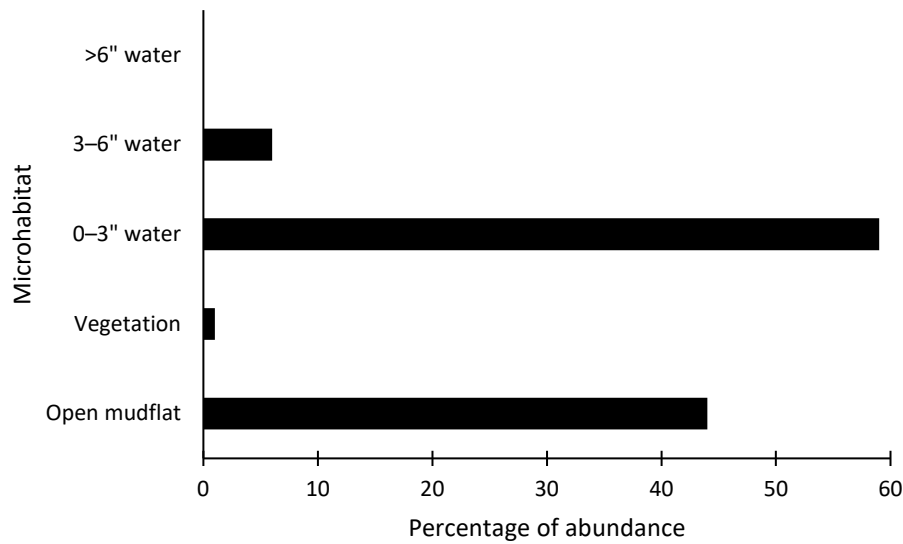


Figure 4. Proportion of stilts in five microhabitats found within Paiko Lagoon State Wildlife Sanctuary on Oahu, Hawaii.

Paiko Lagoon supported one stilt nest in 2019 and was 100% successful. The stilts laid 4 eggs and 4 chicks hatched. Fledging success was 0% as all 4 chicks perished within 30 days.

No predator control efforts were conducted in Paiko Lagoon State Wildlife Sanctuary in 2019.

In 2019 vegetation surrounding the pond was removed including the vegetation between the ocean and the pond.

## Discussion

Hawaiian stilt abundances were highest right before the nesting season and lowest in November and December (0). The stilt population at Paiko Lagoon in 2019 declined as the year progressed.

The stilts had a higher average abundance in the Lagoon than in the Pond. This is best explained by the consistent habitat available in the Lagoon through daily tidal fluctuations as opposed to the inconsistency of water availability inside the Pond. During periods of low rainfall, the Pond remains dry and offers little foraging habitat for the stilt.

Stilts preferred open mudflat and 0-3" water. The Lagoon provides both those microhabitat types throughout the year, whereas the pond provides those microhabitats seasonally during periods of heavy rainfall.

A pair of stilts successfully nested and reared 4 offspring in 2018. The same pair of stilts successfully incubated 4 eggs with all 4 chicks seen on May 10. Every survey (3 surveys) after that sighted only one chick until on June 12 no chicks were observed. In previous years, no observed success was documented. For 2020, the most important information will center around

the stilts and any nesting attempts. In the future, it would be interesting to observe if the 2018 stilt offspring attempt to nest in the sanctuary.