

**Shorebird, Seabird and Waterbird Inventory
of
Pu`ukoholā Heiau
National Historical Site**

Sept. 2003-May 2004



Prepared for Ducks Unlimited Inc.

By

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and

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ABSTRACT

The objective of this inventory was to document avian species diversity and relative abundance along prescribed shoreline and wetland route within Pu`ukoholā National Historic Site (PUHE). The study site of PUHE was divided into four study areas: Administration, Midlands, Pond, and Shore. Three species of shorebirds were observed during the surveys: Sanderling (*Calidris alba*), Wandering Tattler (*Heteroscelus incanus*), Pacific Golden-Plover (*Pluvialis fulva*), and one waterbird, the Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*). The Black-crowned Night-Heron was the most commonly observed bird of these surveys.

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INTRODUCTION

Pu`ukoholā Heiau National Historic Site (PUHE) is a cultural preserve consisting of 34.80 hectares along the coast in the south Kohala district on the island of Hawai`i (Figure 1). PUHE consists mostly of non-native vegetation and rocky shoreline. There is high human impact at PUHE with Kawaihae Harbor to the north and Spencer State Park to the south of the park. The following report documents the results from the avian surveys conducted at PUHE from September 2003 to May 2004.

METHODS

The visitor center was the starting point for the walk through surveys (UTM 204944N 2216893E). The surveys followed a prescribed route from the visitor center down through the park, around the riparian pond and stream area, along the shoreline and terminated back at the visitor center (Figure 2). The route was approximately 1.75 kilometers long. Four study areas were set up within the park: Administration, Midlands, Pond, and Shore (Figure 2).

The Purpose of this survey was to document indigenous shorebirds, waterbirds, seabirds and seasonal migrants including raptors found at PUHE. All other avian species observed along the prescribed route were documented as well. A checklist of birds for the park created from surveys conducted in 1992 and 1993 (Morin, 1996) was referred to for all other species (Table 1). No subsequent information was recorded for species other than shorebirds, waterbirds, seabirds and seasonal migrants.

Surveys were conducted on the first and third Monday of each month. The surveys conducted on the first Monday were started mid-morning and the third Monday surveys began at sunrise. The alternating start times allowed for the concurrent surveys at Pu`uhonua O Hōnaunau National Historical Park to have both a sunrise and mid-morning survey start times (Figure 1).

Observations were made with Zeiss 10 x 40 Victory binoculars, and a Canon D30 digital camera using a 100-400 image stabilized zoom lens. Wind and temperature data was collected using a Kestrel 3000 pocket weather station (Table 2).

RESULTS AND DISCUSSION

There were three species of shorebirds observed during the surveys: Sanderling (*Calidris alba*), Wandering Tattler (*Heteroscelus incanus*) and Pacific Golden-Plover (*Pluvialis fulva*). The Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*) a waterbird, was also observed during this study.

The Black-crowned Night-Heron was the most numerous and frequently observed species of interest on these surveys. An average of 2.82 Black-crowned Night-Herons was observed per survey and at least one individual was observed on all but two of the 17 surveys (88.2%) (Table 2). The highest single count for a survey (all four study areas) was six Black-crowned Night-Heron on 20 October 2003. The Pacific Golden-Plover was the second most numerous and frequently observed species of the four species observed. There was an average of 1.12

Pacific Golden-Plovers observed per survey and the species was observed 82.4% of the surveys. During the 1992 and 1993 inventories (Morin, 1996), neither the Black-crowned Night-Heron nor the Pacific-Golden Plover were observed during the formal counts; however, both were known to frequent the park at the time.

Of the four study areas, the Pond area accounted for the highest usage by the study birds. This was expected since the Pond area contains the majority foraging area utilized by shorebirds and waders.

On 4 March 2004 a Radjah Shelduck (*Tadorna radjah*) was observed in the drainage area above the pond (Exhibit 1). Noting that the home range of the Radjah Shelduck is northern Australia and New Guinea, inquiries were made to the local resorts known to have exotic avian species collections. The Kona Village Resort, approximately 30 kilometers to the south of PUHE, was found to have a collection of Radjah Shelducks. Park staff as well as Kona Village Resort personnel were notified of the sighting. Kona Village Resort staff was going to attempt to capture it if it remained at the park. There were no more sightings of the duck at the park. It is unknown if the duck returned to Kona Village Resort.

Also of note, on 5 April 2004, four Cattle Egrets (*Bubulcus ibis*) were observed 200 meters offshore, flying north (Figure 2) (Exhibit 2). Cattle Egrets are known to frequent wetlands along the coast of West Hawai`i.

Although an exact date was not recorded, park staff reported seeing two Hawaiian Stilt (*Himantopus mexicanus knudseni*) near the end of March in the shore study area near the pond.

There were no seabird observations made during any of the 17 surveys. The checklist from the 1992 and 1993 inventories (Table 1), documented 14 species other than seabirds, shorebirds or waterbirds. All species from the 1992 and 1993 checklist were observed during these surveys with the exception of the Ruddy Turnstone (*Arenaria interpres*), Rock Dove (*Columba livia*) and the Black Francolin (*Francolinus francolinus*). Five additional species observed were: Black-crowned Night-Heron, Pacific-Golden Plover, Cattle Egret, Yellow-fronted Canary (*Serinus mozambicus*) and Northern Mockingbird (*Mimus polyglottos*).

RECOMMENDATIONS

A series of protocols permitting park staff to document observations of rare, unusual, and perhaps previously undocumented species should be developed and implemented.

Bi-annual avian surveys could be coordinated to coincide with the state Division of Forestry and Wildlife summer and winter waterbird surveys. These counts are usually conducted on the third Wednesday of January and August. Both `Aimakapā pond and Kaloko Pond of Kaloko-Honokōhau National Historical Park (Figure 1) are already included in bi-annual surveys of the Kona coast. Kaloko-Honokōhau National Historical Park is the third of the three national historic parks or sites administered by the National Park Service in West Hawai`i. For the sake of consistency the surveys should use the same methods and follow the same route that was established for this inventory.

If possible, qualified staff or individuals should conduct additional surveys with special emphasis given between the months of September and May to observe and document unusual migratory birds and to document, the possible occurrence of nesting of waterbirds and shorebirds within the park.

Additional surveys would also provide an opportunity to monitor the park for invasive bird species such as the Red-vented Bulbul (*Pyconotus cafer*) and the Red-whiskered Bulbul (*Pyconotus jocosus*). Any unusual or invasive species should be reported to the state DOFAW and the United States Fish and Wildlife Service.

Efforts should be made to contain and remove any garbage from the park. All garbage containers should be of a design and maintained as not to create an attractive food source for animals. Mongooses (*Herpestes auropunctatus*) were frequently observed in all four-study areas and feral cats (*Felis catus*) were observed in Spencer State park to the south and undoubtedly enter the park. Both species can have detrimental effects on avifauna populations. Maintaining the park with as little attractants for predators may encourage nesting by various bird species including Black-crowned Night-Heron. The vegetation around the pond area would provide adequate nesting and foraging habitat for Black-crowned Night-Heron if the area is maintained with minimal disturbances.

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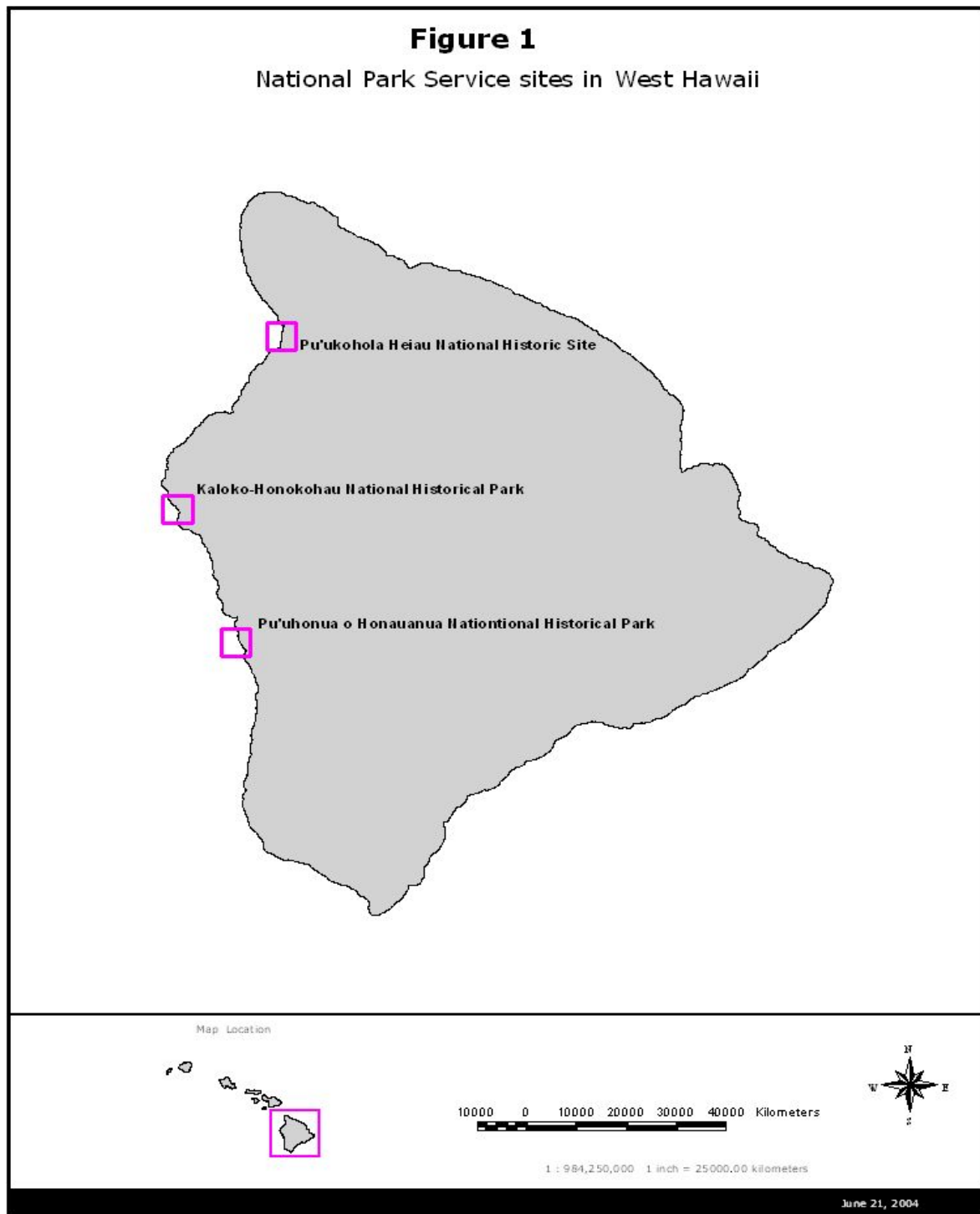
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**Map of three National historic parks and sites in West Hawai`i
Administered by the National Park Service**



Map of Pu'ukohola National Historic Site study areas, Study route, and bird sightings

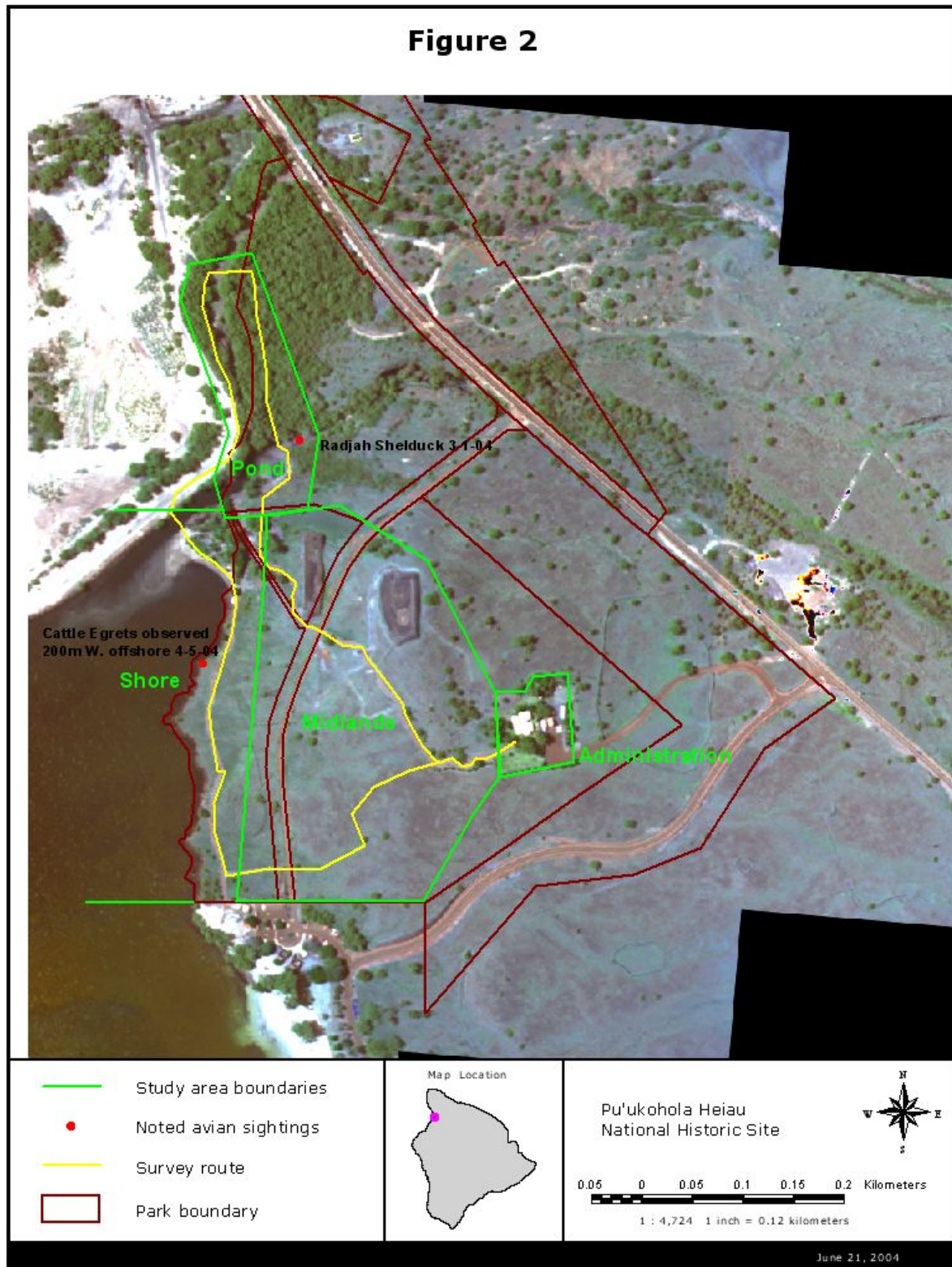


Figure 2 UTM Coordinates

The following UTM coordinates are derived from the heads up digitized study route and study boundaries of Figure 2. The aerial photograph used in Figure 2, is a multispectral image from Terrasync, taken in 1997. Accuracy of the photograph is unknown, but National Park Service staff believes the accuracy of the aerial photograph used in Figure 2 at +/- 10 meters.

Study Route start and end: 204944N 2216893E

Study Areas:

Administration: 204993N 2216869E
204989N 2216955E
204955N 2218953E
204948N 2216938E
204916N 2216938E
204922N 2216854E

Midlands: 204922N 2216854E
204916N 2216938E
204847N 2217067E
204763N 2217115E
204692N 2217112E
204662N 2216732E
204847N 2216729E

Pond: 204731N 2217121E
204744N 2217188E
204673N 2217368E
204615N 2217357E
204609N 2212325E
204652N 2217190E
204639N 2217149E
204651N 2217110E

Shore: 204651N 2217110E
204654N 2217110E
204621N 2216734E
204662N 2216734E

EXHIBIT 1 Photo of Radjah Shelduck at Pond study area



EXHIBIT 2 Photo of Cattle Egrets from Shore study area



TABLE 1
Bird Checklist of Pu`ukohola Heiau National Historic Site

	Morin 1992,1993	Waddington 2003,2004
Japanese White-eye (<i>Zosterops japonicus</i>)	X	X
Common Myna (<i>Acridotheres tristis</i>)	X	X
Zebra Dove (<i>Geopelia striata</i>)	X	X
Spotted Dove (<i>Streptopelia chinensis</i>)	X	X
Northern Cardinal (<i>Cardinalis cardinalis</i>)	X	X
Yellow-billed Cardinal (<i>Paroaria capitata</i>)	X	X
House Finch (<i>Carpodacus mexicanus</i>)	X	X
House Sparrow (<i>Passer domesticus</i>)	X	X
Warbling Silverbill (<i>Lonchura malabarica</i>)	X	X
Nutmeg Mannikin (<i>Lonchura punctulata</i>)	X	X
Saffron Finch (<i>Sicalis flaveola</i>)	X	X
Yellow-fronted Canary (<i>Serinus mozambicus</i>)		X
Ruddy Turnstone (<i>Arenaria interpres</i>)	X	
Wandering Tattler (<i>Heteroscelus incanus</i>)	X	X
Grey Francolin (<i>Francolinus pondicerianus</i>)	X	X
Pacific Golden-plover (<i>Pluvialis fulva</i>)		X
Black-crowned Night-Heron (<i>Nycticorax nycticorax hoactli</i>)		X
Northern Mockingbird (<i>Mimus polyglottos</i>)		X
Cattle Egrets (<i>Bubulcus ibis</i>)		X
Rock Dove (<i>Columba livia</i>)	X	
Black Francolin (<i>Francolinus francolinus</i>)	X	

Shorebird, Seabird, and Waterbird Inventories of Pu'ukoholā Heiau National Historic Site

TABLE 2 Survey data sheets

PUHE					
Date:	9/29/03				
Start Time:	11:15 AM				
End Time:	12:10 PM				
Temperature:	28.4c				
Cloud Cover:	20%				
Wind:	1				
Tide:	0.8 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond					4
Shore				1	
Total	0	0	1	1	4
Notes: N/A					

PUHE					
Date:	10/6/03				
Start Time:	10:10 AM				
End Time:	11:00 AM				
Temperature:	28.7c				
Cloud Cover:	20%				
Wind:	1				
Tide:	1.0 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			2		
Midlands					
Pond					4
Shore				1	
Total	0	0	2	1	4
Notes: N/A					

PUHE					
Date:	10/20/03				
Start Time:	7:10 AM				
End Time:	8:05 AM				
Temperature:	24.1c				
Cloud Cover:	95%				
Wind:	0				
Tide:	0.6 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			2		
Midlands					
Pond				1	6
Shore					
Total	0	0	2	1	6
Notes: Raining for entire survey time.					

PUHE					
Date:	11/3/03				
Start Time:	10:00 AM				
End Time:	11:00 AM				
Temperature:	28.7c				
Cloud Cover:	40%				
Wind:	2				
Tide:	1.4 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	2
Shore					
Total	0	0	1	1	2
Notes: 1 Mongoose observed at the pond.					

Shorebird, Seabird, and Waterbird Inventories of Pu'ukoholā Heiau National Historic Site

TABLE 2 (Continued)

PUHE					
Date:	11/17/03				
Start Time:	6:15 AM				
End Time:	7:10 AM				
Temperature:	23.2c				
Cloud Cover:	0%				
Wind:	0				
Tide:	1.0 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	5
Shore	1				
Total	1	0	1	1	5
Notes: N/A					

PUHE					
Date:	12/1/03				
Start Time:	9:45 AM				
End Time:	10:40 AM				
Temperature:	25.3c				
Cloud Cover:	100%				
Wind:	1				
Tide:	1.7 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	4
Shore	1			1	
Total	1	0	1	2	4
Notes: Light rain for entire survey time. 2 Mongoose observed at the pond					

PUHE					
Date:	12/15/03				
Start Time:	6:35 AM				
End Time:	7:30 AM				
Temperature:	23.3				
Cloud Cover:	10%				
Wind:	2				
Tide:	1.7 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	4
Shore				1	
Total	0	0	1	2	4
Notes: N/A					

PUHE					
Date:	1/5/04				
Start Time:	9:30 AM				
End Time:	10:15 AM				
Temperature:	25.4c				
Cloud Cover:	10%				
Wind:	1				
Tide:	0.5 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	4
Shore				1	
Total	0	0	1	2	4
Notes: N/A					

Shorebird, Seabird, and Waterbird Inventories of Pu'ukoholā Heiau National Historic Site

TABLE 2 (Continued)

PUHE					
Date:	1/19/04				
Start Time:	6:50 AM				
End Time:	7:45 AM				
Temperature:	20.7c				
Cloud Cover:	10%				
Wind:	0				
Tide:	1.0 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond			1		3
Shore			1		
Total	0	0	3	0	3
Notes: N/A					

PUHE					
Date:	2/2/04				
Start Time:	9:40 AM				
End Time:	10:35 AM				
Temperature:	26.6c				
Cloud Cover:	20%				
Wind:	3				
Tide:	0.2 ft rising				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	1
Shore					
Total	0	0	1	1	1
Notes: Sand berm isolating the pond from the ocean washed out. Pond now open to ocean.					

PUHE					
Date:	2/16/04				
Start Time:	6:55 AM				
End Time:	7:45 AM				
Temperature:	22.4c				
Cloud Cover:	20%				
Wind:	0				
Tide:	0.5 falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond				1	1
Shore					1
Total	0	0	1	1	2
Notes: Pond still open to ocean.					

PUHE					
Date:	3/1/04				
Start Time:	8:00 AM				
End Time:	8:50 AM				
Temperature:	24.6c				
Cloud Cover:	90%				
Wind:	1				
Tide:	0.1 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration					
Midlands					
Pond				1	2
Shore				1	
Total	0	0	0	2	2
Notes: No birds observed at admin. Area-mowing grass. Pond still open to ocean. Park staff observed dead BCNH on Hwy 270 the previous week. Radjah Shelduck observed in drainage area above the pond. Photos, GPS and video taken.					

Shorebird, Seabird, and Waterbird Inventories of Pu'ukoholā Heiau National Historic Site

TABLE 2 (Continued)

PUHE					
Date:	3/15/04				
Start Time:	6:05 AM				
End Time:	7:00 AM				
Temperature:	21.9c				
Cloud Cover:	20%				
Wind:	0				
Tide:	0.4 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond					2
Shore				1	1
Total	0	0	1	1	3
Notes: Pond still open to ocean.					

PUHE					
Date:	4/5/04				
Start Time:	9:15 AM				
End Time:	10:10 PM				
Temperature:	24.7c				
Cloud Cover:	40%				
Wind:	2				
Tide:	0.0 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			2		
Midlands					
Pond					
Shore					
Total	0	0	2	0	0
Notes: Pond still open to ocean. 4 Cattle Egrets flying north 200m offshore. Photos taken. 1 Mongoose observed at pond.					

PUHE					
Date:	4/19/04				
Start Time:	6:15 AM				
End Time:	7:05 AM				
Temperature:	24.5c				
Cloud Cover:	20%				
Wind:	0				
Tide:	0.7 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration			1		
Midlands					
Pond					1
Shore				1	1
Total	0	0	1	1	2
Notes: Pond still open to ocean.					

PUHE					
Date:	5/3/04				
Start Time:	8:45 AM				
End Time:	9:35 AM				
Temperature:	27.8c				
Cloud Cover:	20%				
Wind:	1				
Tide:	-0.3 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration					
Midlands					
Pond					2
Shore				1	
Total	0	0	0	1	2
Notes: Pond still open to ocean.					

Shorebird, Seabird, and Waterbird Inventories of Pu'ukoholā Heiau National Historic Site

TABLE 2 (Continued)

PUHE					
Date:	5/17/04				
Start Time:	5:50 AM				
End Time:	6:45 AM				
Temperature:	23.8c				
Cloud Cover:	60%				
Wind:	0				
Tide:	0.3 ft falling				
	SAND	RUTU	PGPL	WATA	BCNH
Administration					
Midlands					
Pond					
Shore					
Total	0	0	0	0	0
Notes: Pond still open to ocean. No shorebirds observed.					

PUHE					
Totals					
17 Surveys					
	SAND	RUTU	PGPL	WATA	BCNH
Administration	0	0	17	0	0
Midlands	0	0	0	0	0
Pond	0	0	1	9	45
Shore	2	0	1	9	3
Total	2	0	19	18	48
Avg. per survey	0.12	0.00	1.12	1.06	2.82
% of surveys					
Observed	11.8%	0.0%	82.4%	82.4%	88.2%

TABLE 2 KEY

PUHO	Site
Date:	month/day/year
Start Time:	
End Time:	
Temperature:	
Cloud Cover:	Percentage of cloud cover
Wind:	Beaufort Wind Scale:
	0 under 1.6 kph Calm
	1 1.7-4.8 kph Light Air
	2 4.9-11.2 kph Light Breeze
	3 11.3-19.2 kph Gentle Breeze
Tide:	Height in feet
Species:	SAND Sanderling (<i>Calidris alba</i>)
	RUTU Ruddy Turnstone (<i>Arenaria interpres</i>)
	PGPL Pacific Golden-Plover (<i>Pluvialis fulva</i>)
	WATA Wandering Tattler (<i>Heteroscelus incanus</i>)
	BCNH Black-crowned Night-heron (<i>Nycticorax nycticorax</i>)