

Hickam Shorebird Survey Index  
and  
Bellows Sea Turtle Population Monitoring

FINAL REPORT

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Sydnie Hetzel

In cooperation with:  
Joel Helm, Natural Resource Specialist  
Hickam AFB  
Craig Gorsuch, Bellows Environmental Manager  
NOAA, Marine Turtle Research  
Fisheries Science Center

University of Hawaii at Manoa  
Interdisciplinary Studies 489  
Environmental Practicum  
Dr. John Cusick

**Abstract:**

The green sea turtle, (*Chelonia mydas*) is a threatened species found commonly in Hawaiian waters year-round. The Hawaiian stilt, (*Himantopus mexicanus knudseni*), is listed as endangered and is an endemic species found only in the island chain of Hawaii. Both of these species require monitoring to help insure they do not end up listed as extinct species like many others have become since man set foot on the Hawaiian Islands. During the seven-week internship, I conducted shorebird surveys from pre-determined index points on Hickam Air Force Base. In addition to collecting shorebird data, sea turtle kayak and beach surveys were conducted in the vicinity of Bellows Beach, which is also a USAF property holding. The green sea turtles were a consistent sight to Bellows Beach making it an area that should be regulated for on and off shore activities that may harm or disturb the threatened turtles. Shorebird monitoring took place during the deployment of Bird Balls (\$80k in government funding) into one of the index areas. Bird balls were deployed in an effort to push endangered Hawaiian stilts to an area further from flight-line activity.

**Introduction:**

The green sea turtle (*Chelonia mydas*; listed as a threatened species) population of the Hawaiian Archipelago is influenced by many anthropogenic and abiotic factors. Some of the turtles living and migrating in the Hawaiian Archipelago have been exhibiting signs of infection with Fibropapillomatosis. This disease has been identified as a possible factor for reducing their long-term survival and is a growing problem in the main Hawaiian Islands (Harrison 2004).

The turtles are an essential part of the environment because they graze on algae and jellyfish which helps keep coral reefs healthy and thriving (ecosystem service). The monitoring or sampling strategy will mimic the methods used by NOAA (G. Balazs, pers. comm.) and will serve as a population index (non-breeding season) that can be repeated in the future. The monitoring of threatened and endangered species is a component of the Hickam/Bellows INRMP 2008 (Anonymous 2007). Data will be delivered to USAF upon completion of the internship.

The USAF 647<sup>th</sup> Civil Engineering Squadron (647 CES) has implemented (in conjunction with the USFWS OAHU) a wetland restoration strategy in an effort to preserve native Hawaiian shorebird and plant habitat. The endangered Hawaiian Stilt, *Himantopus mexicanus knudseni*, is one of the endemic shorebird species being surveyed on the shores and wetland areas of Hickam. Trapping efforts completed by 647 CES and the USDA may reduce predation and increase the likelihood of nesting success for stilts in the area.

The Hawaiian Stilt did not have any natural predators until the Europeans arrived carrying Norwegian, *Rattus norvegicus*, and European, *Rattus rattus*, rat and later domesticated cats and dogs (Reed 1998). Due to heavy recreational usage on Hickam's shorelines, some shoreline can be characterized as sub-optimal habitat for Hawaiian stilts, but there are several locations including the reef runway shoreline and Ahua reef which function as excellent stilt habitat. The current and historical shorebird index data can be used to depict spatial trends amongst the populations utilizing Hickam in the event habitat modification occurs, which is a constant challenge on base. The Air Force has ordered "Bird balls" to be put into the golf course pond to discourage birds (habitat

modification), primarily the Pacific Golden Plover and Hawaiian Stilt, from using the pond since it is in close proximity to the airport. This action will hopefully decrease the risk factor associated with Bird Air Strike Hazards (BASH). Data collected during this study will capture (quantitatively) the population response (spatial distribution) created by the deployed bird balls.

## **Objectives**

Green Sea Turtles:

1. Create a population index for green sea turtles (*Chelonia mydas*) during non-breeding season using kayaking and beach surveys.
2. Identification of habitual feeding/loafing grounds

Hickam Shorebird Surveys:

1. Increase data set for existing survey route and index shorebirds from five historical areas on Hickam
2. Identify banded Hawaiian Stilts
3. Assist with deployment of bird balls

## **Procedure**

Green Sea Turtles:

1. Kayak along coast and survey for turtles with binoculars.
2. Use photography to compile catalog of turtles with and without FP tumors.  
Identify turtles and frequency of appearance in area.
3. Attempt snorkel transects using GPS to be able to repeat surveying route. Use slates to track number of turtles seen.

Shorebirds:

1. Use pre-determined survey route of the five historical sites and time schedule, gather data of native and non-native bird species during low tide with aid from binoculars and digital camera.
2. Identify, with binoculars and digital camera, banded Hawaiian stilts for population estimates.

### **Results and Discussion:**

Over the course of the seven-week internship, the green sea turtle monitoring and the population index for the Hawaiian stilt yielded interesting results. The methods had to be adapted based on the weather conditions and my own human error as well as unseen problems (i.e. when the golf course had tournaments on the day I went to conduct the counts of stilts). There was great support from the lifeguards at Bellows AFS, which helps build a more accurate population of the green sea turtles during the non-breeding season based on on-shore observations and kayak and beach surveys.

*Hawaiian Stilt Index Results:*

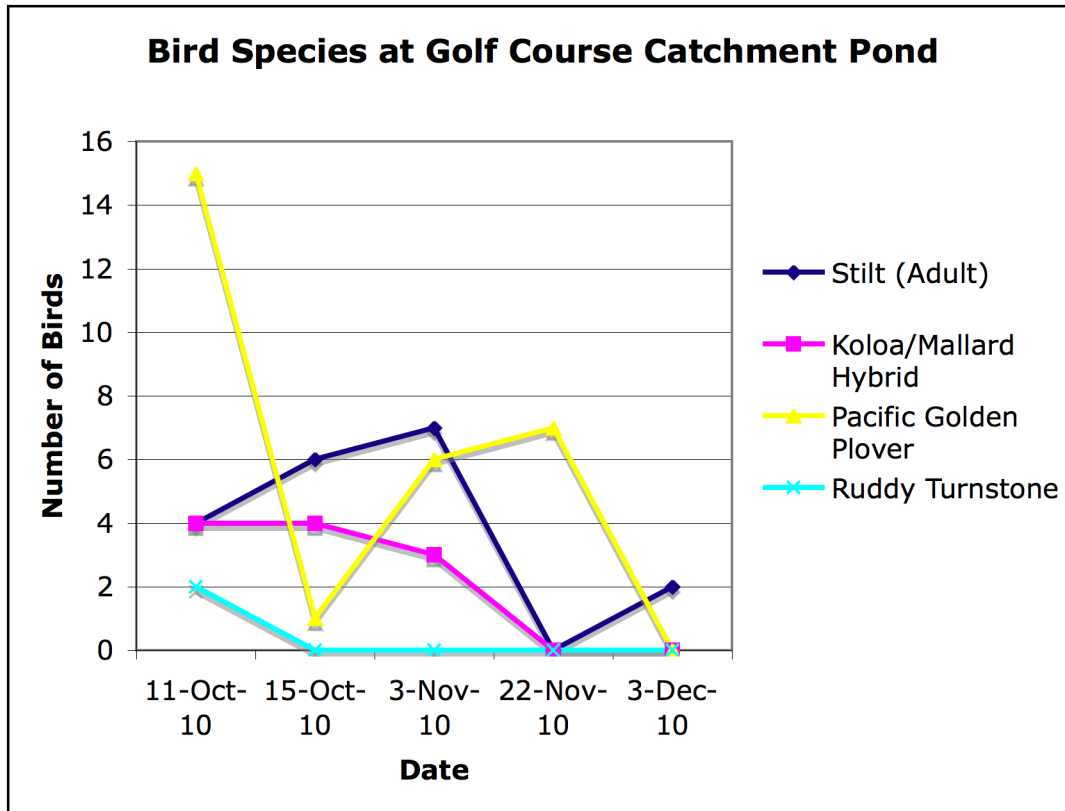


Figure 1: Bird Species at Golf Course Catchment Pond. The different species of birds regularly seen at the pond at the Hickam Air Force Base Golf Course are shown.

As shown in Figure 1, there are four main bird species that consistently rest at the Malama Bay Golf Course Catchment Pond on Hickam Air Force Base. This pond is directly across from the Honolulu International and Hickam Airport, making it extremely difficult to prevent bird strikes because they are in such close proximity to the airports. The Bird Balls were released into the pond in three rounds on October 26, November 10, and December 2, 2010. These are deterrents for landing because the black color over the entire pond diminishes the reflection of the water, which the shorebirds would normally land by.

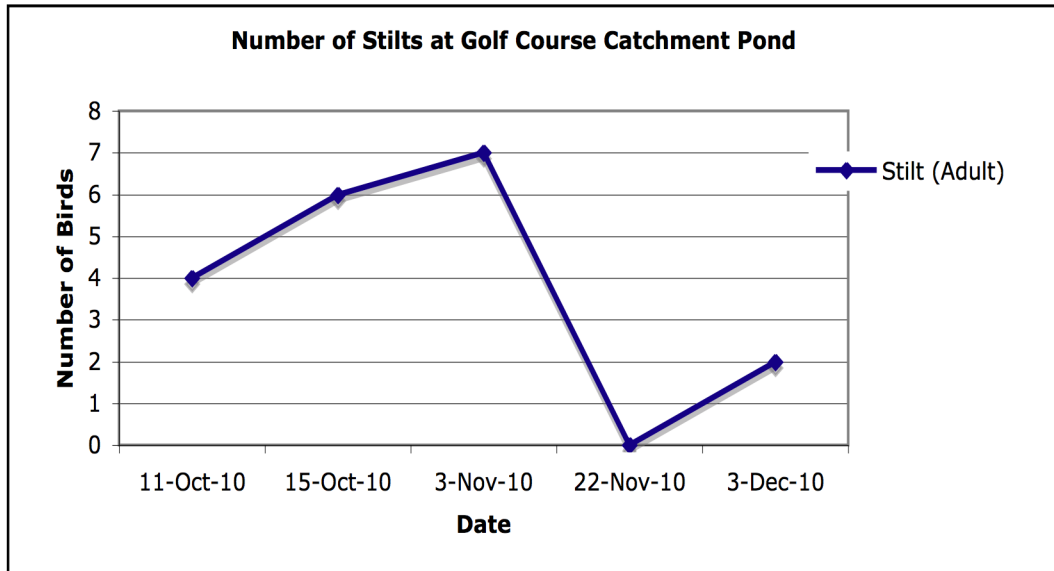


Figure 2: Number of Stilts at Golf Course Catchment Pond: Hawaiian stilt numbers have declined with the implementation of bird balls, a landing deterrent, that occurred on October 26, November 10, and December 2 of 2010.

Since the implementation of the bird balls into the Golf Course Catchment Pond, the endangered Hawaiian stilt numbers have declined, as shown in Figure 2. This is great news for all the work that has been put into getting funding for the BASH program to do this as well as putting the bird balls into the pond itself. The stilts seem to have been pushed in the right direction of the shoreline, however the one shoreline they have chosen to move to is right next to the reef runway. Though this is preliminary success, the landing deterrent is a definite step forward in the process to eliminate bird strikes and bird deaths including the endangered Hawaiian stilts.

INDEX POINT		SPECIES OF BIRD					
		Hawaiian Stilt	Koloa/Mallard Hybrid	Pacific Golden Plover	Ruddy Turnstone	Sanderling	Wandering Tattler
Kumumau Canal	MIN	0	0	0	0	0	0
	MAX	4	0	1	2	0	2
	STDEV	2	0	1	1	0	1
Golf Course Catchment	MIN	0	0	1	0	0	0
	MAX	7	4	15	2	0	0
	STDEV	3	2	5	1	0	0
Manuwai Canal	MIN	0	0	0	0	0	0
	MAX	6	0	4	0	0	1
	STDEV	3	0	2	0	0	1
Fort Kam Flats East	MIN	0	0	0	0	0	0
	MAX	0	0	11	4	0	0
	STDEV	0	0	5	2	0	0
Fort Kam Flat West	MIN	0	0	0	0	1	0
	MAX	0	0	3	17	2	2
	STDEV	0	0	2	10	1	1

Figure 3: Species of Bird per Index Point: This table is to quantify for the different index points used in the annual bird counts that were also used during the internship.

As you can see from Figure 3, the most common bird species in the shorebird counts were the Pacific Golden Plover and the Ruddy Turnstone. The Plovers were seen most often at the Catchment Pond, which is why it was a BASH concern and a regular species to count. The Turnstones were often seen at Fort Kamehameha Flat West, feeding and walking along the open shoreline and various sandbars.

The Hawaiian stilts and Turnstones were rarely seen alone, usually in pairs of two or more, while the Plovers could be seen alone frequently. If there was flushing, or flying, from the area by the Plovers, it did not happen as a group, but individually.

*Green Sea Turtle Results:*

Green sea turtle population monitoring yielded viable results as well. The turtles are not as common in Oahu waters during the winter months of the year, so the amount



recorded was consistent with the amount expected. The lifeguards at the Air Force side of Bellows were given data sheets, (Fig. 5), to help supplement my data, which only recorded turtles seen from 6 AM to 8 AM. Most of the observations were taken from shore because the weather conditions did not favor kayaking.

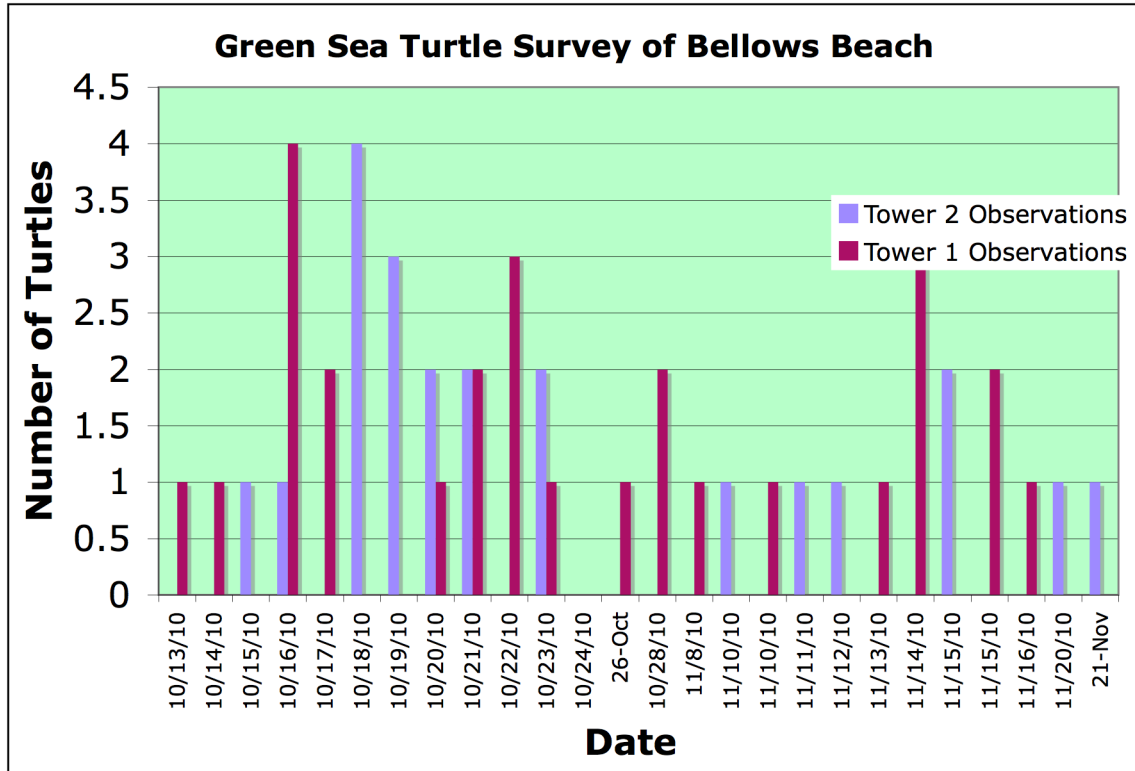


Figure 5: Green Sea Turtles Observed by Lifeguards: The data in this graph was gathered from the lifeguard data sheets given during the seven-week period.

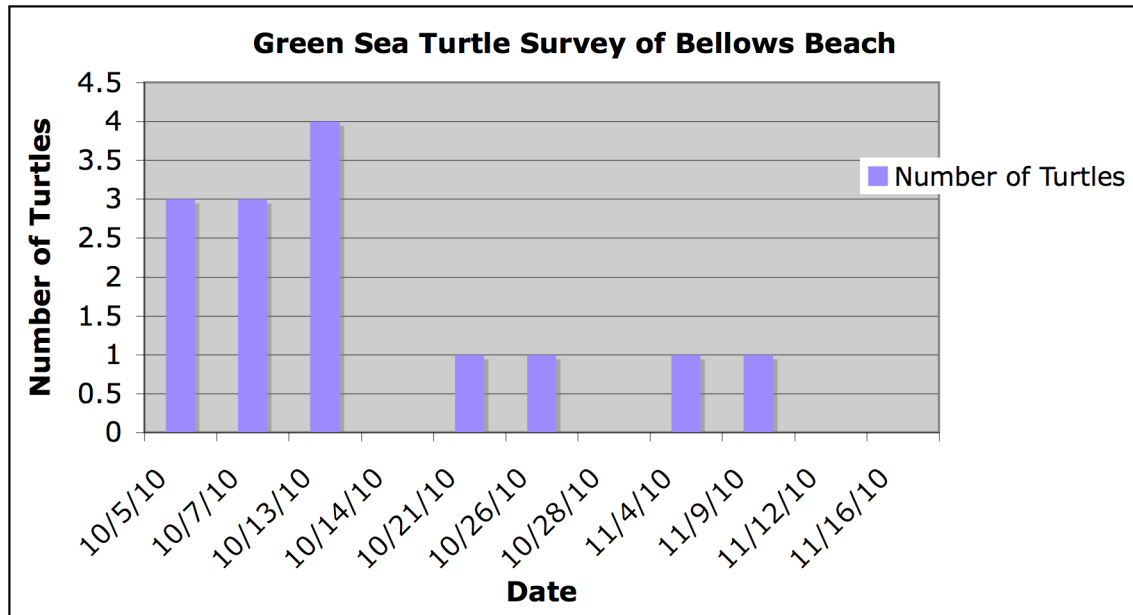


Figure 4: Green Sea Turtles Seen During Seven-Week Survey: The data in this table is from observations by my buddy and I over the seven-week period.

There was a range of 0-4 turtles seen, (Fig. 4), when we conducted surveying during the morning hours from 6-8 A.M. Observations were made twice a week and weather conditions decided our sampling fate (kayak or beach survey). Since we could not identify the turtles, it was difficult to note if we were seeing the same turtles that visited during the week or others that were taking the opportunity to eat the available algae.

The green sea turtles were often seen in or around the South East Jetty during high tides. This may be due to the decent amount of algae, (common food item of green sea turtles), which line the jetty and stream mouth in areas dominated by rocky substrate. High tide may also be favorable to give a better entrance and exit to some of the medium to large sized sea turtles. Other observations recorded the sea turtles off shore, but never resting on land. This may be because of the turbulent waves that pound the shoreline, however sea turtles are very strong swimmers and may have other reasons for not coming ashore to Bellows Beach.

**References:**

Reed, J. Michael, Elphick, Chris S., Oring, Lewis W., *Life-history and viability analysis of the endangered Hawaiian stilt*, Biological Conservation, (April 1998) Vol. 84, Issue 1, Pgs. 35-45

Harrison, Molly. (2004) *Green Sea Turtle*, NOAA Fisheries, Office of Protected Resources, Volume I, Issue 5  
[http://www.nmfs.noaa.gov/pr/pdfs/education/kids\\_times\\_turtle\\_green.pdf](http://www.nmfs.noaa.gov/pr/pdfs/education/kids_times_turtle_green.pdf)

Balazs, G., pers com. *Notes: Telephone conversation (September 2010) discussing NOAA data sheet and harassment concerns when conducting index studies.*

INRMP. 2007. *Final Integrated Natural Resource Management Plan 2008-2012, (7.2, 10.5)*. J. M. Waller Associates for 15<sup>th</sup> Airlift Wing, Hickam AFB, Oahu.