

Determining Variables that Most Affect the White Ibis Habitat

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Abstract

There is a wide variety of species of birds that have been found to inhabit the ponds and marshes of central Florida. The White Ibis, *Eudocimus albus*, is a wading bird commonly found on the coast of Florida, inhabiting ponds, marshes, and other estuarine locations. I examined the number of White Ibis present at six different ponds across Eckerd College's campus. Each pond has a different area, depth, salinity, and amount of vegetation surrounding it. The objective of this study is to test whether White Ibis will be more abundant at ponds with larger surface areas by surveying the ponds located in coastal central Florida. To do this, I went out on different days and at different times to each of the ponds to observe how many White Ibis were present at each location. In the end, I found that there were more White Ibis found in ponds that had a larger area with a higher salinity.

The White Ibis is also known for its "probe" eating habits, which allow it to dive its beak down into the land or water to get food. This allows the species to feed both on land and in water. Overall, my results showed that the ponds with the largest area and highest salinity were the ponds that the most White Ibis were surrounding. This lab provided a lot of information about the White Ibis species and their behaviors and habitats, which could lead to better understanding of the ecosystem functions of the bird.

Introduction

The White Ibis, or *Eudocimus albus*, is a wading bird that is found along the Atlantic coast from southern Virginia to Florida, as well as on the western Gulf Coast to Texas. Few are also found in Mexico and Central America along the coast. Typically found in marshes and in trees, the White Ibis is most commonly found in Florida year-round (Cornell Lab of Ornithology 2019). The population of White Ibis nests in the water ecosystem of Florida in areas such as lakes, freshwater marshes, and coastal estuaries. They are social birds, meaning they often gather in large groups and travel in packs (Kushlan 1977). The species is about 24” tall with a white body. When they are young, they have more of a brown color, allowing them to be identified easily. The White Ibis also has an orange, long beak, which allows them to feed by probing. White Ibis commonly feed on land and in water of wetlands or ponds. They use a probing technique called tactical probing. There is no taunting of the prey, the moment the White Ibis makes contact with the prey is also the moment they capture and consume it (Kushlan 1979). According to a lab that was done linking habitat to selection to wading bird foraging distributions, the White Ibis is more likely to select shallower water when there is a higher rate of the drying, but this only occurred in the species when there were areas with a long wet period available (Beerens *et al.* 2015). This goes to show that the species is more prone to be found near areas with a habitat surrounding them that is typically more wet than other areas. The reasoning behind this could be because of the food that is found within these areas. There is a lot more food availability for the White Ibis in an area with both wet and dry areas because of the wide array of food that is consumable by the species. Because of this, the White Ibis has the opportunity to find more food and better habits at the ponds with a larger area. The diet of the White Ibis

primarily consists of crabs and crayfish, along with other animals such as snakes, frogs, and insects. Crayfish are the top food for White Ibis; therefore, they are much more abundant where crayfish are more readily available (Boyle *et al.* 2014). White Ibis typically eat saltwater prey, but young birds need to eat freshwater prey in order to ensure they will develop normally (Chavez-Ramirez and Slack 1995). To allow this to happen, the bird is typically found in locations where freshwater, salt water, and land food options are available. Based on the literature, I hypothesize that White Ibis will be most abundant at the ponds with the largest area. The objective of this paper is to test this hypothesis by surveying ponds in coastal central Florida.

Methods

We studied White Ibis habitat use at ponds located on the campus of Eckerd College, a small college located on the Gulf Coast of central Florida. We studied the amount of White Ibis present at each of the six ponds that are present on campus. The first pond is called James pond, it is a smaller pond with little depth, but a lot of vegetation. The second pond is the CEC South pond. This pond is small, but deep with a lot of vegetation around it. The third pond is the CEC North pond, which is located next to the CEC South pond. This pond is the smallest pond that we studied and has very little vegetation around it. The fourth pond is the Fox/Chapel pond. This was the largest and deepest pond studied. There is a lot of vegetation around it. The fifth pond we collected data at was the Front Gate pond. This pond is large and has a lot of different kinds of vegetation surrounding it. The final pond is Zeta pond. This pond is the closest pond to the bay, it is a smaller pond with a small amount of vegetation around it (Table 1).

To collect the data, I went out various different times on dates November 2, 2021 through November 7, 2021, to observe the amount of White Ibis present at all of the six ponds. I went out at different times to see the different amounts of White Ibis present, as well as what they were doing at all of the different locations. I wrote down the number of White Ibis at each pond, and recorded my data. Later, I analyzed the data to see how many White Ibis were present at each pond across the different days and times that were studied, as well as different variables to correlate the amount of White Ibis with, including depth of pond, total area of pond, salinity of pond, and the percentage of vegetation at the edge of each pond. I also found the total number of all species of birds found at the ponds, and the average number of White Ibis found at each of the six ponds.

Results

Overall, the number of birds at each of the six ponds had a wide variation. First, at the James Center pond, there were 190 birds total, with the Mottled/Mallard Duck hybrid being the most abundant. The least abundant at this pond was the Great Blue Heron. At this pond, there was an average number of 1.88 White Ibis. Next, at the CEC South pond, there were 228 birds total with White Ibis being the most common. The least common bird found was the Double Crested Cormorant and the Little Blue Heron. There were 5.35 White Ibis on average. At the CEC North pond, there were 9 birds observed, and the White Ibis was the most abundant, about .35 on average. No other bird species were found at this pond. At the Fox/Chapel pond, there were 664 birds studied, and the most abundant was the White Ibis. The least abundant bird species was the Double Crested Cormorant. There were 13.04 White Ibis present on average. At the Front Gate pond, we studied 167 birds total, and the White Ibis was the most abundant, on

average about 1.73. The least abundant bird found at the Front Gate pond was the Little Blue Heron. At Zeta pond, we observed 304 total birds with White Ibis being the most abundant, and the Anhinga being the least common (Table 1). There were 4.04 White Ibis on average at this pond (Table 2).

Looking at the different variables that I studied, there are many different correlations present. First, the average depth at each pond compared to the amount of White Ibis present had a positive correlation of 0.6977, but the p-value showed that the relationship was not significant (Figure 1). Next, the relationship between the total area at the ponds and the amount of White Ibis had a positive correlation with a correlational value of 0.9012, with a p-value of 0.014, making this relationship significant (Figure 2). The average salinity at each pond compared to the number of White Ibis present showed a positive correlation with an r-value of 0.8793 and a p-value of 0.021, making this relationship significant (Figure 3). The final variable studied was the relationship between the percentage of the edge that had vegetation at each pond and the amount of White Ibis present. The r-value of -0.0111 showed a very slight negative correlation, and the p-value of .983 proved that the relationship was not significant (Figure 4).

Discussion

The results did support my hypothesis. The ponds that had the largest area also had the largest amount of White Ibis present throughout the study. A big factor that could explain the variation in the numbers seen is the amount of food present at each of the ponds on campus. There are many different organisms and ecosystems present in the larger ponds as compared to the smaller ponds with less creatures around them. In coastal areas of Florida, White Ibis have

shown different movement patterns and migratory paths to go to areas with the greatest amount of ecological diversity (Kushlan 1979). This proves the point that the amount of food present for the White Ibis could be a driving factor to result in the bird looking for larger marshes and ponds to inhabit. Along with the ponds that have a larger area, there is more room for the White Ibis to scavenge for food, leading to less competition among the species. This species relies strongly on tactical feeding, which requires a lot of creatures to be present in one area (Frederick *et al.* 2009). This is an important factor when studying the White Ibis because it determines where the species will most likely be found. Like many other wading birds, the White Ibis eats small aquatic prey, such as insects and small fish (Animalia 2021). After studying the species more in depth, it appears that they have more food opportunities in places with a larger area, which could also be another contributing factor to support my hypothesis. Another factor that could drive the White Ibis to be more drawn to ponds with larger areas is the ability to find a habitat with less threat of predators. In a previous study, it has been proven that White Ibis are more likely to go to marshes and ponds where they can nest with less of a threat of predation, resulting in less energy being spent (Kushlan 1977). In this case, the larger area for habitat would allow the species to roam free without the threat of another animal attacking it. The White Ibis species is very territorial over their nesting sites to prevent population threats from the loss of nesting or food or human disturbances (Animalia 2021). This goes to show that with more space around them, they will suffer less of the consequences of predation and decrease in food source, which will allow the population to sustain its size.

In the future, one thing that could be studied that we did not test is the conditions of the water at each of the different ponds. It is more likely for a White Ibis to go to a pond that has a

better condition of water because of the abundance of life that will be present at that pond in comparison to a pond with a worse condition of water (Dorn *et al.* 2011). Testing the condition of the water in comparison to the amount of White Ibis at each pond would contribute more to understanding why there are more White Ibis at one pond and not at another. This would also contribute to the hypothesis that White Ibis inhabit ponds with larger areas to see whether the area or the quality of water is more important. In the future, I could also collect data for a longer period of time and at more ponds to gather more variation in my data.

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Tables

Table 1. Physical and biological description of the ponds on Eckerd College's campus, St. Petersburg, Florida.

Body of Water	Maximum depth (m)	total area (ha)	avg. salinity (ppt)	% of edge vegetated	dominant vegetation species	Total number of birds counted
James	1	0.15	1	80	sand cordgrass, fire flag, arrowheads	190
CEC South	2.1	0.09	2	65	Brazilian pepper, melaleuca, wax myrtle	228
CEC North	1.5	0.07	3	20	Brazilian pepper, melaleuca, wax myrtle	9
Fox/Chapel	2.5	1.78	12	45	red mangrove, black mangrove, cabbage palm	664
Front Gate	1.1	0.42	2	62	cabbage palm, Brazilian pepper	167
Zeta	0.5	0.55	6	25	marsh grass, cabbage palm	304
TOTAL						1562

Table 2. The average number of birds seen at each of Eckerd College's ponds.

SPECIES	CEC S	CEC N	James	Front Gate	Fox/Chapel	Zeta
Double-crested Cormorant	0.08	0.00	0.08	0.50	0.50	0.27
Anhinga	0.62	0.00	0.35	0.92	1.35	0.12
Great Blue Heron	0.19	0.00	0.04	0.27	0.58	0.23
Little Blue Heron	0.08	0.00	0.15	0.08	0.77	0.31
Tricolored Heron	0.12	0.00	0.23	0.19	0.58	0.19
Great Egret	0.38	0.00	0.23	0.23	0.69	0.19
Snowy Egret	0.23	0.00	0.23	0.15	1.12	0.38
White Ibis	5.35	0.35	1.88	1.73	13.04	4.04
Common Gallinule	0.73	0.00	1.27	1.15	1.12	2.85
Mottled/mallard duck	1.00	0.00	2.85	1.19	5.81	3.12

Figures

Figure 1. The relationship between White ibis and depth of ponds.

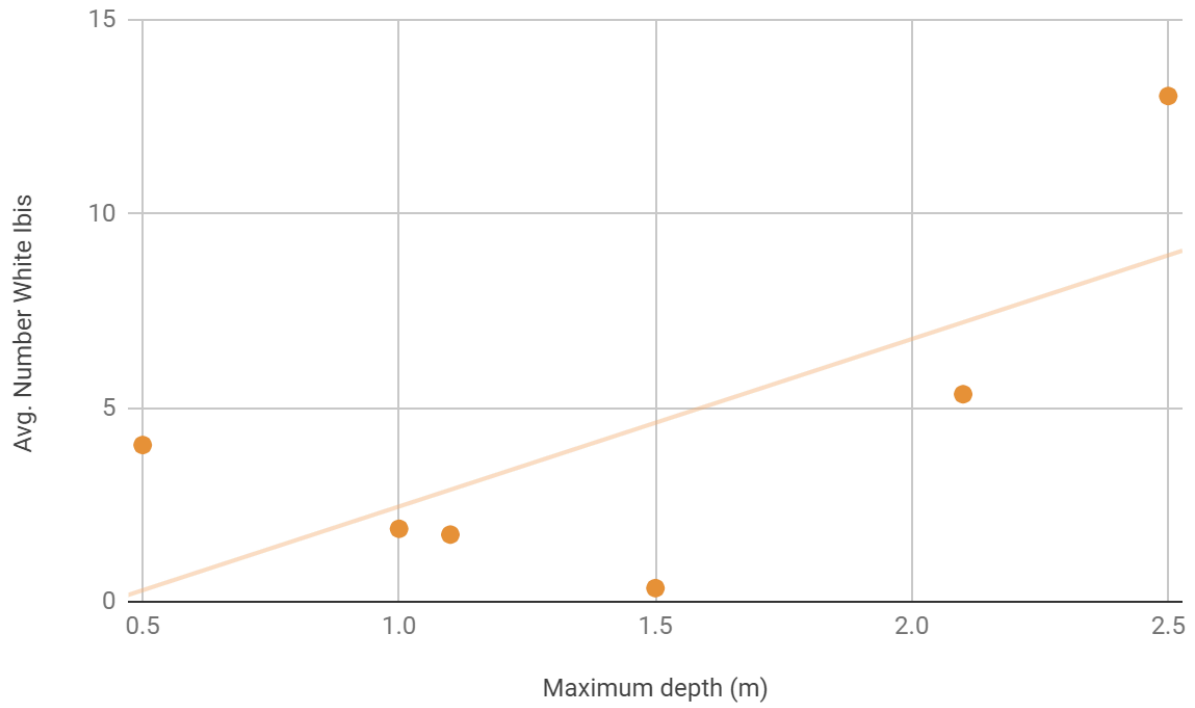


Figure 2. The relationship between White Ibis and total area of the pond.

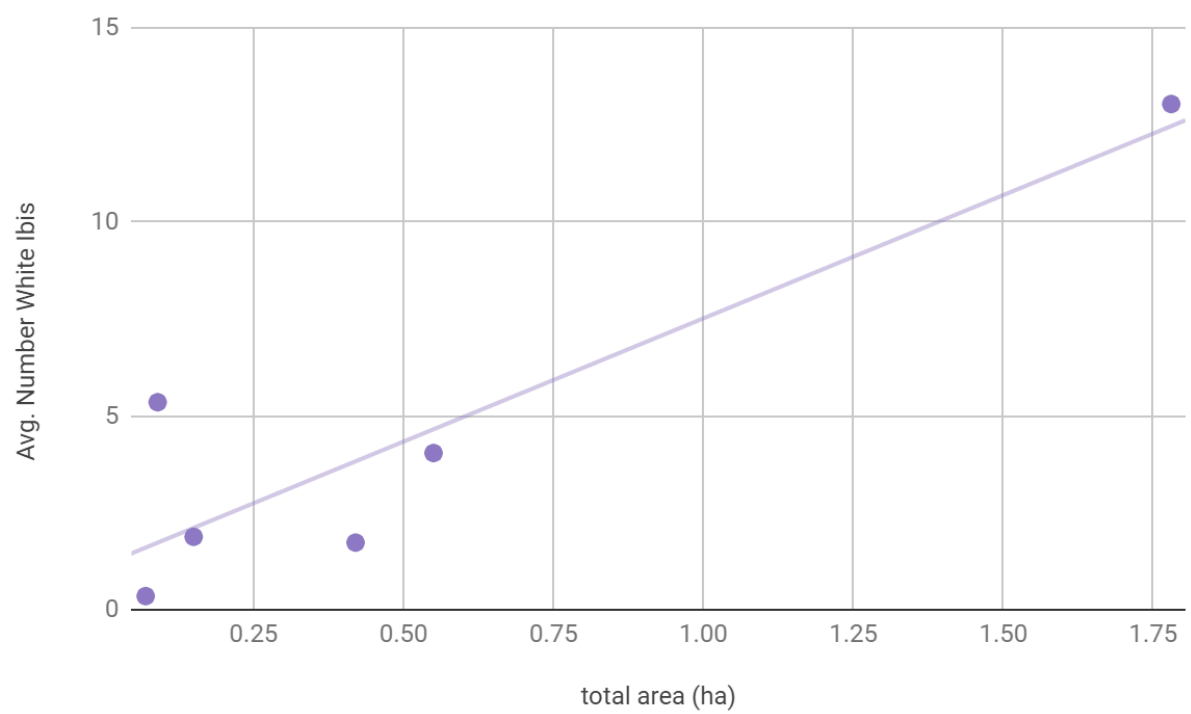


Figure 3. The relationship between average salinity of the ponds and White Ibis.

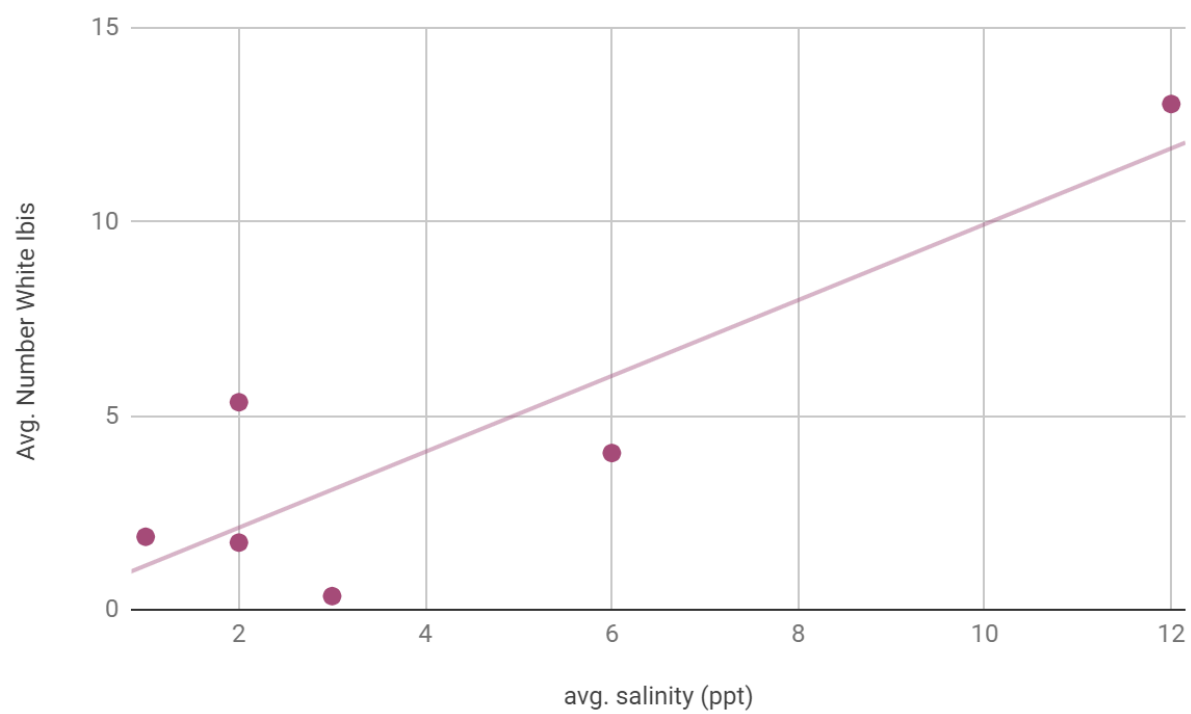


Figure 4. The relationship between percentage of edge vegetated at the ponds and White Ibis.

