Question

How do habitat differences affect deer occurrences in 2020?

Results

We used camera data from 2020 from three substantially different sites on Stockton University's campus including the Burn habitat, Vernal Pond site, and Clearcut site. We determined these three sites were different enough in vegetation makeup, tree cover, water availability, and other ecological factors that we could use them to try to see which kind of habitat deer prefer during different seasons in one year.

The burn habitat showed high species diversity in the Winter season, moderate diversity in Spring and Fall, and low diversity in Summer (Table 1). Deer were present in all four seasons. According to seasonal data summaries, deer were most abundant in Summer and Fall, and daily activity patterns for the year showed a crepuscular pattern with up to 80 deer active at dawn and up to 60 active at dusk (Figure 1).

Winter 2020	Spring 2020	Summer 2020	Fall 2020
0.85	0.46	0.16	0.52

Table 1: Shannon's Diversity Index for Burn Camera data in 2020.

	Deer	Dog	Human	Turkey
Winter 2020	51	5	33	1
Spring 2020	109	2	16	2
Summer 2020	207	1	6	0
Fall 2020	160	7	23	0

Table 2: Species occurrences for Burn Camera data in 2020.

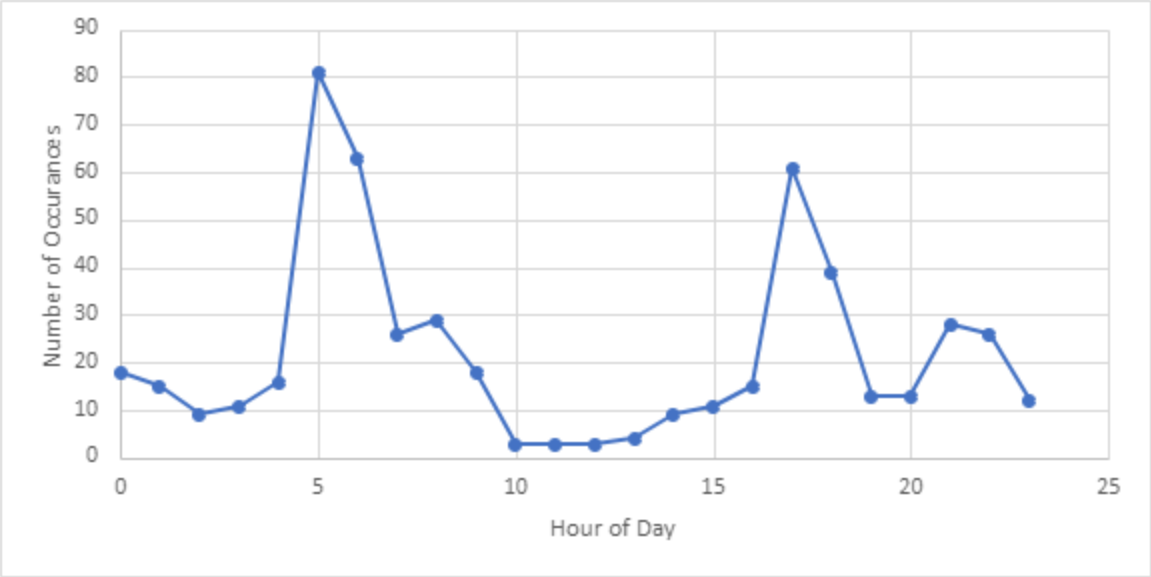

Figure 1: Daily activity patterns for deer during 2020 at the Burn camera site on Stockton University's campus.

The Clearcut habitat showed moderate species diversity in Winter, and low diversity in Spring, Summer, and Fall (Table 2). Deer were present in all four seasons and the only species present in Spring. According to seasonal data summaries, deer were most abundant in Summer and Fall, and daily activity patterns for the year showed a crepuscular pattern with up to 21 deer active at dawn and up to 25 active at dusk (Figure 2).

Winter 2020	Spring 2020	Summer 2020	Fall 2020
0.56	0	0.10	0.33

Table 3: Shannon's Diversity Index for Clearcut Camera data in 2020.

	Deer	Coyote	Human	Groundhog
Winter 2020	18	0	6	0
Spring 2020	30	0	0	0
Summer 2020	96	2	0	0
Fall 2020	82	0	7	1

Table 4: Species occurrences for Clearcut Camera data in 2020.

Figure 2: Daily activity patterns for deer during 2020 at the Clearcut camera site on Stockton University's campus.

The Vernal Pond habitat showed high species diversity in Summer and Fall, and moderate diversity in Winter and Spring (Table 3). Deer were present in all four seasons. According to seasonal data summaries, deer were most abundant in Spring and Fall, and daily activity patterns for the year showed a crepuscular pattern with up to 30 deer active at dawn and up to 15 active at dusk (Figure 3).

Winter 2020	Spring 2020	Summer 2020	Fall 2020
0.68	0.42	1.00	0.72

Table 5: Shannon's Diversity Index for Vernal Pond Camera data in 2020.

	Deer	Human	Mouse	Bird	Duck
Winter 2020	43	32	0	0	0
Spring 2020	81	4	0	1	4
Summer 2020	18	0	51	8	0
Fall 2020	82	1	22	0	0

Table 6a: Species occurrences for Vernal Pond Camera data in 2020.

	Chipmunk	Squirrel

Winter 2020	0	0
Spring 2020	0	0
Summer 2020	1	2
Fall 2020	5	0

Table 6b: Species occurrences for Vernal Pond Camera data in 2020.

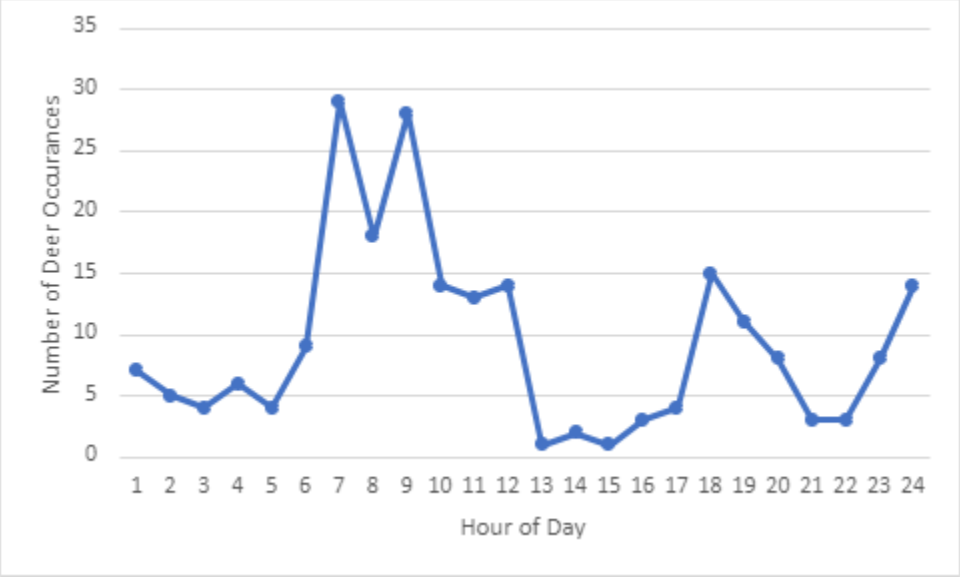

Figure 3: Daily activity patterns for deer during 2020 at the Vernal Pond camera site on Stockton University's campus.

From comparing these results, we can conclude that there are more occurrences of deer found at the Burn camera than the Vernal pond or Clearcut cameras. We can also determine that deer frequent the Burn habitat more often in the Winter season but shift to the Vernal Pond habitat during the Summer season.

Discussion

In order to adequately interpret these results, it is important to know what deer prefer in their ideal habitat. White-tailed deer typically prefer habitats that offer a combination of woody and herbaceous plants interspersed in the landscape. Additionally, the plant community of the habitat should be able to provide "ample food supplies and thermal cover" (Fulbright & Ortega-Santos 2013). It is also noteworthy that "natural habitat often will not provide an optimum diet on a year-round basis," but habitats that provide "higher and more seasonally stable" nutrient levels will promote the genetic potential of white-tailed deer (Fulbright & Ortega-Santos 2013). Of course, we can compare this knowledge to our results by paying attention to the makeup of each different habitat. While this was essentially an oversimplified version of a study conducted by Liu, X. et al, the same principles are established; environmental differences and nuances contribute to the appeal of habitats and affect diversity as well as activity patterns.

The total number of deer occurrences in a given habitat is determined greatly by the amount of forage available in the habitat as well as their nutritional values and a deer's "forage-specific dietary constraints" (Hanley et al 2012). From this, we can determine that the habitat with the most amount of food available to deer is bound to have a higher number of deer occurrences throughout the entire year. One would assume that the Vernal Pond habitat, with its lush vegetation, would sustain the greatest number of deer but our results found that the Burn habitat saw the most deer during 2020. A study done in Oklahoma that looked at how deer use habitat after burn and herbicide treatments found that when presented with treated vs non-treated areas, deer will likely avoid non-treated areas, particularly in summer and fall. Additionally, both male and female deer selected fire treated areas in the summer, which doesn't necessarily coordinate with our found results (Leslie et al 1996).

The most interesting data comes from the contrast between the Burn habitat and the Vernal Pond habitat. It is almost as if deer traveled from the Burn site in the winter to the Pond site in the summer. This can be explained with deer changing habitat depending on season and resource availability (Beier & McCullough 1990). Of course, from examining the sites themselves, we can see the clear difference. The Burn site consists more of woody vegetation with little tree cover, while the Vernal Pond site consists of leafy vegetation along with a body of water and extensive tree cover, without blocking out sunlight. During summer months, this lush habitat provides a great source of nutrients for deer while the hardy and long-lasting woody vegetation at the Burn site provided refuge during colder and harsher winter months. Both the Burn site and Vernal Pond habitat seem to be more in line with the preference of deer habitat (Pauley et al 1993).

Not as interesting or surprising as the previous results, were the number of deer occurrences found at the Clearcut camera site. The occurrences at this site were less than both of the other sites and this could be attributed to the clearcut being more open and with less vegetation than the other sites. With this site being more open than the other sites, this leaves the risk of predation or other threats for the deer because they are vulnerable out in the open. Along with the open space comes the lack of forage for the deer as well. This is not an ideal spot for the deer to come and spend time compared to the other site cameras because of both predation and lack of forage.

Works Cited

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