Name _____

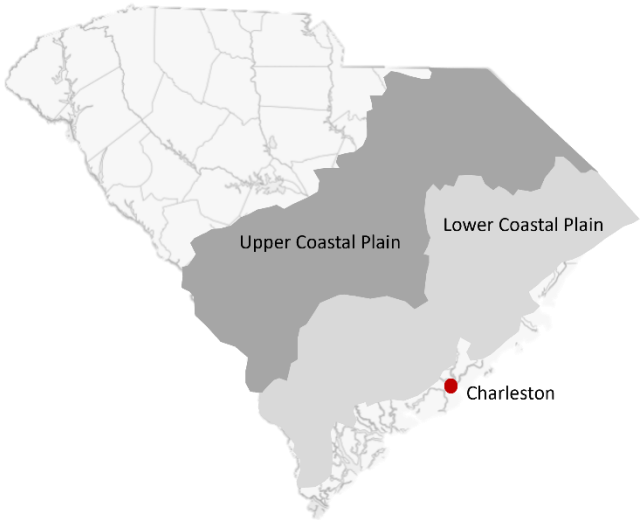
Charleston Cattle Economy Project
Stable Carbon and Nitrogen Isotope Exercise

The purpose of this activity is to familiarize you with traditional graphic methods used to depict stable isotope data, use stable isotopes to reconstruct the diets of cattle in and around colonial Charleston, and link diet to broader social and ecological processes from that time period.

Data[1]:

Site Location	Sample Number	$\delta^{13}C$	$\delta^{15}N$
Lower Coastal Plain	UE-14	-8	6.3
	RB-50	-9	7.8
	RB-44	-10.3	6
	UC-30	-11.4	6.8
	RD-63	-12.6	4.4
	RB-80	-17.1	6.5
Upper Coastal Plain	RC-72	-23.5	6.9
	RBC-71	-20.1	6.5
	RC-70	-15.6	5.4

Map of site locations:



Directions:
This research explores how small-scale, rural cattle farming played a role in the growth and development of urban areas like colonial Charleston, South Carolina, from the late 17th century (late 1600s) to the mid-19th century (mid-1800s). You will plot real data from the Charleston Cattle Economy Project from areas where cattle remains were excavated. You will then use this isotopic data to investigate what types of plants these cattle were eating and make some interpretations about the environments where these cattle lived.

Plot the data from the table above on the blank graph provided on the next page. Once you have plotted the data, answer the questions on the following page using your graph and the contextual information provided.

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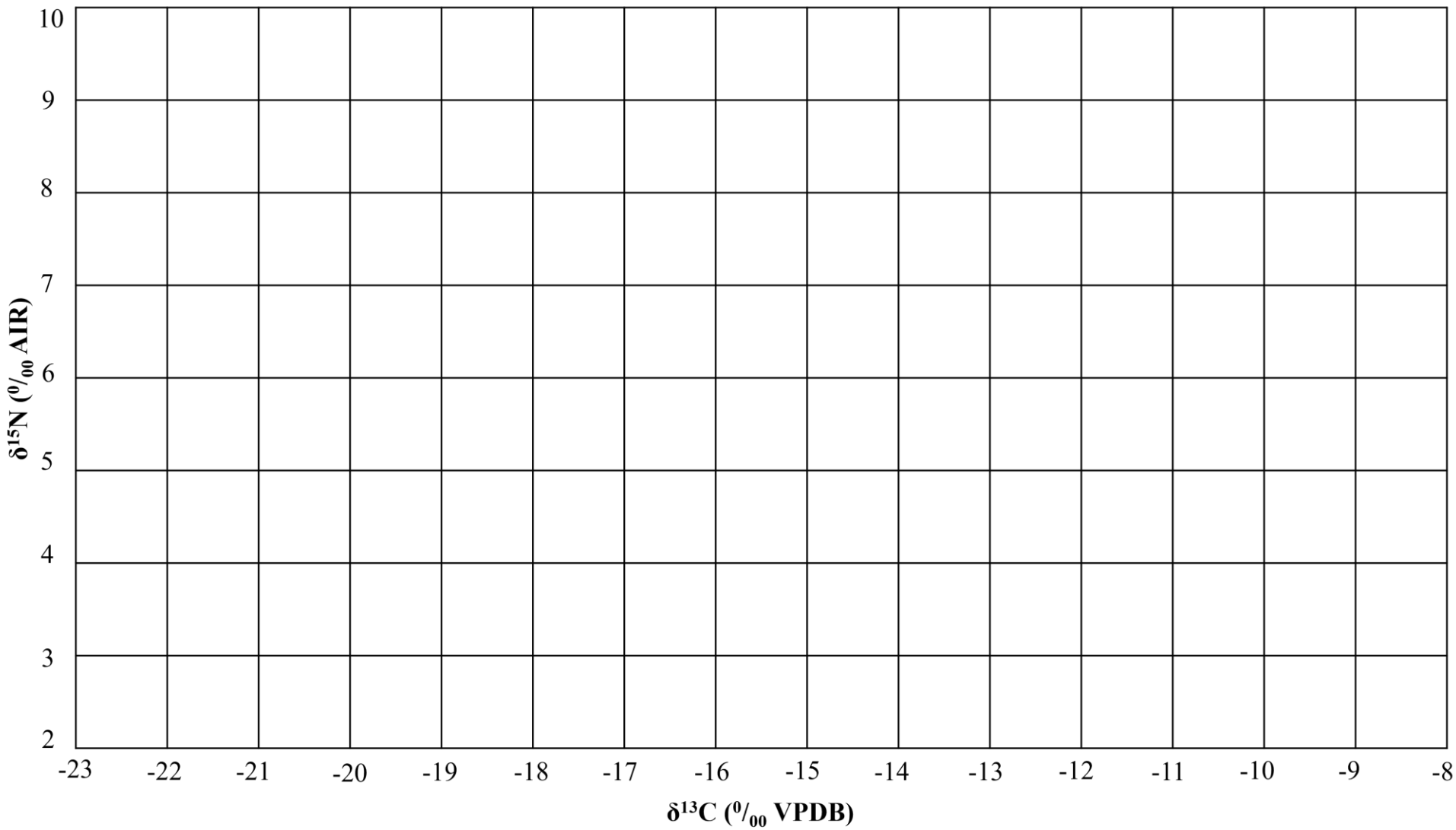
[1]This activity was created using data from the Charleston Cattle Economy Project (NSF Award #1920835).


10
9
8
7
6
5
4
3
2
δ15N (0/00 AIR)
-23
-22
-21
-20
-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-9
-8
δ13C (0/00 VPDB)

1. Cattle eating a lot of C_3 plants like river cane different $\delta^{13}C$ ranges (~-30 to -20 $^{0}/_{00}$) than cattle eating a lot of C_4 plants like grasses and sedges (~-15 to -8 $^{0}/_{00}$). Based on your scatterplot, what kind of diet do you think the cattle from the Upper Coastal Plain had?

2. How do the diets of the cattle from the Upper Coastal Plain compare to cattle from the Lower Coastal Plain? What is one possible explanation for the differences in diet between the two locations? (Hint: Think about the environments of these two places!)

3. Based on your plot and comparisons, describe the broader patterns of diet at Upper Coastal Plain and Lower Coastal Plain sites. Did diets vary in these different geographic locations? If so, how? What do you think could explain the differences in diet?