



Carrying Capacity of Nectar-Feeding Bats

Nectar-feeding bats are found in many deserts. Nectar-feeding bats use their very long tongues to feed on the flowers of certain cacti. The pollen from these flowers stick to the fur of the bats and, when the bats return for tasty nectar, they help pollinate other cactus flowers. The bats can also feed on cactus fruits. The numbers of cactus flowers and fruits that are available to the bats have been linked in certain locations to the number of bats that can survive there.

Recall that carrying capacity is defined as the largest number of individuals in a species that an environment can support. Using the data set that is provided below, determine the carrying capacity of a population of nectar-feeding bats and answer the following questions.

Graphing Exercise

- Ecologists went to a desert and counted the number of flowers and fruit on 30 cactus plants in a particular region. They estimated the number of nectar-feeding bats through mist-netting and visual counting over several months. They also noted the amount of rainfall. The next year, they went out and performed the study again. Use the following data sets to graph the number of bats, cactus flowers, and cactus fruit over the seven months. Plot the individual points then connect the points with a line.

Year One				
Month	Number of Bats	Number of Cactus Flowers	Number of Cactus Fruit	Rainfall (mm)
February	100	0	0	20
March	1000	82	0	26
April	4000	143	12	18
May	6000	205	57	6
June	8000	127	187	3
July	5000	61	122	15
August	500	10	80	24

Year Two				
Month	Number of Bats	Number of Cactus Flowers	Number of Cactus Fruit	Rainfall (mm)
February	300	0	0	18
March	1000	88	0	20
April	2000	99	15	24
May	3500	110	59	17
June	3200	61	87	13
July	2800	58	64	19
August	400	8	11	20

Carrying Capacity of Nectar-Feeding Bats CONTINUED

Analyze

1. What are the biotic and abiotic factors the scientists monitor which influence this bat population?

2. How did the carrying capacity of bats change between Year One and Year Two? How did the biotic and abiotic factors change between Year One and Year Two? Summarize how the changes in the different biotic and abiotic factors influenced the bat population.

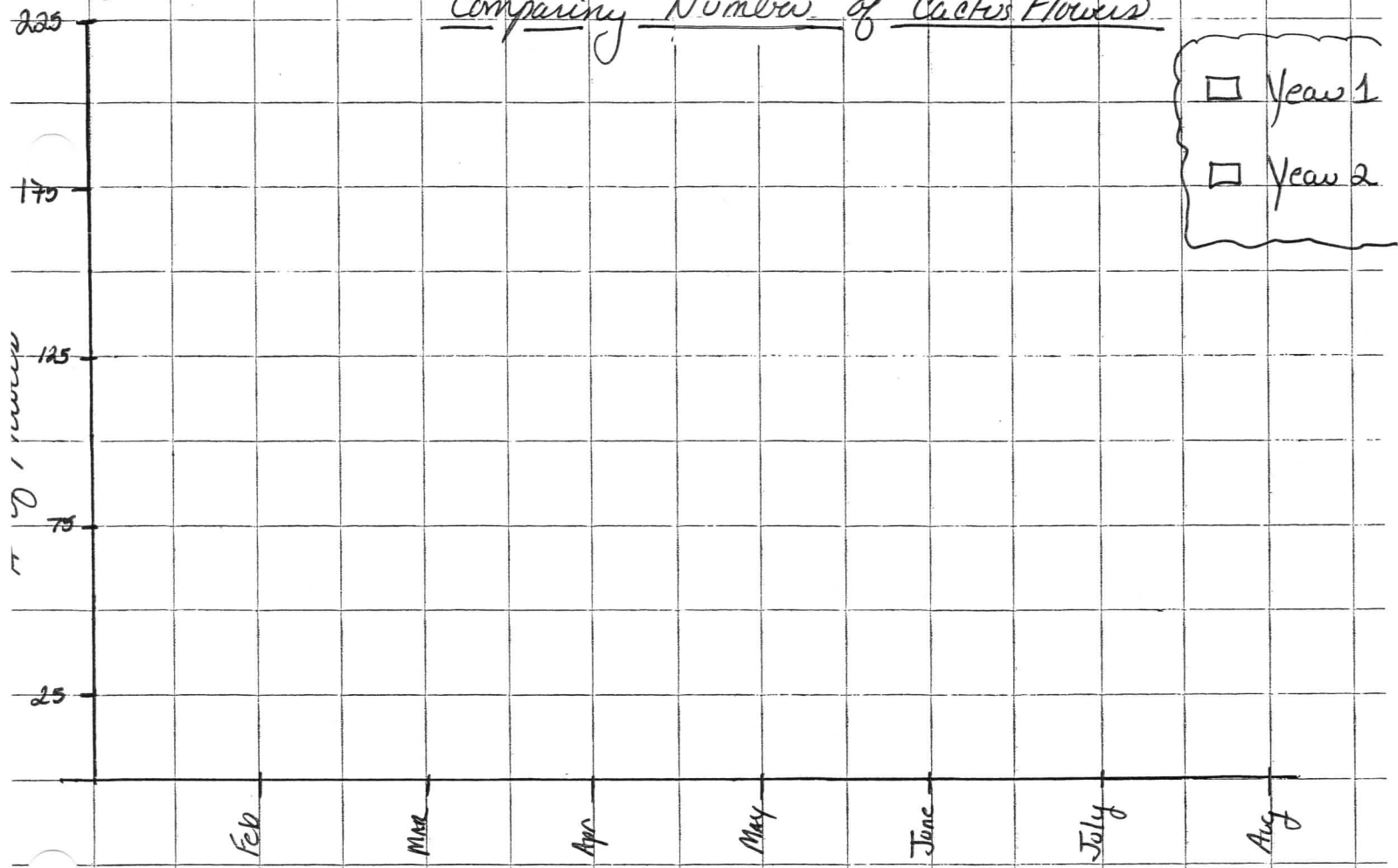
3. How would the bat population influence the number of cactus fruit that develop?

Apply Your Knowledge

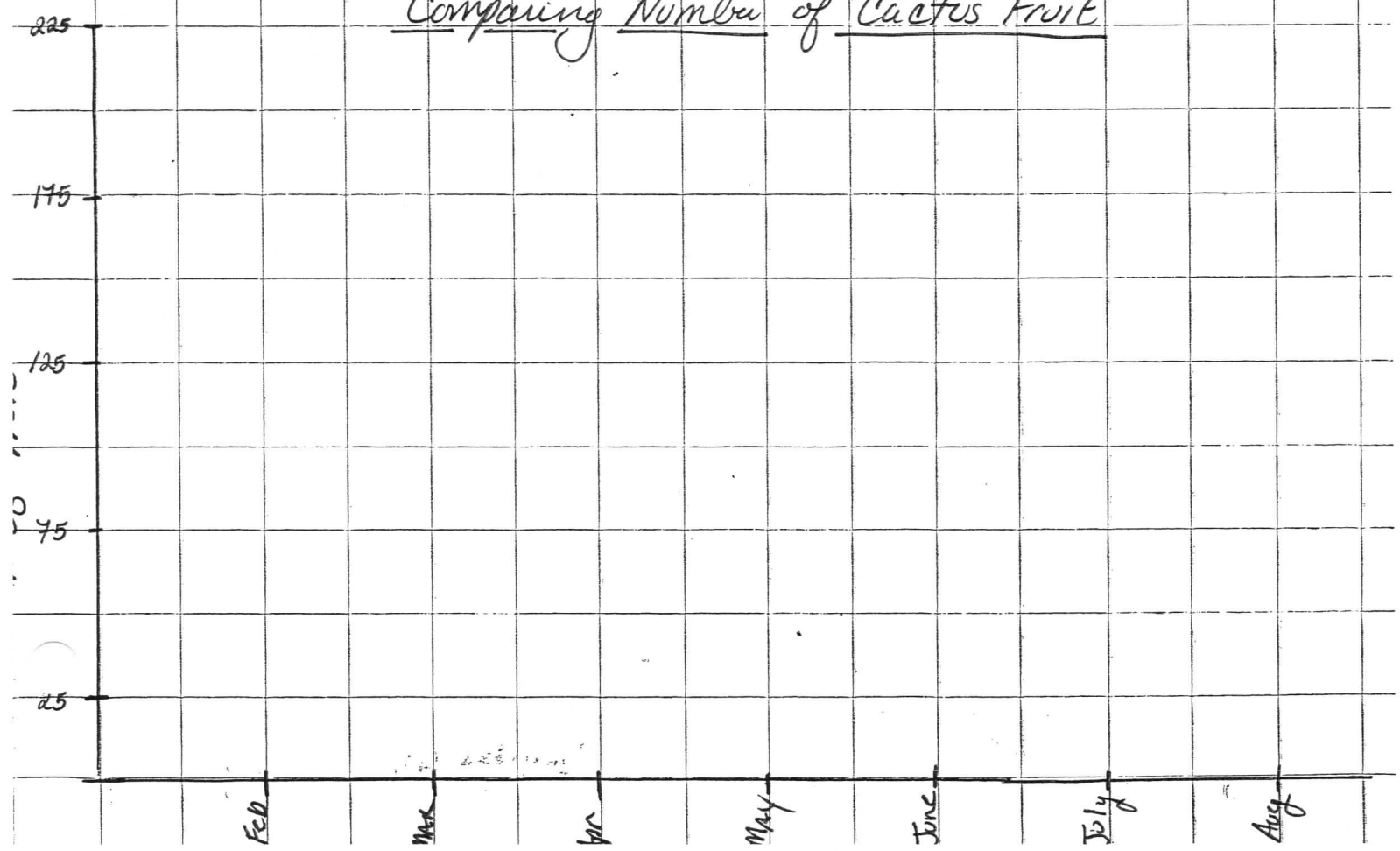
1. What might the consequences be on the bat and cacti population if this desert region continued to experience several years of higher than average rainfall? How would a decline in the cactus population affect the rest of the desert ecosystem (i.e. other organisms such as rodents which feed on cactus fruit)?

Comparing Number of Cactus Flowers

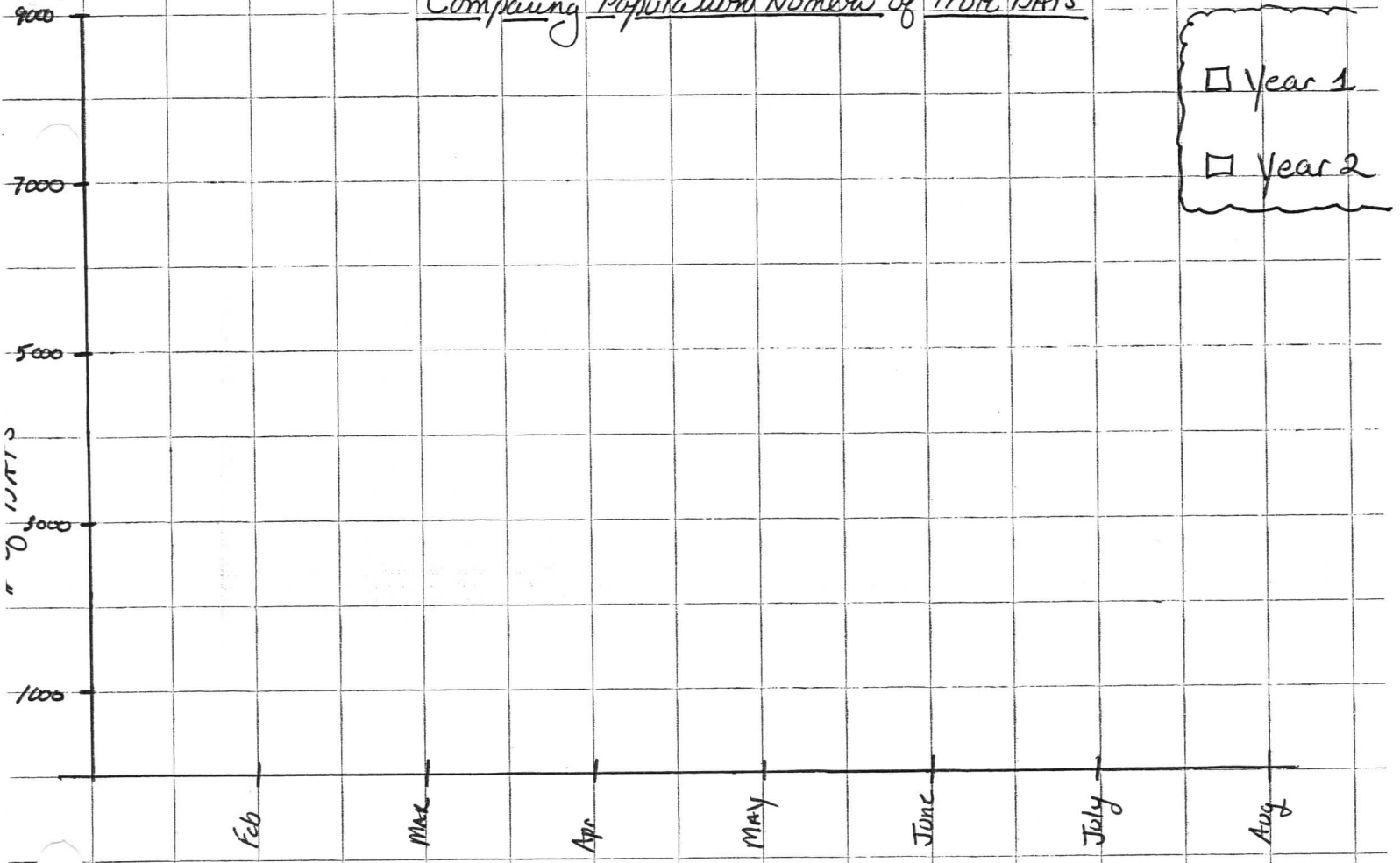
□ Year 1
□ Year 2



Comparing Number of Cactus Fruit



Comparing Population Numbers of Fruit Bats



Comparing Precipitation Levels

