

Black Canyon of the Gunnison

National Park Service
U.S. Department of the Interior

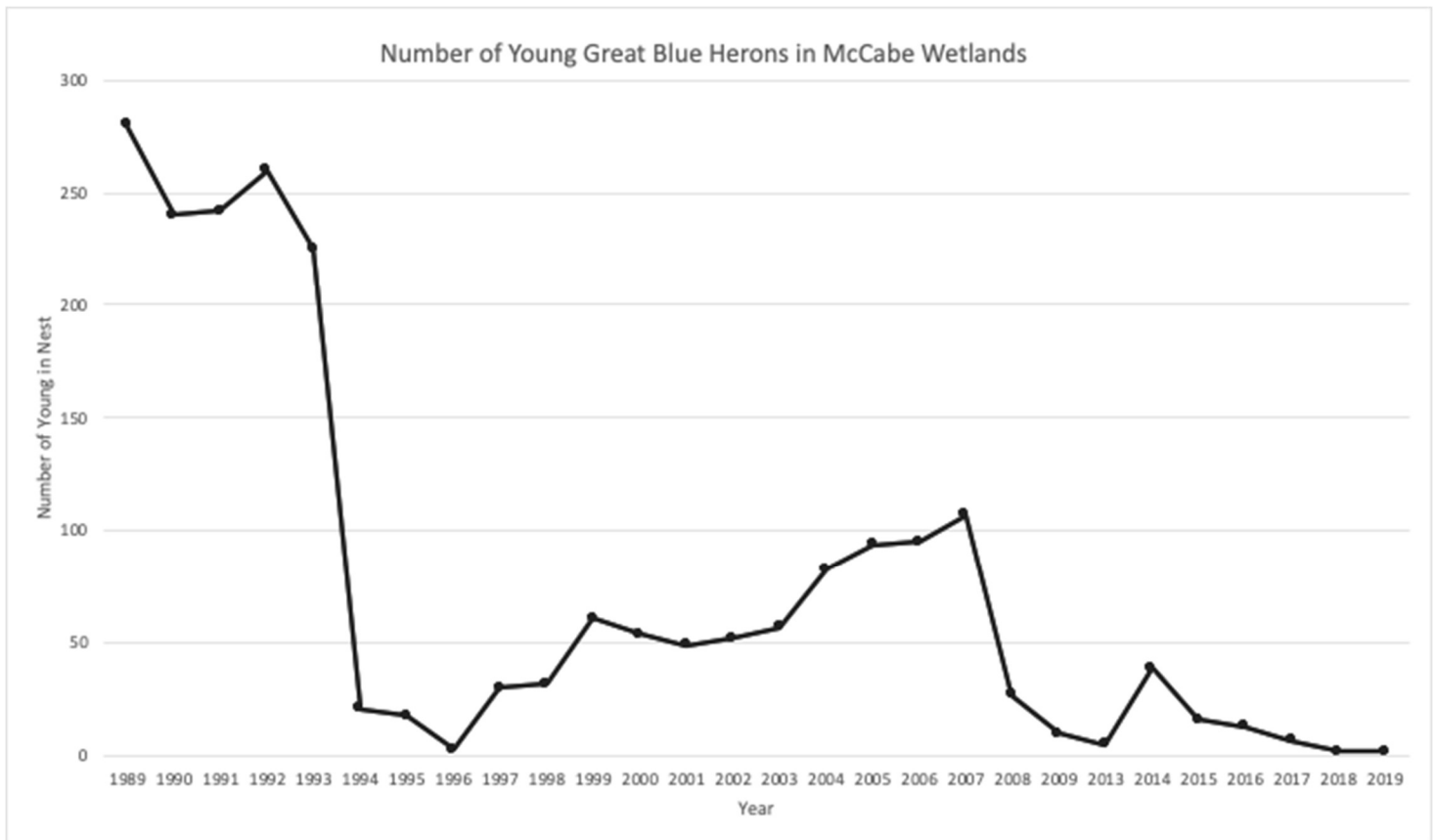
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National Park



Population of Great Blue Heron in Curecanti: Student Worksheet

Objective: You will analyze data on great blue heron populations in Curecanti National Recreation Area to determine the carrying capacity of the area and possible limiting factors for the heron.

1. Look at the graph below:



2. What do you notice about the graph? What questions do you have about the data?
3. Before we start to analyze the data, use the space below to write down anything you already know about great blue herons. This might include, habitat, size, lifespan, etc.

4. Now, conduct some research about great blue herons. Answer the following questions:
 - What habitat do they live in?
 - What habitat do they nest in?
 - How long does it take for young to mature?
 - What predators do adults have? Eggs? Young?
 - Are the herons sensitive to human disturbance?
 - What do herons eat? What do they feed their young?
5. Define limiting factor. Give an example of a density dependent factor and an example of a density independent factor.

Data Analysis:

6. Looking at the data, what is the highest number of young herons? The lowest?
7. Can you determine the carrying capacity of the nest sites based on the data? Why or why not?
8. Based on your research, what are some limiting factors for the herons?
9. What do you predict will happen to the heron population in the next five years? Be specific!
10. Write a hypothesis describing the reason for the decline of the heron population.

Read the following journal entry from Ron Meyer, who conducted the first nine years of observations.

1996 Summary

Eighth consecutive year of observation by Ron Meyer. 1993 was the last year in which the herons enjoyed good reproductive success. It was also the year which for the first time, a tree with twenty active nests produced young in only three of those nests. It was noted that this particular tree was closest to the railroad grade of any nest bearing tree.

The 1994 season started strong with all colonies occupied with a large number of active nests and herons in attendance. From mid-May to early June it became apparent that nest success was failing. Most nests were devoid of young and, when present, counted only one or two versus the expected three or four.

The 1995 season began encouragingly with goodly numbers of Great Blue Heron and attending nests in all the colony groupings. During May, however, the colonies crashed leaving only two or three nests containing young per colony. By late June there were only seven nests with a grand total of nine young. A few days later I could find only two immature Great Blue Heron.

The 1996 season was bad from the outset. Of the historically active five colonies only two contained active nests totaling eight. In early May four occupied nests remained and by mid-May the colonies that formerly boasted upward of eighty productive nests were down to one! It was noted that Great Blue Heron were appearing in cottonwood trees with old, abandoned nests along the south bank of the Gunnison River. I optimistically speculated that the birds were relocating in an effort to avoid the hub-bub of ranch activity concentrated along the railroad grade. In mid-May there were thirty-three of Great Blue Heron at twenty nests with approximately fifty percent containing incubating adults in the new "river colony." Alas, my optimism was betrayed. Two weeks later no Great Blue Heron could be located in the river colony. The season ended with only one successful nest located in the Central Colony producing three healthy appearing young.

Is this the end of the McCabe lane of Great Blue Heron and Black Crowned Night Heron rookery? What are the reasons for its demise? As previously speculated, disease, predation, parasitism, food inadequacy or contamination, physical disturbance are considerations coming to mind. Perhaps the collapse is an event to be expected in the natural history of a rookery. Who knows, maybe there will be a rejuvenation. The one thing that is clear to me is over the eight years of observation the locale containing the rookery has become less a natural area and more an intensively managed livestock operation. Increased foot traffic on the railroad grade, road building onto the meadows, culvert construction with channeling and drainage of wet meadow hollows, inconsistent water levels, loss of stream side vegetation and willows, increased livestock numbers and foraging, etc. There are more low flying aircraft approaching the Gunnison airport. Park Service personnel conducting on-the-ground studies and my visits every five or six days may contribute irritations to the birds. Wild things don't always fit into the human scheme. In any event, it will be prudent to judiciously observe the area and search for new nesting areas not only nearby but more distantly in the future.

11. What new questions did the journal entry bring up?

12. What limiting factors does Ron Meyers write about? List which ones are density dependent and which ones are density independent?

Density Dependent Factors	Density Independent Factors

13. How does Meyer's hypotheses compare with your hypothesis?

14. What data would you need to collect to prove your hypothesis?

Extension Questions:

15. At this point in time, park rangers and biologists still don't know why the heron population declined so rapidly and has not recovered. What data would you need to collect to find the answer?

16. What effects is the decline of the heron population having on the rest of the ecosystem? Use what you know about food webs to help you answer this question.

17. Most of the data for this case study was collected by a citizen scientist. What is a citizen scientist?

18. How can you be a citizen scientist in your community? Brainstorm some things you could observe.