NATIONAL CENTER FOR CASE STUDY TEACHING IN SCIENCE

Which Elephant Population Would You Protect?

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Conservationists use data to determine how to allocate conservation funding. For this case study, you will assume the role of a representative from an African country that is applying for a conservation grant for one of your local elephant populations. Your instructor will provide you with a Population Data Profile sheet for two elephant populations from your country and you will have to do additional research to learn about each of these populations. You will then develop a grant application in the form of an infographic for one of the two elephant populations. The infographics will then be reviewed and the most persuasive grant application, determined by vote, will be selected for funding.

Part I – Graphing Population Data

For each population, create a population growth curve by graphing population size estimates over time. Do not worry about including the SE (i.e., standard error) in your graphs unless directed. What kind of graph is appropriate for these numerical data? Which variable is on the x-axis and which variable is on the y-axis? Make sure to label your axes.

Part II – Analyzing Population Graphs

Go back to the previous two graphs that you drew. Next to each graph, describe the population growth of each curve. Note that "population growth" does not imply that the population is increasing; it only refers to the change in the population size over time.

Questions

1. Do the graphs fit an exponential or logistic growth curve or neither?
2. Estimate the carrying capacity and describe how confident you are in your answer. Is there a consistent enough pattern to confidently estimate the carrying capacity?

Part III – Additional Research

Now perform some online research to learn about your country and each population. Find density-dependent and independent factors specific to your country. For instance, do not simply list "disease" as a density-dependent factor. Determine if there are any diseases prevalent in your country.

Questions

1. Climate is one possible density-independent factor. Do the climate trends in your country match population growth patterns? Follow these instructions to find out:
   a. Go to <https://en.tutiempo.net>.
   b. Click the "Climate" tab at the top of the page.
   c. Under "Global Climate Data," click on "Africa."
   d. Click on the name of your country.
   e. The data are provided by weather station. Refer to your population profile sheet for which weather station has the most relevant data.

f. Describe specific climate trends (e.g., how temperature varies across the years).
g. Do any of these climate trends correlate with your population data? If not, then these climate properties may not be important density-independent factors for your population. If so, then it is a relevant density-independent factor.

2. What are some other density-independent factors that impact the population size?
3. What are some density-dependent factors that impact the population size?
4. Take notes on additional findings; for example, is some of the area already protected?

Part IV – Decision

Your next goal is to determine which of the two populations you will represent in your conservation grant application. Determine which information should be used to make your selection. Here are some questions to consider:

- Which density independent or dependent factors appear most important?
- Should an area with a larger or smaller population be conserved?
- Should a smaller or larger area be conserved?
- Should an area with a larger or smaller population density be conserved?
- Should funding go toward a country that already has national parks/preserves?
- Should funding go to a country that is experiencing habitat loss or one that is relatively stable?
- Should funding go to a country that has current ecological research programs?
- Any other things to consider?

Questions

1. Which population are you going to represent for the grant application infographic?
2. Explain your reasoning.

Part V – Create the Infographic

Once your team has determined which population to conserve, create an infographic of it. Each person creates one to bring back to the original team. The goal is to persuade your original team to fund your population. Use enough information that someone reading it will understand your provided evidence. Be sure to include:

- Name of the country and population.
- A population growth curve (like what you created for Part I).
- Size of area.
- Examples of density-dependent and density-independent factors.
- Why your data support the need for conservation funding.
- Any other persuading information.

Part VI – Vote

Once everyone's infographics are complete, you will go back to your original teams. Wait until instructed to do so. Once back in your original team, team members will describe their infographics and then have a discussion on the discrepancies between the infographics. Each team will vote on which one should receive the conservation funding.

Question

1. Which infographic won? Explain why.