Unit 4: Virtual Fish Ecology and Adaptation Lab Report

SECTION A LAB REPORT (Document 1)

Complete the virtual fish simulation and take note of important factors that might impact the growth of the fish population. Use the information you have gathered in the simulation to complete your Lab report. *Make sure you review Unit 4 Project Procedures for all required details.*

How to Complete the Virtual Simulation

Open the Virtual simulation on a new page and then follow all the prompts to familiarize yourself with how the simulation works.

1. There's a tutorial guide at the beginning of the simulation. Make sure to complete the tutorial before moving on to the first stage. Read each screen carefully and be sure you understand each part of the tutorial before moving to Stage 1 of the simulation. 2.
2. In Stage 1, click on the "Show Normal Population Growth" box to see the graph of what happens to this population if reproduction, migration, and death rates are moderate.
3. Explore what happens to the population as you change the three variables. In your personal notebook, record your observations of what happens to the sustainability of the population. What variable settings cause the population growth rate to increase? What settings cause it to decrease? What settings cause the population growth rate to stay steady? What are the limiting factors? Then transfer the detailed observation onto your results/observations section in your science lab report sheet.
4. Scientific advisors to the fishery have determined that the population is sustainable at 60,000 fish. Use the simulation to determine what settings are for the three variables to maintain the population at 60,000 fish. Record the graph and the settings in your personal notebook
5. Scientific advisors have reexamined the population data for the Avril Gulf tuna and determined that the population is sustainable at 80,000 fish. Predict what settings would maintain the population at 80,000 fish. Write down your predictions in your science lab report sheet under the hypothesis section and then use the simulation to test your prediction. If necessary, change the settings as you run the simulation. Record the graph and the settings in your personal notebook.
6. Move to Stage 2 and repeat Steps 3 through 5. Note that in Stage 2 you cannot control pollution or disease events, which will occur at random intervals.
7. Move to Stage 3 and repeat Steps 3 through 5.
8. Move to Stage 4. In this stage, all of the factors are combined. Predict what settings will allow for a maximum amount of fishing while maintaining the fish population (i.e., having a sustainable fishery). Repeat Steps 3 through 5 but incorporate the maximum amount of fishing possible.
9. Include a screenshot of the graphs at all stages in your analysis section of the lab report. Remember to discuss your analysis.

SECTION B Student Analysis Report (Document 2)

Your responses should be based on what was covered in the unit and the simulation experience alone. All responses must be original and in your own words. Do not copy from peer documentation, AI, or external sources.

Copy these questions under the "**Student Analysis Report**" section so that you can appropriately answer all the questions.

Student Analysis Report Questions

1. What specific environmental and human-induced factors limit the growth of the fish population in your simulation?
2. What specific values for food availability, reproduction rate, and water quality must be maintained to sustain a stable population of 60,000 fish?
3. Describe the immediate impact on the fish population when pollution was introduced into the ecosystem.
4. What was the immediate effect on population numbers when the disease outbreak occurred in your fish population?
5. Measure the recovery period (in simulated months or years) needed for the fish population to stabilize after the disease outbreak.
6. Which combination of environmental conditions and management practices allowed for maximum sustainable fishing yields?
7. How could a model, such as this simulation, help fisheries zoologists make recommendations about setting fishing limits? Explain your answer.