Fish Count Data Analysis

Introduction: Currently, an agency that owns a dam across a river traversed by migrating fish species is required to facilitate and record data on fish passage. The number and species of fish lifted over the Holyoke Dam has been counted since 1950. This provides important information as to the effectiveness of passage as well as trends in fish populations.

In this exercise, you will act as a fisheries biologist and use this data to analyze trends of fish species in the Connecticut River. Use a graph that you make to substantiate your claims.

Materials:

Graph paper and pencil   OR   Microsoft Excel   OR   Google Sheets

Procedure:

1. Use the historical fish count data found here:
040620_Historic Counts Hand out 2019.cdr
This data shows the count of fish passing through Holyoke Dam broken down by species since 1950.

2. Here are some questions you may be able to answer by looking at the data table:

1- In which year did fish counters start to distinguish Gizzard Shad from American Shad and start to count them separately?

2- In 2015, the fishlift was shut down while improvements were being made to a number of fish passage systems. One update was made to the fishlift entrance. Which species benefited from this improvement the following year when the fishlift reopened?

3- The fishlift was first built with one lift in the year 1955. A second lift was installed in 1976. The buckets were enlarged in the year 2004. In 2015, modifications were made to the lift entrance. Did any fish species benefit from these improvements according to this data?

3. Pick a species of fish. You will make a line graph for the population of this species. (Modification: Instead of graphing all the years since 1955, graph all the even(or odd) years; every 5 years; the last 20 years, or some other subset of data.)
   Here is some information to help you design your graph:

   > *The Independent variable is always on the bottom. Therefore time (in this case years) goes on the x axis. To determine the x axis scale:
   >> How many years are recorded?
   >> Determine the increments needed to fit all the years along the bottom of your graph paper.

   > * Population is the dependent variable and therefore goes on the vertical, or y axis.To determine your y axis scale:
   >> What is the highest population recorded for your fish species?
   >> What is the lowest number recorded?
   >> What is the difference?
   >> What increment will you use on the y axis to fit all the data on the vertical side of your graph paper?

4. Plot your data points on your graph. Connect them with a line.

5. Label your graph.

6. Examine your graph. Do you see any patterns? Trends? Anomalies? Please describe your observations:

7. Can you hypothesize a cause for any of these trends or anomalies? (Fisheries biologists work years to find these answers.) A small list of possible causes may include:
   a. Overfishing in the ocean
   b. Population declines due to unknown factors
   c. Variances in how fish are counted
   d. Alterations made at the fishway making it easier for fish to pass
   e. A more southerly fish species extending its range northward
   f. ???
   g. ???

8. Conduct some research on your fish species to help you answer #7. You may access some information from HG&E website here:
   https://www.hged.com/community-environment/fishway/species/default.aspx
    OR, access information from trusted sources on the internet.

9. Share your expertise on your chosen fish species on a method of your choice:
   a. Powerpoint
   b. pamphlet/brochure

c. Creative story
d. Graphic novel
e. Research paper