

Exploring ELMR Estuary Data

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Eyes on the Estuaries at National Oceans Service NOAA

http://oceanservice.noaa.gov/education/kits/estuaries/lessons/estuaries_eyes.pdf

Waquoit Bay National Estuarine Research Reserve

The ELMR Data Base includes data on selected fish and invertebrate species in 122 estuaries along the coastlines of the United States. Each estuary is divided into one to five salinity zones. In each zone, data are provided for the relative abundance of five life stages for each of the selected species that are present. These life stages are adults, eggs, juveniles, larvae, and spawning adults. Data for each life stage for each species are provided for each of twelve months. Relative abundance is represented by a scale from 0 to 5:

0 = not present

2 = rare

3 = common

4 = abundant

5 = highly abundant

An entry of “.” means that no data are available.

Your assignment is to compare data for certain species in two or more estuaries assigned by your teacher. For each assigned species, you should find out:

- In what months is each of the five life stages present, and in what months is each stage most abundant?
- In what salinity range is each of the five life stages found during the months that it is most abundant?

The easiest way to make these comparisons is to download the necessary data, and import these data into a spreadsheet program that will allow you to sort, summarize, and graph them. Here’s how to retrieve ELMR data and import them into Microsoft Excel® using the Waquoit Bay estuary as an example:

1. Open the ELMR Data Base at <http://ccma.nos.noaa.gov/ecosystems/estuaries/elmr.html>

Read about the project, then scroll down to the ELMR Database link to access the data.

2. Select the “Region” that includes the estuary you are interested in (MidAtlantic), then the appropriate estuary name in the “Estuary” window (Waquoit Bay). You can confine your search to specific Species, Life Stages, and Salinity Zones, or just leave “ALL” selected in these windows. For now, leave “ALL” selected. Click the “Preview query” button.

3. Click the “Save as text” button. Give the file a name, then save onto your hard drive. It will be a zipped file, which you can rename and save as a text file.

4. Open the downloaded data file in Microsoft Excel®. You will get the Text Import Wizard.

Step 1. Select “Delimited,” “Start Import at Row: 1,” and the operating system you are using next to “File Origin.” Click “Next.”

Step 2. Select “Delimiters: Tab” and “Text Qualifier: “.”” Click “Next.”

Step 3. Click the “General” button under “Column Data Format.” Click “Finish.”

5. You now have a spreadsheet with all of the data for Waquoit Bay. Now, you need to make a few adjustments to this spreadsheet to make it easier to analyze:

- a) Highlight columns B and C. Under the “Format” menu, select “Column” and then “Width.” Change the width of columns B and C to 20.
- b) Highlight columns E through P. Under the “Format” menu, select “Column” and then “Width.” Change the width of columns E through P to 5.
- c) Highlight all cells by clicking on the empty cell in the upper left corner. Under the “Data” menu click “Sort.” Check the box next to “Header Row” under “My list has.” Under “Sort By” select “Common Name.” Under “Then by” select “LifeStage.” Click “OK.”

6. Prepare data summary graphs for each of your assigned species as follows:

- a. Highlight all cells in columns C through P for all Life Stages of the species you are analyzing. For this example, suppose “Alewife” is one of your assigned species; so you would highlight cells C2 through P16
- b. Click on the Chart Wizard icon. Select “Column” under “Chart type” and the upper left icon under “Chart sub-type.” Click “Next.”
- c. Click the button next to “Rows” under “Series in.” click the “Series” tab, and remove all life stages except “Adults” and “Spawning.” Click “Next.” Click “Next.”
- d. Click the “Titles” tab. Enter a title for your chart (such as “Alewife Adults and Spawning”). Enter “Month” in the “Category (X) axis:” box and “Abundance” in the “Value (Y) axis:” box. Click “Next.”
- e. Click the button next to “As new sheet” and enter the name that you want to appear on the tab for your chart in the spreadsheet workspace. Click “Finish.” You now have a column chart that shows the relative abundance of alewife adults, and spawning adults in each salinity zone for each month.
- f. If you want to print your chart and do not have a color printer, you may want to change the column fills to black and white patterns. To do this, double click on one of the columns on your chart. The “Format Data Series” dialogue box will open. Click on the “Patterns” tab, then the “Fill Effects” button under “Area.” Click the “Pattern” tab. Select black in the window under “Foreground:” and white in the window under “Background:” Windows containing the various pattern options should appear under “Pattern:” Select the pattern you want, be sure it looks OK in the “Sample” box, then click “OK.” Click “OK” in the “Format Data Series” dialogue box. The column on your chart should now contain a black-and-white fill pattern. Repeat these steps for the other columns.
- g. Repeat steps a. and b. Click the button next to “Rows” under “Series in.” Click the “Series” tab, and remove “Adults” and “Spawning” life stages. Click “Next,” and repeat steps d. and e.

You now have a second column chart that shows the relative abundance of alewife eggs, larvae, and juveniles in each salinity zone for each month. Adjust the column fills if necessary.

7. Use your chart to find out:

- a. When are spawning adults most abundant?
- b. When are eggs most abundant?
- c. When are larvae most abundant?
- d. When are juveniles most abundant?
- e. When are adults most abundant?
- f. Are any of these life stages more abundant in certain salinity zones?

For the Waquoit Bay alewife example, adults are most abundant in March through July and juveniles are abundant from April through November.

Look at ELMR data for alewives in the Connecticut River or another estuary. Different life stages of alewife appear to have different salinity preferences. Alewife eggs and larvae are found only in salinities of 0 - 0.5 ppt. Juveniles are also confined to this salinity zone during April, May, June, and July; but are found in the 0.5 - 25 ppt salinity zone between August and November, and in the >25 ppt zone between September and November. Alewife adults are found in all three salinity zones, but spawning adults are only found in the 0 - 0.5 ppt zone.

8. Discuss possible reasons for seasonal variations in the abundance of different life stages. What effect could severe storms or prolonged drought have on your assigned species?

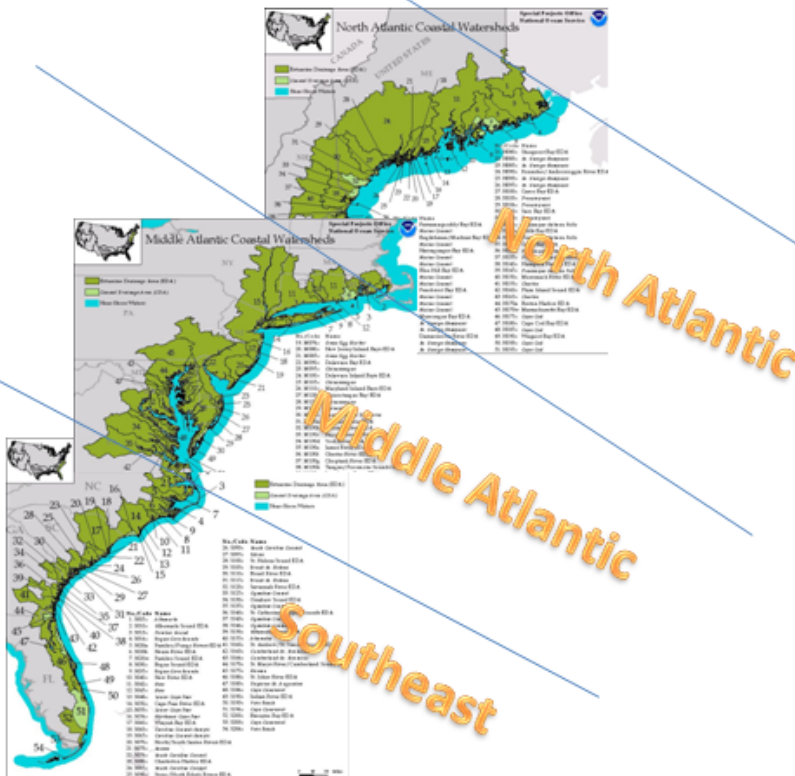
Background Information about NOAA's ELMR database.

NOAA's Estuarine Living Marine Resources (ELMR) Data Base <http://biogeo.nos.noaa.gov/products/elmr/>
[Query the ELMR Database](#)

In 1985, NOAA launched the Estuarine Living Marine Resources (ELMR) Program to develop a consistent data base on the distribution, relative abundance, and life history characteristics of ecologically and economically important fishes and invertebrates in the Nation's estuaries. The Nationwide ELMR data base includes information for 153 species found in 122 estuaries and coastal embayments. The data base is divided into five study regions - West Coast, Gulf of Mexico, Southeast, Mid-Atlantic, and North Atlantic. For each species, five life stages are considered - adults, juveniles, larvae, spawning, and eggs - with some exceptions. Each estuary is subdivided into one to five salinity zones. Relative abundance is ranked by month for each life stage of each

species, in each salinity zone of each estuary.

Eastern USA Coastal Watersheds



A series of reports have been published which summarize the methods and results of the ELMR Program.

These include a National report (2000), regional data summary reports for the North Atlantic (1994), Mid-Atlantic (1994), Southeast (1991), Gulf of Mexico (1992), and West Coast (1990), and regional life history summary reports for the West Coast (1991) and Gulf of Mexico (1997). Copies of all reports are available free upon request.

Map composed of images from: <http://coastalgeospatial.noaa.gov/gallery.html>

ELMR relative abundance data can be downloaded from this website, by using the search keys for Region, Estuary, Species, Life Stage, and Salinity Zone as follows:

1. Select Region (GULF OF MEXICO, MIDATLANTIC, NORTH ATLANTIC, SOUTHEAST, OR WEST COAST). A list of estuaries within the selected region will appear.
2. Select Estuary or estuaries within the region.
3. Select Species, but remember that not all species occur in all regions.
4. Select Life Stage (ADULTS, EGGS, JUVENILES, LARVAE, SPAWNING, or ALL)
5. Select Salinity Zone. Each estuary contains one to five salinity zones.
6. Click the “Preview Query” button. Data will appear on your screen, along with a record of the search parameters.
7. Click the “Save as text” button to download a file of the displayed data.

The downloaded data file will contain sixteen fields - Estuary, Common Name, LifeStage, Salzone, and twelve months (J F M A M J J A S O N D). Data on monthly relative abundance rankings are interpreted as:
. = no data available 0 = not present 2 = rare 3 = common 4 = abundant 5 = highly abundant

For more information on the ELMR data base, or to request publications, please contact Moe Nelson, phone (301) 713-3028 x154, email david.moe.nelson@noaa.gov