



Searching for Striper Spawn

By Liz Duff

Mass Audubon ©2009

Learning Goals: Students will gain better understanding of the scientific process, and the interconnections between ecosystems on a large scale, wildlife, and humans.

Objectives:

Students will develop skills in analyzing data.

Students will understand these ocean literacy concepts:

5. The ocean supports a great diversity of life and ecosystems.

f. Ocean habitats are defined by environmental factors. Due to interactions of abiotic factors such as salinity, temperature, oxygen, pH, light, nutrients, pressure, substrate and circulation, ocean life is not evenly distributed temporally or spatially, i.e., it is “patchy”. Some regions of the ocean support more diverse and abundant life than anywhere on Earth, while much of the ocean is considered a desert.

Science Frameworks: Inquiry, Life Science(Biology) Gr. 3-5:Characteristics of Living Things 3, Evolution and Biodiversity Gr. 3-5: 7, Gr. 6-8: 17, Ecology: Living Things & Their environment Gr. 3-5: 8, 10, HS: 6.1, 6.2.

Timeframe: (Prep, Implementation)

Initial Prep: Visit the website and try the activity yourself. Make sure links are functioning and you are able to understand how it works. 30-45 minutes.

Classes: Implementation 45-60 minutes.

Grade Level(s): Grade 5-12

Class 1:

Engaging Experience(s): Invite students to share personal experiences with fish/ fishing and/or share your own experiences fishing.

Vocabulary:

Estuary: Coastal water body where ocean tides and river water merge;

Salinity: The degree of saltness of the oceans, seas, lakes, and rivers, usually expressed as the number of parts per thousand,

Spawn: To produce or deposit (eggs), as fishes or frogs do.

Materials:

Worksheets Maps 2 & 3 showing the North Atlantic and Mid Atlantic regions. Pencils.

Computer access for the class. ELMR Website: http://www8.nos.noaa.gov/biogeo_public/elmr.aspx

**Preparation:**

Photocopy maps and worksheets. You may want to bookmark the website on computers in advance.

Facilitation Guidelines.

1. Ask students whether they have gone fishing for striped bass before. If yes, ask what months did they go fishing for the stripers. (Some people say “If it’s June in Joppa, there are striped bass.) Ask if they know whether the stripers are there year round, or if they are only seasonally.
2. Explain that there is a great database that holds data on selected fish and invertebrate species such as crabs, shrimp, and lobster in 122 estuaries along the coastlines of the United States.
3. Explain that the class will be investigating that data base to see if Stripers are born in the coastal region nearest to them, and to also see what regions the stripers are spawning in.
4. Optional follow-up: they will use the database to investigate additional questions of their own.

Class Two (or Homework): Have students investigate a question of their own (or in pairs or teams) and present their results.

Class Three: Investigate the role of temperature on striped bass and its prey.

Class Four: As a class, investigate the potential impact of a warming climate on striped bass. Investigate and debate possible management possibilities.

Follow up striped bass information:

For a Species Profile from the

Mass Division of Marine Fisheries go to.

<http://www.mass.gov/dfwele/dmf/recreationalfishing/stripedbass.htm>

Name _____

Date _____

Region	Name of estuary	Indicate what life stages of striped bass are present. A =Adult E = Eggs J = Juvenile L = Larvae S= Spawning All = All	What months are striped bass present?	What is the salinity level when eggs are present?
North Atlantic	Kennebec/ Androscoggin Rivers			
North Atlantic	Merrimack River			
North Atlantic	Massachusetts Bay			
North Atlantic	Cape Cod Bay			
Mid Atlantic	Hudson River			
Mid Atlantic	Delaware Bay			
Mid Atlantic	Chesapeake Bay			

1. Look at the distribution of different life stages of striped bass in the following estuaries: Merrimack River, Massachusetts Bay, Cape Cod Bay, Hudson River, Delaware Bay, Chesapeake Bay
2. Where and when do striped bass spawn?
3. What do you notice about typical salinity levels where striped bass spawn?
4. What are additional questions that this database could answer? Think of 3 and then investigate one.

Spawn: To produce or deposit (eggs), as fishes or frogs do.

Answer Sheet: If eggs are found in an estuary, that is evidence that striped bass are spawning there. The months that the eggs are present are the months that the fish are spawning.

Region	Name of estuary	Indicate stages of striped bass present. A =Adult E = Eggs J = Juvenile L = Larvae S= Spawning	What months are striped bass present?	What salinity are eggs present? In what salinity ranges are other stages present?
North Atlantic	Kennebec/ Androscoggin Rivers		Eggs: June-July Larva=june-Aug. Juveniles=Year round Adults=May-Nov	0-0.5 ppt
North Atlantic	Merrimack River	A, J	April-November	Not present.
North Atlantic	Massachusetts Bay	A, J	April-November	Not present.
North Atlantic	Cape Cod Bay	A, J	April-November	Not present.
Mid Atlantic	Hudson River	All	All (Eggs present April-July)	Eggs: 0-.05 and .05-25! Juveniles present in all salinity.
Mid Atlantic	Delaware Bay	A,E,J	All. (Eggs present in April-June)	Eggs: 0-.05 Juveniles not in >25 in April-Sept. (why?)
Mid Atlantic	Chesapeake Bay	A, E, J	All, (Eggs in April-June)	Eggs 0-.05 Juv < 25

2. Where and when do striped bass Spawn? April-June/July in Mid=Atlantic: Hudson River, Delaware Bay and Chesapeake Bay. Surprising to see they spawn in North Atlantic in one place (Kennebec/And. River in June/July.

3. What do you notice about salinity levels where striped bass spawn?

At most sites they spawn in fresh water. In the Hudson river they are shown to spawn in .5-25. I wonder about this data. Perhaps they are found at a site that is closer to .5. That salinity range is huge!

4. What are additional questions that this database could answer? Think of 3 and then investigate one.

Example follow up questions:

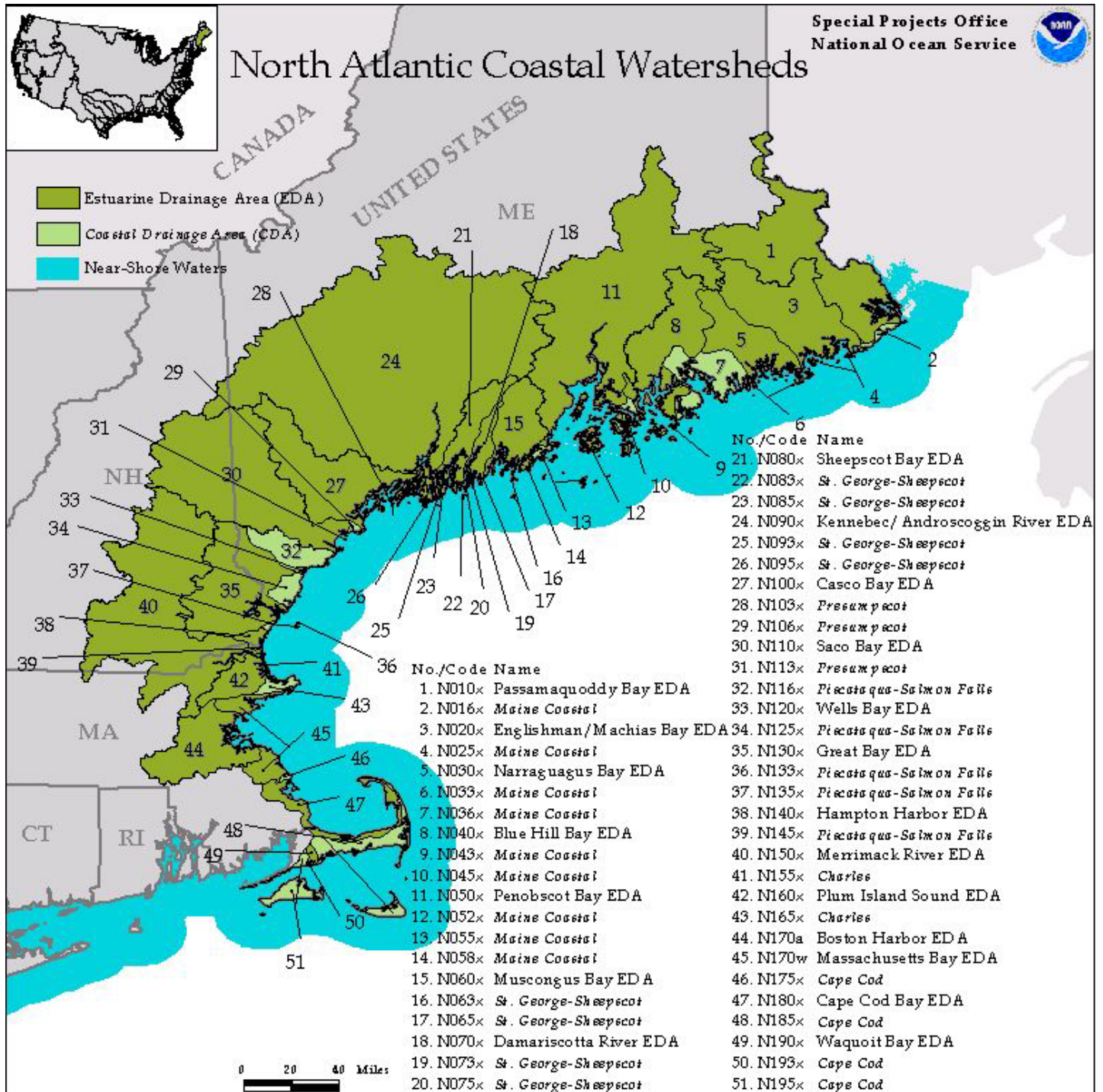
1. Where are bluefish found?
2. Is there greater diversity of fish in the North Atlantic or the Mid Atlantic?
3. Which fish are sensitive to salinity ?

5. Additional Class discussion: How might warming climate and warming ocean temperatures impact striped bass. What else do you need to know to investigate this question? Where else might you find that information?

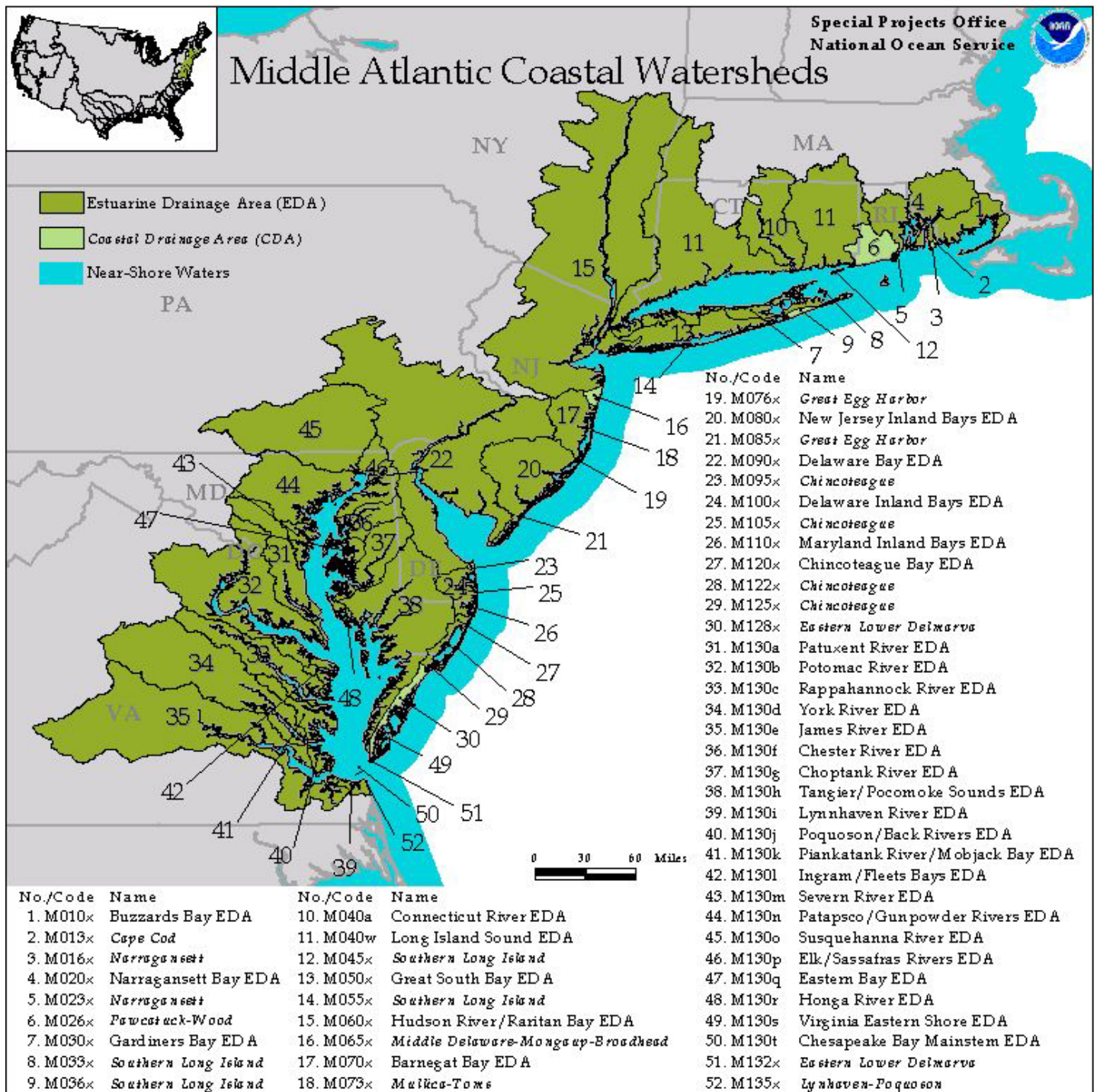
United States Atlantic Ocean Regions.
Map 1.



Map 2. http://coastalgeospatial.noaa.gov/gallery/natl_region.jpg

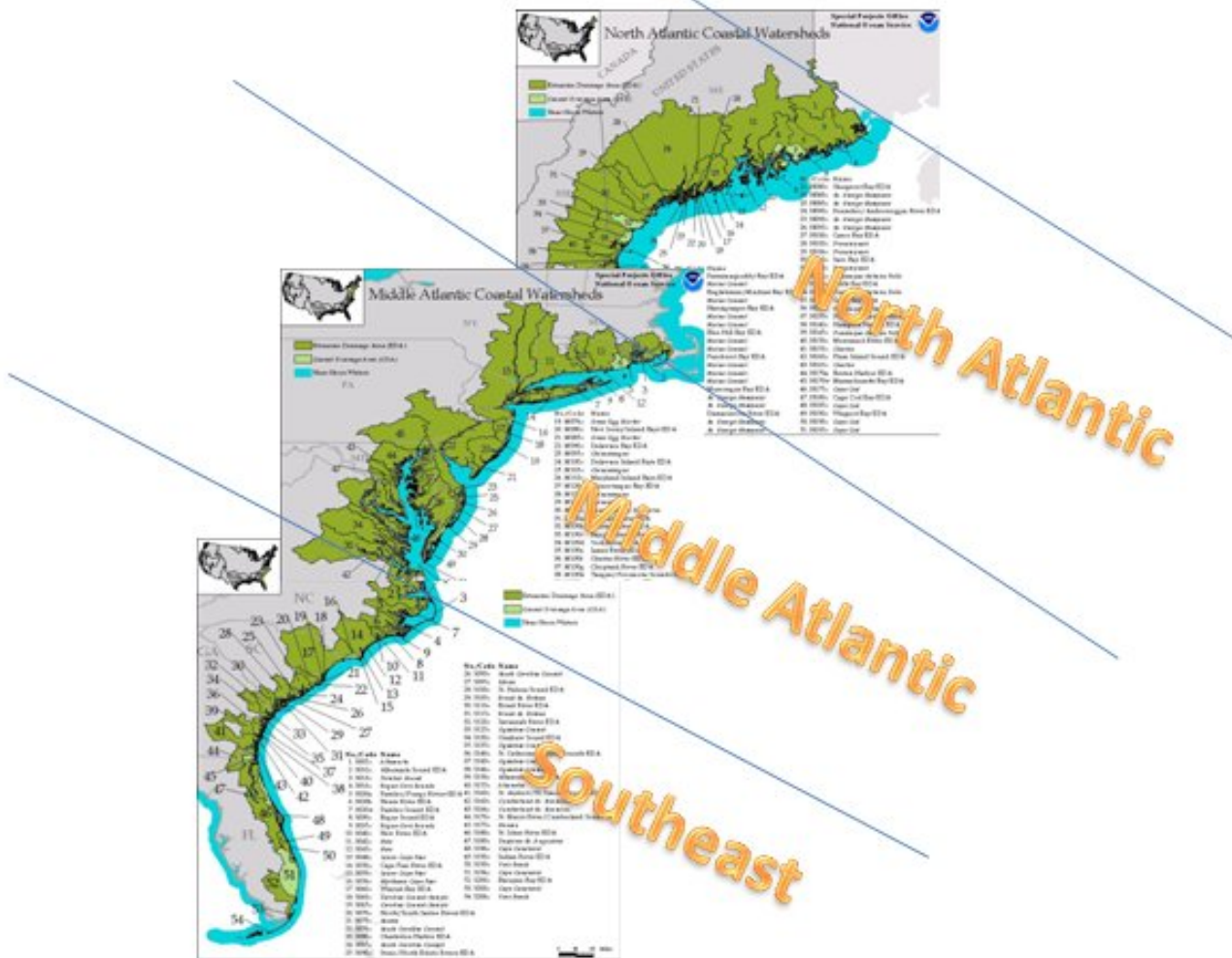


Map 3. http://coastalgeospatial.noaa.gov/gallery/matl_region.jpg



Map 4. Map compiled from images at <http://coastalgeospatial.noaa.gov/gallery.html>

Eastern USA Coastal Watersheds



Background on the ELMR database.

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.