

## Mapping the Migration of American Eels

Please complete the following activities *as a group*. Make sure you have at least one recorder of all answers and calculations. When you are done, please erase all of your marks and lines on the chart.

The **American Eel** (*Anguilla rostrata*) is an amazing fish, migrating hundreds of miles during its life cycle. These fish are **catadromous**, meaning they are born in salt water and live most of their adult lives in fresh water, including the Hudson River and its tributaries. We're going to look at nautical charts so we can determine just how far these creatures have to go.

1. Scientists are not exactly certain where eels spawn (mate and release their eggs), but it is somewhere in a region of the Atlantic Ocean known as the Sargasso Sea. This is an area of deep water, slowly turning in a clockwise direction.

- **With a dry erase marker, find and circle Miami (in Florida), Puerto Rico (a big island), and Bermuda (a little island) on the chart. Connect these three places. What shape do they make? The eel spawning area lies inside this famous shape.**
- **Scientists don't know exactly where eels spawn, but one possible area is near the coordinates of longitude 67°W and latitude 24°N. Using the degree markings on the edge of the chart, find this point on the chart, mark it with an "X", and label it "Eel Spawning Area" with a dry erase marker.**
- **Small numbers all over the chart indicate depth of the water. What unit of measurement are these depths given in? Hint: your chart should tell you.**
- **How deep is the Spawning Area? If 1 meter = 3.28 feet, what is the depth in feet?**

\_\_\_\_\_ feet

2. Juvenile eels have to swim and drift long distances to find the estuaries and fresh water streams they will live in as adults. This kind of journey is called a migration. Some eels enter the mouth of the Hudson River, located at New York Harbor, at the western end of Long Island. We are using the Hudson River as our destination in this lesson plan. However teachers from Florida to Maine can pick their own eel destinations relevant to their location, or you can have students pick different destinations to compare results. Just remember that nautical charts show lot of information in the water, but don't have a lot of political information like state borders.

- Find, mark, and label the “Hudson River” (Hint: the Hudson is by the “New York” label near the western end of Long Island).
- Draw a line between the spawning area and the Hudson River. Label this line “Migration Route.”

3. Eels can travel more than 1000 miles to get to their habitats they will live in as adults.

- Use the ruler to measure the line from the Spawning Ground to the Mouth of the Hudson. How long is it?

\_\_\_\_\_Inches

- Each inch equals 79 Land miles. How many miles is it between the Spawning Ground and the Mouth of the Hudson?

\_\_\_\_\_Miles

4. There are a few factors we didn’t consider here. Juvenile eels probably don’t travel in a straight line. They may head northwest and hitch a ride up the Gulf Stream, a wide north-flowing current marked on the chart as a line of squiggly arrows.

- Repeat exercise 3, but this time re-draw the migration route as best you can taking the Gulf Stream and other current effects into account. What is your final distance for this estimated migration route?
- Repeat exercise 3, but this time re-draw the Migration Route taking the Gulf Stream and other current effects into account (your best estimate). What is your final distance for this Estimated Migration Route?

\_\_\_\_\_Inches

\_\_\_\_\_Miles

American eels can be found along much of North America's east coast, even north to Canada. The leaf-shaped larvae (*leptocephali*, or "thin heads") transform into transparent "glass eels", then pigmented "elvers", and grow into larger "yellow eels". Even after reaching the coast, many eels, especially females, continue up rivers and streams for dozens of miles looking for good habitat in which to live and grow. After five to twenty years, American eels become mature "silver eels" and begin their long journey back to the Sargasso Sea. They undergo remarkable changes once again. Their eyes become large, their digestive system slows down, and their skin turns black and silver. Scientists think large females may lay up to 20 million eggs when they spawn and eventually die, their long-distance marathon finished at last.

**Challenge Questions:** Brainstorm in your groups, then share answers as a whole class. There is no one "right answer" for any of these questions.

A. How do eels know where to go when they return to the Sargasso Sea as adults? How do they navigate?

B. Eel populations have declined in many places. What are some possible causes of eel decline? What can you do to help conserve eels and keep them thriving in our rivers?