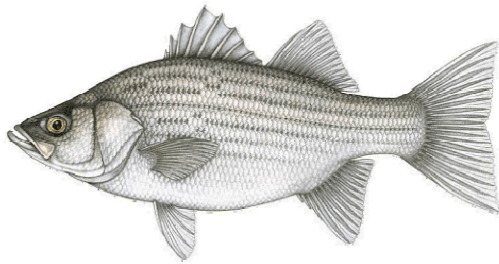


# Animal Migrations and Ocean Temperature

*Ideas for a Secondary Research Project*



If you have spent any time in, on, or near the ocean you know that the temperature of the water in many areas can change from season-to-season, day-to-day, and even hour-to-hour. As humans, we tend to only want to swim in the ocean if it is very warm (unless we have a wetsuit on). Since waters around Florida are typically warm, we can swim there year-round. In New York, the water is warm between July and September. But in Massachusetts, it might only be warm enough to swim in August.



Just like us, fish and other animals that live in the ocean have their own preferences. Some prefer warm waters, some like it cold, and others don't mind at all. Since the temperature of the ocean changes daily, and throughout the year, animals that prefer a constant temperature must move, or *migrate*, to waters they can live in. It is important

for us to understand the kinds of *habitats* animals and plants like to live so we can manage fish stocks well to prevent *over-fishing*.

Once we know the temperature range a particular species prefers to live in, we can map where they might live throughout the year if we have a map of the ocean's temperature. We can also use this information to determine their migration pattern. For example, adult *Striped Bass* prefer water temperatures between 20-23°C. Sensors on satellites hundreds of miles above the Earth provide the ideal place to map ocean temperatures over a large area. The satellites send the information back to Earth where colored *Sea Surface Temperature* (SST) images, or maps, are created to show the temperatures of water in different areas. Red typically indicates the warmest temperatures, and blue and purple areas are the coldest.

You can use the same SST maps scientists use to determine where fish like Striped Bass prefer to live throughout the course of a year. By measuring the temperature of several locations along the Mid-Atlantic coast, you can determine when they might be found at each point.

## ***Things to Think About Before You Start Your Research***

- What is a habitat?
- What is the preferred habitat of Striped Bass (or another species like dolphins or tuna)?
- How do Striped Bass (or another species) migrate?
- Why are phytoplankton important in the ocean?

## Research Questions

- Are ocean temperatures related to seasons?
- Is the migration of Striped Bass related to temperature? Over the course of a year, during which months are you likely to find Striped Bass off North Carolina (76W/35N), New Jersey (74W/40N), and Massachusetts (70W/42N)?
- Does the Gulf Stream flow along Long Island? (Compare 74W/35N and 72W/40N)
- Does the shallow continental shelf around New York influence ocean temperatures? (Compare 72W/40N vs. 64W/36N. Concept: heat capacity.)

## Cool Datasets



Daily images of Sea Surface Temperature for the Mid-Atlantic are available from RU COOL (that's at Rutgers University). This site provides easy access to data going back many years. Additional maps from Florida to Maine are also available. We recommend choosing one good colorful image per month, as close to the same day as possible, for

your analysis.

[http://marine.rutgers.edu/cool/sat\\_data/?product=sst\\_comp&region=bigbight](http://marine.rutgers.edu/cool/sat_data/?product=sst_comp&region=bigbight)

Just like many animals on land eat grass, animals in the sea eat *phytoplankton*. Ocean Chlorophyll maps show where this ocean “grass” is growing, and where many other animals can be found.

[http://marine.rutgers.edu/cool/sat\\_data/?product=chlor&region=bigbight](http://marine.rutgers.edu/cool/sat_data/?product=chlor&region=bigbight)

## Example References

- StriperTracker – <http://stripertracker.org/>
- COOL Classroom Satellites – [http://coolclassroom.org/whats\\_cool/remotesensingsat.html](http://coolclassroom.org/whats_cool/remotesensingsat.html)
- The COOLroom – [http://www.thecoolroom.org/fishermen/fish\\_help\\_sst.htm](http://www.thecoolroom.org/fishermen/fish_help_sst.htm)