

Introduction



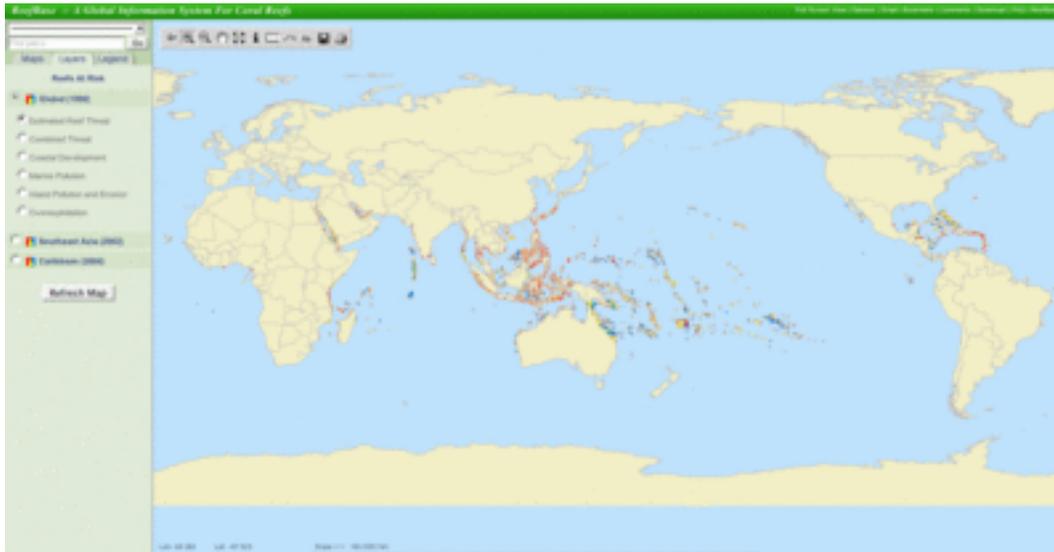
Diver measuring coral. Photo courtesy of [NASA](#).

In the previous lab, you explored the characteristics of the ocean environment in which coral reefs thrive. Unfortunately, there are a number of factors, both natural and anthropogenic (resulting from human activities), that can alter the ocean environment and threaten the health of coral reef ecosystems. In this activity, you will examine the three main factors that disrupt corals.

After completing this investigation, you should be able to:

- use a Geographic Information System (GIS) tool to evaluate threats on coral reefs;
- explain how certain fishing practices, pollution, and climate change can damage coral ecosystems; and
- describe the predicted consequences for coral reefs.

Part A: Reefs at Risk in the Caribbean



http://d32ogoqmya1dw8.cloudfront.net/images/eslabs/corals/reefgis_reefs_risk.gif

World view of reefs at risk using ReefGIS. Map provided by [ReefBase](#). Click on image for a larger view.

According to a recent article in *Science*, over 30% of the world's 700+ species of reef-building corals are threatened with extinction, making coral the most endangered species on the planet. Just one decade ago, as little as 2% of corals were considered to be endangered. What could possibly be to blame for this overwhelming and rapid decline in coral reef health and stability? Unfortunately, human activities, including fishing, pollution, and coastal development, are largely at fault. In this part of the lab, you will use the ReefGIS tool to examine the severity of risks faced by coral reefs in and around the Caribbean Sea. You will also explore the human activities that are generating the most harm to reefs in this region.

A **Geographic Information System (GIS)** is a tool used to explore and analyze spatial geographic data. These data are often displayed on a map in various layers that can be viewed separately or simultaneously to reveal patterns and relationships. ReefBase's Online GIS (ReefGIS) contains a series of interactive maps displaying coral reef data from around the globe.

1. Open [ReefGIS](#) in a new window. You will see a world map showing the locations of coral reefs around the globe in gray.
2. Click on "Reefs at Risk" in the map list on the left-hand side of the screen to switch to a view of endangered coral reefs.
3. To look at the most recent data available for the Caribbean region, click on the white circle to the left of the "Caribbean (2004)" label. This will bring up additional choices for viewing maps of reef locations and the threats faced by the reefs in this region. For now, keep the default setting and click the "Refresh Map" button.
4. Click on the "Legend" tab in the left-hand navigation bar to view the map legend.

5. Examine the map carefully. This layer shows the locations of coral reefs in the Caribbean region, color-coded by the estimated threat level faced by each reef. Blue = low threat level, orange = medium threat level, red = high threat level, and dark red = very high threat level. To learn more about the Caribbean (2004) data and what each threat level indicates about the status of reefs, click on the "More Information" link above the map legend.

6. NOTE: If you navigate away from ReefGIS, you may need to refresh the map when you return to the ReefGIS browser window.

Stop and Think

1: Describe your initial impression of the status of coral reefs in the Caribbean. Are the overall threat levels higher or lower than you expected?

2: Predict which human activity you think is the largest contributor to coral reef threats in the Caribbean. Explain your choice.

NOW: Switch the map view to show the overall threat levels for the entire Caribbean region (not just coral reefs). Click on the "Layers" tab in the left-hand navigation bar. Then click on the white circle in the "Threats" column next to "Overall" and the "Refresh Map" button. This new view includes threat risks to coral reefs as well as those faced by

coastal reefs.

Describe how the Overall "Threats" view differs from the Overall "Reefs" view. What do you think this means for the future health of coral reefs in the Caribbean? Explain.