

Chapter 3 MAPPING EARTH

3.3 Bathymetric Maps

You just learned how mountains and valleys on land are represented on a topographic map. Mountains and valleys also occur on the bottom of the ocean. A **bathymetric map** shows the depths of a body of water, such as an ocean, and indicates mountains and valleys where the water is shallower or deeper. Imagine if all the water was drained out of an ocean, and then a map was drawn of how the ocean bottom looks. That's what a bathymetric map (bath map for short) shows.

Showing depth

Contour lines As with elevation, the depth of a body of water is compared to sea level. Bathymetric maps often use contour lines to show depth. Look at Figure 3.19. Can you tell which part of the lake is deepest? Keep in mind that the numbers you see in this graphic are meters *below* sea level!

Using color Color is also used to show depth in a lake or an ocean. In the image below, shallow areas are light blue and deep areas are darker blue. Find the long undersea mountain chain in the middle of the North Atlantic Ocean. This is called the Mid-Atlantic Ridge. You'll learn more about this ridge in a later chapter.



VOCABULARY

bathymetric map - a map that shows the depths of a body of water such as a lake or an ocean.

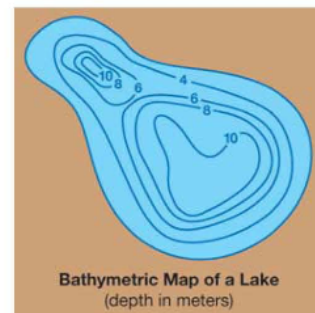


Figure 3.19: A bathymetric map of a lake. Where is the deepest part of the lake? Where is the shallowest part?

Technology and making bathymetric maps

How do you map the bottom of the ocean? A bathymetric map is a map that shows a body of water with all the water missing. You can't drain all the water out of an ocean or a lake. So, how do scientists make bathymetric maps?

How deep is the ocean? The average ocean depth is 3,711 meters (12,175 feet) and the deepest place of all is the Challenger Deep in the Mariana Trench (located in the Pacific Ocean, near Guam) which is 10,923 meters (35,838 feet). Scientists measure these depths using a technology called *echo sounding* or *sonar*.

Echo sounding Echo sounding uses sound waves to measure the distance to the bottom of a body of water. A device on a ship sends sound waves outward from the bottom of the ship (Figure 3.20). The sound waves "echo" off the ocean floor. The time it takes for the echo to return to the ship and the speed of sound in water are used to calculate the depth of the ocean in that location. The combined data for many areas can be used to map the ocean floor (Figure 3.21).

Nautical charts Nautical charts are important tools for people who are interested in navigating bodies of water. The nautical chart to the right shows a harbor of Puerto Rico. Land is indicated in yellow and water in blue. The contour lines on the yellow region show elevation on land. The contour lines in the blue region show depth of the water. Depths at single locations are indicated by numbers.

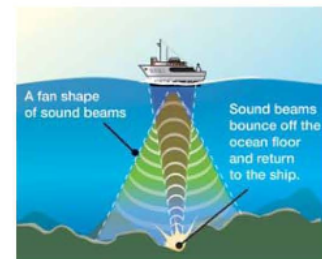
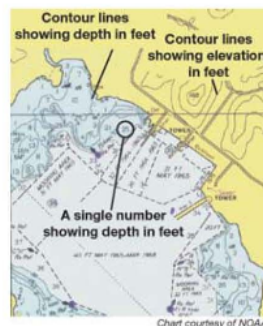
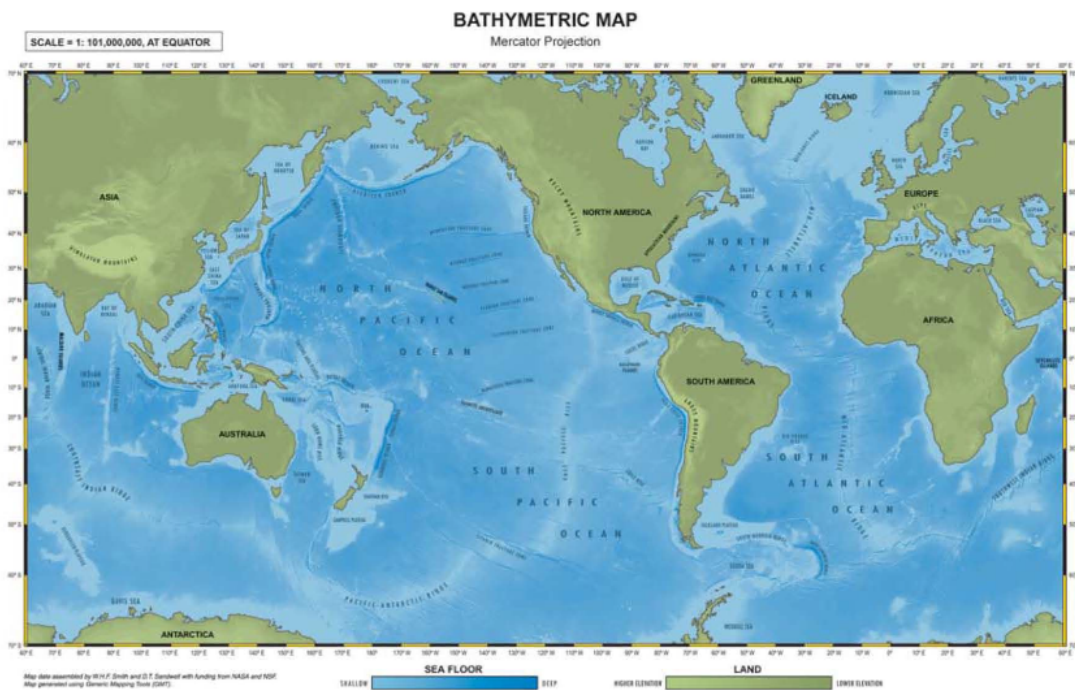


Figure 3.20: Echo sounding.



Figure 3.21: A bathymetric map of the ocean floor. Color is used to show elevation and depth. The islands are green and mountains on these islands are yellow. The deep Puerto Rico Trench is purple and the other parts of the ocean floor are bright blue. See if you can find this location on a globe!

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Section 3.3 Review

1. Name two ways that you could show depth on a bathymetric map.
2. Describe how sound waves are used to map the bottom of a lake. What is this technique called?
3. Look at the bathymetric map below.
 - a. Which region is 200 meters deep on average at its edge?
 - b. What single feature is 4,000 meters deep on the abyssal plain?
 - c. What is the range of depth for the region of the ocean floor called the continental rise?
 - d. Which ocean is featured in this bathymetric map?
 - e. Which coast of the United States is featured on this map—the east or the west coast?



CHALLENGE

Write a paragraph that compares and contrasts a bathymetric and a topographic map.



JOURNAL

Search a local or national newspaper for articles about the bottom of the ocean. Gather your articles and any other information you find into a folder. Use the facts you find to write a story about the ocean floor.

