

Details



Completion Time: About 1 period

Permission: Download, Share, and Remix

3D Bathymetry

Overview

Scientists use bathymetry to understand the ocean floor. This lesson is a basic introduction to bathymetry using salad trays to help students understand how bathymetric maps work.

Objectives

1. Students will be able to identify the advantages to using a bathymetric map.
2. Students will be able to transform a bathymetric map into a three-dimensional model.
3. Using just a bathymetric map, students will be able to determine a rough estimate of the difference in depth of two different areas.

Lesson Preparation

Make copies of the maps you would like to use. You may need to reduce or enlarge the maps to fit each of the trays.

Procedure

1. Make one master copy of the bathymetric map for each group. Using scissors, trim the master copy so that it just fits the flat bottom of the inside of a salad tray. Getting the fit as tight as possible will help you put the master copy in the same position in each salad tray, and this will help the contour lines on the salad trays line up properly.
2. Position the master copy in the bottom of a salad tray, with the darkened contour lines against the plastic. Secure with tape so the master copy won't move while you are tracing.
3. Looking through the bottom of the salad tray at the master copy, use a permanent marker (black seems to work best) to trace one contour line onto the salad tray. Tip: Oil from your hands can prevent the marker from writing on the plastic. A tissue beneath your writing hand (and used to wipe each tray before you start

Materials

- 7-8 salad trays for each group (available at restaurant supply stores like Smart & Final, local delis or any place that uses them for take-out food or salads), square work better than round
- Permanent marker for each group
- Copies of maps

tracing) will help.

4. Remove the master copy and position it in a second tray. Trace another contour line onto the second salad tray.

5. Continue until you have a different contour line on each salad tray. Add the name of the feature, a scale bar (showing how long a mile is, for example), and a north arrow on the top or bottom salad tray. Label each tray with the elevation of the depth line on that tray. Stack them up and be amazed!

6. Ask students to compare their bathymetric map to their drawing. Do any particular features stand out?

7. Pick two spots on their model and ask them how far apart they are in depth? Do the same with the bathymetric map and help them if they have difficulties.

Extension

This was originally intended to teach students about topographic maps and you can use this to teach about them as well. If you follow the link, there is a map of Angel Island that you can use for this extension.

In addition, if you would have a bathymetric map of a local feature, you may use that map instead. Once you have the correctly sized photocopy, use a marker to darken just those contour lines you want to transfer to salad trays. This is confusing for students and first time map users, so do this step for them unless you have advanced students. In picking the top lines to transfer, remember two things:

- The difference in elevation between adjacent pairs of contour lines should always be the same. This difference is called the contour interval.
- The models seem to work best if you have 7 or 8 contour lines (equal 7 or 8 salad trays).

Resources

http://online.wr.usgs.gov/outreach/topo_instructions.html

Assessment

Teachers should check to see that the contour lines on the salad trays match those of the map they were given. An extension would be to have students look at different maps and then describe the type of underwater surface feature they see in each of the maps.

Credits

Amber Lancaster/US Geological Survey



National Science Education Standards (NSES)

Content Standards, Grades 5-8

Content Standard E: Science and Technology

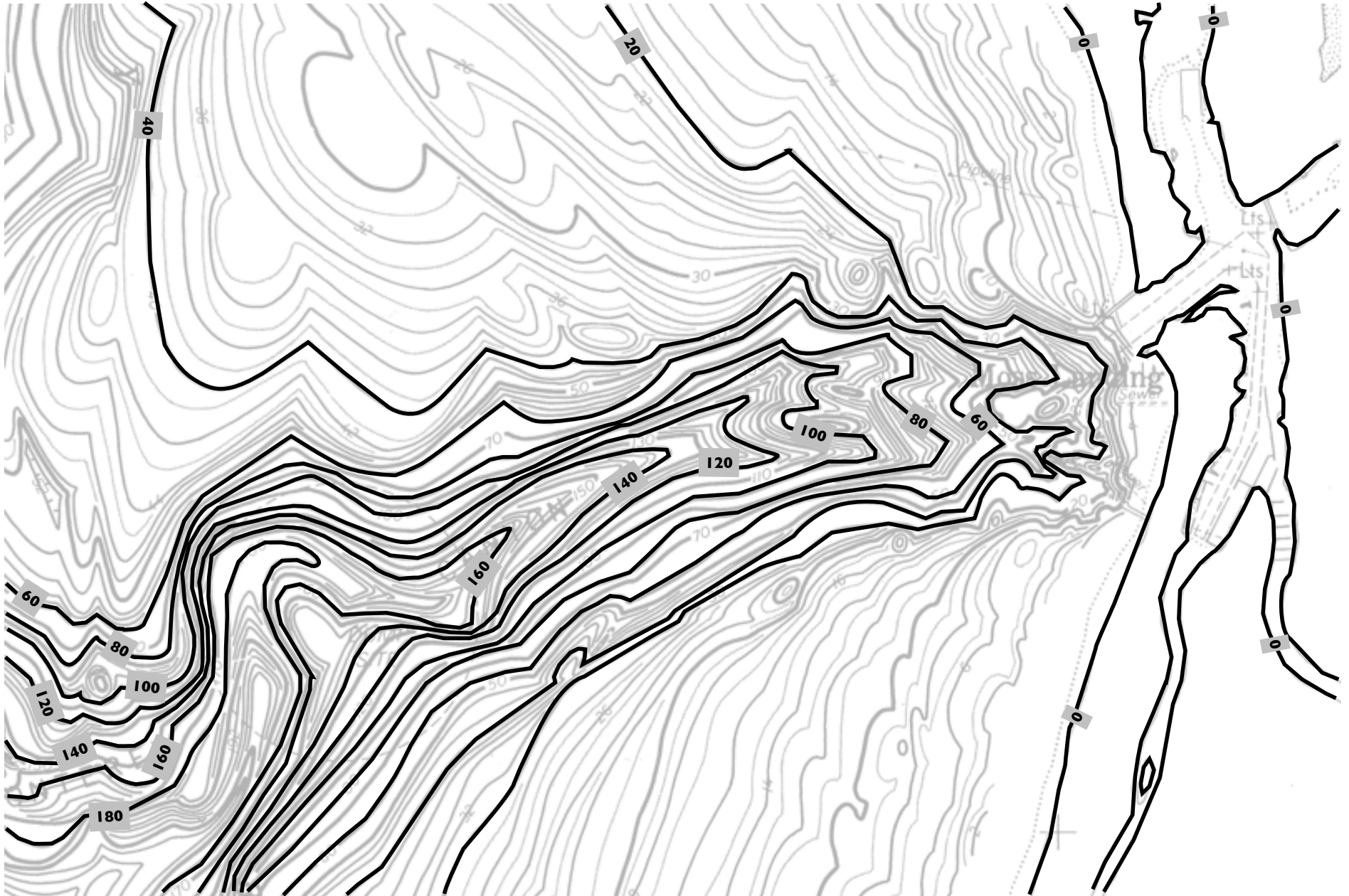
b. Understandings about science and technology

Content Standards, Grades 9-12

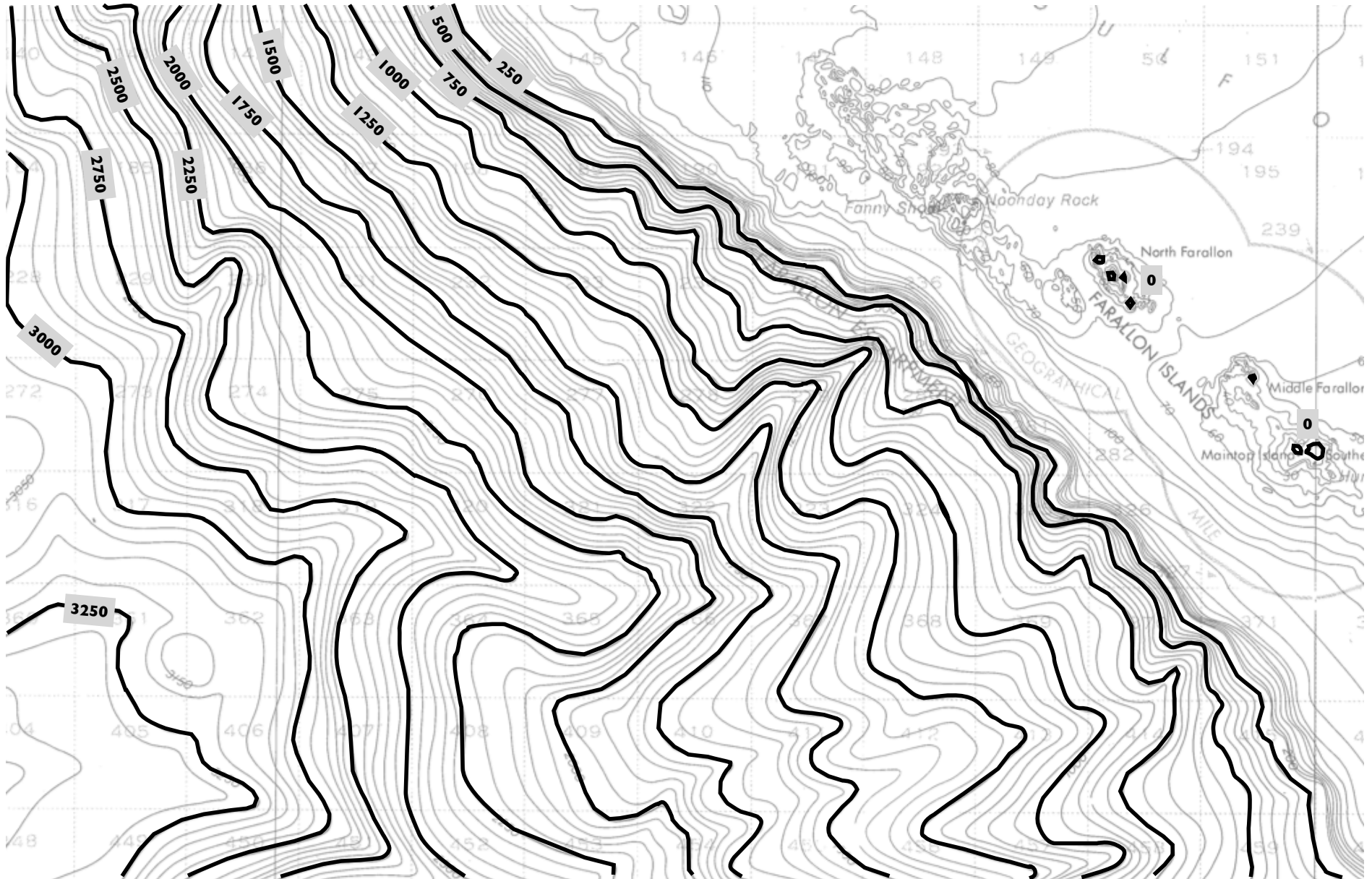
Content Standard E: Science and Technology

b. Understandings about science and technology

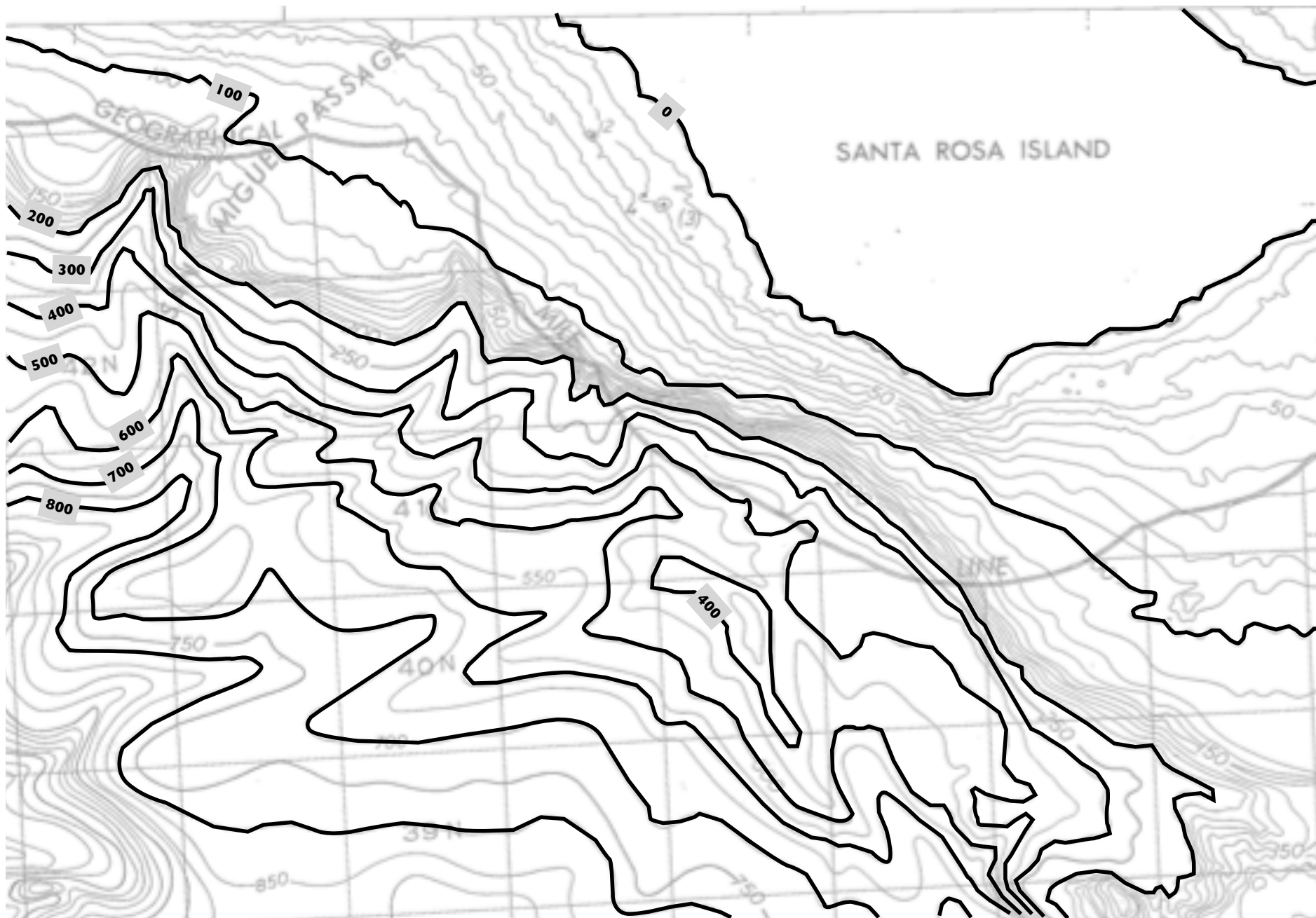
Elkhorn Slough (near Santa Cruz, CA)



Farallon Islands/Coastal Shelf

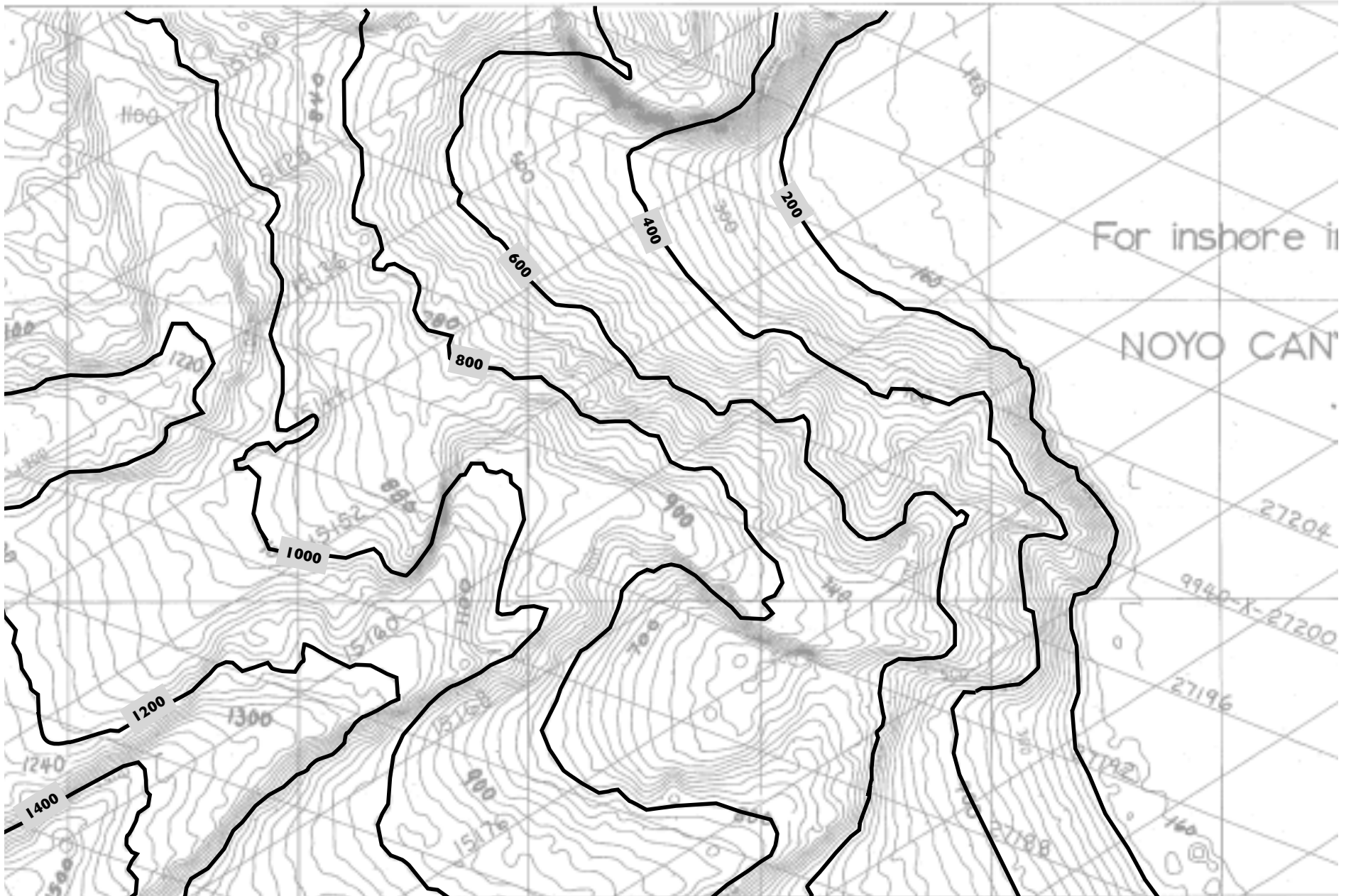


Santa Rosa Island



Noyo Canyon

24° 21' 00" -124° 18' 00" -124° 15' 00" -124° 12' 00" -124° 09' 00" -124° 06' 00"



Seamounts near Cape Mendocino

