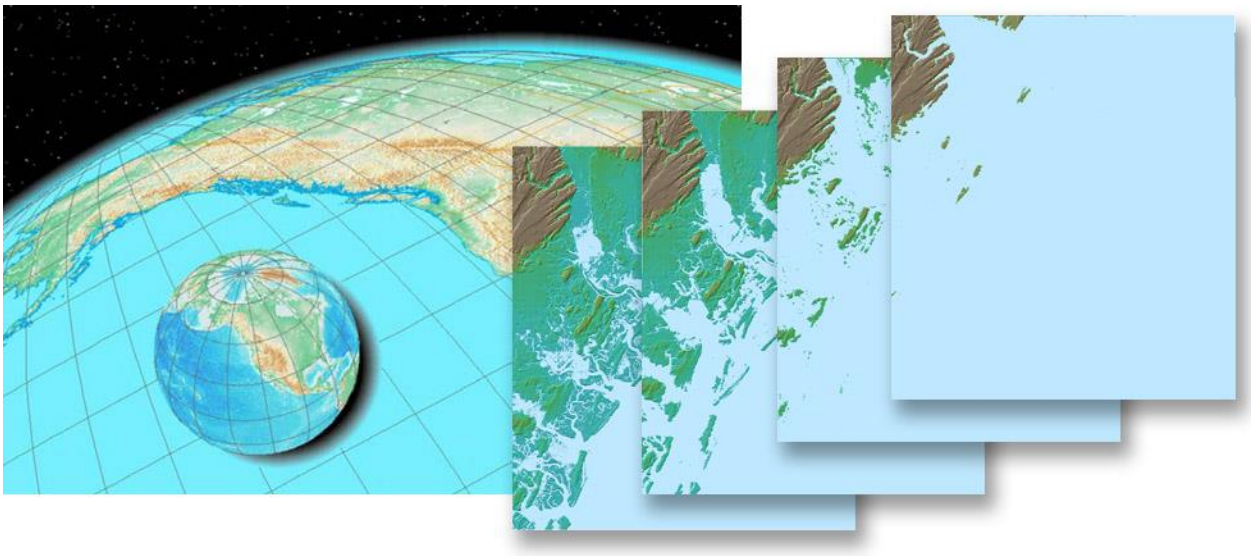
Exercise 5a: Data Download and Prep for Sea Level Rise Exercise

National Geophysical Data Center (NGDC)
ArcGIS Online

Due: At the start of class on Monday September 19.
Task: You will download a bathy-topo DEM for a coastal region that you are assigned (see list last page), a world bathy/topo DEM, and county outline maps for the US. **Note: during business hours, NOAA's NGDC site can be very slow. If you do your download on the weekend or in the evening, it should take only 10 minutes to download a bathy-topo DEM from the NOAA site. During the day in the middle of the week, it can take 3-4 hours. Plan accordingly.**
Prepare: a folder on your hard drive with well-labeled folders inside to contain the data indicated in these instructions. Add to your data sources spreadsheet as you download the data.



A word to the wise for this assignment: over the next two weeks, you will be downloading many, many files of different types for Exercise 5, and many of them will download with inscrutable names. Good file management and careful (and meaningful!) naming will be crucial to avoiding wasted time and needless frustration.

World map graphic from http://mappingcenter.esri.com/index.cfm?fa=resources.gatewayPresentation
"Making Beautiful Maps", 2010 presentation by Buckley, Akella, and Richards.

Part I. Bathy-topo DEM from the National Geophysical Data Center

A. Data download

1. This data download **can** be done on a Mac.
2. Go to the National Geophysical Data Center, www.ngdc.noaa.gov/mgg/coastal/coastal.html and poke around the site to find out what kinds of GIS data are available free from the NGDC at NOAA. Really drill down to see what's there – don't just be satisfied with a cursory look at a couple of pages. What kinds of data are available from the NGDC that you could use in a GIS analysis?

   Be sure to add some of this to your portfolio.
3. You'll see that the data are referred to as "1/3 arc-second" data, "1 arc-second" data, "3 arc-second" data, "24 arc-second" data, "8/15 arc-second", etc.. What does this mean? Do a little sleuthing to see what resolution in m/pixel corresponds to each of these data resolution:

   1/3 arc-second = m/pixel
   8/15 arc-second = m/pixel
   1 arc-second = m/pixel
   3 arc-second = m/pixel
   24 arc-second = m/pixel

4. Go to the following NGDC page, where you can download NOAA Tsunami Inundation DEMs: http://www.ngdc.noaa.gov/mgg/inundation/. Read a little about NOAA's tsunami inundation project. What did you learn?

5. Click on one of the red rectangles on the key map to take you to the search for DEMs available for that region. Don't bother with the advanced search – just choose your state and region and view all the DEMs. Notice that the cell sizes are different. Why might you want 1/3 arc-second data, instead of 3 arc-second data? Why might you want the reverse for a particular project?

6. Using the DEM Name hot links, browse the various DEMs available at 1/3 arc-second resolution for the region you've selected. Each one has a thumbnail. Then go back to the index page, and choose a new region, and browse those 1/3 arc-second DEMs. Repeat for all of the regions. What interesting things did you learn by looking at the various thumbnails?

7. Go back to the main NGDC coastal site (step A.2 above). Check the list on page 6 of this handout to see what you've been assigned to download and from which page. Download the DEM that you have been assigned. If there is more than one DEM for your area, download the **1/3 arc-second DEM** with the **MHW vertical datum**.

B. Data prep

1. Decompress the data in Windows Explorer using **Extract All** (remember that the files won't show up in ArcCatalog until they are unzipped).
2. Launch ArcCatalog, and **remember to check to make sure that, under Geoprocessing options, you have <u>unchecked</u> enable background processing.** You want the geoprocessing dialog box to come up so that you can see the progress of any operation you do.
3. Open the DEM file in ArcCatalog, and you'll see that your DEM is a **.asc** file (an **ASCII** file, pronounced *ass-key*). Click on the .asc file in the CT, and build Pyramids. Preview once you've built pyramids, and you'll see the familiar gray square. **Calculate statistics,** and you can now preview your DEM.
4. Even though the Preview works, ArcMap can't read ASCII files, so you will need to convert from ASCII to raster. Do a tool search for *ASCII to raster*, and run the tool. Drag and drop does not work – you will need to browse to your .asc file using the folder next to the Input line.
   a. Be sure to choose **Float** for integer type.
   b. Be sure to give the file a **short, meaningful name** instead of accepting the long default.
5. Preview the file and make sure it looks good.
6. Check the metadata. No coordinate system is defined! But, you know what to do. Go back to the data download page, and check the metadata. The data ***have*** a CS; you just need to define it in ArcMap. You should know what to do at this point, so go do it! What did you do, and why?

Part II. World bathy-topo DEM from NOAA

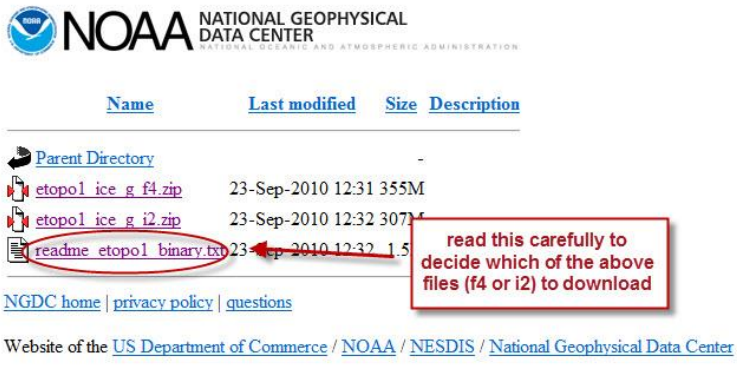
A. Data download

1. For this assignment, you will also need a worldwide bathy/topo DEM – one that shows both on-land topography and submarine bathymetry. You can't use the SRTM data, because it only has land data. So, you do the sensible thing, and you go to Google and do a search on world bathymetric data or world bathy/topo or something like that. Be sure that you read through the sites carefully and follow the links. What did you find that is available?

2. If you were thorough in your sleuthing, you might have run across a statement like "*ETOPO2v2 is deprecated; the current relief model is ETOPO1*." What does the statement mean? (If you don't know what deprecated means, you should look it up.)

3. When you find the current **world** (global) bathy/DEM from NOAA, be sure to read the web pages carefully and choose the correct file format to download (and choose the ice surface DEM, rather than the bedrock DEM). Which format did you select, and why? Did you choose grid-registered or cell-registered? If you aren't sure what these are, look at this link to see the difference.

4. Once you get to the actual download page, you will need to choose between an …f4.zip and an …i2.zip file.



5. Open the *readme* file, read it carefully, and decide which to download. Which one did you choose, and why?

6. Add it to your spreadsheet of data sources.
7. What is the resolution of these data?
8. What other aspects of the metadata (which you can link to from the main ETOPO1 page) are interesting and important?

B. Data prep

1. Extract the data and do whatever prep work you need to do (including defining the CS, if necessary) so that the file is ready to work with in ArcMap on Tuesday morning. What did you do to prep the data?

List of NOAA bathy-topos. Be sure to download the correct one!

First, choose one of the following study areas. Areas have been sorted by region for your convenience. You may choose any area on the list, but be warned – areas in *red italics* will require a little extra work for census data download because the DEM intersects with more than one state.

Atlantic Coast

a. Daytona Beach, FL
b. Palm Beach, FL
c. Portland, ME
d. Atlantic City, NJ
e. Morehead City, NC
f. Myrtle Beach, SC
g. Virginia Beach, VA

h. Savannah, GA
i. Ocean City, MD
j. Montauk, NY

Gulf Coast

k. Mobile, AL
l. Panama City, FL
m. Key West, FL
n. Galveston, TX
o. Corpus Christi, TX

p. New Orleans, LA
q. Biloxi, MS

West Coast

r. Crescent City, CA
s. Santa Monica, CA
t. San Francisco Bay, CA
u. Seaside, OR - Lucy
v. La Push, WA

w. Astoria, OR