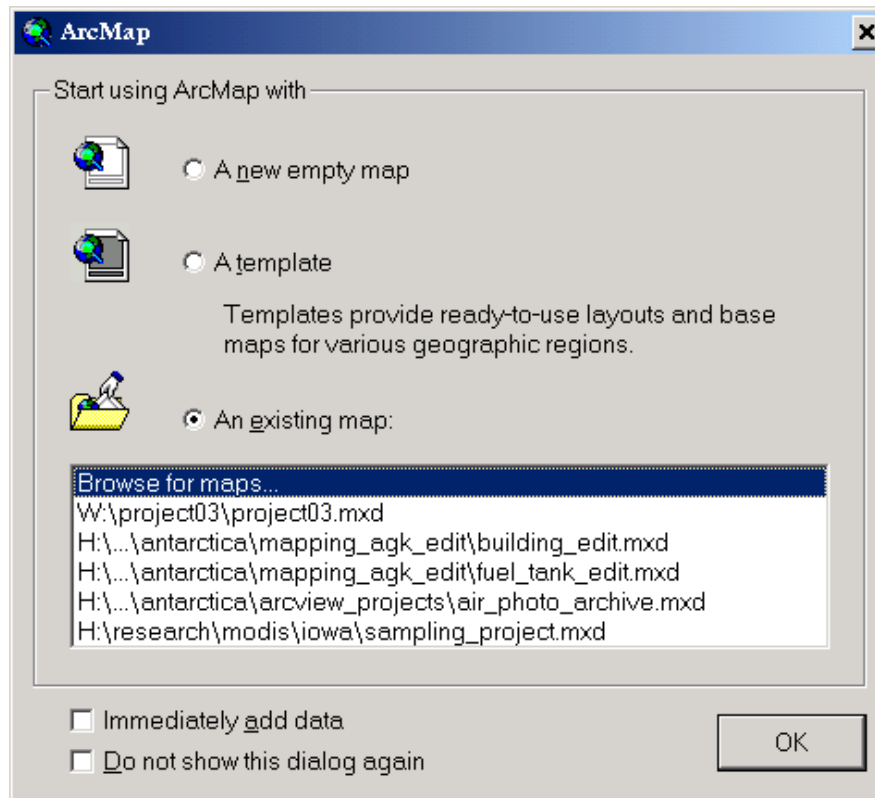


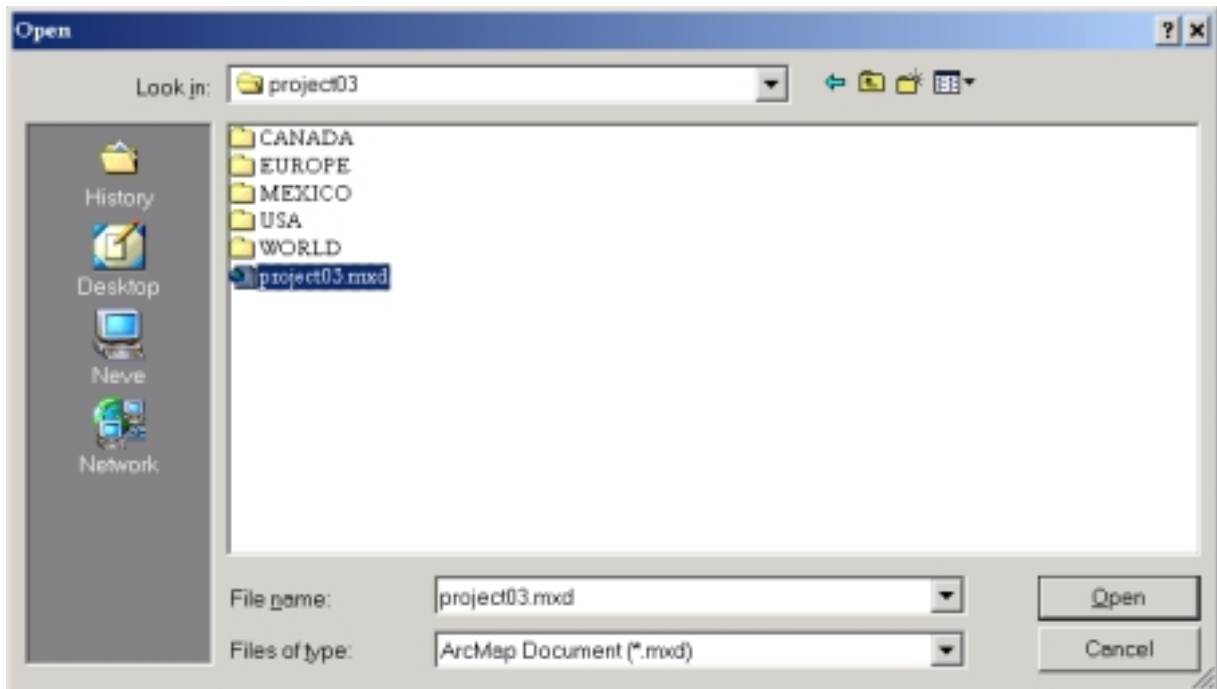
In this project you will be using ArcGIS – perhaps the world’s most popular GIS package. Don’t worry, you will only be using its map projection capabilities.

Introduction to Map Projections in ARCGIS

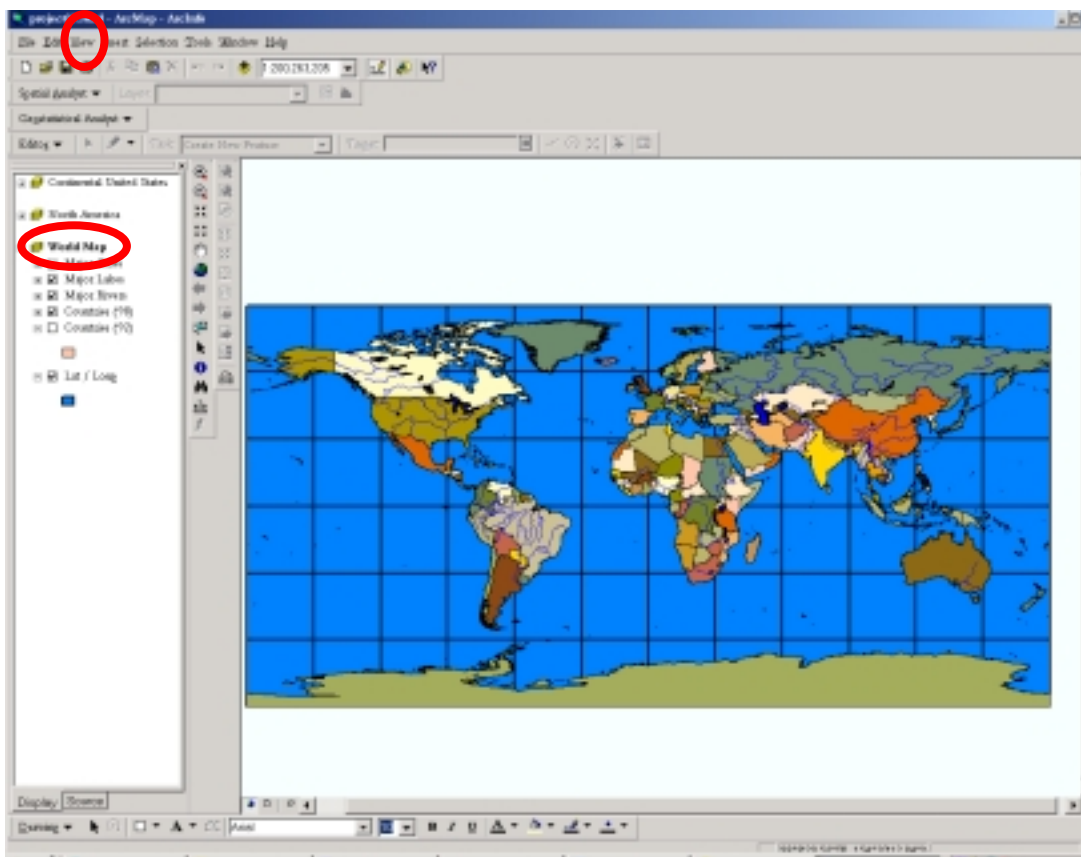
1. In the GIS Lab (O&M 807) or the Undergraduate Lab (O&M 805), log into one of the computers using the account name on the **Computer Systems Use Policy Sheet** you filled out. If you have a problem, the TA or system administrator can help you
2. Next you will have to map the Geog332 folder to the W: drive. Your TA can help you with this. **YOU MUST USE THE LETTER W: OR ARCMAP WILL NOT FUNCTION CORRECTLY!**
3. Under the *Start Menu => Apps => ESRI => ArcGIS => select ArcMap*
4. After Starting ArcMap, the following Dialog Box should appear. Under Start Using ArcMap with...*Select An Existing Map and Highlight Browse for maps...*



3. Navigate to *the Project03 folder* under your W: drive and select *Project03.mxd*



- Now you are ready to rock and roll... You now only need to concern yourself with the View selection on the menu bar
- Make the ArcGIS window fill the screen



- Select the **view** menu and then **Data Frame Properties...** [This can also be accomplished by selecting **World Map** and right clicking]
- Select the **Coordinate System** tab
- Under **Current Coordinate System**, you will notice all sorts of information, including the work projection. When you manipulate the projections for the scenarios later on, you will need to transcribe **ALL** of the information in this part of the window in your lab write-up.

Under **Select a coordinate system**, you will find familiar-looking folders including **predefined**, **Layers**, and **<custom>**. Under **<custom>**, it should currently display **WCS_WGS_1984** which is the current map projection

To change the map projection the world is displayed in you need to do the following...

1. Click on **Predefined**
2. You should see **Geographic Coordinate Systems** and **Projected Coordinate Systems**
3. Click on **Projected Coordinate Systems**. Here, you will find various types of map projections for you to experiment with
4. The **Modify** button will allow you, oddly enough, to modify data such as the Central Meridian. This will be important in the scenarios. You may modify the following parameters, among others.
 - Projection
 - Spheroid
 - Central Meridian
 - Reference Latitude

Try clicking on **Geographic Coordinate Systems** and see what happens – you should get a long list of countries (too long to list here) and many of their associated projections that are commonly used for each country.

Projected Coordinate Systems are a bit more generic, but also useful for many applications. Sometimes, these are good to use for regional maps. Experiment around with several different projections.

The scenarios in this lab will require the use of both **Geographic** and **Projected Coordinate Systems**.

What you need to do is this: Choose one of the projections in the window and click the **Apply** button.

Voila – the map in the window changes into this new projection. **Pretty spiffy, No?**

Some ARCGIS Hint...

Your job is to alter the map projections to create a basemap that fits the need of each scenario below.

The maps can be printed out by selecting file => print, but we are going to use Layouts in order to make a much better-looking map. First, in the **Data View** (under **view** => **data view**...you should already be there), zoom into the area of the map you wish to print. Then, under **view**, select **Layout View**. Here, you may easily modify the map as you wish it to be printed. You should include your name in the layout. You may add text by selecting **Insert** from the menu and then **text** while in the Layout view. If you right-click on this text box and select **properties**, you may modify the text's size, font, color, etc.

I suggest you play around with the map projections to get a feel for them. It is quite easy and I think somewhat interesting to do.

Also, you may want to play around with some of the icons on the **Tools** sidebar, specifically:

- Zoom in (magnifying glass with the +)
- Zoom out (magnifying glass with the -)
- Zoom to previous extent (the arrow pointing to the left)
- Zoom to next extent (the arrow pointing to right)

Hint: ArcGIS will tell you what each icon does if you just hold the cursor over it.

DON'T BE AFRAID TO TRY THINGS IN ARCGIS, YOU CAN'T HURT ANYTHING!

Assignment

For each of the scenarios below, you need to turn in the following items:

1. A map in the correct projection and covering the area of interest (e.g. if I am interested in Florida, I do not want a world map. Likewise, if I am interested in Australia, you might want to think about changing the “Central Meridian” option in the map properties.)
2. The information that **FULLY** describes the map projection as given in the ArcGIS map projection information window.

I suggest selecting the parameters carefully. If I ask for a map of Africa, it is best not to have the central meridian set to somewhere in the Pacific Ocean. Remember in today’s computer world that you, the cartographer, have extreme control over the exact projection. Use this power well - - don’t just settle for the standard choices. They may not be well suited for your needs.

3. Justification for why you selected the projection you did.
4. I WILL NOT ACCEPT HANDWRITTEN WORK.

The Scenarios

1. You are working for a publishing firm and are asked to create a series of world maps for an elementary school geography textbook. What projection would you choose for this textbook and why?
2. You are a researcher working for a NASA investigator working in Earth’s Polar Regions. Your boss asks you to select a projection in which to place some satellite data. She tells you that she will need to calculate the areas of certain land cover types based on the satellite images. She tells you to select an appropriate projection and to justify the selection, as it will be required for inclusion in the manuscript that will be published in a world-renown journal.
3. You are a student working for a researcher studying the paleoclimate of the tropical Andes of Peru, Bolivia, Argentina, and Chile. He needs a basemap of the entire area and tells you the following, “I can live with a little distortion of areas, but I need the shapes to be correct so people can easily identify certain landmarks.” What projection do you select and why?
4. You are working for an airline company that wants to make a map to hang in Easterwood Airport. You are asked to select a map projection that best shows distance and direction from the departing destination – Bryan-College Station, Texas. Furthermore, the map should be centered on Bryan-College Station, Texas. What projection do you select and why? [hint: one of the projections from the standard list won’t cut it]
5. You are working for a neo-fascist, left-wing, cappuccino-sippin’ environmental lobby that wants a map showing the number of waterfowl species per square kilometer that are threatened by gun-toting, flannel-wearin’, NRA-supporting duck hunters in the United States. What projection would you select and why?

If you have any problems, please do not hesitate to contact the TA or myself