Biomes, Ecoregions

Introduction: This workshop is a computer exercise. You will be using the National Atlas Map Maker (http://www.nationalatlas.gov/), an on-line GIS (Geographical Information System) program. Answer the following questions using the various maps that you create.

Key concepts:
- The environment, particularly climate, influences the distributions of plants & animals
- Human impact on the environment varies locally, regionally and globally.
- The distributions of plants & animals have changed in the last two decades

What’s due?
After filling in the answers, log onto D2L Workshop 6 and answer the questions. 10 pts

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1. What is a biome?

Go to GEOS170C lecture 16. Compare the definition of “biome” in lecture 16 with that of “ecoregion” in the National Atlas site.

Ecoregions and biomes are both classifications of ecosystems.

A. Write down a definition for “Biome” from lecture 16

B. Write down the definitions for “Ecoregion” (both Bailey’s and Omernik’s) from the National Atlas site (enter “ecoregion” in the search bar at the top of the page and click “Go.”). For each system (Bailey’s and Omernik’s) how is one ecoregion distinguished from another. What distinguishes their boundaries.

The difference between “ecoregion” and “biome” is one of scale. One is larger than and includes several of the other. Find the two words in Wikipedia and fill in the blanks

"____________ are classified by ____________ type"

2. Ecoregion characteristics.

Based on the two definitions you copied (1.A.) what are the environmental parameters that define the ecoregions in a biome (what marks their boundaries)? How do Bailey’s and Omernik’s ecoregion classifications differ? Which environmental characteristics do both use? Which uses the largest number of characteristics?

3. Ecoregion subdivisions.

“Ecoregions” are the highest level of Bailey’s ecosystem classification. What are the lower (smaller area) units of Bailey’s classification? These units are used in land management for building roads and construction permits. Upon what environmental parameters is each level based? Are they based on different environmental factors?
4. Return to the National Atlas site. If you cannot see any of the tabs mentioned below, click on the yellow “[map maker]” tab near the upper left of the page. Check the boxes □ for "Cities and Towns" and "States" under the "Basic Maps" tab. Click on “Biology,” and select “Provinces,” under “Ecoregions-Bailey” then under "Invasive Species" (farther down) check "Land Cover 200 Meter Resolution." Then, above the map, select “Arizona” from the "Zoom to State(s)" menu.

For Phoenix, AZ, (check the “Cities & Towns box □ if it isn’t showing), use the “[Identify]” tab above the map to identify the type of ecoregion province. Phoenix is in the ___ province.

What is the ecoregion province for Tucson? (You can use the "Find" tab near the top of the page to move to Tucson (zoom to feature) or your Tucson zip code. example

The ecoregion sections are smaller-scale and more homogeneous in terms of vegetation, climate and relief. What are the ecoregion sections for Tucson and Phoenix? The section is named on the pop-window for provinces. You many need to click on “MAP LAYERS” to access the “Ecoregions – Bailey” Menu.

5. In urban areas like Phoenix and Tucson, there is little natural vegetation left, so classifications like “Land Cover” are used instead of natural classification like Bailey’s and Omernik’s. On the National Atlas site, under "Biology," click "None Selected" under "Ecoregions - Bailey" (but Land Cover 200 Meter Resolution must be checked) then click "Redraw Map" tab near the top of the page. Scroll through the map to Tucson, (or use the "Find" tab near the top of the page).

Zoom in to "Tucson" until you "Cannot zoom in any more." The square beneath the word "Tucson" is red, what kind of "Land Cover Class" is it?” (Find it on the "Map Key" near the top of the page. The "Identify" tab doesn't work for "land cover.")

At this scale ("Cannot zoom in any more") is the Tucson Basin (3 mile radius around the “Tucson” label) mostly natural or mostly residential?

The Land Cover Class for most of the Tucson Basin is pink. That is the "Low intensity residential" Land Cover Class. Only two kinds of natural land cover are shown near Tucson at this scale -- one is light brown and the other is a less-common blue-gray color. What is the Land Cover Class of the more common light brown cover type?

Use the "Find" tab near the top of the page to zoom in on "Mount Lemmon Ski Valley." What land cover class is most common next to the Mount Lemmon Ski Valley? Is it natural or human made?

6. The distributions of animals and plants may be widespread at the continental scale, but locally, they may be restricted to specific vegetation types or land cover types. The importance of local environments may become more pronounced at the edges of organisms’ ranges.

Un-check "Land Cover 200 Meter Resolution," click on the “Map Layers” tab (top center), then select the distributions of the various kinds of bats from the menu beneath the "Bat Range." Of the following bats, which one(s) occur in Tucson, Idaho, New York, West Virginia? (Click on Redraw Map each time.) California leaf-nosed bat, Mexican long-nosed bat, Mexican long-tongued bat, Townsend’s big eared bat, Western yellow bat
Click "None Selected" and click on "Butterflies" then in the window below "Individual Butterfly Species Distribution" click on “None selected.” Which of the following butterflies occur in Tucson? Acadian Hairstreak, Crescent Metalmark, Desert cloudywing, Desert elfin, Dusky Azure

7. The National Atlas site also includes information on changing animal distributions. These are recent introductions of species harmful to humans, whose ranges are rapidly expanding.

Under "Invasive Species" check "Land Cover 200 Meter Resolution" and then open the "Invasive Species" Menu. Under "Invasive Species" click on the "None Selected" menu under "Africanized Honey Bees." Click on “[Identify]” at the top of the page, click on the location of Tucson on the map and read the information. When did Africanized bees first appear in Tucson?

Click “Redraw Map” and under "Invasive Species" check the box for "Purple Loosestrife" and under "Basic Maps." Then click on “[Identify]” and the location of Tucson on the map and read the information. When did purple loosestrife first appear in Tucson?