

## Using a Web-Based GIS Viewer

This tutorial walks you through the basic tools needed to explore data using a Web-based GIS data viewer.

A Web-based GIS viewer is a program to view maps on the Internet which is generated by Geographic Information System (GIS) software. Like a paper map, these maps will have information about locations or features (for example: roads, rivers, cities) as well as thematic information (population, languages, literacy rates, rainfall). However, unlike paper maps, these maps are dynamic, meaning we can update them and change them quickly according to our needs. You can choose which information (data layer) you wish to view. You can zoom in and out to view different scales of information. You can also select information by asking spatial questions using logical arguments (a.k.a. Boolean Logic Queries).

To use Web-based maps you need a computer with a Web-browser and a fast Internet connection. You can use a dial-up connection, but files are very large and it takes a long time to load. The current version of Firefox (Mozilla) works very well with these sites.

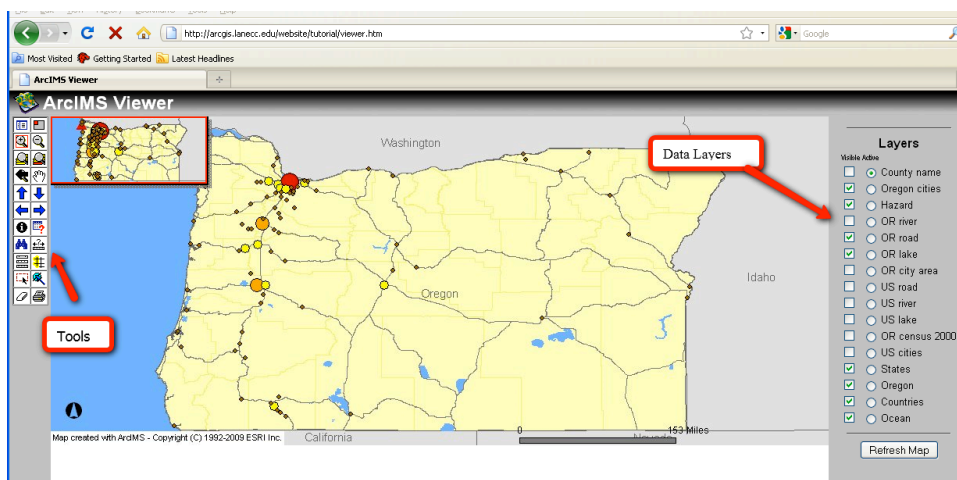
Learning to use new technology, like any new tool or concept, can be **frustrating** at first (##@@!!). You may need to repeat a step or even start over if you get too far off track. However, if you follow directions as you would when trying a new recipe or replacing the water pump in your car, you will get through it

**Learning Objectives:** You will be able to change layers and map scale. You will be able to find specific places with specific information about them. You will learn to measure distance, create a spatial buffer, and perform a Boolean logic query.

**Computer steps are indicated by a ► symbol. Questions you need to answer are numbered.**

Record your answers on a separate sheet of paper

- Connect to the MAPS-GIS Web page at <http://gis.lanecc.edu>
- Click on the Modules Tab → Scroll down and click on the link to the Module Tutorial.
- Click on the link to the Web-based map. When you begin the tutorial, you should see a map of Oregon.
- Or go directly to the map <http://arcgis.lanecc.edu/website/tutorial/viewer.htm>

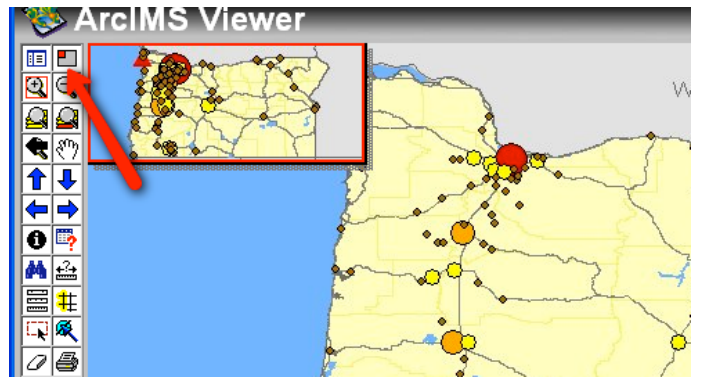


On the left side of the map is a list of **tools** and on the right is a list of **data layers**.

Currently you see red, orange, yellow and brown circle that locate some cities in Oregon.

In the upper left hand corner is a small inset map.

- ▶ Turn the inset map off by clicking the inset icon located at the top of the tool bar.



Look at the data layers on the right. You should see a map of Oregon with a list of different layers of information or data. Each layer has a **Visible** check box beside it. Some are checked and some are not. You can view the data layer if the box is checked. Next to the check box is a circle called a radio button. This makes a data layer **Active**. Only one layer can be active at a time.

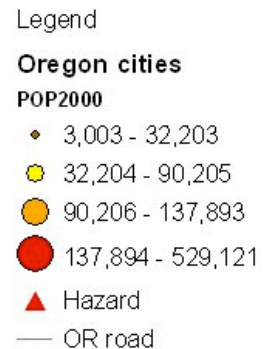
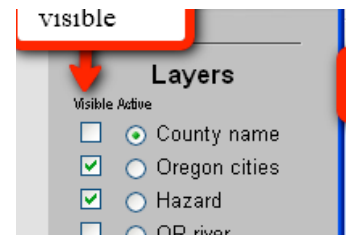
- ▶ **Uncheck** “Oregon cities” by clicking the check  button.
- ▶ Then click the “**Refresh Map**” button.

1. What happens to the data layer?

- ▶ Make “Oregon cities” **Visible** again and **Refresh Map**.

**Important:** You can have multiple layers visible, but only one layer active at a time.

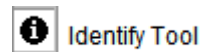
- ▶ Make “Oregon cities” **Active**; click the circle (radio button). It should be **Visible** and **Active**.
- ▶ **Refresh Map**.
- ▶ Click the **Legend Tool**



The **Layer** menu changed to a **Legend**. This Legend shows population range of cities.

2. What is the largest population range for the layer Oregon cities in this legend?

- ▶ Click on the **Identify** tool → Click on any one of the medium sized circles on the map. The Identify tool only works on the layer that is active and visible.



Information about the city appears in a data table at the bottom of the map.

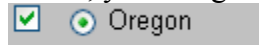
3. What is the name and the population of the city you selected?

- ▶ Click on the **Legend** button again to go back to **Layers**.

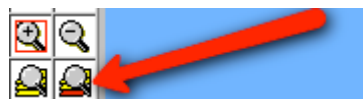
**HELP! WHERE AM I?**

If you get totally zoomed in or out and are not sure where you are, you can get back to the original view.

- 1) Make Oregon **visible** and **active**, then Refresh the map..














- 2) Click the Zoom to **Active Layer** tool



to get back to the map of Oregon.

Here are some basic tools available for this GIS viewer. Spend a few minutes exploring the tools.

Explore Basic Tools			
	Full extent – This will take you to the extent of the map. For this map the full extent is the world.		Zoom to Active Layer - This is zoom to a layer with the radio button selected
	Measure – A line is drawn between mouse click and the distance is shown at the top of the window.		Find– You can type in a text string (words) and a feature with that text will be located
	Zoom out -You can click or draw a box around the area you want to back out to a larger area		Pan – Push the map view around the screen
	Zoom in -You can click or draw a box around the area you want to examine more closely.		To erase the lines use the erase tool.
	Buffer – This tool allows you to create an area around a feature.		Select by rectangle -This tool selects all the features in the rectangle you draw.
	Query – This tool is used to select specific data features		

- ▶ Use the **Measure** tool and click on the west coast of Oregon → then click on eastern border of Oregon.



4. What is the total distance across the state in miles?

- ▶ Clear your selection with the **Erase** tool.



- ▶ Measure the distance from north to south.

5. What is the total distance from north to south?

- ▶ Make Oregon Rivers **Visible** and **Active** → Use the “Zoom to Active Layer” tool and **Refresh**



- ▶ Use the **Find** tool and **type in** Necanicum River (exactly as shown here) in the box below the map.



- ▶ Select “**Find String.**” Text is called a string in a GIS.

6. How many records (lists) for Necanicum River do you see?

- ▶ Click on the number “**1**” beside the entry for Necanicum River in the list. The map will zoom to the river.

The river is highlighted in a different color to indicate that it is selected from all the Oregon rivers.

7. What city is near the Necanicum River? To find out you need to make Oregon cities active and **visible** then refresh the map. Now you can use the identify tool to click on the small dot symbol for the city .

GIS is not just a program to make maps, it has tools that can be used to answer questions about relationships between things, (people, places, events) on the earth's surface.

**A Scenario:** One dark and stormy night, a full diesel truck overturned along a portion of the Oregon Coast Highway near Seaside, Oregon. It took nearly an hour to get the driver out of the cab and to the hospital. In the meantime, diesel fuel leaked from the tank. The Environmental Hazards team from the city of Tillamook estimated that the spill could have flowed a distance of .2 miles. The wreck happened on a small hilltop and the spill radiated in all directions. Did the diesel fuel run into the Necanicum River?" Use GIS and the **buffer** tool to find out.

▶ Make Hazards **Active** and **Visible** → make Roads **Visible** → **Refresh Map**.

▶ Use the “**Select by Rectangle**” tool and draw a box around the red triangle that locates the oil spill → **Refresh** map.



▶ Select the **Buffer** tool. A dialogue box will appear at the bottom of the viewer. Set the distance value to **.2** → click **Create Buffer**.



▶ Use the Zoom tool to view the area. The circle or buffer is the area or surface that is within a .2 mile radius around the spill.



8. Did the spill reach the river?

In a GIS each layer of data has information or attributes attached to it that can be accessed and viewed.

▶ Make Oregon Census **Visible** and **Active** and **Refresh** → Zoom to Active Layer. Each of the polygons are divisions or areas used by the US Census Bureau to collect population data.

▶ Turn on the **Legend**. This map shows the number of children between 5 and 17 years of age. There is other information connected to the data table that you can evaluate.

▶ Use the **Identify** tool and click on one of the census areas that shows a high number of children between the age of 5 and 17.

▶ Scroll horizontally across the attribute table below the map and find the field Age\_5\_17

9. How many children are in the age range 5 to 17?

10. How many are 65 and older? (Scroll across to find the field Age\_65\_UP)

Use a **Query tool** to explore relationship between data fields. Perhaps you want to find census areas that have high populations of people age 65 and older and low populations of children age 5 to 17.

- ▶ Click on the **Query** tool.  
Make sure Census is still visible and active.



- ▶ In the **Field** dropdown menu choose Age\_65\_UP.
- ▶ In the **Operator** dropdown menu choose the “greater than” symbol >.
- ▶ Click **Add to Query String**
- ▶ Type in 1000 after the > symbol (Do not use a comma).
- ▶ Click Execute

The census areas that meet your query are highlighted and shown in a data table at the bottom of the map. These are the places that have more that 1,000 people age 65 and over.

**11.** How many census areas are selected? You will need to scroll down the table and hit “More Records.” Do this until there are not more records listed. (Hint: there are more than 60 and less than 100).

- ▶ Erase the Query. 
- ▶ Now find the census tracts that meet this statement Age\_5\_17 < 500 (Remember to scroll down.)

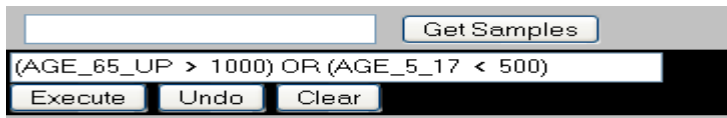
**12.** How many census areas are selected? ( Here you should be a number between 150 and 200) Remember to scroll down and choose More Records.

Explore the difference between an **AND** and **OR** statements in a **Query**. Follow the steps carefully. This time combine the two statements you used above. You will need to use parenthesis ( ) around each of the statements with the **AND** between them.

- ▶ (1) Click the ( parenthesis to the left of the tool box. It will be added to the query string box.
- ▶ (2) Choose the field AGE\_65\_UP and the < operator. Now click Add to Query string again.
- ▶ (3) Type in 1000 and click the ) parenthesis.
- ▶ (4) Click the And , now click the ( parenthesis.
- ▶ (5) Choose the Age\_5\_17 field and the < operator
- ▶ (6) Type in 500 and click the ) operation.
- ▶ (7)Click Execute.

**13.** How many areas meet your conditions using the **AND** statement? You will get a much smaller number than you did in question 11 or 12. (Hint: between 1 and 10)

- Now set up the Query with the **OR** statement. Remember to put things in the correct order.



The screenshot shows a query editor interface. At the top, there is a text input field containing the query string: `(AGE_65_UP > 1000) OR (AGE_5_17 < 500)`. To the right of the input field is a button labeled "Get Samples". Below the input field, there are three buttons: "Execute", "Undo", and "Clear".

14. How many areas met your conditions using the **OR** statement? (you should get a number between 200 and 300) You will have to choose more records a few times to get to the end of the table.
15. Explain the difference between using **AND/OR** statements when setting up a Query.

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