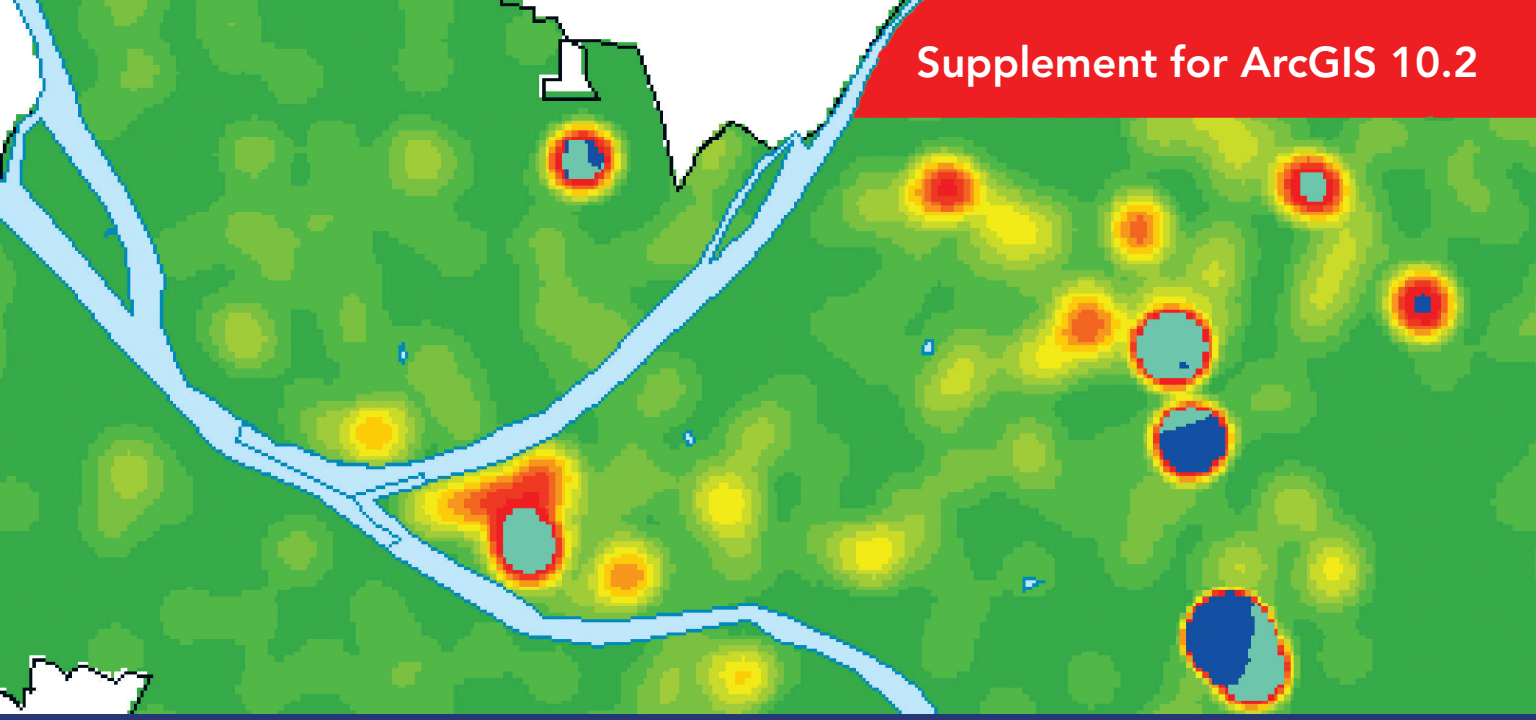# GIS Tutorial

for Health

Fifth Edition

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Cover map designed by Kristen Kurland; cover photograph courtesy of Nattika/Shutterstock.

Contents

Introduction

This supplement contains changes and corrections for *GIS Tutorial for Health*, fifth edition (Esri Press, 2014). Resources (e.g., websites) and technology (e.g., ArcGIS software) we refer to in the book have changed since the publication of the fifth edition, requiring us to update workbook steps or readings. In addition, this supplement gives us the opportunity to correct errors or unclear workbook instructions found by users, such as yourself.

If you find additional errors or problems, please e-mail either author (gorr@cmu.edu or kurland@cmu.edu) and you will get a quick response.

How to use this supplement

First, download the latest version of the exercise data for this workbook, available on the Esri Press "Book Resources" webpage, esripress.esri.com/bookresources. Click the appropriate book title, and then click the data link under "Resources" to download the latest version of the exercise data.

Before working through a chapter of the workbook, compare your workbook to the supplement. The tutorial number and name are listed at the top of each page of the supplement to guide you. (We do not list page numbers because content in the print and digital versions of this book may appear on different pages.) Once you come to a place in the workbook where a change occurs, write the word "Change" in your workbook. This will remind you when you need to consult the supplement. Alternatively, just keep both the workbook and the supplement open, checking for changes as you work.

Chapter 4

Projecting, downloading, and using spatial data

The following are changes and corrections for chapter 4. Changes to the text and figures are highlighted in yellow.

Tutorial 4-4
Downloading international HIV/AIDS data

In the following exercises, you will log on to the HIV Spatial Data Repository website and download subnational HIV prevalence data for Zambia, a country in Africa.

Download and extract HIV data for Zambia

1   In a web browser, go to http://spatialdata.dhsprogram.com/home/.

2   In the box "Attention ESRI GIS Tutorial for Health Users:", click "Download the Zambia DHS 2007 data for tutorial 4-4." New figure. ▶

3   **Browse to** your Chapter 4 MyExercises folder, and save the compressed file ZM_DHS_07_GIS_Tutorial_for_Health.zip. Note that the FinishedExercises folder does not include this file and you must download it from the website.

Tutorial 4-9
Downloading USGS raster maps

The United States Geological Survey (USGS) has major responsibility for creating, maintaining, and providing basemaps of the United States. It recently launched a new seamless version of The National Map Viewer, which you can use to download GIS basemaps. "Seamless" means that all basemaps are available for viewing across the entire country, so one option for downloading is from the current extent of the viewer, and that extent may cut across several map tiles, counties, or states. The only limitation of the system is that "shipping" of the desired basemap is delayed; you are notified by e-mail when it's ready and given a link to download a compressed file, often with substantial delays. In any event, it's valuable to use a seamless download site for spatial data because of the website's convenience and reliability. If you have trouble downloading the files in this tutorial, copies are saved to the USGS folder in the Chapter4 folder in FinishedExercises.

Use The National Map Viewer

1   **In a web browser, go to** http://viewer.nationalmap.gov/viewer/. USGS recommends using Firefox as the browser. The images in the book may differ from what you see on the website.

2   **At the top of the map, click the Reset Zoom (Initial Extent) button** 🌐 .

3   **If the Overlays window is not displayed at the left side, click the Overlays expander and click the Content button at the top of the window.** (See next page.)
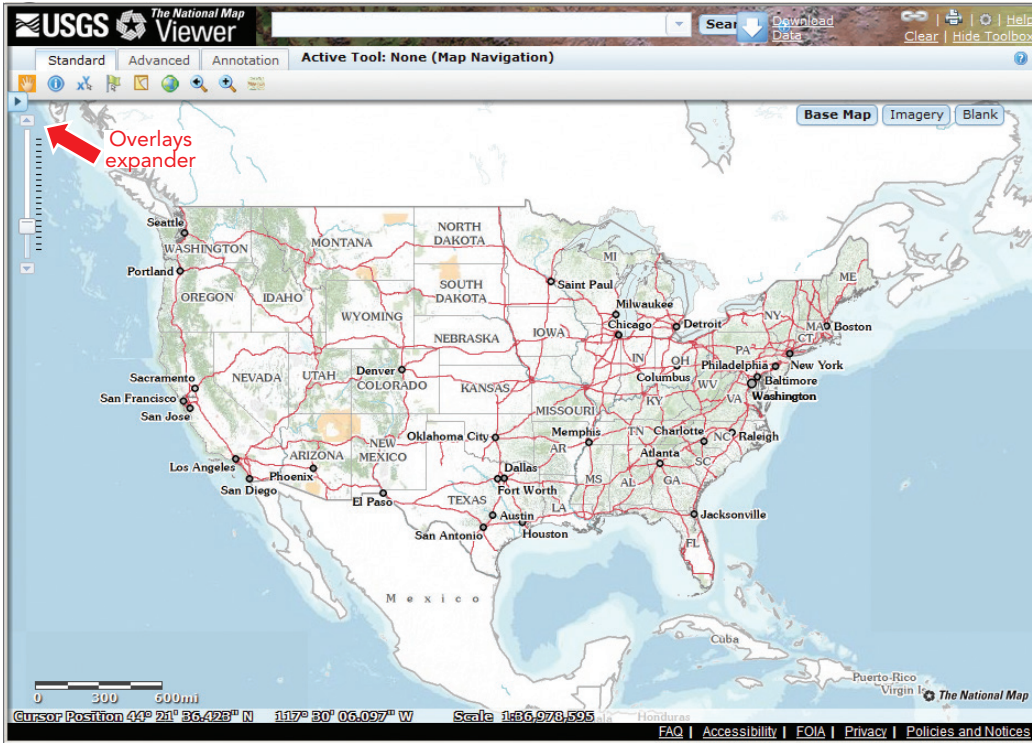
4 Expand and select Governmental Unit Boundaries, and then expand Labels and then Features. Clear the check boxes for all expanded layers except Unincorporated Place and Unincorporated Place labels (leave these two selected). ▶

5 From the GIS Toolbox, click the Standard tab and the Zoom In button. If the toolbox is not displayed, click the Show Toolbox link at the top-right corner of the page.
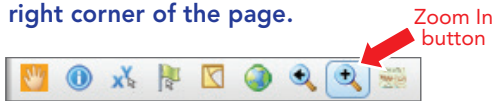
6 Zoom in on Pennsylvania and then Pittsburgh.
Pittsburgh is at the western side of the state.

4
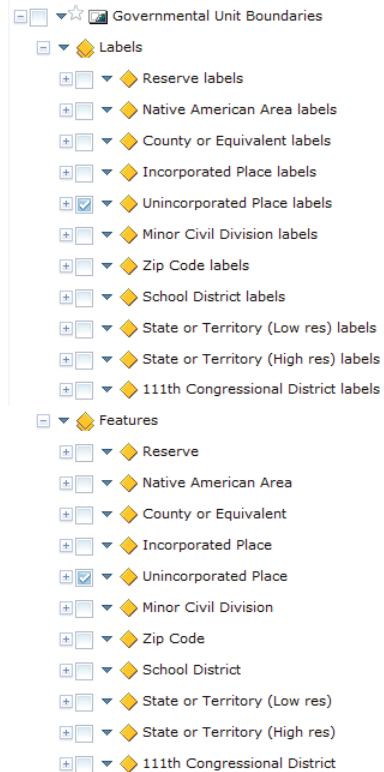
7 Use the Map Navigation button 🖐 and other navigation tools to zoom in on downtown Pittsburgh and Fort Pitt, where Pittsburgh's three rivers meet. New figure below.

8 At the upper-right corner of the map, click the Imagery button [Imagery] to see an orthophoto. Make sure your map scale is on the order of 1:4,000 or more (for example, 1:2,000) so that the files you download are not too large. The scale is shown at the bottom of the map. Be sure to include Pittsburgh's football stadium (where the Pittsburgh Steelers play) and the baseball stadium as shown in the figure. Note that the zoom scale in the figure is 1:2,257. (See new figure on the next page.)

YOUR TURN

Experiment using different Base Data layers, turning them on and off. *Hint:* You may need to zoom in to see certain basemaps better. If you do, use the Zoom to Last Extent button to return to your Downtown Golden Triangle/North Shore extent.

Order data for download

There are several options to download data by geographic area. In this exercise, you will use the simplest, by current extent.

1   Click the Download Data button .

2   In the "Download options" dialog box, click the "Click here" link to download by current map extent. The default data type for vector maps is File Geodatabase 9.2, which works fine with ArcGIS 10.2.

3   Select the Orthoimagery check box and click Next.

6

4 Select Mar2012 0.3m Color Orthoimagery - Pittsburgh, PA and click Next. New figure below.

5 Click the Checkout button.

6 Type your e-mail address twice and click the Place Order button.

You will get a message saying that your order has been placed and to check your e-mail. Later, you'll get an e-mail message summarizing your order and telling you that a link will arrive in the future, which you can use to download the order.

7 Click OK and close your browser.

Download data

At some point, you'll get an e-mail message containing a link to download the data. It is likely the data is large enough to be divided into multiple "chunks." Your message from the USGS will reflect this. If this is the case, you will download and extract the data one chunk at a time.

1 **Click the link in your e-mail to download the data.** You will see the following messages in succession: "Current order status … Adding your request to the queue. … Extracting data … The data extraction has completed. … Please wait for the data to be returned."

2 **Click Save File and save the downloaded file to the USGS folder in your Chapter4 folder in MyExercises.**

3 **In Windows Explorer, double-click the compressed file, click "Extract all files", browse through your Chapter4 folder to the USGS folder, and click OK. Then click Extract.** A folder that has a unique number is created, containing all the files that are needed to display the raster image properly in the correct projections.

4 **Use Windows Explorer to view these files. Close Windows Explorer when you are finished.** <mark>New figure below.</mark>
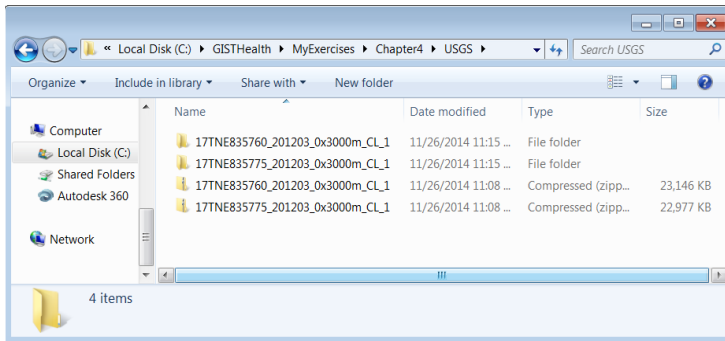
YOUR TURN

If your message from the USGS listed several "chunks," repeat steps 1–4 to download all the remaining files.

Import the raster image into the file geodatabase

In addition to vector files, you can also import raster images into a file geodatabase.

1 **Click the Catalog window button and browse to your Chapter4 folder.**

2 **Right-click Chapter4.gdb and click Import > Raster Datasets.**

3 **In the "Raster To Geodatabase (multiple)" dialog box, click the Browse button for Input Rasters, browse through your Chapter4 folder to the USGS folder, and double-click the first downloaded folder. Click the downloaded .tif file and click Add.** This step adds the TIFF image file to the input panel.

8

4   Browse to the remaining folders and add each remaining TIFF image file. Click OK. Be patient while the image files are imported. New figure below.
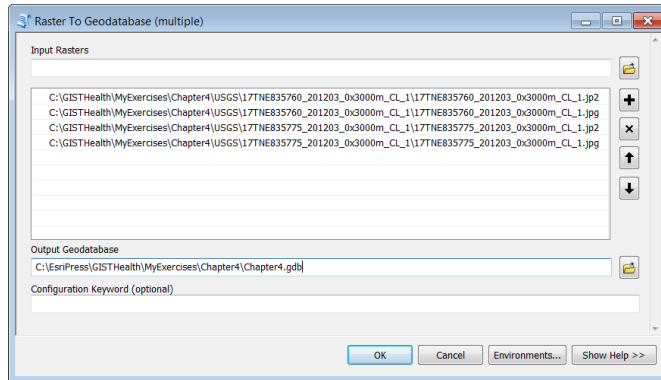
YOUR TURN

Browse through the file geodatabase and notice that ArcMap renamed each JPG image file.

Add the raster image to the map

The orthophoto raster image you will add next has a spatial reference. So, when you add it to the map document and data frame, ArcMap reprojects it on the fly into state plane coordinates.

1   If necessary, start ArcMap and open Tutorial4-8YourName.mxd.

2   On the Standard toolbar, click Add Data, go to Chapter4.gdb, click the first JPG image file, and click Add and then Yes if prompted. ArcMap creates raster pyramids for your file. Be patient during this process.

3   In the table of contents, right-click the new image layer and click Zoom To Layer.

4   In the table of contents, right-click the image layer, click Properties, and click the General tab.

5   In the Scale Range box, select the "Don't show layer when zoomed" option, click the "Out beyond" arrow, and click 1:10,000.

6   Click the Source tab, scroll down in the property panel, and observe that the image layer has UTM_zone17N coordinates. Click OK to close the Properties window.

YOUR TURN

Add the remaining JPG images, turn off the Rivers layer, and zoom in to Point State Park where the three rivers meet. Create a spatial bookmark called **Point State Park.** New figure below.

Save the map document

1   On the File menu, click Save As.

2   **Save your map document as** Tutorial4-9YourName.mxd **to your Chapter4 folder in MyExercises.** Do not close ArcMap.

YOUR TURN

On the USGS website, try downloading another USGS image or layer.

Chapter 5

Downloading and preparing spatial and tabular data

The following are changes and corrections for chapter 5. Changes to the text and are highlighted in yellow.

Tutorial 5-1
Downloading spatial data from the US Census Bureau

You can download census-related map layers that have unique identifiers for polygons such as census tract IDs, but they do not include census attribute data such as population, age, sex, race, income, and so on. You'll need to download the census demographic data separately, from the bureau's American Fact Finder website; do some data preparation; and then join the data to the corresponding map layer.

Download TIGER/Line shapefiles

The end results of this tutorial are downloaded shapefiles. Because Internet sites change often, some of the screen captures that follow may look different from what you find on the website. If you have difficulty downloading the Census TIGER shapefiles, they are available in the Chapter5 folder in FinishedExercises.

1   From Internet Explorer or another web browser, go to
    http://www.census.gov/geo/maps-data/data/tiger.html

2   On the resulting TIGER Products page, click the TIGER/Line Shapefiles link then the 2010 tab. The TIGER/LINE Shapefiles link name may vary slightly based on recently uploaded TIGER shapefiles.