

Appendix 2.1.
Obtaining Digital Elevation and Imagery
Data from the USGS for an Area of Interest in the United States

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Introduction

The USGS National Map Website provides spatial data (e.g., topographic contours, transportation networks, hydrography, and land cover) for the continental United States. You will use these data sets for many of the other appendices for Chapter 2.

Learning Outcomes

- After completing this exercise, students will be able to use the USGS National Map website to download data (e.g., elevation and imagery) for the entire United States.

Instructions

Select A browser

- This site works well with Internet Explorer. On some but not all computers, it works with Google Chrome and Mozilla Firefox. You may have to experiment with different browsers.

Go to the USGS National Map website to select data

- To acquire DEM data open a web browser and go to National Map website: <http://nationalmap.gov/> and click on “National Map Viewer and Download Platform” button on the left side of the browser window.
- Click on the hypertext that says “Click Here To go to the National Map Viewer”.

Zoom to an Area of Interest

- On the left side of the screen, check the box next to the word “imagery” and then expand images by clicking on the “+” symbol. When you see all of the images, make sure that only the box next to “1_meter_imagery” is checked (Figure 1).



Figure 1. National Map Viewer window with 1-m imagery button checked.

- Double click in the viewable map area to navigate to a place of interest. The computer will be slow to respond, so be patient and don't click or move very rapidly. You can also hold your left mouse button down and drag the map to pan left, right, up, or down. You can use the plus and minus zoom tool in the upper left part of the map window or the mouse wheel to zoom in and out. You can also use the the "Standard" toolbar (on the top menu) where you will click the right hand magnifying glass with "+" (Zoom in Box). Hover your mouse over the other buttons to learn what they do.
 - For advanced users only, you can create a KML boundary file from a shape file with ArcGIS. In the middle of the page, click on advanced. Finally, click on the "Add Data" button. Next click on "KML RSS" to upload a shape file. Then on the left side of screen, click "Overlays" and then "User Added Data." Double click on the hyperlink.
- After you find your area of interest with the zoom tools you will zoom out one level by clicking on the down arrow one times on the vertical zoom tool in the map window (this arrow is circled in Figure 2).
 - Zooming out one level will help insure that you have selected a large enough area to model flow accumulation in subsequent exercises.

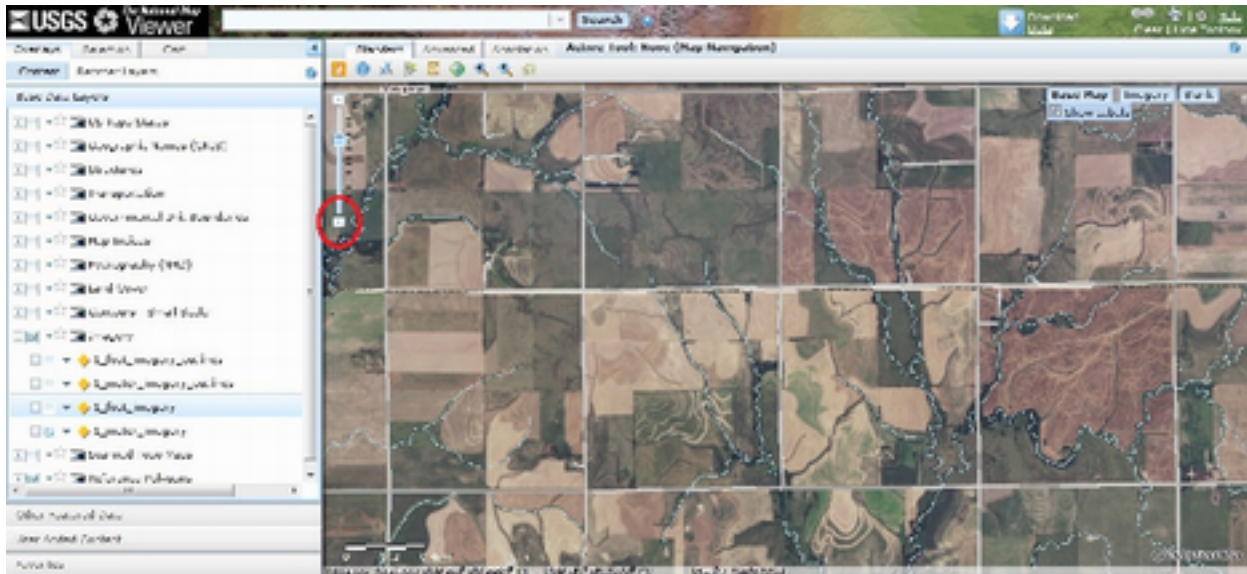


Figure 2. Screenshot of map with a red circle around the zoom out button.

Download Data

- Above the map, click on the large arrow to "Download data". A selection box called "Download options" will appear. Select "Click Here" to download by current map extent (Figure 3). The current map extent is the area that is visible in the map. If you get an error message, wait a few seconds and try again.



Figure 3. Screenshot of popup window indicating download options.

- On the new menu, click the options "Elevation" and "Orthoimagery" as shown in Figure 4. There are many datasets available for the current map extent that you could also click to download but they are not required for this exercise. Click next.

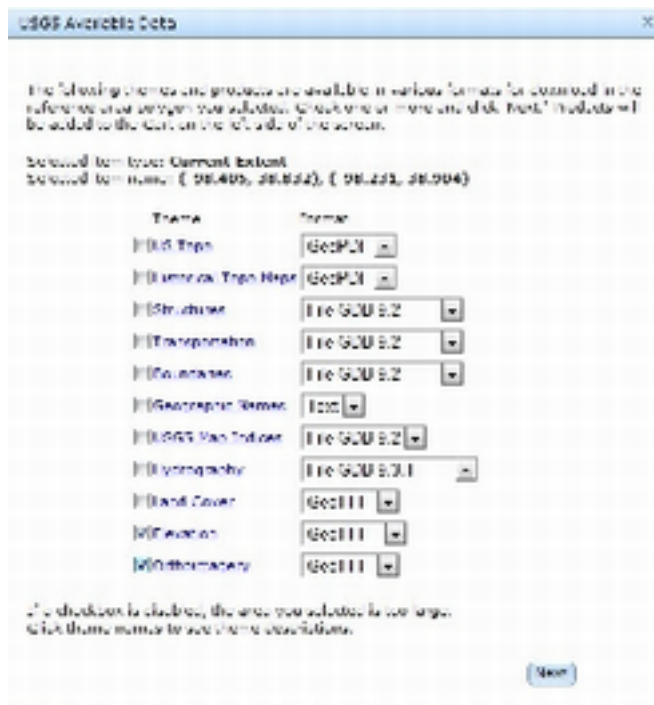


Figure 4. Screenshot of the popup box indicating the categories of data available from the National Map Website for the area of interest.

- A menu box will appear indicating the available elevation datasets for download. Select the *product* with the name "National Elevation Dataset (1/3 arc second)" and the *type* set to "Dynamic"(second word type with the down arrow) (Figure 5). Then click Next.
 - Read the following notes:
 - The listed order of these products may be different each time you download so make sure you read them carefully.
 - Dynamic indicates that the data is dynamically clipped out to your area of interest.
 - Staged means that large tiles have been pre-cut and will likely include an area much larger than desired.
 - The 1, 1/3, and 1/9 arc second data are generally and approximately 30, 10, and 3-m raster datasets, respectively. Generally, the 1 and 1/3 arc second data were created with stereo ortho photogrammetry and the 1/9 arc second data were created from LiDAR.

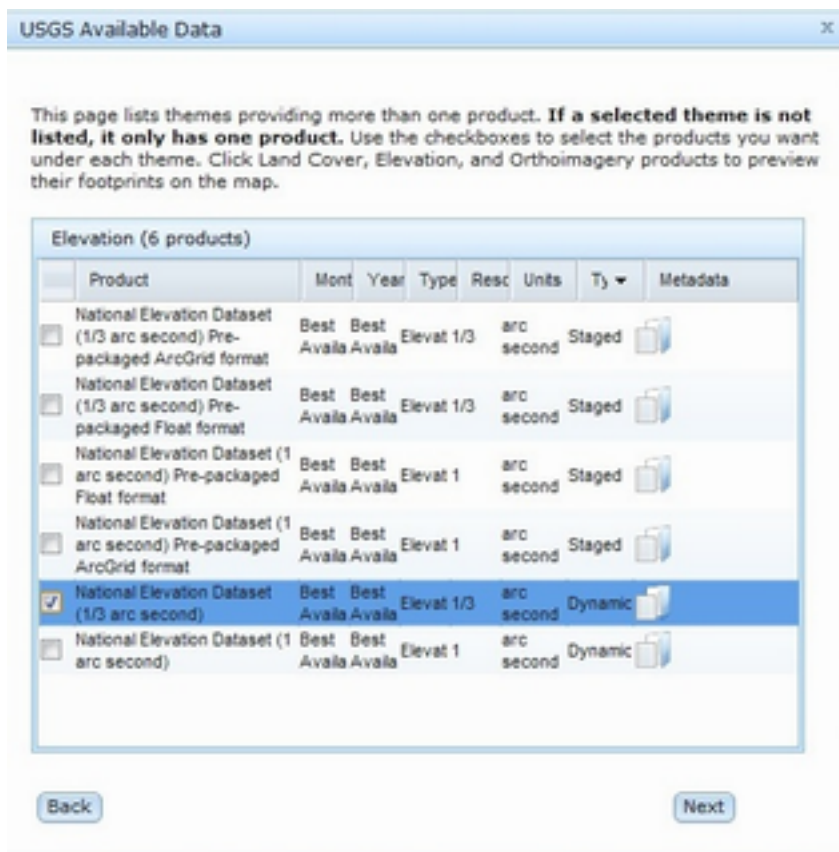


Figure ~5. Screenshot of pop-up window indicating the available elevation data with dynamic 1/3 arc second data selected.

- Another menu box will appear indicating the availability of the orthoimagery data. For this exercise, check the National Agriculture Imagery Program (NAIP) 4 band imagery (if available) as shown in Figure 6. Then Click Next
 - The NAIP four bands include red, green, blue, and near infrared bands. You can find more information here about NAIP imagery: http://www.fsa.usda.gov/Internet/FSA_File/fourband_infosheet_2012.pdf.
 - Four band imagery is not available everywhere yet. If it is not available for your area, select an alternative imagery dataset.

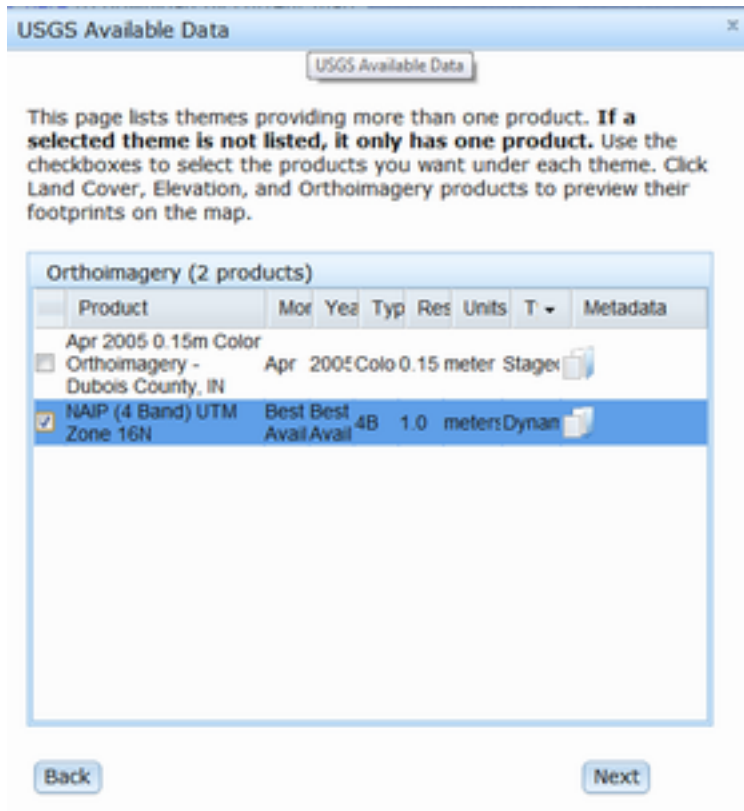


Figure 6. Screenshot of **popup** window indicating the available orthoimagery available for your area of interest.

- A menu box will appear on the left hand side of your screen indicating the contents of your cart (Figure 7). Your UTM zone number will be indicated in this window. For example, UTM Zone 14N appears in the product column of Figure 8. Since you will need this information for Appendix 2.2, make note of this number for your area of interest and print it here:

UTM Zone _____

There should be two layers listed. Click on the checkout button..

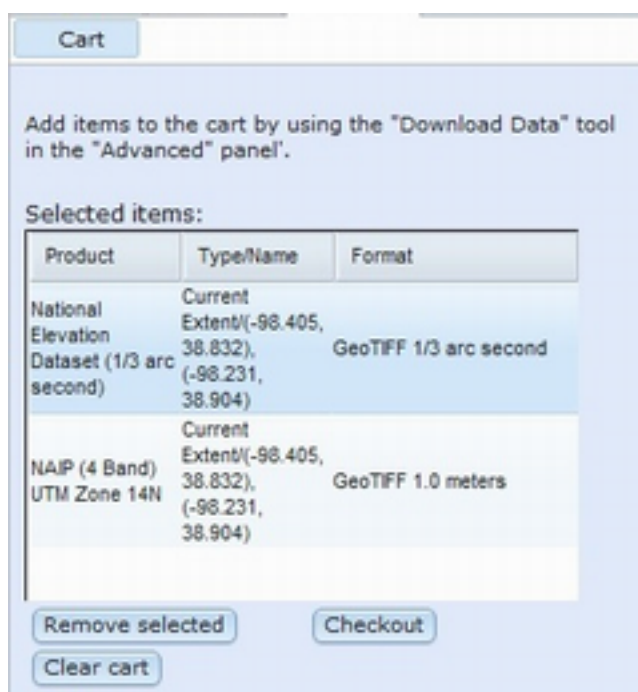


Figure 7. Screenshot of checkout cart.

E-mail for download.

- A dialog box will appear where you need to enter your email address two times. Click on Place Order then click OK in the TNM Download window. You will receive an email with the links for download.
- After you place your order, you can close down the National Map Viewer Window.

Downloading Data

- You will receive an e-mail from The National Map Viewer that contains critical information as shown in (Figure 8).
- Then download all of the links using the "Click here to download" links.

- Move the downloaded zip files to a sub-directory named “Chap2DEM.” Do not place this sub-directory in the “My Documents” directory or in any other directory with a space in the name.
- You will note that we have 4 chunks for the NAIP imagery. You may have more or fewer chunks. We will resemble these chunks in a subsequent appendix.

Elevation - Below are the links to download the data you requested. Due to the size of raster data, your request may have been broken into chunks. The chunks are listed below, and in the near future, this message will include a map to locate the chunks.

Product	Extracted by	Format	Download Link
National Elevation Dataset (1/3 arc second) Chunk 1/1	Current Extent(-98.405, 38.832), (-98.231, 38.904)	GeoTIFF	Click here to download

Orthoimagery - Below are the links to download the data you requested. Due to the size of raster data, your request may have been broken into chunks. The chunks are listed below, and in the near future, this message will include a map to locate the chunks.

Product	Extracted by	Format	Download Link
NAIP (4 Band) UTM Zone 14N Chunk 1/4	Current Extent(-98.405, 38.832), (-98.231, 38.904)	GeoTIFF	Click here to download
NAIP (4 Band) UTM Zone 14N Chunk 2/4	Current Extent(-98.405, 38.832), (-98.231, 38.904)	GeoTIFF	Click here to download
NAIP (4 Band) UTM Zone 14N Chunk 3/4	Current Extent(-98.405, 38.832), (-98.231, 38.904)	GeoTIFF	Click here to download
NAIP (4 Band) UTM Zone 14N Chunk 4/4	Current Extent(-98.405, 38.832), (-98.231, 38.904)	GeoTIFF	Click here to download

Figure 8. Screen shot of the email from the national Map

Uncompressing the Files and Renaming the Directories

- After the files are downloaded, uncompress the files into the same subdirectory where your Zip files are located as shown in Figure 9a.
- The newly created directories will have complex names that may be difficult to interpret so you will need to give them more meaningful names as shown in Figure 9b. Here are some tips for renaming.
 - The Zip files 4-band NAIP imagery should all have similar file sizes. You can see that they are all about 100,000 kb in Figure 9a.
 - The elevation data is probably the smallest.
 - You should use similar names to the ones we used in Figure 9b.

a. **Directory names prior to modification**

Name	Date modified	Type	Size
07015926	8/30/2012 9:29 AM	File folder	
70793961	8/30/2012 9:13 AM	File folder	
84589209	8/30/2012 9:13 AM	File folder	
90182188	8/30/2012 9:24 AM	File folder	
95926859	8/30/2012 9:13 AM	File folder	
07015926	8/30/2012 9:12 AM	WinZip File	96,261 KB
70793961	8/30/2012 9:10 AM	WinZip File	98,572 KB
84589209	8/30/2012 9:09 AM	WinZip File	100,540 KB
90182188	8/30/2012 9:07 AM	WinZip File	5,922 KB
95926859	8/30/2012 9:10 AM	WinZip File	103,783 KB

b. **Directory names after modification**

Name	Date modified	Type	Size
Elevation	8/30/2012 9:24 AM	File folder	
Imagery_1	8/30/2012 9:29 AM	File folder	
Imagery_2	8/30/2012 9:13 AM	File folder	
Imagery_3	8/30/2012 9:13 AM	File folder	
Imagery_4	8/30/2012 9:13 AM	File folder	
07015926	8/30/2012 9:12 AM	WinZip File	96,261 KB
70793961	8/30/2012 9:10 AM	WinZip File	98,572 KB
84589209	8/30/2012 9:09 AM	WinZip File	100,540 KB
90182188	8/30/2012 9:07 AM	WinZip File	5,922 KB
95926859	8/30/2012 9:10 AM	WinZip File	103,783 KB

Figure 9. Directory names a) prior to and b) after modification.

Backing up your data

- Save your data to a portable storage device (e.g., jump drive).