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Isn't That Spatial? Geography Education Resources:

#1: USGS Topographic Maps and Aerial Photographs from Terraserver

Note: This column originally appeared in the July-August 2003 issue of *Perspective* from the National Council for Geographic Education.

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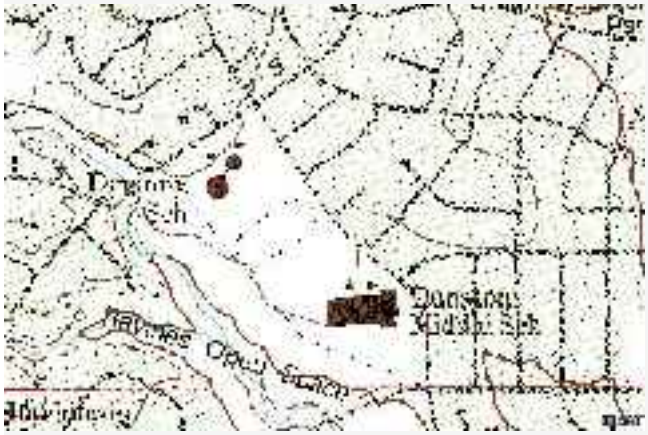
Introduction

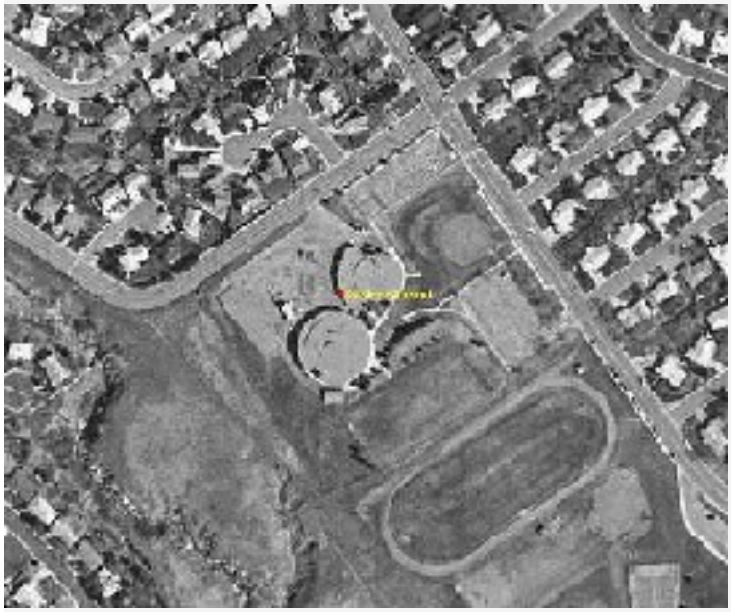
I thank Chris O'Toole for inviting me to write this column and Ruth Shirey for suggesting this column about resources for geography educators. It has been my passion for a decade now to share these resources with geography educators all over the world via approximately 35 workshops and conferences annually and through our "geoged" listserv. I am thrilled to write the column and look forward to hearing your comments--what worked, what didn't, and your ideas of incorporating these resources into your curriculum.

Resource Description

After reflecting on my postings over the Internet and the workshops I have conducted with educators and students throughout the past decade, I would like to begin this column with the resource that has consistently proven to be useful for geography education at all levels--Terraserver. Stemming originally from a USGS agreement with Microsoft, USGS topographic maps and digital aerial photographs are available for free download from the URL http://terraserver-usa.com.



Topographic Map of Devinny Elementary School Neighborhood, Lakewood, Colorado USA. Click for larger image.



Aerial Photograph of Devinny Elementary School Neighborhood, Lakewood, Colorado USA. Click for larger image.

Imagine a site where you and your students could examine, in sharp detail, your school building and the surrounding neighborhood, the exact spot where the Mississippi River flows into the Gulf of Mexico, the San Andreas Fault, ancient glacial lakeshores in North Dakota, urbanization along the Colorado Front Range, or the effects of the Public Land Survey System in Iowa. These images make excellent graphics to back up your lessons on glaciation, land use, population, or plate tectonics, for example. The TerraServer Web site is one of the world's largest online databases, providing free public access to a vast data store of maps and aerial photographs of the United States. TerraServer is designed to work with commonly available computer systems and Web browsers over slow speed communications links. The TerraServer name is a play on words, with 'Terra' referring to the 'earth' or 'land', and also to the terabytes of map images stored on the site.

The maps and aerial photographs can be downloaded into a graphics program, brought into a Geographic Information System (GIS), printed, or viewed on the computer screen.

The maps available on the site are USGS topographic maps at the following scales: 1:24,000, 1:100,000, and 1:250,000 (Alaska and Hawaii at other scales). The site allows for zooming in on the maps to a resolution of 2 meters. The aerial photographs available on the site are USGS aerial photographs flown at 1:40,000 scale. The site allows for zooming in on the photographs to a resolution of 1 meter, as shown in these example images for schools in Colorado.

How To Access

To use the resource, go to http://terraserver-usa.com and enter the name of any feature on a USGS topographic map, such as a city, for example. Select the correct city/state combination that you are interested in from the list that appears. Select a topographic map or an aerial photograph of the area you are interested in and zoom and pan until you are examining the desired area. Then, select download from the button bar above the image, and save the image as a .jpg file to your computer. Open with any graphics program or insert into a Word document. If you would like to examine the image within a GIS environment, be sure to click on the "world file" link to open and save the registration file that appears.

Use in the Curriculum

Geography educators and their students can the maps and images to analyze human and physical processes across the Earth's surface, from across the country to right in your own neighborhood. Example questions include the following:

1) Land Use: What is the land use like in your neighborhood? In your region? How does it compare to land use elsewhere in the United States? Why? What influence does population, climate, proximity to coastlines, and other phenomena have on land use? Why?

2) Landforms: What type of landforms exist in your neighborhood? In your region? How do they compare to landforms elsewhere in the United States? Why? What influence does climate, geology, rivers, ancient and current processes, proximity to coastlines, and other phenomena have on landforms? Why and how? Examine the following landforms in your region and in other regions: plains, floodplains, alluvial fans, oxbow lakes, deltas, braided streams, intermittent streams, glaciers, glacial valleys, eskers, kames, moraines, coastlines, ancient lakes, cirques, buttes, mesas, lava flows, sand dunes, karst topography, rolling hills, mountains, valleys, swamps, marshes, lakes, and other landforms. How are these features evident on the topographic maps and aerial photographs? What will the landscape look like 10, 100, or 500 years from now?

3) Population: Can you estimate the population in the map or photograph of your neighborhood? In your region? How does it compare to population elsewhere in the United States? Why is it similar or different? What influence does land use, climate, perception, and other phenomena have on population? Why? What does the settlement pattern look like in

your region—is it clustered around a certain physical feature, or spread out evenly across the landscape? What are the reasons?

4) Urbanization: What type of dwellings do people live in around your area? How do these dwellings compare in size and density to those in other parts of your city? How do these dwellings compare to those in other urban areas? Why? What influences the size and density and type of dwellings?

5) Scale. How much terrain is visible (in square miles or square kilometers) at a resolution of 1, versus 2, 8, or 16 meters? How does the amount of detail change as the scale changes? What is the best scale to view a glacier? A school building? A river delta? A city? Why? How does the resolution of the aerial photographs compare to the topographic maps? What is the maximum that you can zoom in on an aerial photograph versus a topographic map?

6) Seasons. Examine some aerial photographs taken in summer versus winter, spring, and fall. What are the differences, in vegetation and sun angle, for example? Why do they exist? What would your area look like during the other seasons?

7) GIS uses. With a GIS, you can use these maps and images as base maps behind your field-collected coordinates from a GPS (Global Positioning System) receiver. You could also drape the maps and aerial photographs on a 3D digital elevation model (DEM) to visualize the Earth as it truly exists, in three dimensions.

For more information and lesson ideas, visit http://rockyweb.cr.usgs.gov/public/outreach/terraerver.html. Use the terraserver site to enhance your teaching and learning about the geography of the United States.

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URL:http://rockyweb.cr.usgs.gov /public/outreach/isntthatspatial_terraserver.html
Last modified: 5 December 2003