

**Historical Topographic Map Collection**

# Scanning and Georeferencing Historical USGS Quadrangles

*“A government cannot do any scientific work of more value to the people at large than by causing the construction of proper topographic maps of the country.”*

John Wesley Powell to Congress, Dec. 5, 1888

The U.S. Geological Survey (USGS) National Geospatial Program is scanning published USGS 1:250,000-scale and larger topographic maps printed between 1884, the inception of the topographic mapping program, and 2006. The goal of this scanning, which started in 2011, is to provide a digital repository of USGS topographic maps, available to the public at no cost. For more than 125 years, the USGS topographic maps have accurately portrayed the complex geography of the Nation. The USGS is the Nation’s largest producer of printed topographic maps, and, prior to 2006, USGS topographic maps were created using traditional cartographic methods and printed using a lithographic process. As the USGS continues release of a new generation of topographic maps (US Topo) in electronic form, the topographic map remains an indispensable tool for government, science, industry, land management planning, and leisure.

When physical and cultural features change over time, maps are updated, revised, and new editions printed. Although they are technically out of date, these historic maps are often useful to scientists, historians, environmentalists, genealogists, and others researching a particular geographic location or area. A series of maps of the same area published over a period of time can show how some areas looked as early as 1884, before current development, and provide a detailed view of changes over time.

Because historical maps are stored in a limited number of collections and are not readily available, the USGS National Geospatial Program is converting these historical printed topographic quadrangles to an electronic format (GeoTIFF and GeoPDF). This serves the dual purpose of creating a master catalog and digital archive copies of the irreplaceable collection of topographic maps in the USGS Reston Map Library, as well as making the maps available for viewing and downloading from the USGS Store and *The National Map Viewer*.

## Historical Topographic Map Benefits

Building a comprehensive historical collection of topographic maps requires accurate cataloging and creating metadata (complete information about



Photographer: Terry Carr , USGS

**Cartographers in the Field** This Depression-era oil painting, created by Hal Shelton in 1940, depicts mapping techniques used in the early days of cartography, including an alidade and stadia rod for determining distances and elevations and a plane-table for sketching contour lines. This 4-by-6 foot painting is on display in the USGS library in Menlo Park, California.



each map) to accompany high-resolution, georeferenced digital files representing the lithographic maps. Georeferencing in the digital file allows basic map analysis to be done, such as pointing and clicking on the map to determine distance, area calculation, coordinate points, and other information. Each map image is scanned “as is” and captures the current content and condition of each one. The collection provides ready access to maps that are either no longer available for distribution in print or are being replaced by the new generation of US Topo maps. Georeferencing of the map files—that is, tying them to a known earth coordinate system—enables them to be imported into geographic information systems so that they can be overlain with other geospatial (map) data from other sources, such as from *The National Map*. The potential for research that analyzes change over time is becoming increasingly recognized by the geospatial community, and this project provides published lithographic USGS maps in georeferenced digital formats. With georeferencing, the historical maps can be combined with current data from The National Map. The product will be delivered as GeoTIFF images with embedded metadata.

The scanned historical maps will also be available for general reference and viewing in a compressed GeoPDF format. These files can be viewed and printed as PDF documents with a wide range of software. Using the geospatial extension requires Adobe Acrobat Reader with the no-cost TerraGo Toolbar for Microsoft Windows. GeoPDF files are accessible using all browsers for downloading at the USGS Store Web site (<http://store.usgs.gov/>). These GeoPDF files will continue to be added to the USGS Store as they become available.

### The USGS National Geospatial Program is:

- Developed and published specifications for scanning maps.
- Developed methods to efficiently create accurate, high-resolution, scanned georeferenced images.
- Created a catalog and metadata for all historical topographic maps that have been scanned and published in electronic form by the USGS.

**1884 map from Massachusetts** The first State to participate in the Cooperative Topographic Mapping Program.

- Provided historical paper maps in electronic form to support the new generation of electronic topographic maps (US Topo).
- Archived published files with the National Archives and Records Administration and the Library of Congress.
- Provided publicly accessible, downloadable, and viewable files of approximately 200,000 scanned maps, complete with metadata that is compliant with the Federal Geographic Data Committee.

### Future Plans

- As they are identified, scan and release historical USGS quadrangles that are not currently electronically available.

- A GeoTIFF product has been designed and the release of historical quads as GeoTIFF files will begin in early 2015.

### For More Information

To view and download information about *The National Map*, go to [www.nationalmap.gov](http://www.nationalmap.gov). To contact the USGS concerning *The National Map*, go to <http://www.usgs.gov/ask/> or email [nationalmap@usgs.gov](mailto:nationalmap@usgs.gov).

**For information regarding the Historical Topographic Map Collection, go to [nationalmap.gov/historical](http://nationalmap.gov/historical).**

By L.R. Davis and G.J. Allord

