

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 USGS Historical Quadrangle Scanning Project (HQSP) is scanning all scales and all editions of approximately 250,000 topographic maps published by the U.S. Geological Survey (USGS) since the inception of the topographic mapping program in 1884. This scanning will provide a comprehensive 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 begins 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 Although they are out of date, these historic maps are often useful to scientists, historians, environmentalists, genealogists, and others researching a particular geographic location or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 has begun a project to convert these historical printed topographic quadrangles to an electronic format (GeoTIFF and GeoPDF®). This project 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*.



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.

Historical Quadrangle Scanning Goal

The HQSP is accurately cataloging and creating metadata (complete information about 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 project 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 will provide 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 will be accessible using all browsers for downloading at the USGS Store web site (store.usgs.gov). These GeoPDF files will be added to the USGS Store as they become available beginning in mid-2011.

1884 map from Massachusetts The first State to participate in the cooperative topographic mapping program.

The USGS Historical Quadrangle Scanning Project is:

- developing and publishing specifications for scanning maps;
- creating a catalog and metadata for all topographic maps published by the USGS;
- scanning historical paper maps to coincide with the release of related new generation electronic topographic maps (US Topo);
- developing methods to efficiently create accurate, high-resolution scanned georeferenced images;
- archiving files with National Archives and Records Administration and the Library of Congress; and

- providing publicly accessible, downloadable and viewable files of all scanned maps with complete FGDC-compliant metadata.

For More Information

To view and download information about *The National Map* go to www.nationalmap.gov. To contact the USGS concerning *The National Map*, go to www.usgs.gov/ask or email nationalmap@usgs.gov.

For information regarding the Historical Quadrangle Scanning Project, go to nationalmap.gov/ustopo/index.html

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