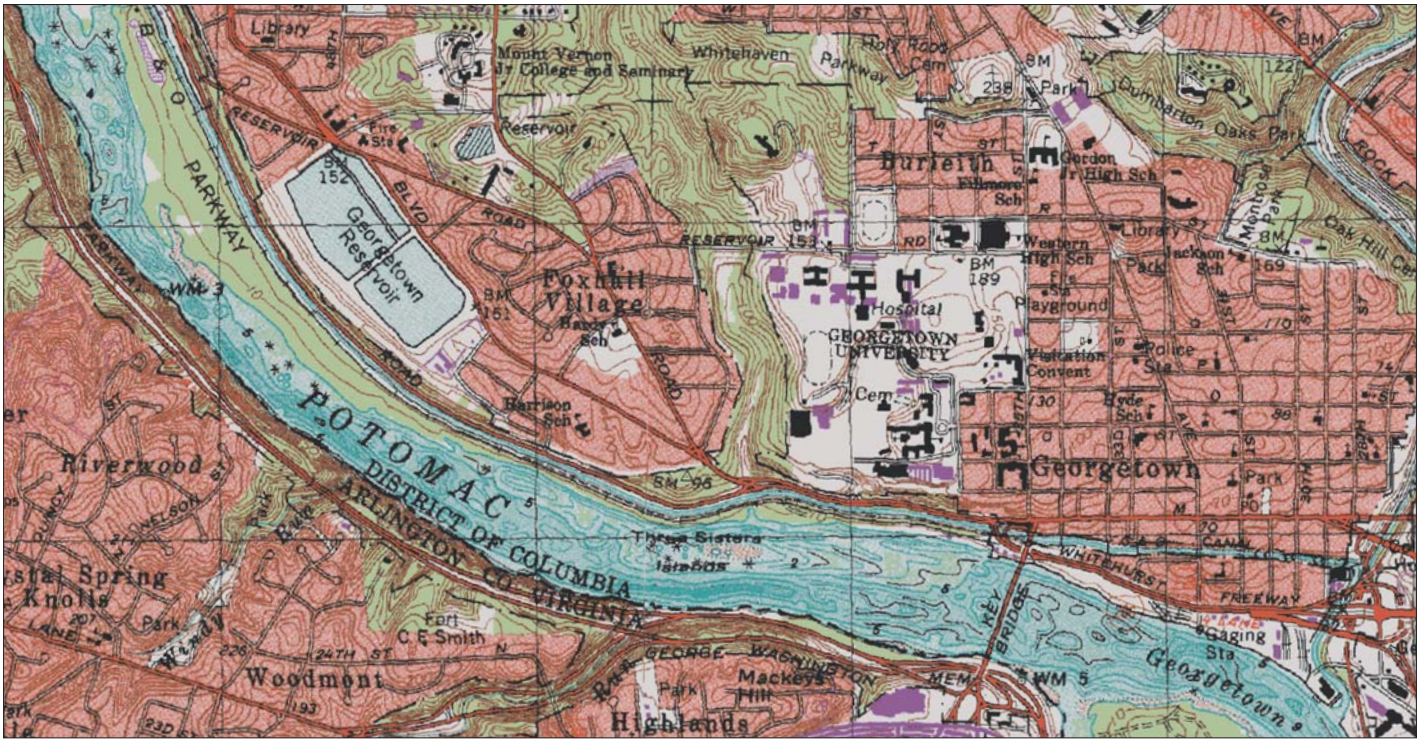
USGS GeoData Digital Raster Graphics



A part of the Washington West, D.C., digital raster graphic.

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey (USGS) topographic map. The scanned image includes all map collar information. The image inside the map neatline is georeferenced to the surface of the Earth.

Between 1995 and 1998, the USGS produced DRGs of the 1:20,000- (Puerto Rico) 1:24,000-, 1:25,000-, 1:30,000- (Caribbean Islands), 1:63,360- (Alaska), 1:100,000-, and 1:250,000-scale topographic map series.

Specifications

Most USGS 7.5-minute DRGs produced between 1995 and 1998 have the following specifications:

- The source material for a DRG is a USGS topographic paper map.
- USGS DRGs are in TIFF 6.0 format, with GeoTIFF 0.2 or 1.0 extensions to define georeferencing.
- The map is scanned at a minimum resolution of 250 dots per inch (dpi). If scanned at a finer resolution, the image is resampled to 250 dpi.
- The digital image is georeferenced to the true ground coordinates of the 2.5-minute grid ticks and projected to the Universal Transverse Mercator (UTM) for projection consistency with USGS digital orthophoto quadrangles (DOQ) and digital line graphs (DLG).
- Color values are standard between DRG quadrangles. The USGS uses up to 13 colors on each DRG. The image is an 8-bit palette-color image in a compressed TIFF file.
- The digital image is accompanied by a metadata file that complies with the Federal Geographic Data committee's "Content Standards for Digital Geospatial Metadata" (June 8, 1994).

Two areas were covered by other agencies with DRGs made to slightly different specifications:

- Most DRGs in California were made by the Teale Data Center. See www.gislab.teale.ca.gov/wwwgis/drg.html for product, price, and ordering information.
- DRGs of parts of Arkansas, Tennessee, North Carolina, South Carolina, Alabama, and Mississippi were made by the Tennessee Valley Authority (TVA). See www.tva.gov/mapstore/ for more information.

Replacement and New Version Digital Raster Graphics

Although the original data program was completed in 1998, the USGS has

continued to make new DRGs for two reasons:

1. To replace data found to contain errors.
2. To make new DRGs of revised maps.

About 1,000 replacement and new version DRGs per year have been produced since the completion of the original data program.

In addition, many DRGs have been made of maps other than standard topographic quadrangles, such as National Park Maps, maps of Antarctica, and geologic and hydrologic maps.

In some cases, new DRGs are derived directly from digital data rather than from scans of the paper map.

Changes to the technical specifications for DRGs to accommodate different maps and data sources are under consideration.

Projections and Datums

To be consistent with other USGS digital data, the image is cast on the UTM projection. The digital image will, therefore, usually not be consistent with the credit note on the image collar. Only the area inside the map standard cell boundary is georeferenced. Minor distortion of the text may occur in the map collar. Overedge areas and inset maps are not georeferenced.

In most cases, the datum of the source map is preserved in the DRG. That is, if a map is published on the 1927 North American Datum, the DRG is also on this datum.

Positional and Attribute Accuracy

The horizontal positional accuracy of a DRG is approximately the same as the accuracy of the published source map. The DRG georeferencing process removes errors caused by material stretching and shrinking, but human pointing mistakes may introduce other small errors. In most cases, errors in the DRG are small compared with sources of error in the original map graphic.

A USGS DRG has a standard color palette of 13 colors, intended to model the line-drawing nature of the source graphic. The colors are indexed according to the TIFF standard, with the additional requirement that the TIFF color look-up table be exactly the same for every DRG. The colors are always indexed in the same order, with the same red-green-blue values. Variations in paper map colors caused by different brands of ink, different printing presses, the age of the map, and other factors lead to misclassification of pixel colors in the DRG. Most DRGs made by scanning paper maps contain significant amounts of color noise, especially in areas filled by lithographic screen tints.

Uses of a Digital Raster Graphic

DRGs are useful as backdrops onto which other digital data can be overlaid. At the USGS, DRGs are used for collecting and validating DLGs. The DRG can help assess the completeness of digital data from other mapping agencies. It can also be used to produce "hybrid" products. These include combined DRGs and DOQs for revising and collecting digital data and combined DRGs and digital elevation models for creating shaded-relief maps.

Distribution Media

The USGS distributes DRGs on a variety of media, including CD-R, DVD, and FTP as uncompressed files.

Note: Sale of DRGs in fixed 1-degree blocks was discontinued on October 1, 1998.

Obtaining Digital Raster Graphics

DRG files are available from the USGS Sales Data Base and can be ordered through EarthExplorer at earthexplorer.usgs.gov or from any Earth Science Information Center (ESIC).

See the Teale and TVA Web sites referenced above for DRGs in areas around California and Tennessee.

DRG orders are filled on demand, and any combination of quadrangles can be ordered. For price and ordering information, see the USGS GeoData Digital Raster Graphics order form, available online at mac.usgs.gov/mac/isb/pubs/forms/drg.pdf.

Information

Detailed information about DRGs, including technical standards, DRG viewing software, and status and availability of all DRGs, is available on the World Wide Web at mcmcweb.er.usgs.gov/drg.

Questions and problems not addressed on the Web site can be sent to:

Rolla-ESIC
U.S. Geological Survey
1400 Independence Rd., MS 231
Rolla, MO 65401-2602
573-308-3500; Fax: 573-308-3615
E-mail: mcmcesic@usgs.gov

For information about data production cost sharing with the USGS, contact the DRG program manager at drg_pm@usgs.gov.

For information on other USGS products and services, call 1-888-ASK-USGS, or visit the general interest publications Web site on mapping, geography, and related topics at erg.usgs.gov/isb/pubs/pubslists/.

For additional information, visit the ask.usgs.gov Web site or the USGS home page at www.usgs.gov.