

US Topo

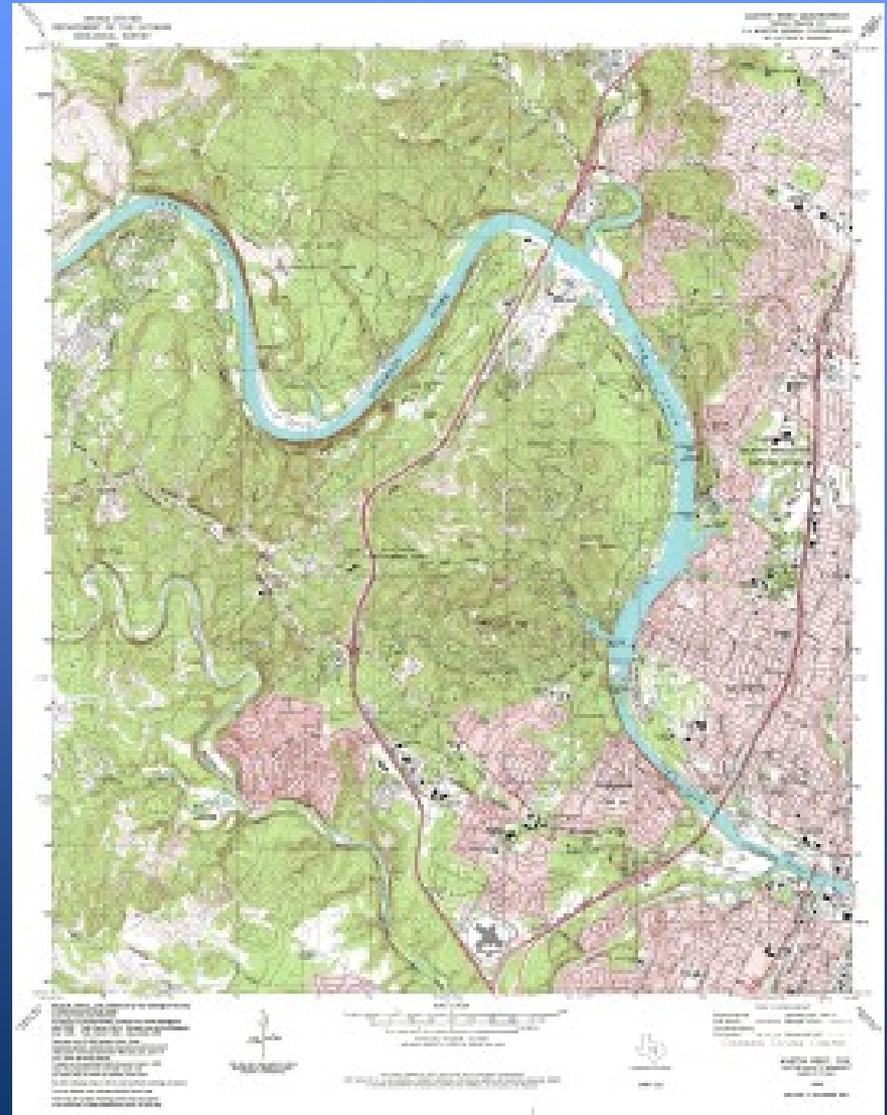
The New Generation of Topographic Maps

Topics

- **Background of USGS topographic mapping program**
- **New US Topo maps**
- **Demonstrations**
 - **Access and Download US Topo maps**
 - **Using US Topo maps**
- **Historical topographic map collection**

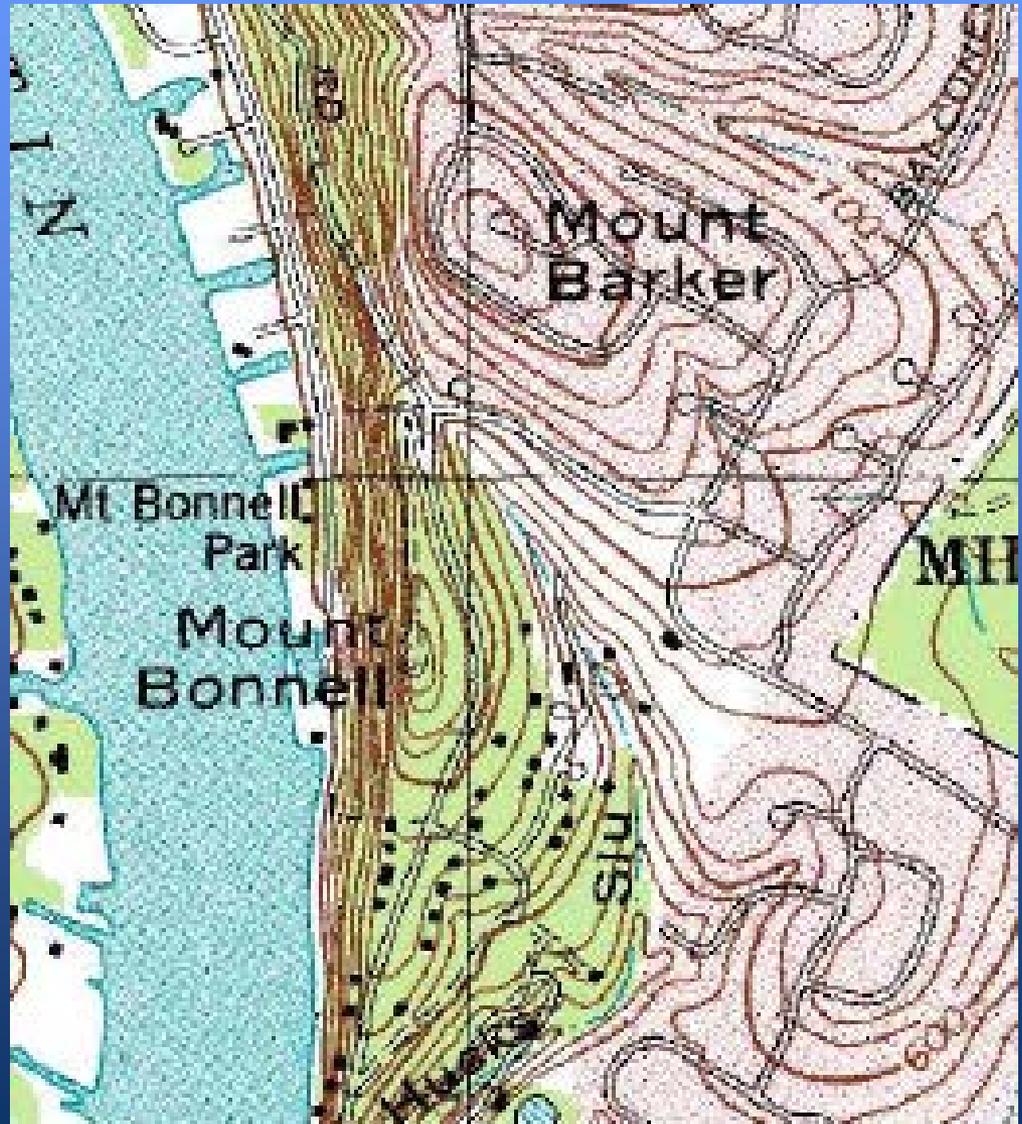
USGS Topographic Maps

- Topographic maps became a signature product of the USGS because the public found them to be a critical and versatile tool for viewing the nation's vast landscape.

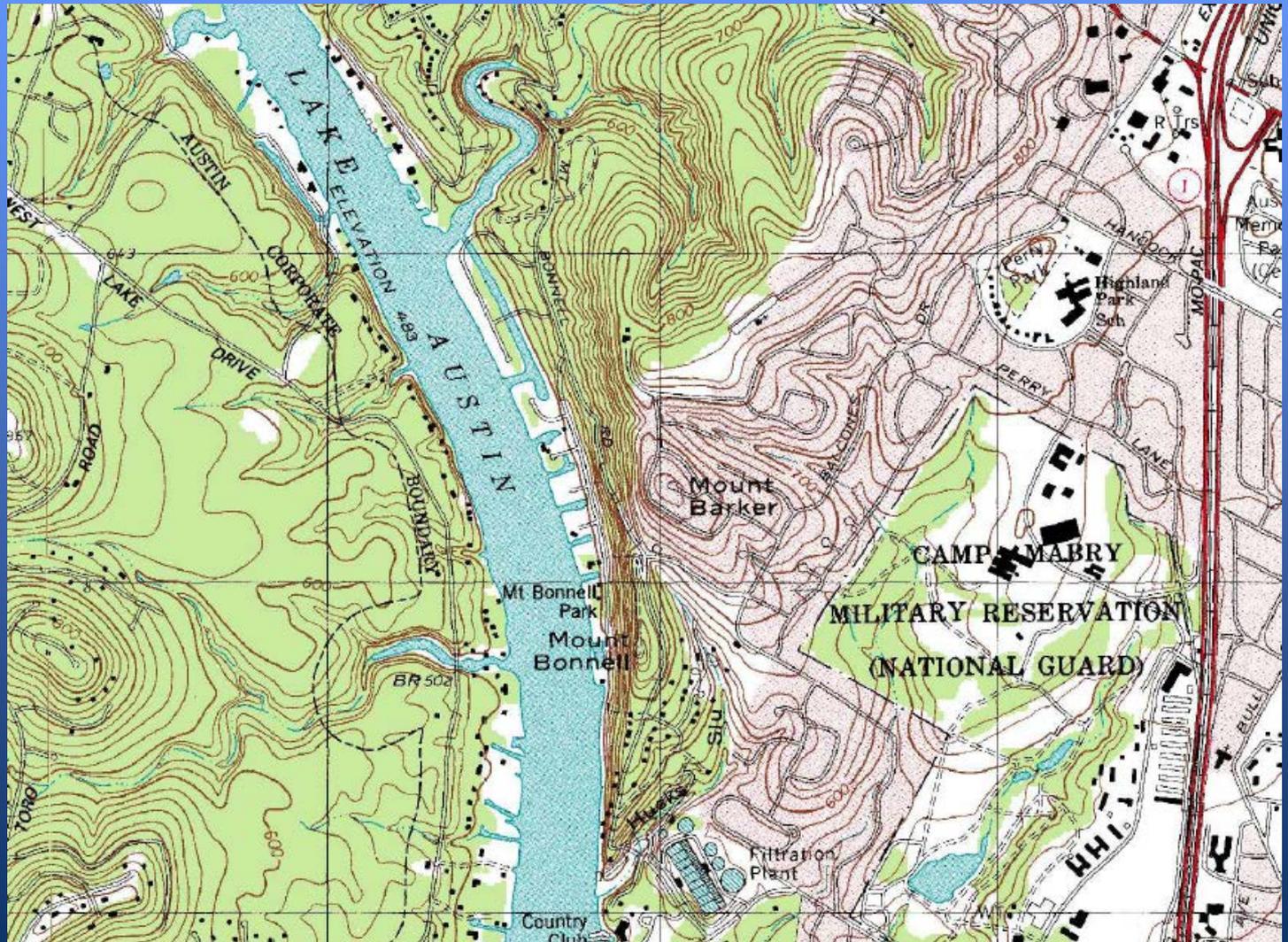


What is a topographic map?

- The distinctive characteristic of a topographic map is that the shape of the earth's surface is shown by contour lines



Also includes symbols that represent such features as streets, buildings, streams, and vegetation



125 Years of Topographic Mapping

- In 2009, USGS celebrated the 125th anniversary of its national program for topographic mapping (1884–2009)
- 2010 – Launch of the new type of topographic map: US Topo

1880s Field sketching



1940s Mapping from stereophotography



1970s Electronic instrumentation



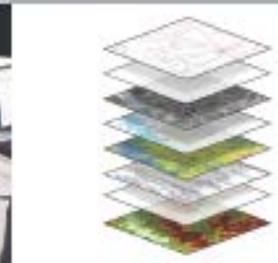
1980s Earth observing satellites



1990s Mapping with computers



2000s Mapping with the Internet

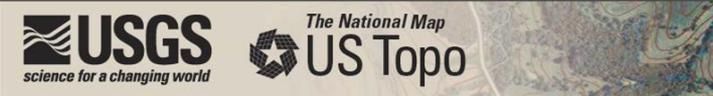


Systematic topographic mapping of the US

- Complete coverage at a variety of scales
- Mapping techniques evolved over time
 - Field surveys
 - Photogrammetry
 - Computer-based methods
- Scales and content of the topographic maps have changed over time (1884 – present)
- USGS mapping processes and data helped spur the evolution and development of other digital map applications and products in use today: Google Maps, Bing Maps, consumer – grade GPS units

Foundation: *The National Map*

- Base topographic data
 - ✓ Seamless
 - ✓ Continuously maintained
 - ✓ Nationally consistent
- Developed and maintained through partnerships
- Available on line
- *Source for products and services*



Topographic Maps for the Nation

US Topo is the next generation of topographic maps from the U.S. Geological Survey (USGS). Arranged in the familiar 7.5-minute quadrangle format, US Topo digital maps are designed to look, feel and perform like the traditional paper topographic maps for which the USGS is so well known. In contrast to paper-based maps, US Topo maps provide technical advantages that support faster, wider public distribution and enable basic, on-screen geographic analysis for all users.

US Topo maps are available free on the Web. Each map quadrangle is constructed in GeoPDF® format from key layers of geographic data (orthoimagery, roads, geographic names, topographic contours, and hydrographic features) found in *The National Map*.

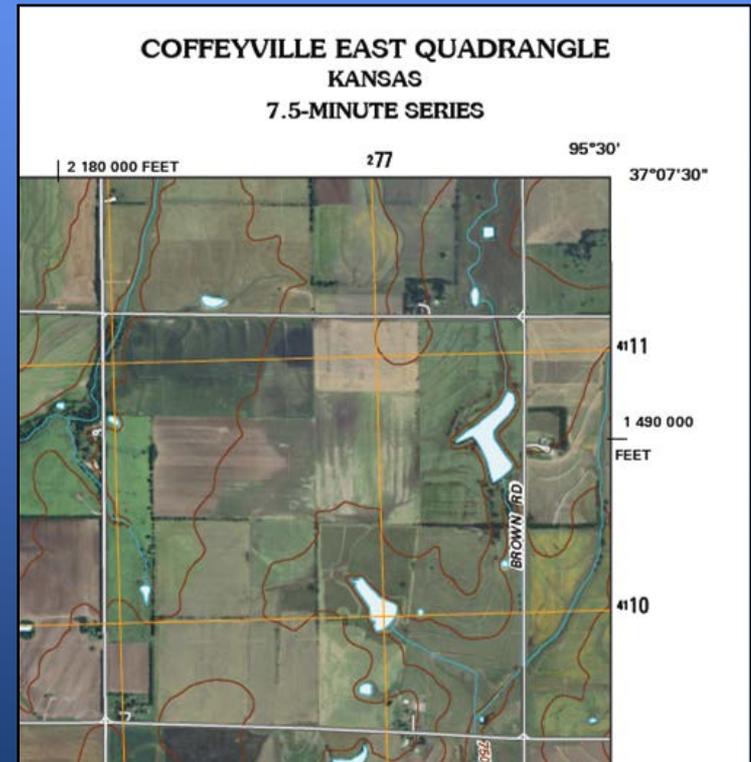
US Topo maps can be printed from personal computers or plotters as complete full-sized maps, or in customized sections, in a user specified format. Paper copies of the maps can also be purchased from the USGS Store.¹ The US Topo Web site³ features downloadable links and a users guide.



US Topo

- *A new USGS topographic map product*

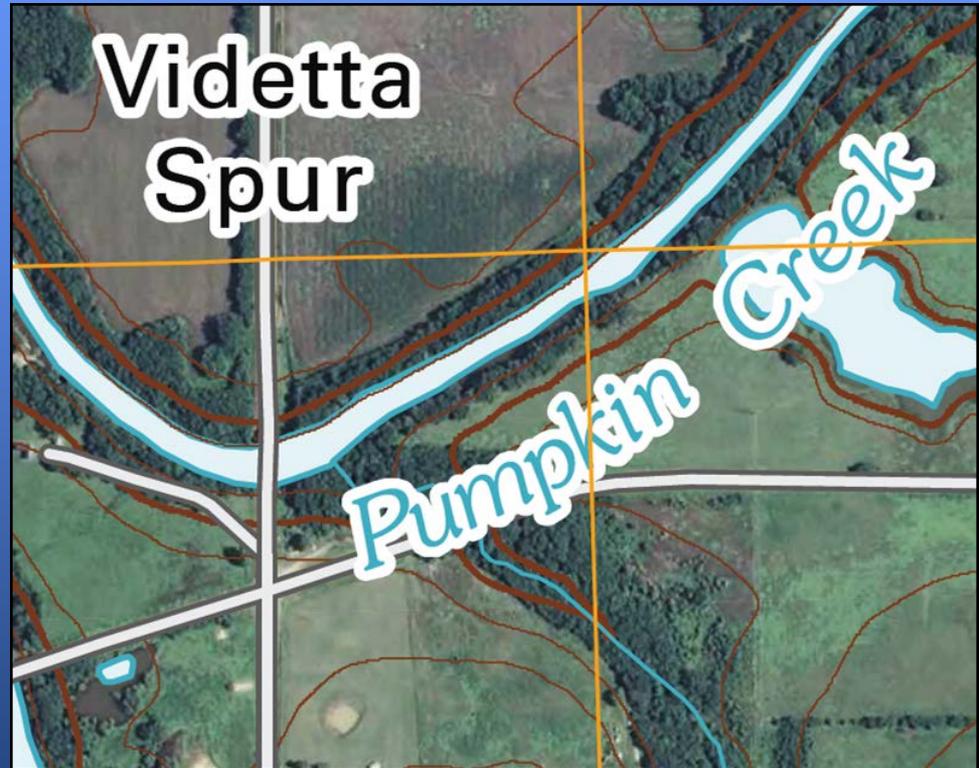
- ✓ Built from *The National Map* digital data
- ✓ GeoPDF Format
- ✓ Available free on the Web
- ✓ Image base
- ✓ Core feature layers
- ✓ Regular update



Content

■ US Topo Content

- ✓ Orthorectified image
- ✓ Roads
- ✓ Names
- ✓ Contours
- ✓ Hydrography
- ✓ Woodland/ Veg
- ✓ State and county boundaries
- ✓ Structures





Then vs Now

- Older maps were handcrafted products created from primary data sources
- US Topo maps are mass-produced from secondary data sources
 - Pros
 - Lower cost
 - Better currency *
 - Better overall coverage
 - Cons
 - Less content
 - Do not completely replicate the visual appearance of a hand-drawn map



Strategy

- **Primary strategic goal is to refresh the 1:24,000-scale national map series on a regular three-year cycle**
 - **Linked to US Department of Agriculture's National Agricultural Imagery Program (NAIP) image acquisition schedule**
 - **For the conterminous 48 states alone, this requires publishing 18,000 maps per year (72 maps produced every work day)**



Strategy (continued)

- **Secondary strategic goal is continuous product improvement**
 - **Additional data content will be added as data are obtained from authoritative sources and integrated into The National Map**
 - **Contours and hydrography in October 2009**
 - **State and county boundaries in April 2011**
 - **Vegetation in October 2011**
 - **Improved Cartographic Presentation**
 - **Challenges with text placement, integration of different feature classes**
 - **US Topo appearance is superior to typical GIS display, but still falls short of traditional USGS topographic map presentation standards**



Data Sources

■ *The National Map*

- ✓ Names - Geographic Names Information System
- ✓ Orthoimage – National Agriculture Image Program (NAIP)
- ✓ Elevation – National Elevation Dataset
- ✓ Hydrography – National Hydrography Dataset
- ✓ Vegetation – National Landcover Dataset
- ✓ Structures – National Structures Dataset
- ✓ Boundaries – National Boundaries Dataset
- ✓ Transportation – TomTom (licensed data)

■ Other Sources

- ✓ Grids and quadrangle level metadata - generated

Product Characteristics

- Traditional USGS 7.5-minute topographic quadrangle format
- Nationally consistent
- Can be used electronically or plotted
- Reference systems:
 - ✓ Latitude/Longitude
 - ✓ National Grid and Coordinates (Military Grid Reference System)
 - ✓ Universal Transverse Mercator



Product Characteristics

- **GeoPDF format**
 - ✓ A TerraGo Technologies published extension to the Adobe PDF file format
- **File size varies - about 15 to 25 Mb**
- **Georeferenced**
 - ✓ Locations defined in terms of map projection and coordinate systems
- **Layered (select layers, turn layers on/off)**
- **Limited interactive capabilities, free tools**
- **Designed for map users who are not GIS specialists**

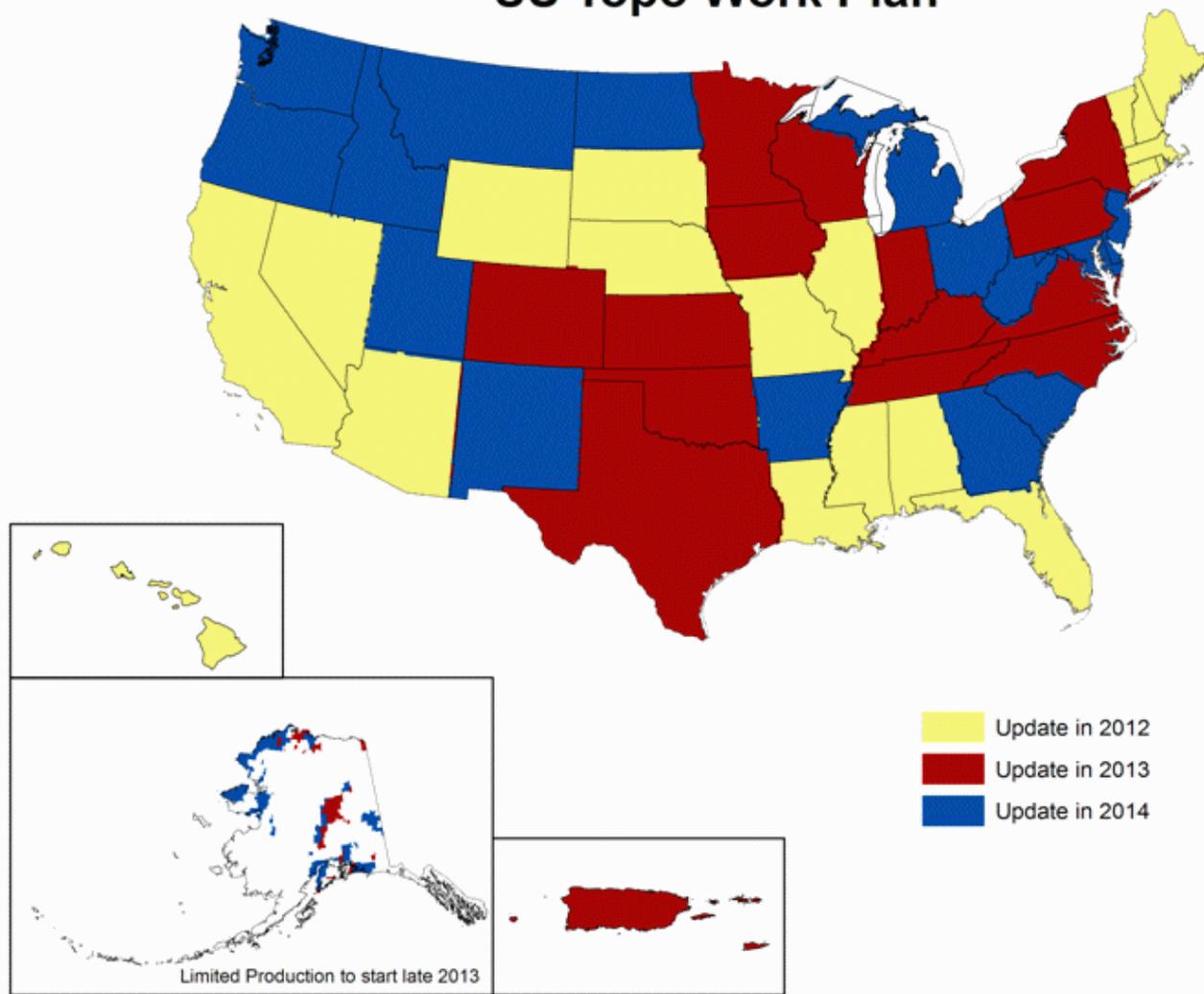


Key Advantages

- Accessible on line from a personal computer
- Interactive & enhanced
- Functionally superior to a Digital Raster Graphic (DRG)
- Will evolve & improve over time
- Plot / print ready
- Authoritative content
- Quality assured to standards
- Public domain (* except TomTom transportation data)
- Free download (* except TomTom transportation data)



US Topo Work Plan



- Update in 2012
- Update in 2013
- Update in 2014

October 15, 2012

http://nationalmap.gov/ustopo

http://nationalmap.gov/ustopo/index.html

US Topo The National Map: 125 Years o...

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USGS science for a changing world

The National Map US Topo

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The National Map
[The National Map Home](#) >> US Topo

About US Topo Maps

Download Maps (Map Store)

Frequently Asked Questions

User's Guide-Quickstart (1.2 MB pdf)

Fact Sheet

US Topo News

Contact Us

US Topo Quadrangles — Maps for America

US Topo quadrangles are digital topographic maps produced by the [National Geospatial Program](#) of the [U.S. Geological Survey](#) (USGS). Created in the familiar 7.5-minute quadrangle format like the legacy paper maps, US Topo maps support frequent updating, wide and fast public distribution, and basic, on-screen geographic analysis.

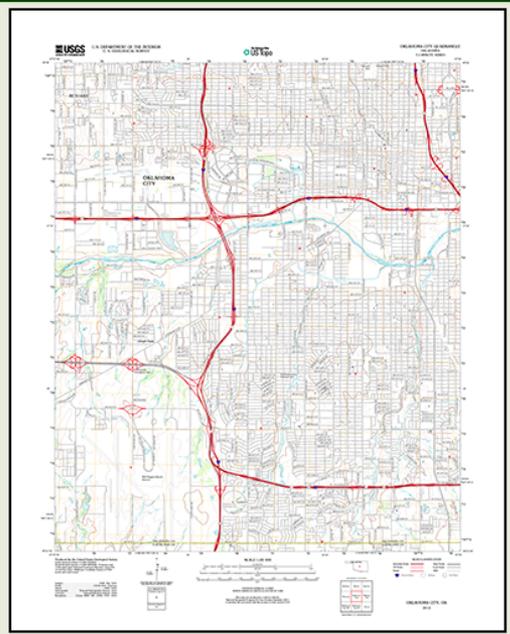
US Topo maps are available for free Web download from the [USGS Store](#). Each map is delivered in PDF format with geospatial extensions (GeoPDF®) and is made from key layers of geographic data - [orthoimagery](#), [transportation](#), [geographic names](#), [topographic contours](#), [boundaries](#), [hydrography](#), [structures](#), and [woodlands](#) - found in [The National Map](#). *The National Map* is a nationwide repository of integrated data from local, State, Federal, and other sources. Recent US Topo maps also include the [Public Land Survey System](#) (PLSS) and the [United States National Grid](#) (USNG).

Users can turn US Topo data layers on and off as needed, zoom in and out to examine specific features or see a broader area, and print the maps in their entirety or in customized sections on a broad array of printing devices. Viewing and analytical tools are available for free download from [Adobe](#) and [TerraGo Technologies](#). File size for each US Topo is about 15-20 megabytes.

US Topo maps are produced by the USGS [National Geospatial Technical Operations Center](#). The first US Topo prototypes, "Digital Maps - Beta," were made in June 2009. A limited number of these maps were made spanning 18 states. As of October 2012, the prototype maps were replaced by US Topo maps and the "Digital Maps - Beta" prototype maps are no longer available. More information about US Topo maps [can be found here](#).

The USGS also distributes digital versions of earlier US Topo and paper topographic quadrangle maps through the [Historical Topographic Map Collection](#). These maps also are available for download through the [USGS Store](#).

 **Introduction to US Topo -- a video** The National Geospatial Program has released an informative and entertaining video to demonstrate the advantages, capabilities and opportunities provided by US Topo electronic maps. <http://gallery.usgs.gov/videos/568>



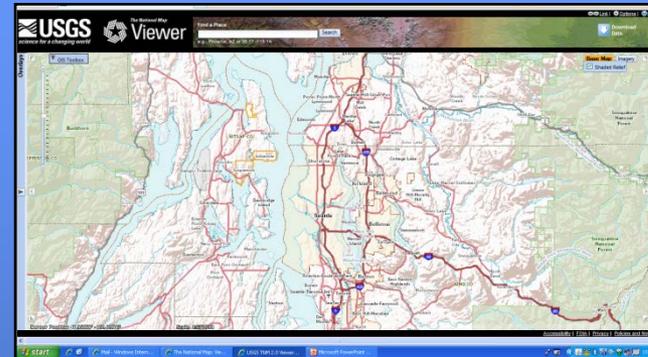
**OKLAHOMA CITY, OK 2012 (ORTHOIMAGE OFF)
7.5 MINUTE SERIES QUADRANGLE (1:24,000--SCALE)
US TOPO MAP**

[click on map to view larger image](#)
[download map \(GeoPDF 22.6 MB\)](#)

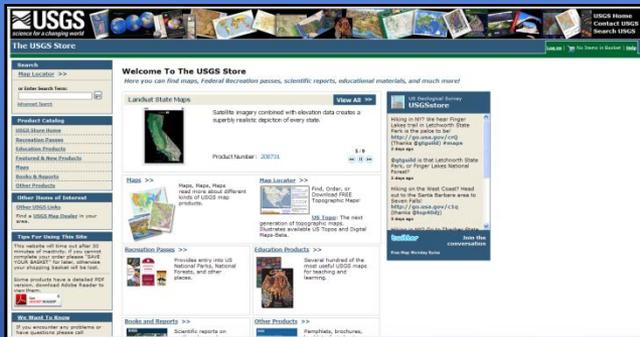
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Internet Access Pathways

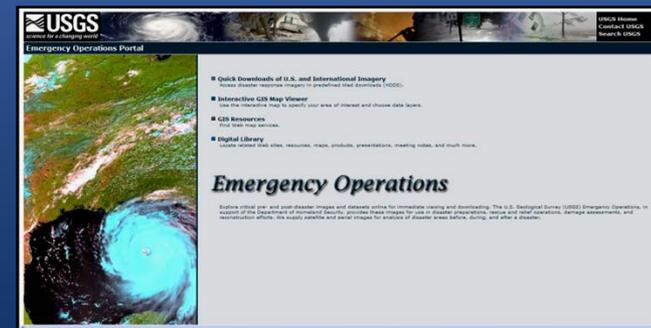
- **The National Map Viewer**



- **USGS Store**



- **Hazards Data Distribution System (HDDS)**



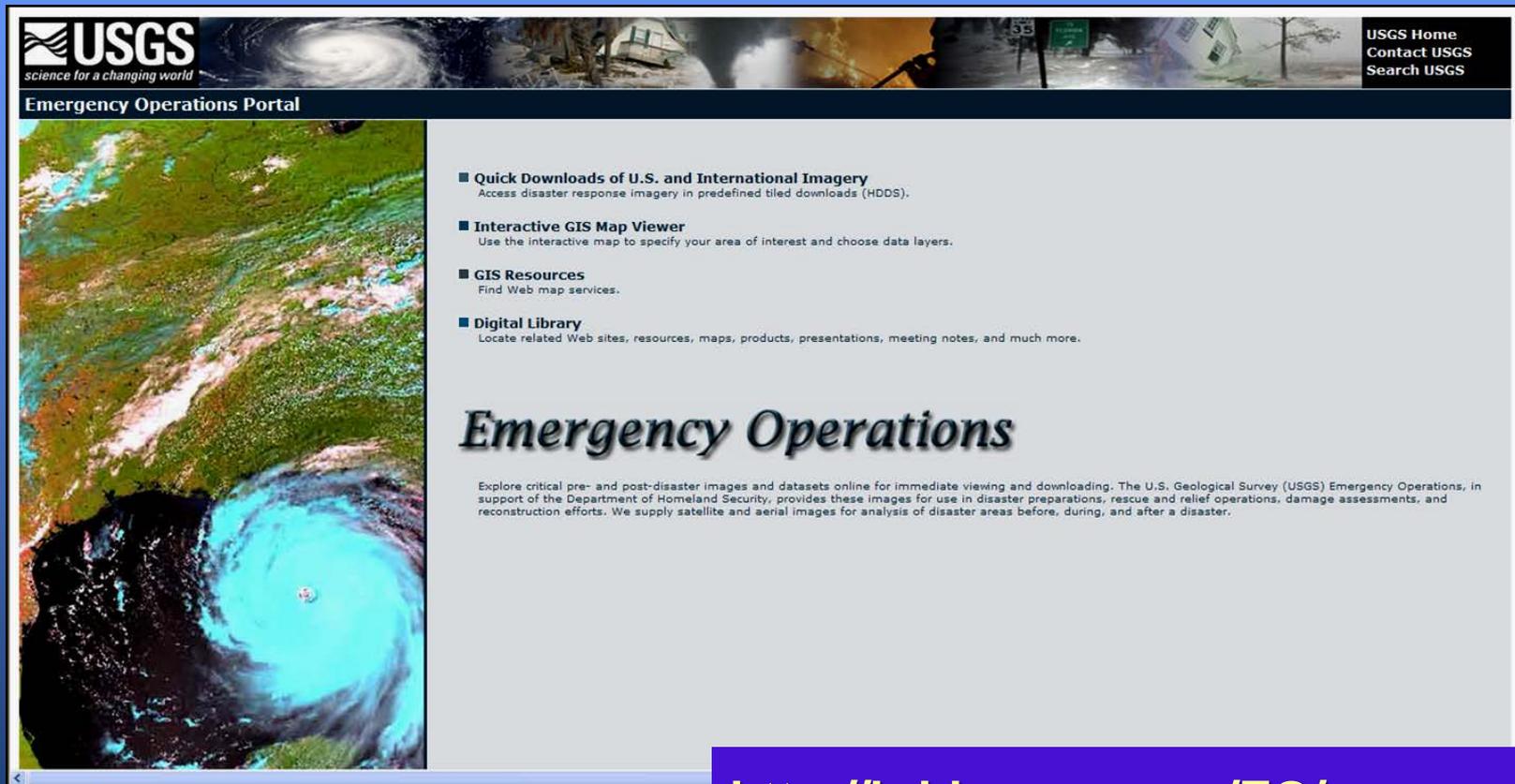
The National Map Viewer

The screenshot displays the USGS National Map Viewer interface. At the top, the browser address bar shows the URL <http://viewer.nationalmap.gov/viewer/>. The page features a search bar, navigation tools, and a toolbar with options like 'Standard', 'Advanced', and 'Annotation'. On the left, a 'Base Data Layers' panel lists various map layers such as 'US Topo', 'Geographic Names (GNIS)', 'Structures', 'Transportation', 'Governmental Unit Boundaries', 'Map Indices', 'Hydrography (NHD)', 'Land Cover', 'Elevation Availability', 'Elevation Contours - Small Scale', 'Imagery', 'Scanned Topo Maps', and 'Reference Polygons'. The main map area shows a topographic view of the United States with state boundaries and major cities labeled. A scale bar at the bottom indicates a scale of 1:86,978,595. The cursor position is shown as 31° 51' 52.724" N, 81° 27' 59.534" W. The page footer includes links for 'FAQ', 'Accessibility', 'FOIA', 'Privacy', and 'Policies and Notices'.



<http://nationalmap.gov/viewer.html>

Emergency Responder Access Hazards Data Distribution System (HDDS)



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science for a changing world

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Emergency Operations Portal

- **Quick Downloads of U.S. and International Imagery**
Access disaster response imagery in predefined tiled downloads (HDDS).
- **Interactive GIS Map Viewer**
Use the interactive map to specify your area of interest and choose data layers.
- **GIS Resources**
Find Web map services.
- **Digital Library**
Locate related Web sites, resources, maps, products, presentations, meeting notes, and much more.

Emergency Operations

Explore critical pre- and post-disaster images and datasets online for immediate viewing and downloading. The U.S. Geological Survey (USGS) Emergency Operations, in support of the Department of Homeland Security, provides these images for use in disaster preparations, rescue and relief operations, damage assessments, and reconstruction efforts. We supply satellite and aerial images for analysis of disaster areas before, during, and after a disaster.

<http://hdds.usgs.gov/EO/>

USGS Store – US Topo Download



Search:

Address or Place

[\[Search Help\]](#)

or [Find a place on the map](#) [\[Navigation\]](#)

Map | Satellite | Hybrid | Topo

	BUY	Size	Date	View	DOWNLOAD
Bastrop US Topo Revision 1		7.5X7.5	2013	view	25.1MB
Bastrop US Topo		7.5X7.5	2010	view	14.9MB
Bastrop		7.5X7.5	1982	view	12.0MB
Bastrop		7.5X7.5	1982	view	12.2MB
Bastrop		7.5X7.5	1982	view	12.3MB
Bastrop		15X15	1950	view	8.8MB
Bastrop		15X15	1948	view	8.6MB
Bastrop		30X30	1904	view	8.5MB

Map data ©2013 Google - [Terms of Use](#)

NAVIGATE:
Double click to re-center, click and drag around, zoom in and out.

MARK POINTS:
Click on a place to add a marker.

NOTES:
Switch between Navigate and Mark Points at any time.
The following [map footprints](#) appear when you are in Mark Points mode and zoomed in:

SELECT AND GET YOUR MAPS:
Click marker to see an information popup, then click on "order", to add maps your download cart.

[View Download Cart](#)

[Clear Markers](#)

[Reset Map](#)

[Show US Topo](#)

terraGo TECHNOLOGIES

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- **Measure** distances and area, in your own coordinate system
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Future Goals

- Each year produce/revise maps for at least 1/3 of the lower 48 States using the latest imagery and *The National Map* data
- Add coverage of Puerto Rico and the US Virgin Islands by the end of 2013
- Limited Alaska production in 2013
- Add additional integrated data layers from *The National Map*
- Major improvements to product standard, including enhanced quality requirements
- Bundle each US Topo with all prior editions of corresponding printed quadrangle map as layers in the GeoPDF

Scanned Historical Topographic Maps

- ✓ Approximately 250,000 printed quadrangles – all maps, all scales
- ✓ Consistent, high quality specifications (600 dots per inch)
- ✓ Georeferenced
- ✓ Metadata
- ✓ Released through the USGS Store and *The National Map Viewer*



USGS science for a changing world

The National Map

Historical Quadrangle Scanning Project

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, 1855

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 1847. 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, geologists, 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 1824, 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.



Cartographers in the Field This depicton is 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.

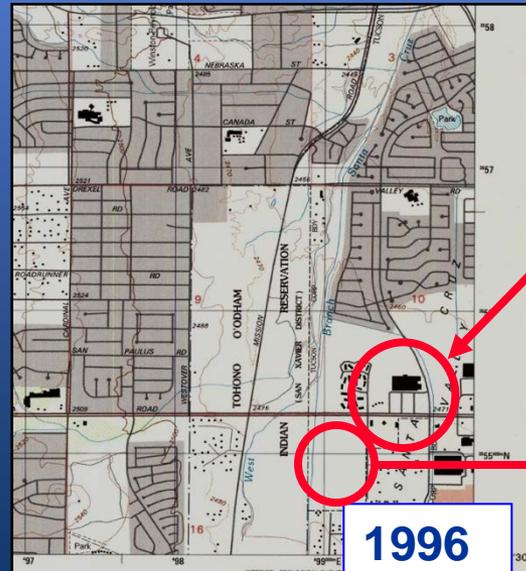
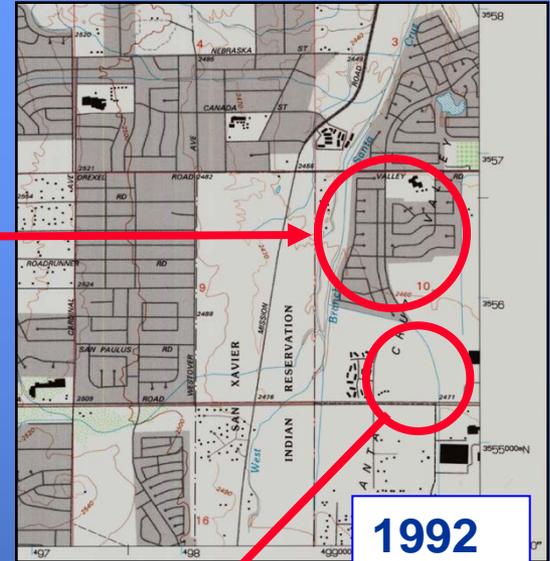
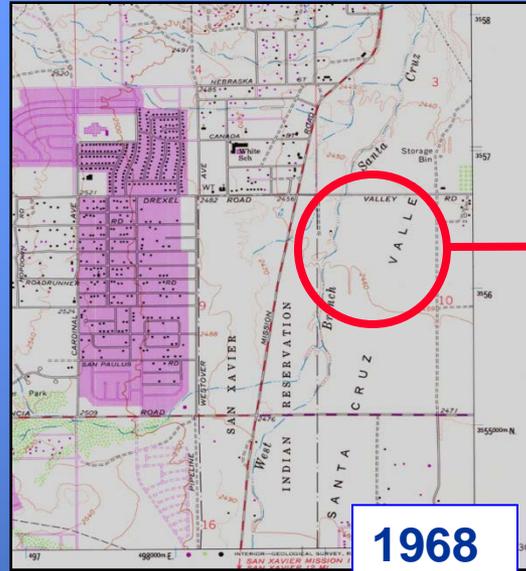
U.S. Department of the Interior
U.S. Geological Survey

Printed on recycled paper

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Map Time Series

An historical perspective of changes to the Nation's landscape



Thank you!

Claire DeVaughan
Geospatial Liaison for Texas
512-927-3583
cdevaugh@usgs.gov