

# ***USGS National Geospatial Program: The National Map and Changing Program Priorities***

OKSCAUG User Group Meeting  
Edmond, OK  
February 26, 2014

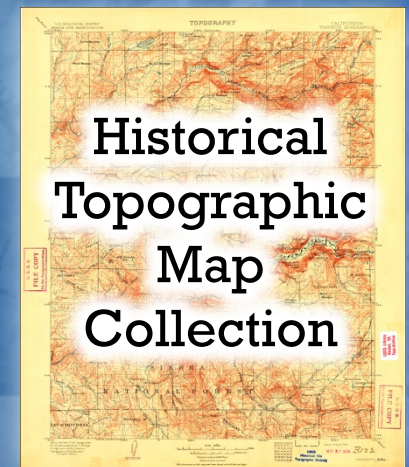
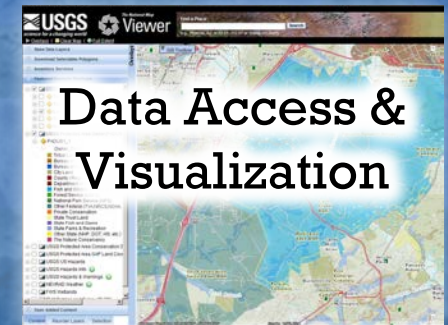
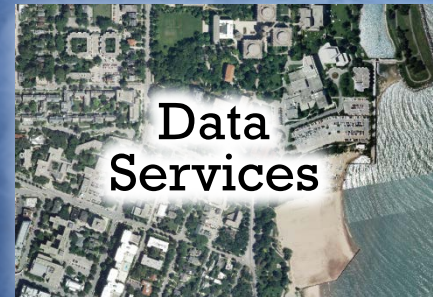
Darryl S Williams, Cartographer  
U.S. Geological Survey  
Oklahoma City, OK





# National Geospatial Program (NGP) Mission

- Organize, maintain, publish, and disseminate the geospatial baseline of the Nation's topography through *The National Map*
- *The National Map* is a nationally consistent, continuously maintained platform for public domain geographic base data and services





# ***National Geospatial Program (NGP) Priorities***

***The National Map (TNMN): <http://nationalmap.gov/>***

- **US Topo Maps (Oklahoma coverage)**
- **3D Elevation Program (3DEP) Initiative**
  - **US Interagency Elevation Inventory (USIEI)**
- **Communities of Use (COUs)**
  - **Water Resources (NHD: Stewardship Assessment Survey)**
  - **Geologic (Hazards and Mapping)**
  - **Natural Resources Conservation**
- **Evolution of the Geospatial Liaison Network**

## **Reduce Participation in Specific Activities**

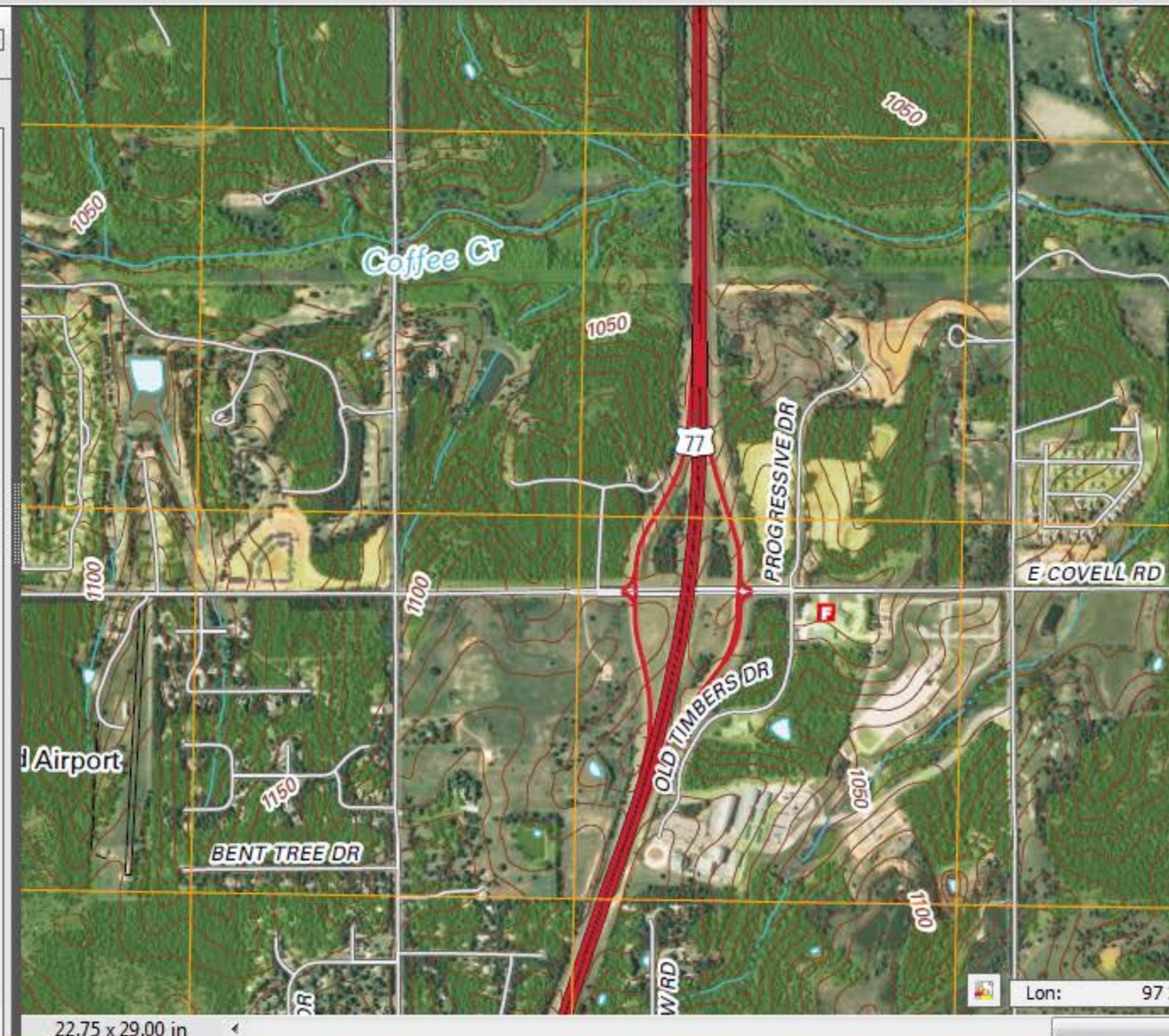
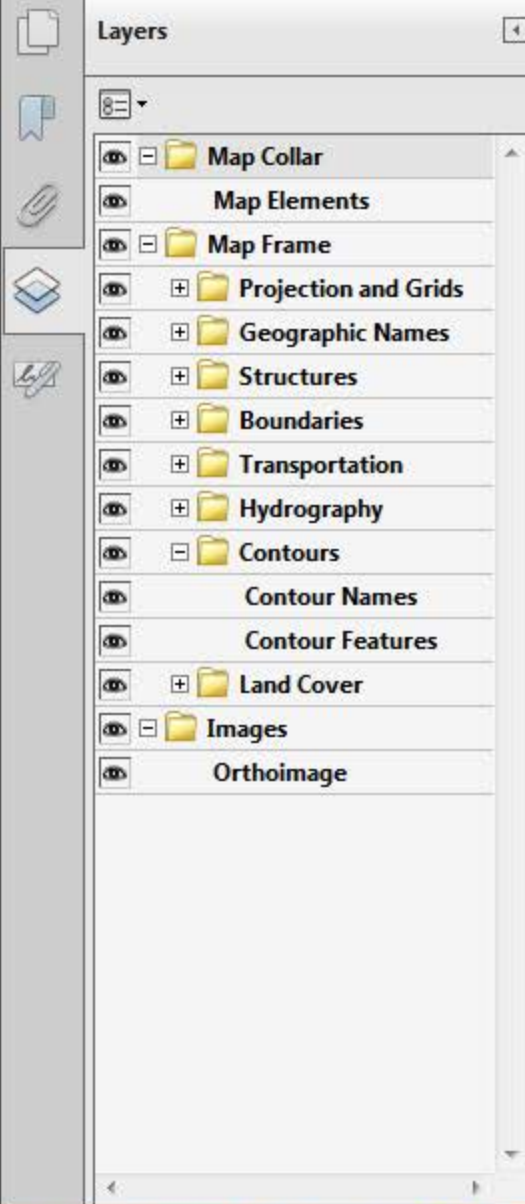
- **High resolution 1-foot Orthoimagery Acquisitions**
  - NGA (National Geospatial-Intelligence Agency) 133 Urban Area Program
  - Oklahoma City and Tulsa (2015)
- **Aerial photography Acquisitions other than NAIP**
- **NSDI Partnerships and Sponsorship Activities**
- **The National Atlas Activities**



# US Topo Map Coverage for Oklahoma

- New generation of digital topographic maps continually maintained, nationally consistent, and available free on-line
- Oklahoma revised coverage: US Topo 2013 maps (NAIP 2010)
- Additional Content (Layers/Features) added on 2013 maps:
  - Woodland - tint derived from the National Land Cover Dataset
  - Structures - Fire stations, Hospitals, Schools
  - Boundaries - State and county, Forest Service boundaries
  - Commercial roads in lieu of U.S Census roads
  - Forest Service roads and road numbers
- Future:
  - Public Land Survey System (PLSS)
  - National Trails
  - National Cemeteries - future



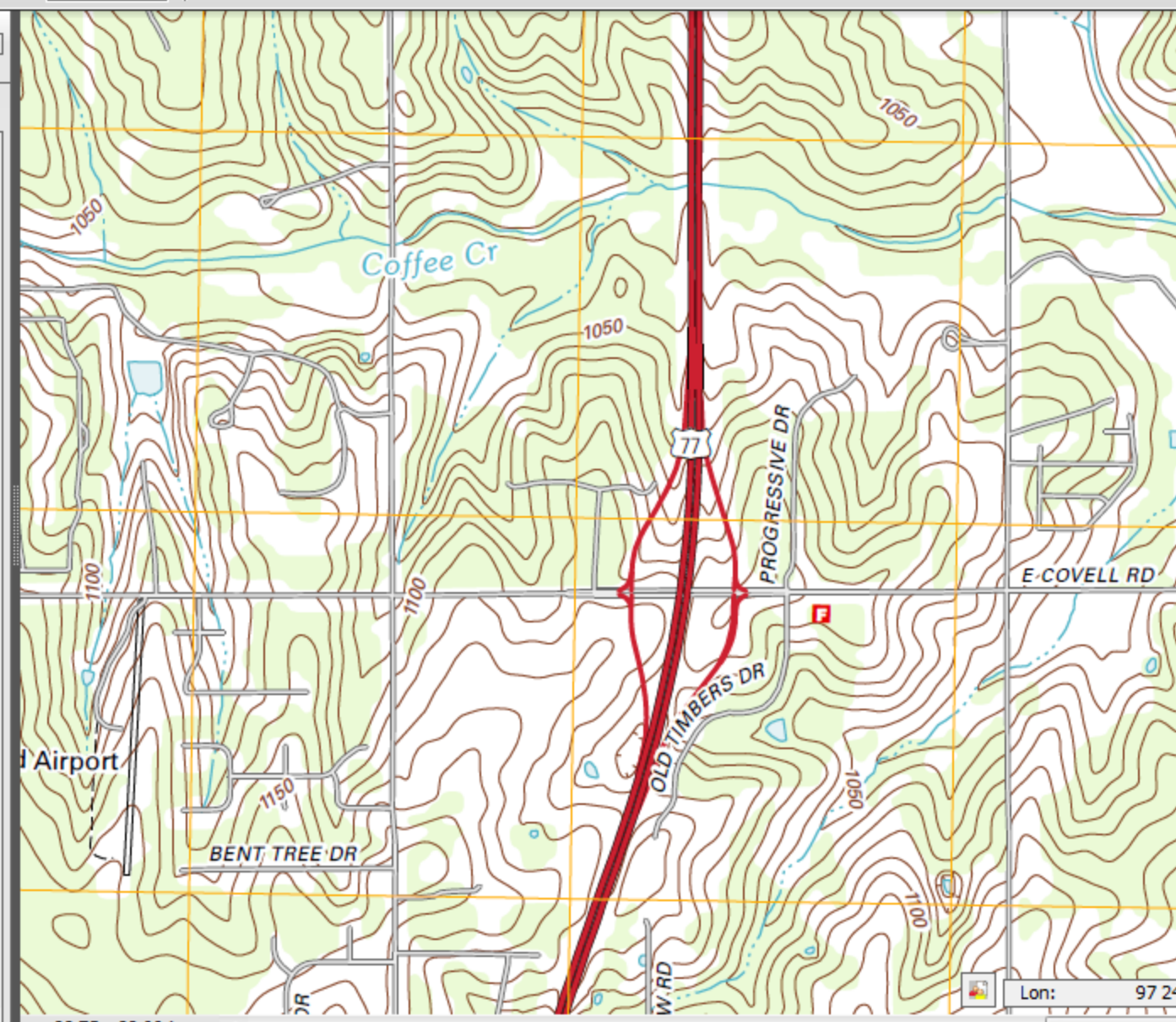




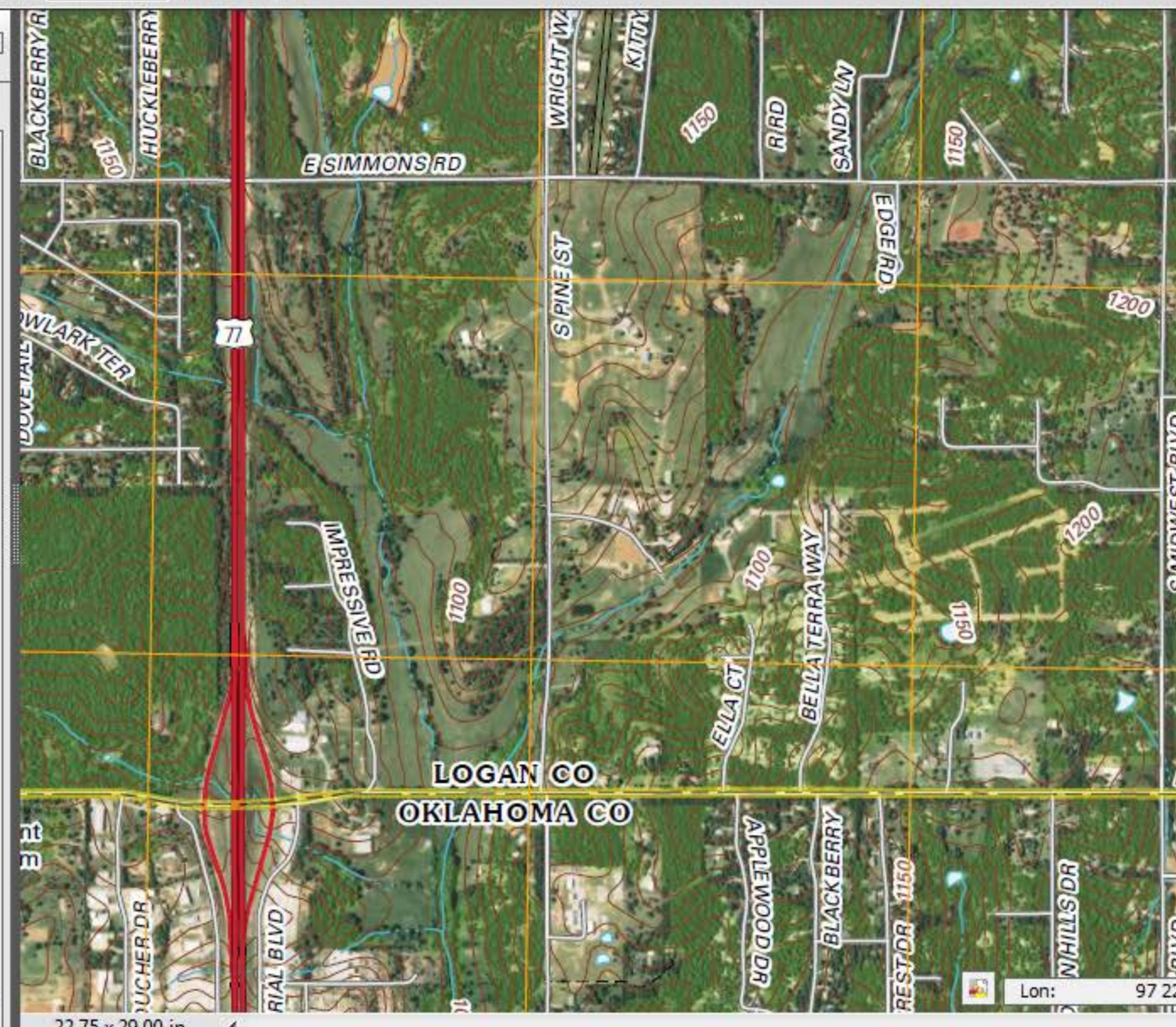
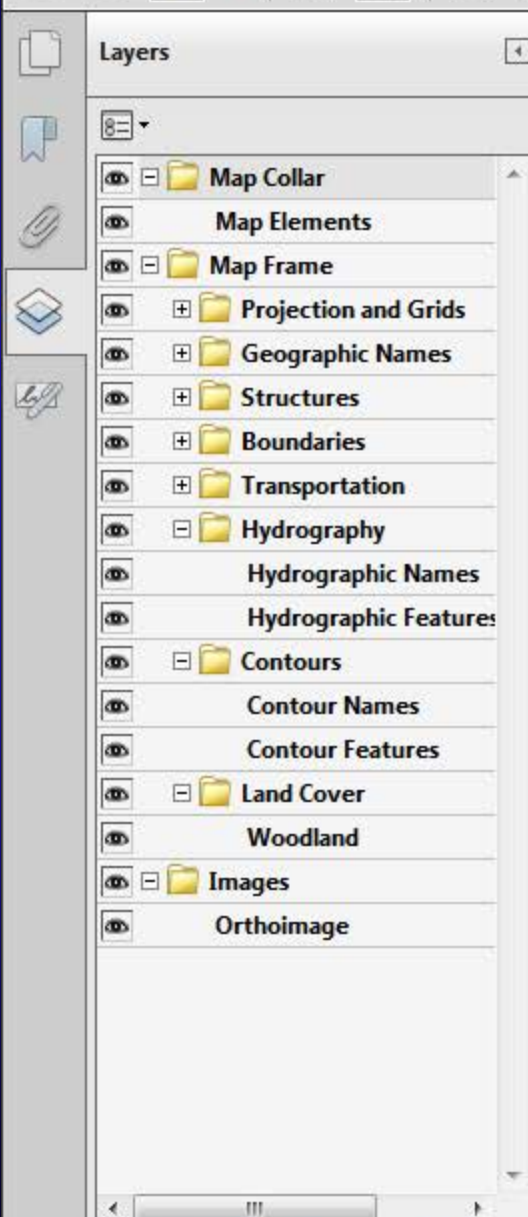


**Layers**

- ☒ Map Collar
- ☒ Map Elements
- ☒ Map Frame
- ☒ Projection and Grids
- ☒ Geographic Names
- ☒ Structures
- ☒ Boundaries
- ☒ Transportation
- ☒ Hydrography
- ☒ Contours
- ☒ Contour Names
- ☒ Contour Features
- ☒ Land Cover
- ☐ Images
- ☐ Orthoimage









# Historical Topographic Map Collection

The USGS topographic mapping program has accurately portrayed the complex geography of our nation for more than 130 years.

Scanned complete collection of approximately 193,000 USGS Quadrangle maps

Use consistent high quality specifications with scans at 400-600 dpi.

GeoPDF files available for free download

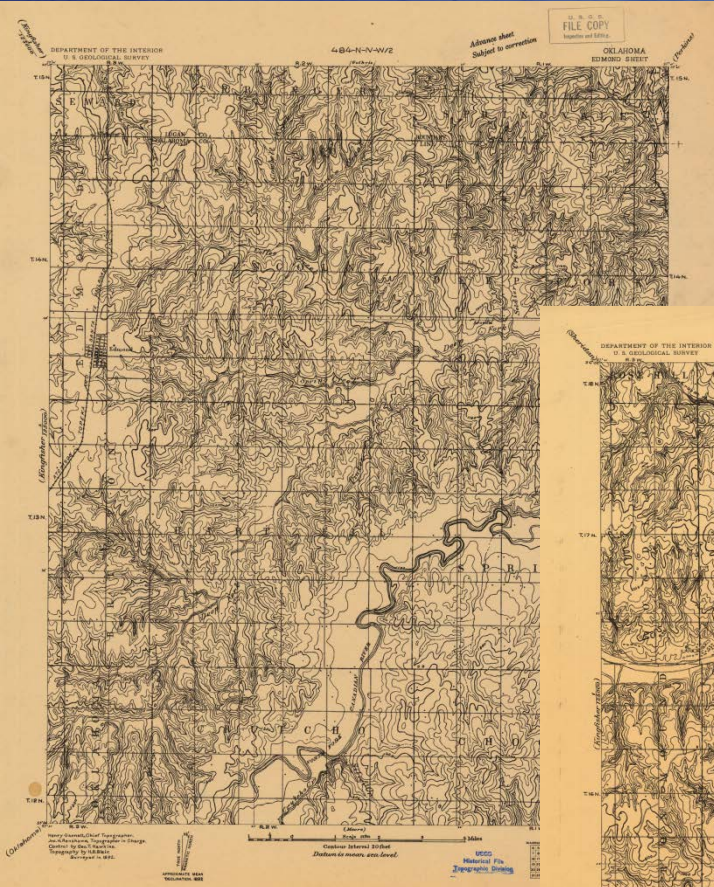
All maps have complete Metadata



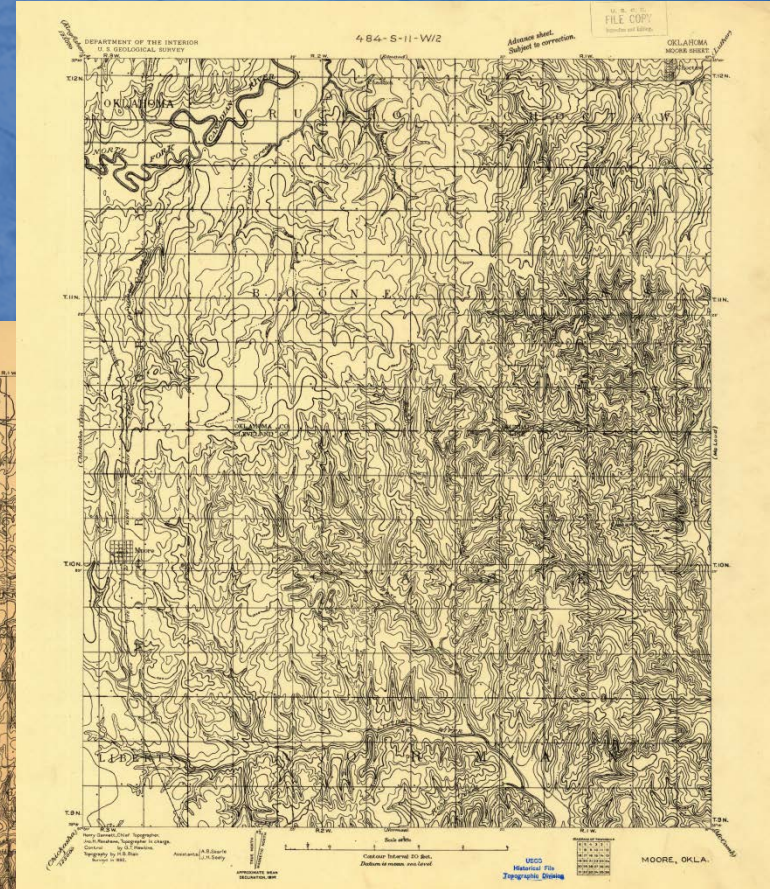


# Oklahoma's Oldest Maps

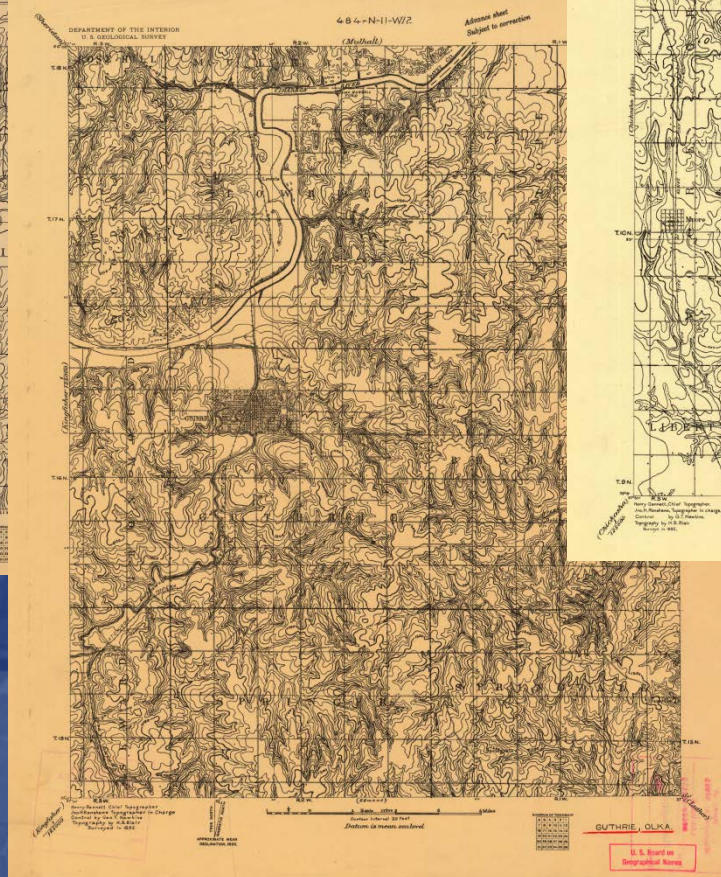
Published 1892, 1:62,500



Edmond



Moore



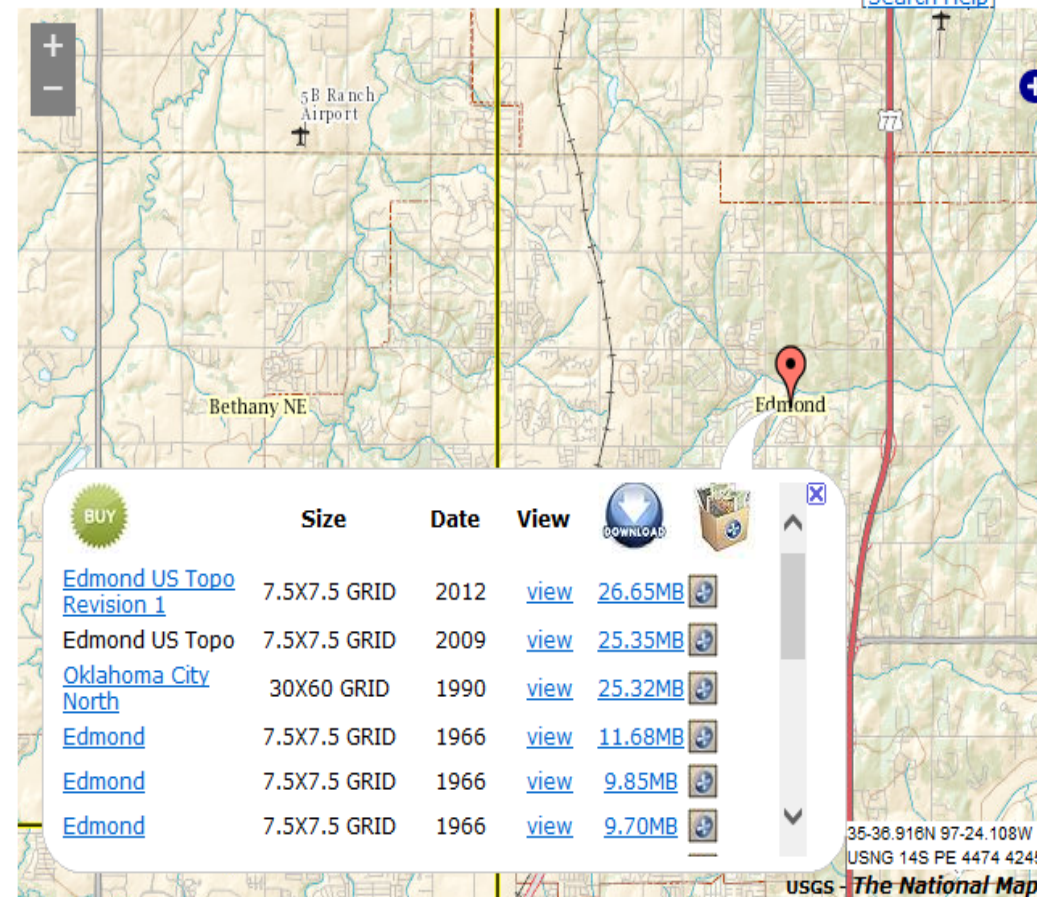
Guthrie



## Map Locator & Downloader

[DOI Disclaimer on Google Maps API](#)

Don't see the Map Locator & Downloader? [Help](#) | Having trouble? Call: 1-888-ASK-USGS (1-888-275-8747, Select Option 2) or Write: [usgsstore@usgs.gov](mailto:usgsstore@usgs.gov) for help.

Search: USGS Map Name or Find a place on the map [\[Navigation Help\]](#)[\[Search Help\]](#)

### NAVIGATE:

Double click to re-center, click and drag to pull the map 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 the Mark Points mode and zoomed in:

### SELECT AND GET YOUR MAPS:

Click marker to see an information bubble showing maps available, then click on "order", "download", or add maps your download cart.

[View Download Cart](#) 0 item(s).[Clear Markers](#)[Reset Map](#)[Show US Topo Availability](#)

Free plug-in  
for Adobe® Reader®

- ACCESS geospatial maps & imagery
- MEASURE distances & area
- CAPTURE field information

**DOWNLOAD NOW**



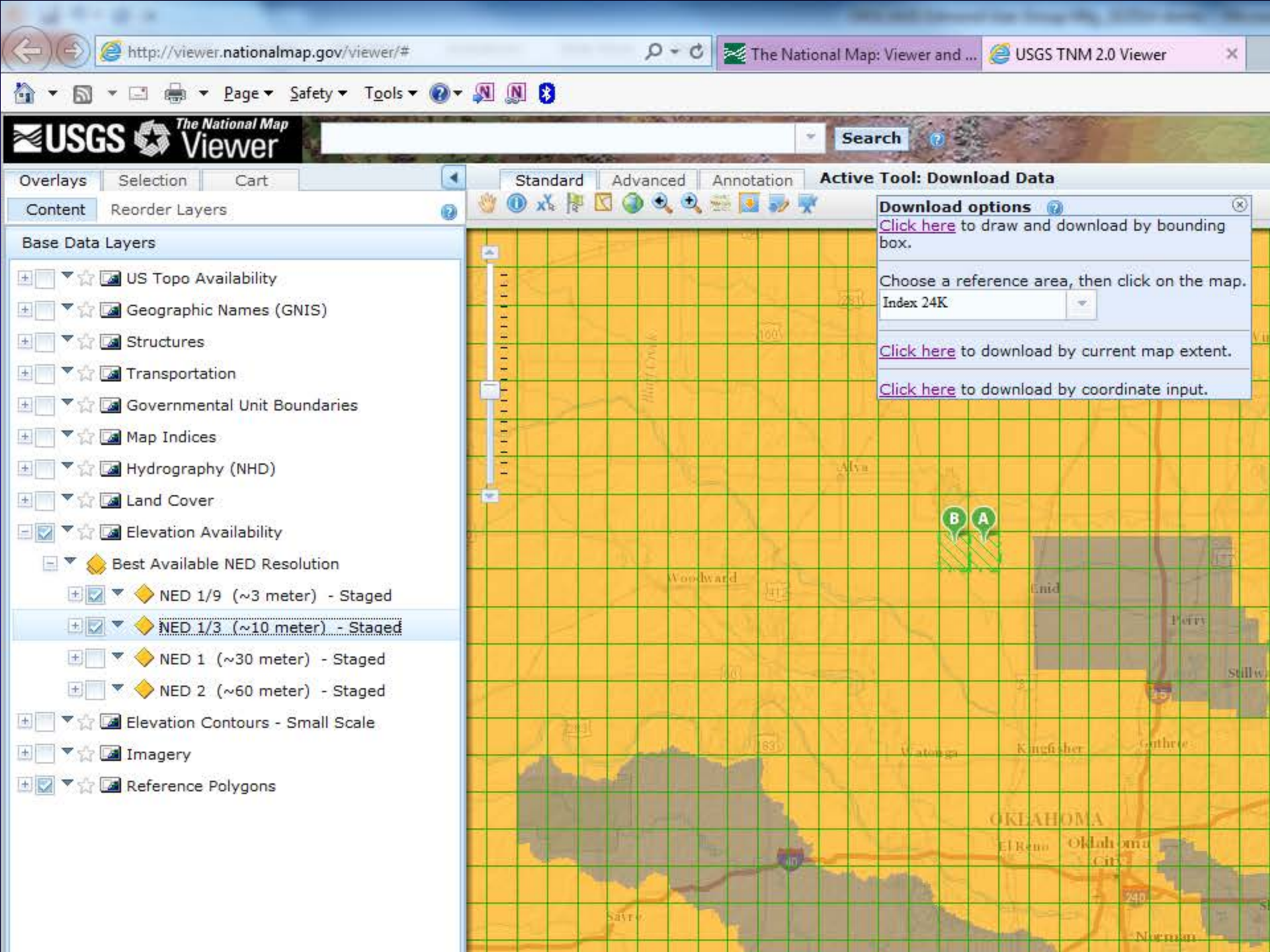
***The National Map Viewer and Download Platform provides access and download for eight primary data layers of *The National Map*, US Topo and Historical Topographic Map products.***

**Elevation, Orthoimagery, Hydrography, Geographic Names, Boundaries, Transportation, Structures, and Land Cover**

**US Topo Maps & Historical Maps**

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





Base Data Layers

- ☐ ☐ ☐ US Topo Availability
- ☐ ☐ ☐ Geographic Names (GNIS)
- ☐ ☐ ☐ Structures
- ☐ ☐ ☐ Transportation
- ☐ ☐ ☐ Governmental Unit Boundaries
- ☐ ☐ ☐ Map Indices
- ☐ ☐ ☐ Hydrography (NHD)
- ☐ ☐ ☐ Land Cover
- ☒ ☐ ☐ Elevation Availability
  - ☐ ☒ Best Available NED Resolution
    - ☐ ☒ NED 1/9 (~3 meter) - Staged
    - ☒ ☐ NED 1/3 (~10 meter) - Staged
    - ☐ ☐ NED 1 (~30 meter) - Staged
    - ☐ ☐ NED 2 (~60 meter) - Staged
- ☐ ☐ ☐ Elevation Contours - Small Scale
- ☐ ☐ ☐ Imagery
- ☒ ☐ ☐ Reference Polygons

**Download options**

[Click here](#) to draw and download by bounding box.

Choose a reference area, then click on the map.

Index 24K

[Click here](#) to download by current map extent.

[Click here](#) to download by coordinate input.



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Search

Overlays Selection Cart

Cart

Standard

Advanced

Annotation

Active Tool: Download Data

Download options

[Click here](#) to draw and download by bounding box.

Choose a reference area, then click on the map.

Counties

[Click here](#) to download by current map extent.

[Click here](#) to download by coordinate input.

Add items to the cart by using the "Download Data" tool in the "Standard" panel.

**Click on an item in the cart to see a preview (when available) and product footprint.**

Selected items:

Product	Type/Name	Format
USGS US Topo 7.5-minute map for Guthrie North, OK 2009	Counties/Logan, Oklahoma	GeoPDF
USGS US Topo 7.5-minute map for Guthrie North, OK 2012	Counties/Logan, Oklahoma	GeoPDF
USGS US Topo 7.5-minute map for Langston, OK 2010	Counties/Logan, Oklahoma	GeoPDF
USGS US Topo 7.5-		

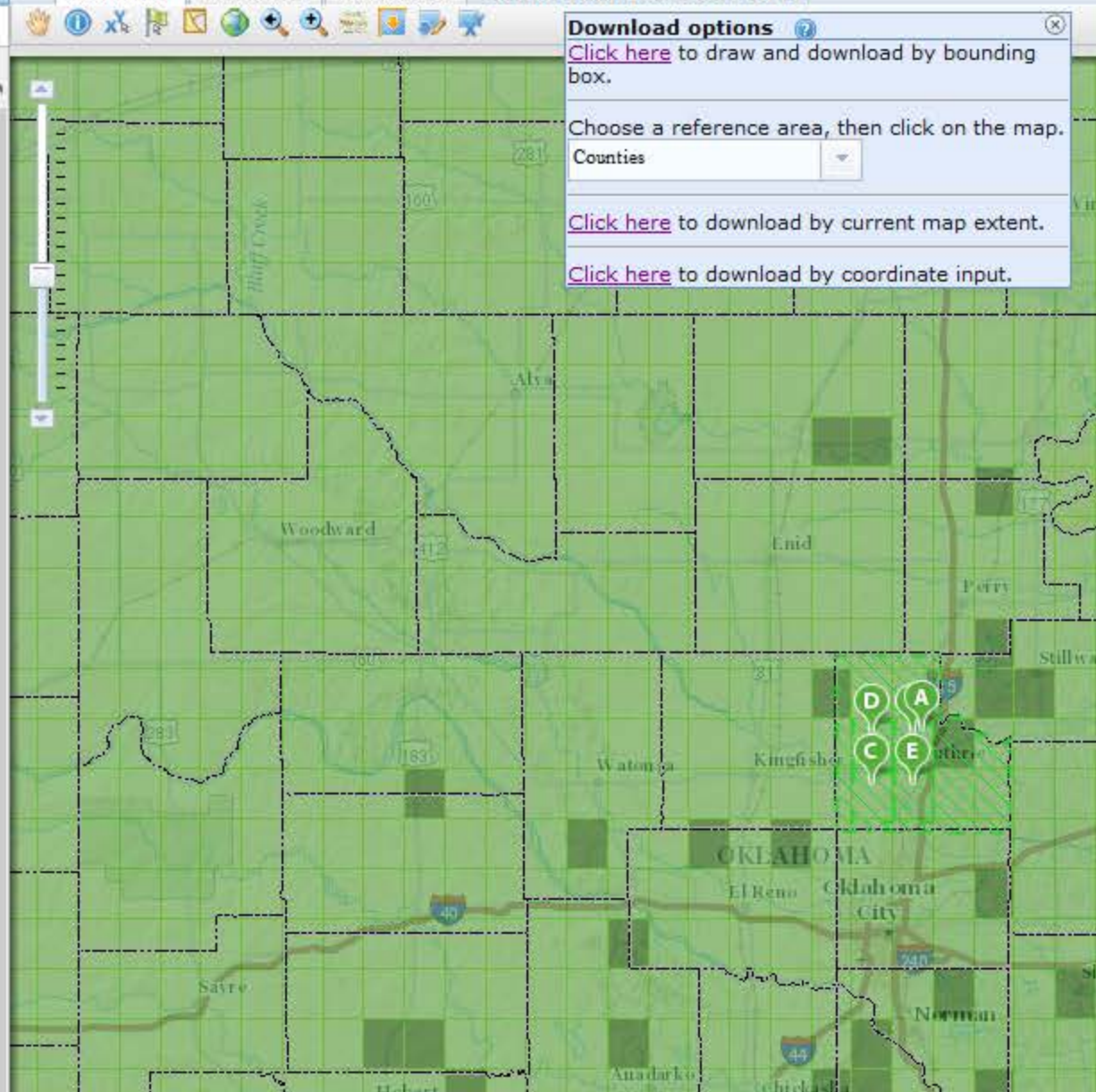
Remove selected

Checkout

Clear cart

Add More

Preview:





## 3D Elevation Program (3DEP) Initiative Plan

- 3D Elevation Program (3DEP) is a program initiative that implements recommendations resulting from the National Enhanced Elevation Assessment (NEEA) study completed in March 2012.
- FY14 will serve as a transition year to establish 3DEP planning and governance activities.
- The USGS is developing 3DEP with a goal to fully launch an operational program in January 2015.

### Key Goals:

Acquire LiDAR data over the conterminous United States, Hawaii, and the territories on an eight-year cycle. IFSAR data over Alaska

LiDAR point cloud data to be publically accessible; multiple derivative products to be supported as services and made freely available



# Data Quality Levels for 3DEP

Elevation Quality Levels (QL)	Elevation Source	Horizontal Resolution Terms			Vertical Accuracy Terms	
		Point Density	Nominal Pulse Spacing (NPS)	DEM Post Spacing	Vertical RMSEz * in open terrain	Equivalent Contour Accuracy
QL 1	LiDAR	8 pts/m <sup>2</sup>	0.35 m	1/27 arc-sec ~1 meter	9.25 cm	1-ft
QL 2	LiDAR	2 pts/m <sup>2</sup>	0.7 m	1/27 arc-sec ~1 meter	9.25 cm	1-ft
QL 3	LiDAR	1 – 0.25 pts/m <sup>2</sup>	1 – 2 m	1/9 arc-sec ~3 meters>	≤18.5 cm	2-ft
QL 4	Imagery	1 – 0.04 pts/m <sup>2</sup>	1 – 5 m	1/3 arc-sec ~10 meters>	46.3 cm – 139 cm	5 – 15 ft
QL 5	IFSAR	0.04 pts/m <sup>2</sup>	5 m	1/3 arc-sec ~10 meters	92.7 cm – 185 cm	10 – 20 ft

Bathymetric LiDAR requirements assessed for three Quality Levels to include Low, Standard and High. Standard Quality Level (3-5 meter post spacing; RMSEz ~ 20 cm)  
 Note: USGS LiDAR Base Acquisition Specification version 1.0 is for QL3 data



# Top Business Uses

Business Use #	Business Use Name	Enhanced Elevation Data Annual Benefits	
		Conservative Benefits	Potential Benefits
14	Flood Risk Management	\$295M	\$502M
21	Infrastructure and Construction Management	\$206M	\$942M
1	Natural Resources Conservation	\$159M	\$335M
8	Agriculture and Precision Farming	\$122M	\$2,011M
2	Water Supply and Quality	\$85M	\$156M
16	Wildfire Management, Planning and Response	\$76M	\$159M
9	Geologic Resource Assessment and Hazard Mitigation	\$52M	\$1,067M
5	Forest Resources Management	\$44M	\$62M
3	River and Stream Resource Management	\$38M	\$87M
20	Aviation Navigation and Safety	\$35M	\$56M
18	Land Navigation and Safety	\$0.191M	\$7,124.875M
	<b>Total for all Business Uses (1 – 27)</b>	<b>~\$1.18B/yr</b>	<b>~\$13.B/yr</b>

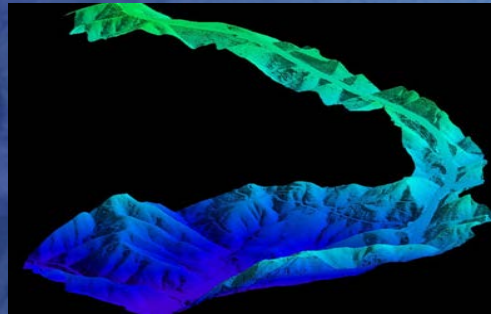


# Example Functional Activities

**602 Functional Activities** documented from 34 Federal agencies, 50 States and Territories, Tribes, and from sampled non-profit/industry, and local governments



Precision Farming



Land Navigation and  
Safety



Geologic Resources and  
Hazards Mitigation



Natural Resource  
Conservation



Infrastructure  
Management

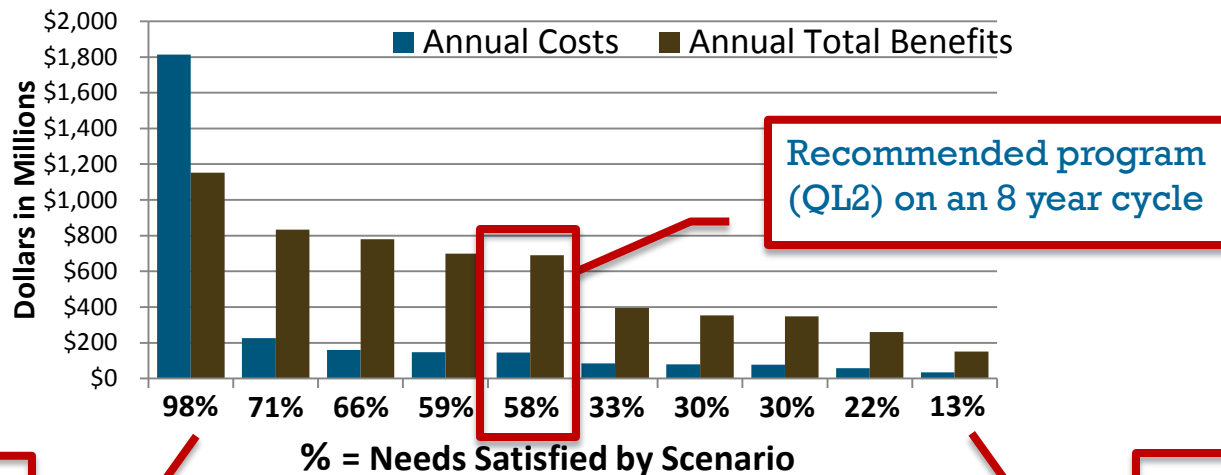


Flood Risk Mitigation



# National Program Recommendation

- Acquire LiDAR, Quality Level 2 over conterminous US, Hawaii, and the territories on 8 year acquisition cycle
- IfSAR, Quality Level 5 over Alaska
- Average Annual Costs Est.: \$146M
- Average Annual Benefits: \$690M (B/C: 4.7:1)
- Total Possible Benefits Satisfied: 58%



Highest quality level (QL1) on an annual cycle

Recommended program (QL2) on an 8 year cycle

Existing program (QL3) on a 25 year cycle



# Quality Level Data Requirements

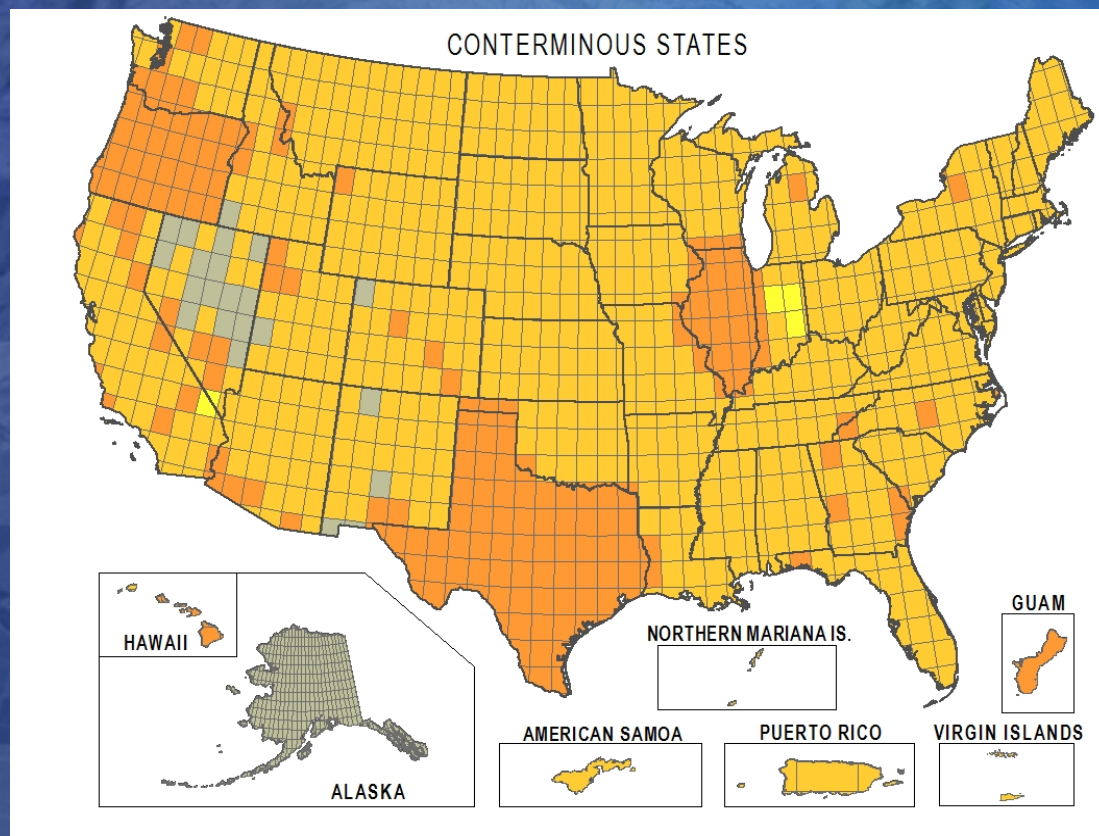
## Federal, State and non-governmental requirements

### Quality Levels

#### Data Requirements

##### Quality Level

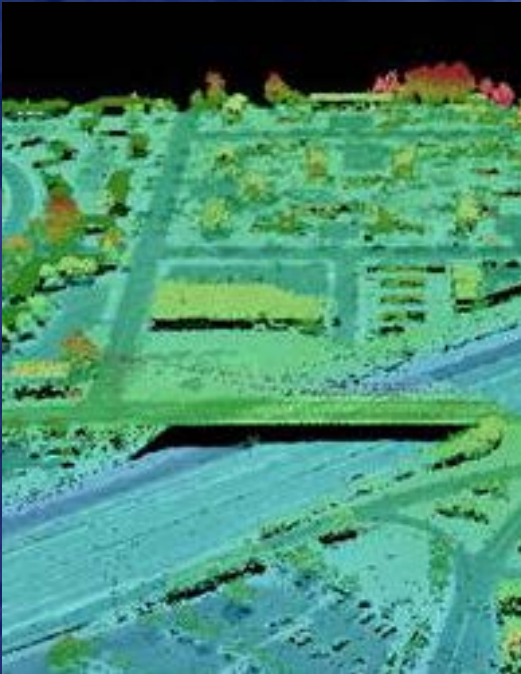
-  Quality Level 1
-  Quality Level 2
-  Quality Level 3
-  Quality Level 4
-  Quality Level 5





# LiDAR at Three Quality Levels

- Simulated Quality Levels based on resampled QL1 data



0.35 meter point  
spacing (QL1)



0.7 meter point  
spacing (QL2)



1.4 meter point  
spacing (QL3)



# 3DEP Acquisition Planning - Prioritization Criteria

- Areas with the highest net benefits as identified through the NEEA requirements study
- **Areas included in a federal, state or regional partner acquisition plan**
- Areas of no existing coverage
- Areas with existing coverage that do not meet Quality Level 3 specification
- Areas with coverage greater than 8-years old
- Areas with significant topographic change
- Areas subject to serious and significant hazards (earthquakes, landslides, volcanic activity, coastal flooding, sea level rise)

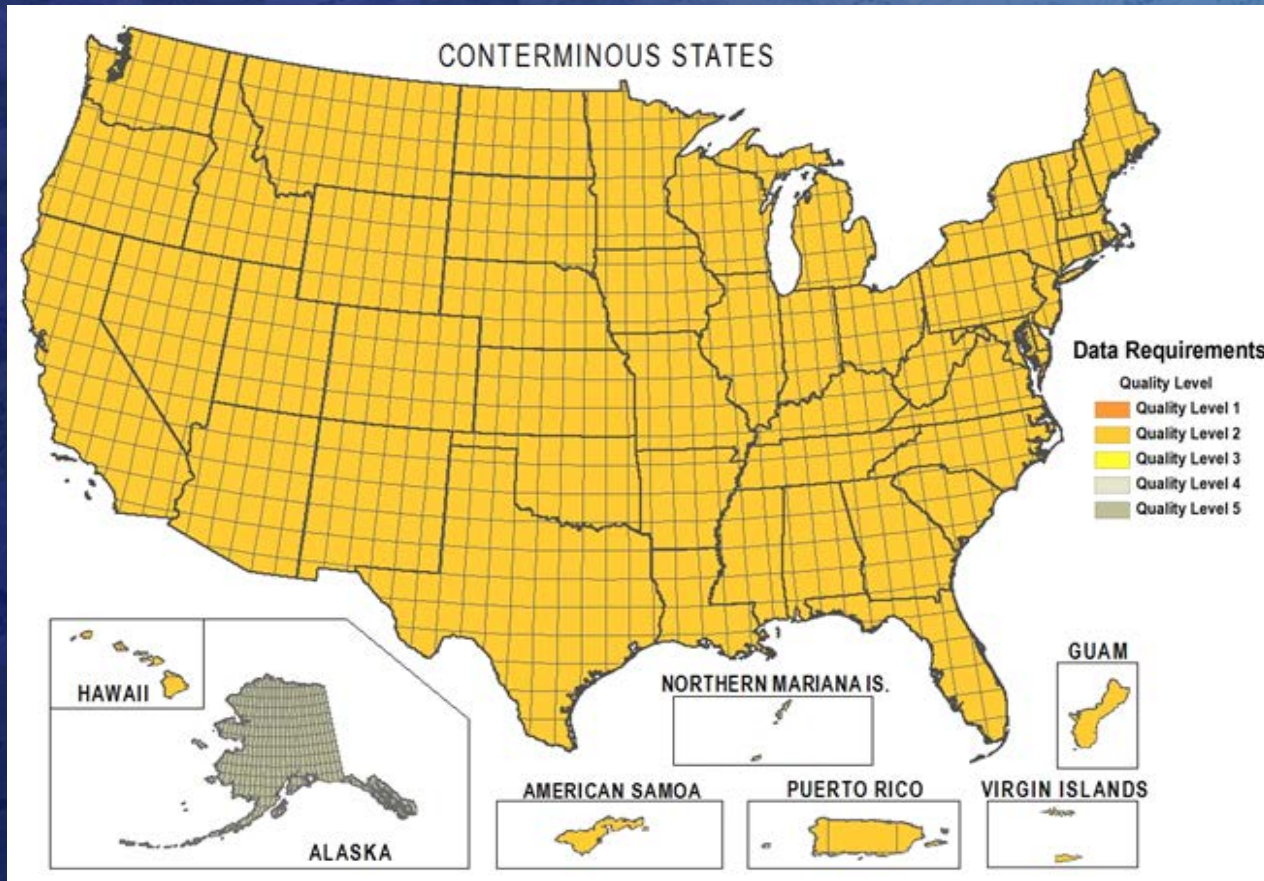


# 3DEP Acquisition Planning - Approach

- Determine baseline coverage from existing US Interagency Elevation Inventory (USIEI)
- Solicitation of agency requirements; **annual and multi-year production plans**
- Implementation of a **Broad Agency Announcement (BAA)** process develop partnerships to meet jointly defined criteria and priorities
- GIS analysis of submitted requirements **compared to USIEI** and development of proposals for new acquisitions
- Identify partnership opportunities for USGS data acquisition, as well as partner acquisition through BAA (**between 1500 and 5000 sq. mi. preferred**).
- Acquire and distribute data



# Target State: 3D Elevation Program (3DEP)



- Evaluated 10 options  
Benefit to cost – 4.7:1  
Total benefits - \$690 million/year
- Partnerships
- Publically Accessible LiDAR point cloud
- 1 meter DEMs, multiple derivative data products and services freely available
- Operational in early 2015
- Complete one cycle of data collection by 2023

<http://nationalmap.gov/3DEP/>



# Online Inventory Viewer

<http://www.csc.noaa.gov/inventory>

USGS Liaisons currently gathering data for the FY14 update of the Inventory  
Oklahoma update due March 28<sup>th</sup>.

## United States Interagency Elevation Inventory


NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION || U.S. GEOLOGICAL SURVEY || FEDERAL EMERGENCY MANAGEMENT AGENCY



FEMA

Select State ▼






Select County ▼



Instructions    FAQ

Demo    Map Service

**Data Type**

-  Topographic Lidar
-  Topobathy Shoreline Lidar
-  IfSAR Data
-  Bathymetric Lidar
-  NOAA Hydrographic Surveys







## United States Interagency Elevation Inventory



Select State/Territory



▼

Select County/Island

▼

Instructions

FAQ

Download Inventory

Metadata

Map Service

More Information

Contact Us

### Data Type

Topographic Lidar

Topobathy Shoreline Lidar

IfSAR Data

Bathymetric Lidar

NOAA Hydrographic Surveys

Other Bathymetric Surveys

Topographic

Bathymetric



Data Set Name	Data Access	Metadata Access	Collection Date	Project Status	Restrictions	Data Type	Vertical Accuracy	Horizontal Accuracy











*Best Available Elevation Data*

## Cleveland County, Oklahoma

Report created on Mon Feb 24 2014

The U.S. Interagency Elevation Inventory displays high-accuracy topographic and bathymetric data for the United States and its territories. The project is a collaborative effort between NOAA and the U.S. Geological Survey, with contributions from the Federal Emergency Management Agency.

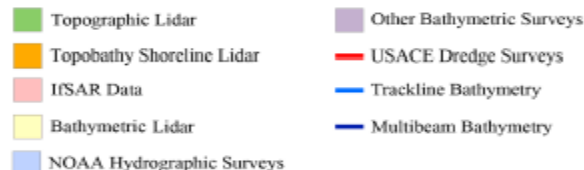
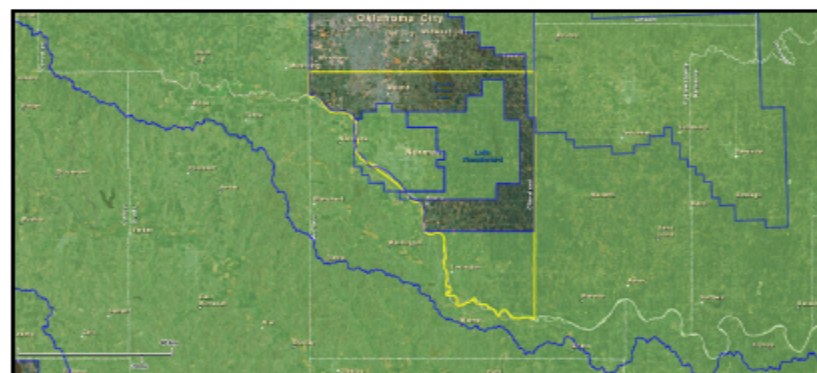
This resource is a comprehensive, nationwide listing of known high-accuracy topographic data, including lidar and IfSAR, and bathymetric data, including NOAA hydrographic surveys, multibeam data, and bathymetric lidar. This inventory was completed August 2013 and will be updated annually.

The information provided for each elevation dataset includes many attributes such as vertical accuracy, point spacing, and date of collection. A direct link to access the data or information about the contact organization is also available through the inventory.

If you know of additional datasets that could be included in the inventory, please contact the NOAA Coastal Services Center at <http://csc.noaa.gov/contact/contactForm.htm>.

For more information about the U.S. Interagency Elevation Inventory, visit <http://www.csc.noaa.gov/digitalcoast/tools/inventory>.

**Best available topographic and/or bathymetric data available from the U.S. Interagency Elevation Inventory for Cleveland County, Oklahoma.**



FEMA – Federal Emergency Management Agency  
USACE – U.S. Army Corps of Engineers  
USGS – U.S. Geological Survey



FEMA

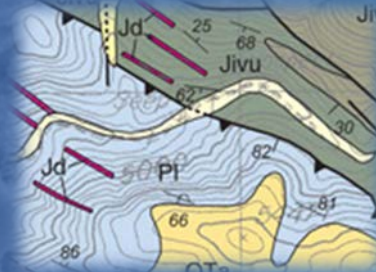


	Topographic Layer 1
Project Name	2011 Lower North Canadian Region_Pottawatomie County Lidar.OK
Data Access	<a href="http://earthexplorer.usgs.gov/">http://earthexplorer.usgs.gov/</a>
Metadata Link	<a href="http://earthexplorer.usgs.gov/">http://earthexplorer.usgs.gov/</a>
Collection Date	8 & 10 Dec, 2011
Project Status	Complete
Restrictions	Public
Data Type	Lidar-Topo
Vertical Accuracy	12.5 cm
Horizontal Accuracy	Not Provided
Point Spacing	2 m
Vertical Datum	NAVD88
Horizontal Datum	NAD83
Products Available	Points, DEM, Breaklines
Notes	Horizontal Accuracy not provided.



# NGP COU Strategic Direction

- Transition to COU (Communities of use) Activities
- NGP priority communities of use; aligned with mission strategies
  - Water resources
  - Natural resources conservation
  - Geologic Hazards and Mapping





# Planned Liaison Network Activities

## Partnerships and Coordination (Elevation)

- Coordinate data acquisitions, stewardship and inventory partnerships
- Serve as technical POC for partners and users on 3DEP, LiDAR, IfSAR
- Agreements Management

## Water Resources COU Liaisons (Hydrography)

- Coordinate and support NHD stewardship and applications
- Support users in applying NGP products and services to hydrologic applications, facilitate documentation of Water Resources user needs

## COU Liaisons for Geologic Hazards & Mapping; and Natural Resources Conservation:

- Support users in applying NGP products and services to COU applications, facilitate documentation of user requirements.



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	A	B	C	D	E	F
1		FY 14 COU Liaison Actions	Geo Haz & Map	Nat Res	Water Res	
2	Priority 1	Become more familiar with USGS Science Centers within your assigned state(s) then - Identify/document the following: • People that participate would/should be part of each COU. • Active projects using TNM products and services • Overall project goal, how TNM will help achieve goal • Which TNM P&S used • If other sources used, why not TNM?	X	X	X	
3		Respond to requests for information/requests for assistance from UE HQ, COU Coordinators and Technical Committees.	X	X	X	
4		Document user needs and provide to the COU to support P&S planning activities.	X	X	X	
5		Provide demonstration on 3DEP program and access to elevation and NHD data to each USGS Science Center in your assigned state(s).	X	X		
6		Provide demonstration on NHD/WBD program and access to elevation and NHD data to each USGS Science Center in your assigned state(s).			X	
7		Meet with State geologist for all assigned states. Discuss COU concept and 3DEP program.	X			
8		Meet with geologic hazard emergency planners/responders and geologic hazard scientists and for all assigned states. Discuss COU concept and 3DEP program	X			
		Within your assigned state(s) identify/document the following for Non-USGS Users: • People that participate would/should be part of each COU. • Active projects using TNM products and services	X	X	X	



# Questions?

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405-810-4403

