

USGS Topographic Maps and Data - A Personal Journey and Look Ahead

Dr. David J. Cowen
Distinguished Professor Emeritus
Department of Geography
University of South Carolina



Outline



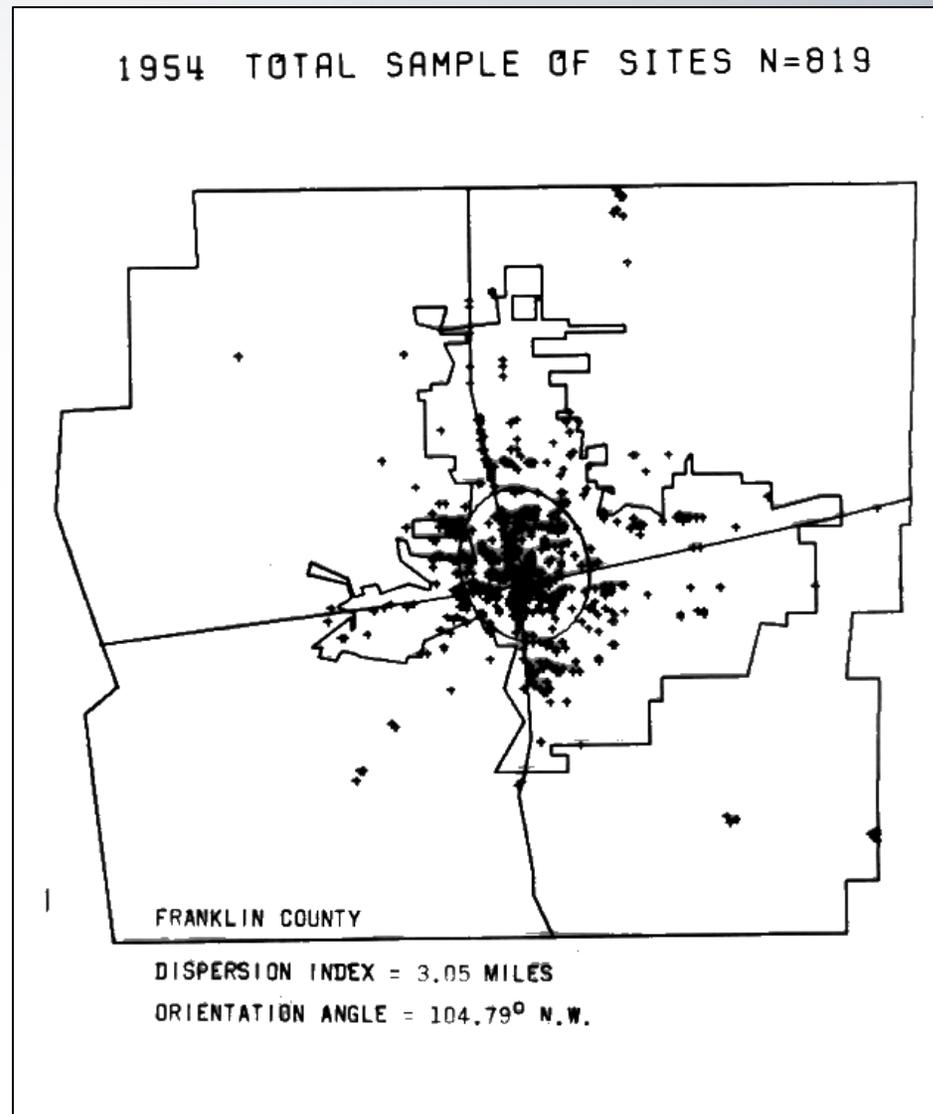
1. A Personal History
2. Transition from paper to digits
3. What are you doing now ?
4. What are your plans?
5. What have “experts” recommended ?
6. What should you be doing (What do your users want)
7. How should you be evaluated?
8. The institutional setting
9. Hey – What about parcels?

Part 1 – Personal History

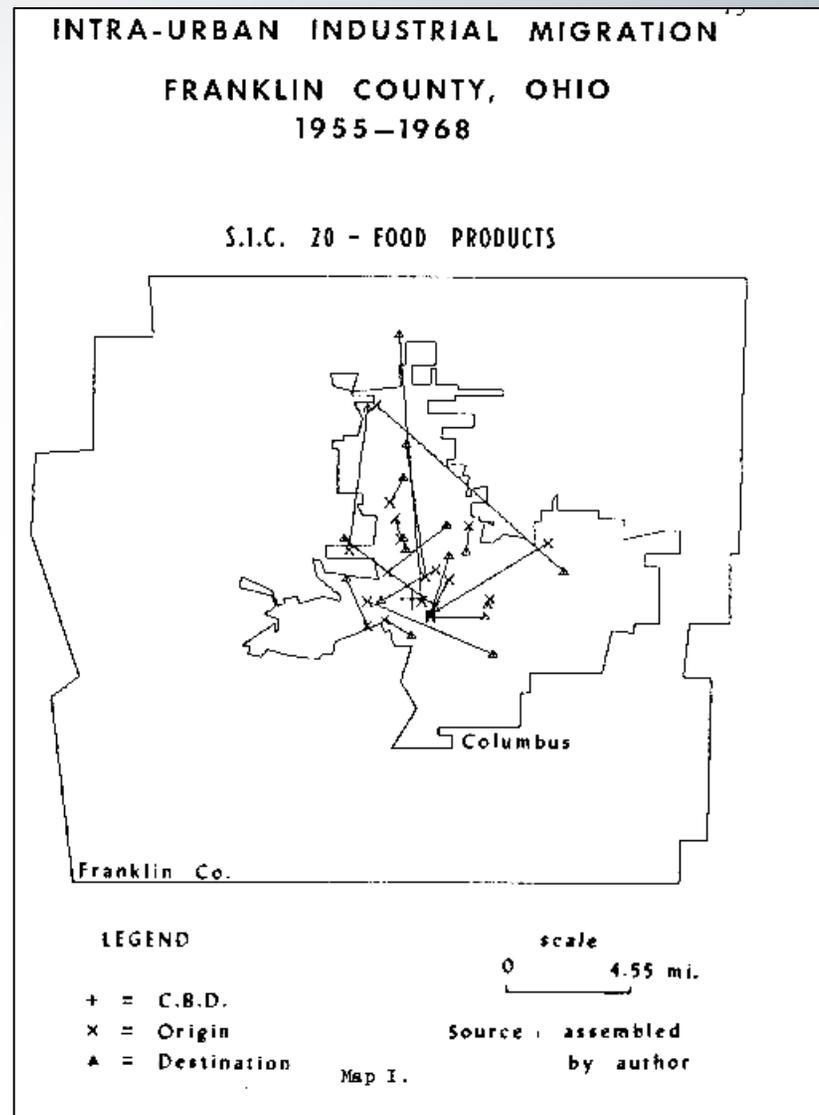


GIS – Circa 1968

Ohio State University – dissertation



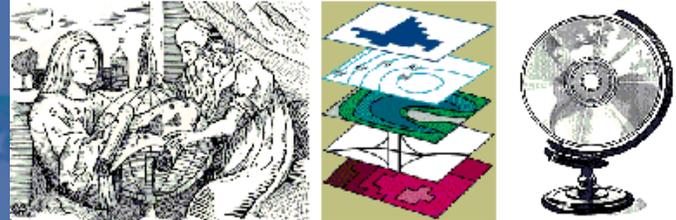
1968 Dissertation



THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

Mapping Science Committee



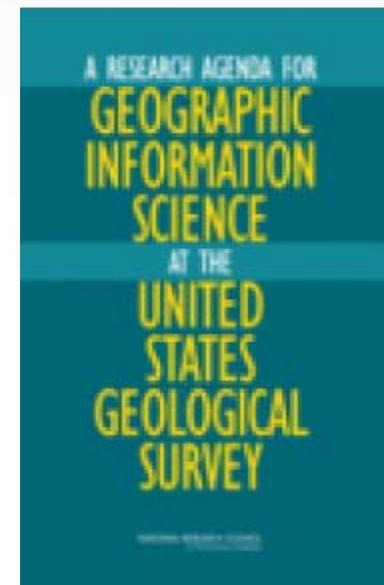
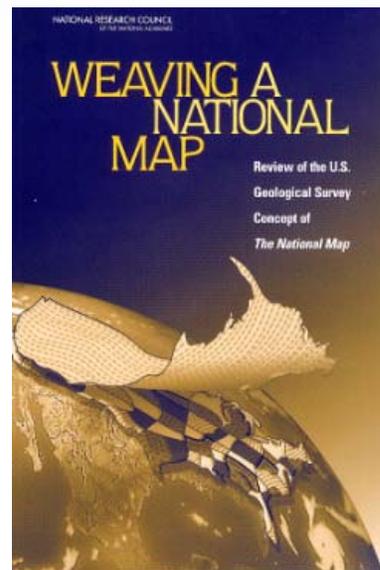
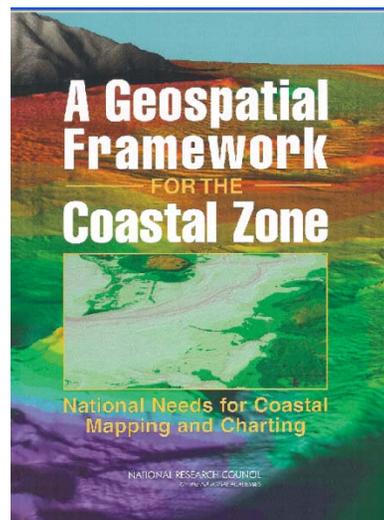
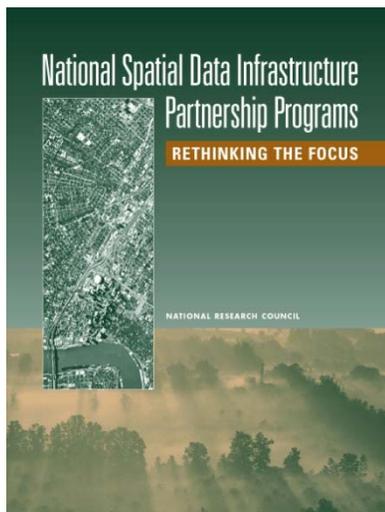
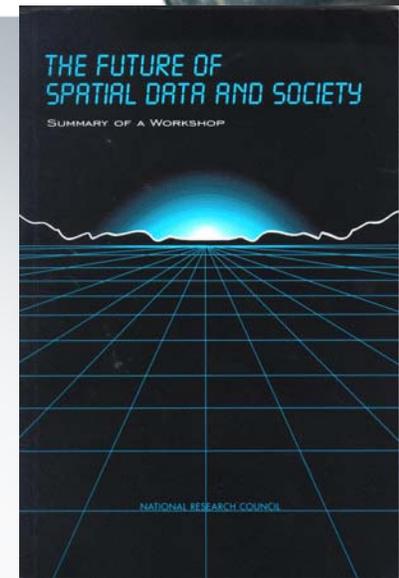
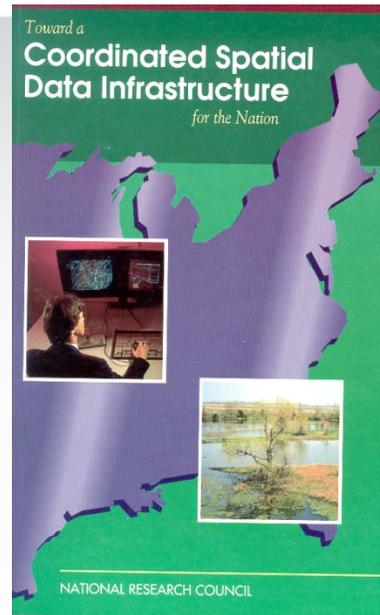
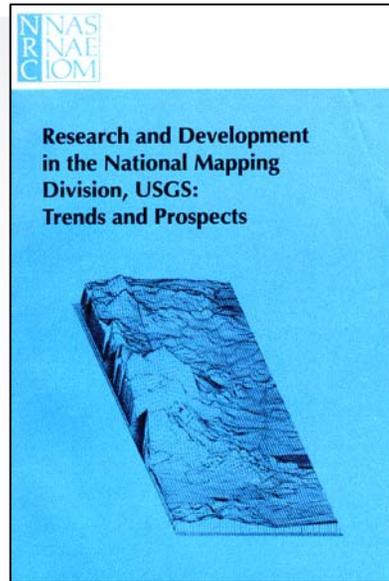
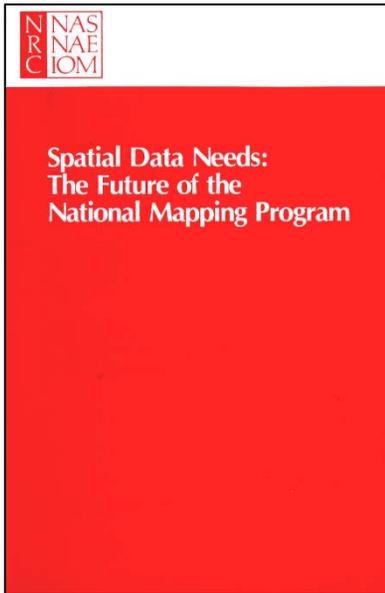
Provides independent advice to society and to government at all levels on scientific, technical, and policy matters relating to **spatial data**.

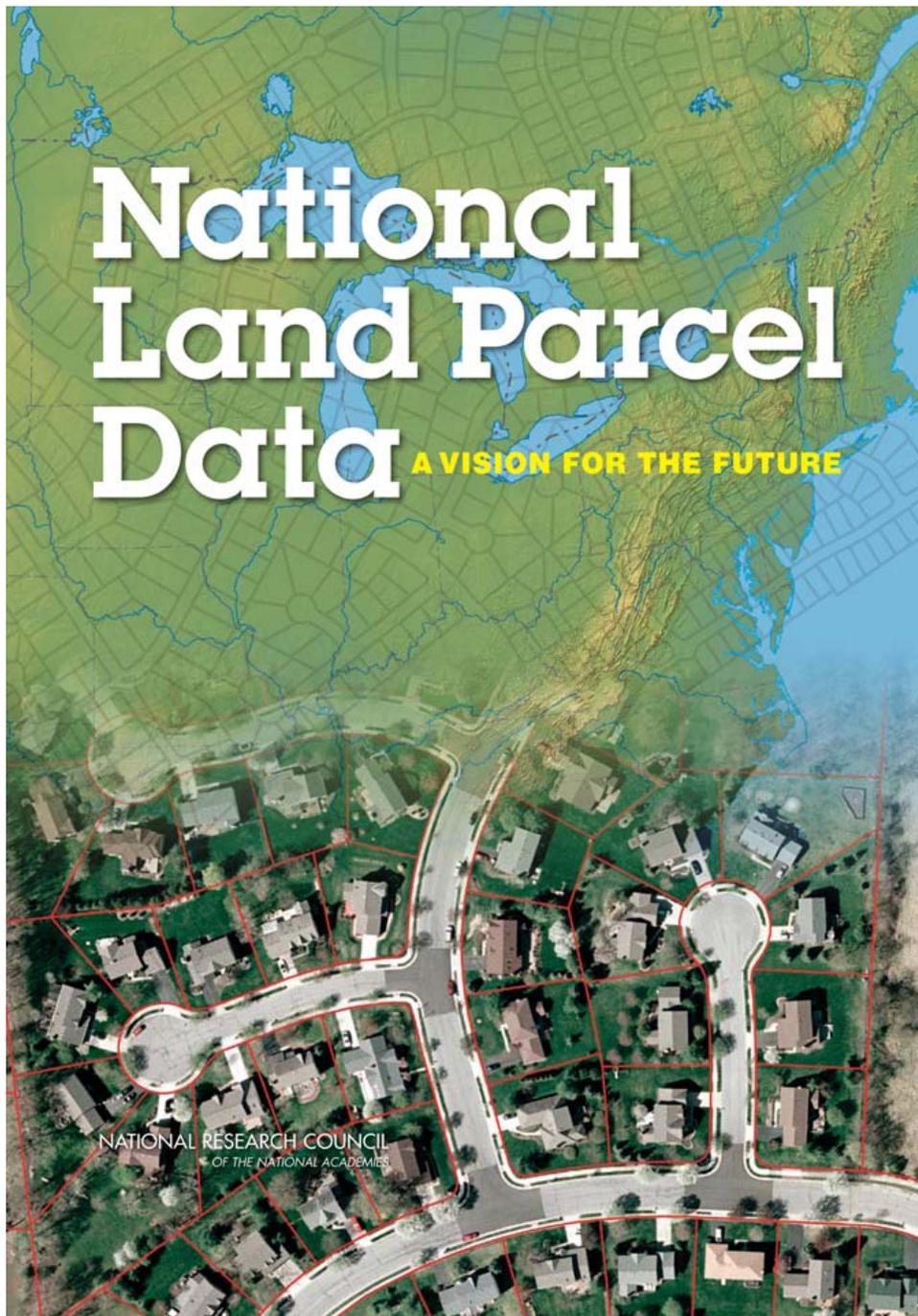
It also addresses aspects of geographic information science that deal with the acquisition, integration, storage, and distribution of **spatial data**.

The committee promotes the informed and responsible development and use of **spatial data** for the benefit of society.

We appreciate being included today.

Mapping Science Committee – 1989 – 2009





The Changing GeoSpatial Landscape

Dr. David J. Cowen,

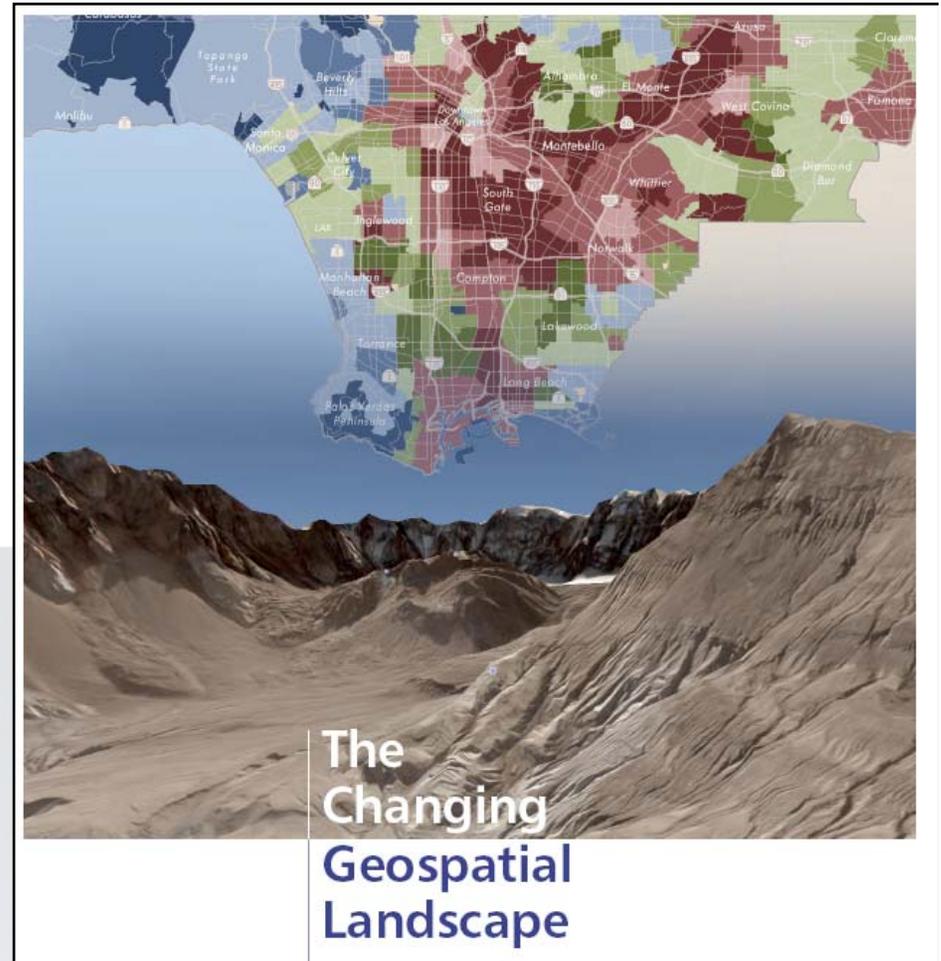
**Distinguished Professor Emeritus
University of South Carolina**

**Representing NGAC –
National Geospatial Advisory Committee**

Available @ www.fgdc.gov/ngac

<http://www.fgdc.gov/ngac/NGAC%20Report%20-%20The%20Changing%20Geospatial%20Landscape.pdf/download>

Versions to appear in Photogrammetric Engineering and Remote Sensing
ArcNews



Recent Shock Waves



- **Shock waves**

- Personal Navigation Systems < \$100
- Navteq - Street Centerlines valued @ \$8.1 Billion
- Google Earth - the 4th innovation in computing
 - GIS users grow from 1,000,000 to 100,000,000 +
 - Now on iPhone
- Zillow.com - More than 80,000,000 properties
- Open Street Map – Volunteered Geographic Information
- Location Based Social Networks via cell phones
 - Loopt etc. *Click ACCEPT to consent to: (a) the use, display, & disclosure of your phone's location to provide Loopt to you & your Loopt friends, geo-tag your messages & content,*

Big Changes in GIS



- Computing environment
- Software
- Data sources
- Data capture
- Data Models
- Data Storage
- User interfaces and access –
- GI Data collection and Distribution –
- Users
- Institutional Setting
- Products
- Relationship to IT

Economist – Battle of the clouds

The Fight to dominate cloud computing will increase competition and innovation



Illustration by Jon Berkeley

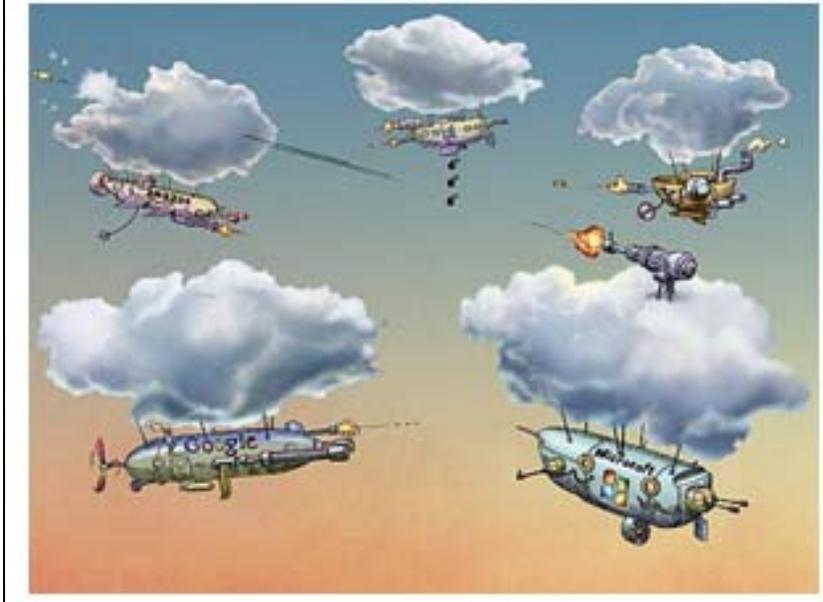
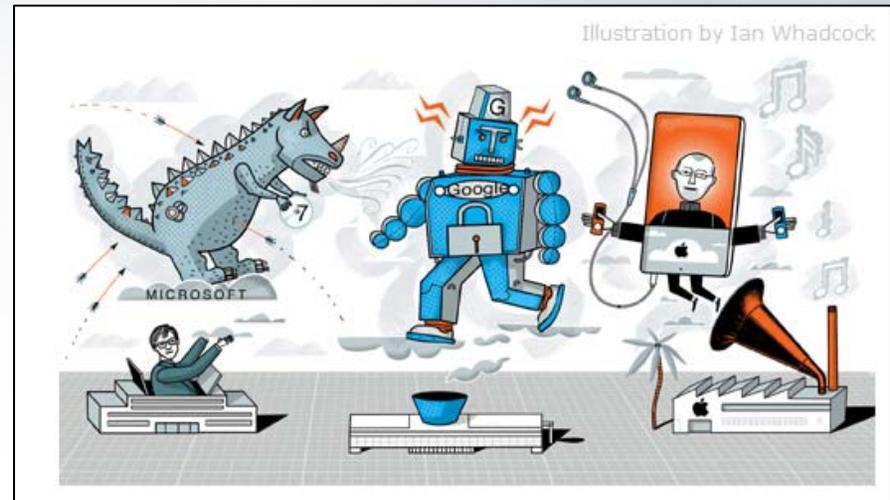
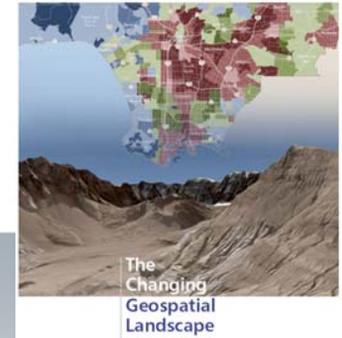


Illustration by Ian Whadcock



Will Google and Microsoft compete to have the first “Imagery for the Nation” and put it in a cloud ?

USGS Twitter – Real Time !!



Department of the Interior Recovery Investments

Investing in America's Economic Recovery



HOME ABOUT *the* RECOVERY BUREAUS PLANS *and* REPORTS CONTRACTS *and* GRANTS CONTACT *us*

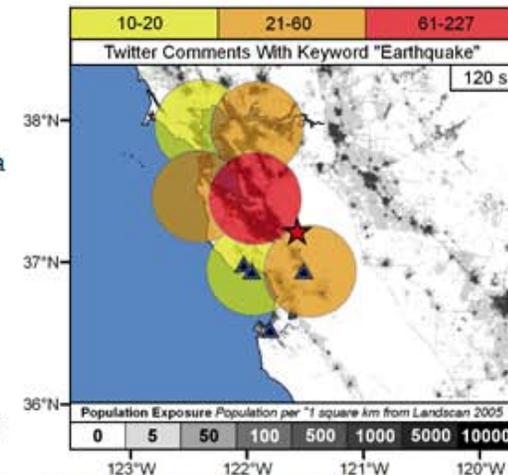
U.S. Geological Survey: Twitter Earthquake Detector (TED)

The U.S. Geological Survey is using funds from the American Recovery and Reinvestment Act to support a graduate student who's investigating social Internet technologies as a way to quickly gather information about recent earthquakes.

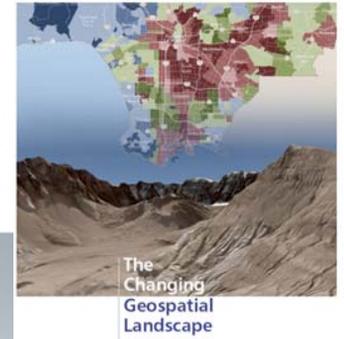
In this exploratory effort, the USGS is developing a system that gathers real-time, earthquake-related messages from the social networking site Twitter and applies place, time, and quantity data to provide geo-located earthquake detection within 60 seconds of an event's origin time. This approach also provides a central directory of short first-impression narratives and, potentially, photos from people at the hazard's location.

Social Internet technologies are providing the general public with anecdotal earthquake hazard information before scientific information has been published from authoritative sources. People local to an event are able to publish information via these technologies within seconds of their occurrence. In contrast, depending on the location of the earthquake, scientific alerts can take between 2 to 20 minutes. By adopting and embracing these new technologies, the USGS potentially can augment its earthquake response products and the delivery of hazard information.

For more information on this project, please e-mail USGSted@usgs.gov. Read more information about the [USGS Earthquake Program](#). You can follow the project updates on Twitter [@USGSted](#).



Parcels on Iphone – Says it all



1963 - Paper Topographic Quads – The key to understanding geography !



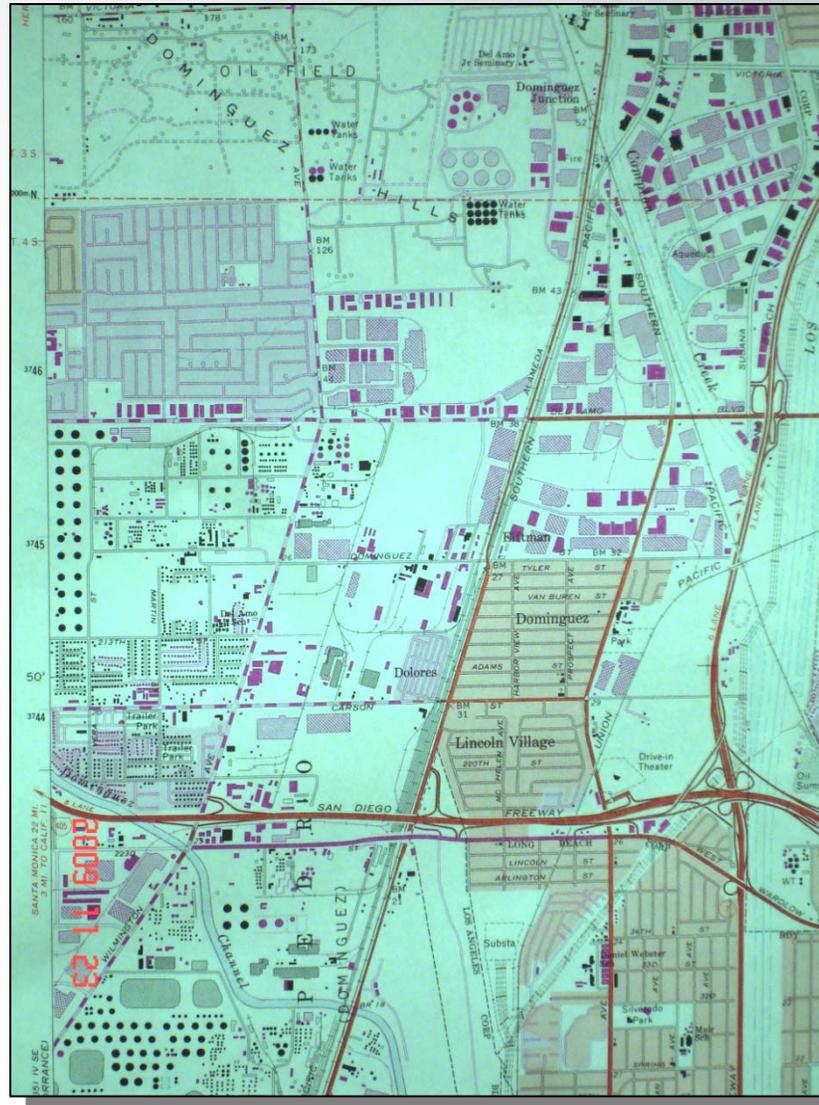
Grand Canyon



Study area always spanned four quads



Long Beach – Photo Revisions of Urban Features



1978 Coastal Zone Management Plan GIRAS – 1:250,000

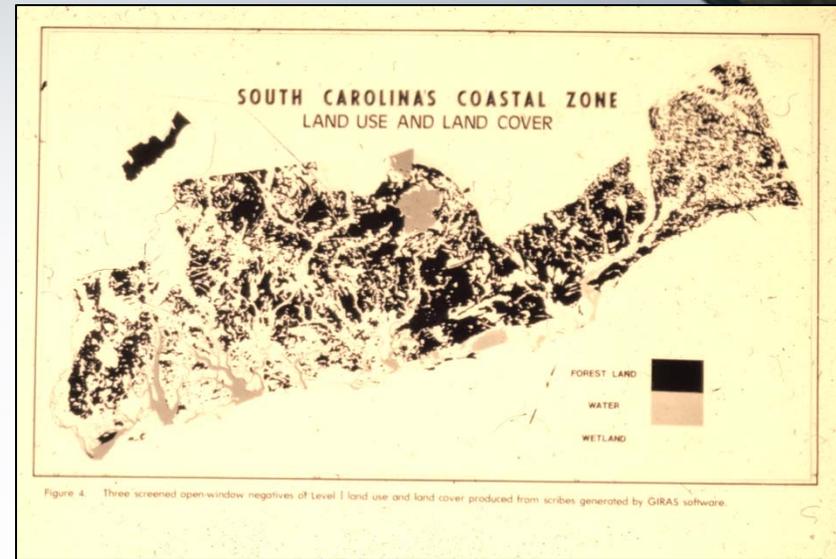
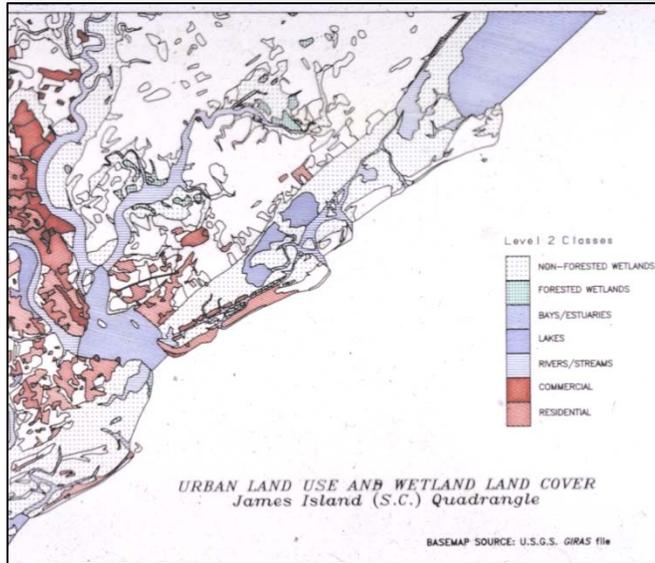


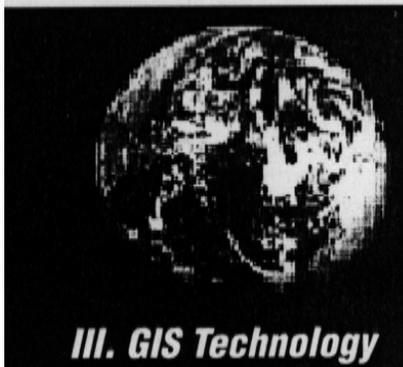
Figure 4. Three screened open-window negatives of Level 1 land use and land cover produced from scribes generated by GIRAS software.



		LAND USE STATISTICS IN ACRES										TOTAL BY COUNTY
		URBAN OR BUILT UP LAND	AGRICULTURAL LAND	IMPOUNDMENT	PARKLAND	FOREST LAND	FORESTED WETLAND	SALT MARSH	BRACKISH MARSH	FRESH MARSH	WATER	BARREN LAND
JASPER	CRITICAL	183	15,348	1,994	0	28,081	4,170	33,606	2,301	2,500	5,341	419
	NON-CRITICAL	5,740	52,400	3,900	7,966	122,837	125,649	107	0	4,208	1,866	2,243
	COUNTY TOTAL	5,913	67,748	5,894	7,966	160,799	129,819	33,713	2,301	6,536	7,311	3,497
BEAUFORT	CRITICAL	24,926	44,137	7,712	455	49,041	59,492	128,420	1,357	61	47,471	4,528
	NON-CRITICAL	30	9,337	2,064	0	10,389	5,972	23	0	903	351	1,137
	COUNTY TOTAL	24,958	53,474	4,278	455	79,470	65,264	128,658	1,357	1,533	48,044	5,665
COLLETON	CRITICAL	49	9,297	10,624	10	24,267	12,670	19,956	10,170	1,559	7,851	89
	NON-CRITICAL	8,064	143,014	9,212	403	264,295	148,974	0	0	7,125	1,551	3,215
	COUNTY TOTAL	8,110	152,311	20,046	772	288,562	161,646	19,956	10,170	8,184	9,355	3,304
DORCHESTER	CRITICAL	405	899	45	0	18,336	12,117	0	439	842	49	148
	NON-CRITICAL	9,282	75,249	0	158	155,341	87,749	0	0	1,143	4,201	335,147
	COUNTY TOTAL	9,687	76,148	45	158	173,677	101,866	0	439	862	1,292	4,349
CHARLESTON	CRITICAL	38,499	86,515	11,941	374	120,132	16,091	131,911	10,520	4,178	52,171	6,381
	NON-CRITICAL	13,599	8,018	0	0	87,366	44,039	273	320	872	793	916
	COUNTY TOTAL	52,027	94,533	11,941	374	207,498	60,123	131,583	10,842	5,050	53,000	7,297
BERKELEY	CRITICAL	40	2,827	21	0	7,710	4,217	0	814	742	2,345	0
	NON-CRITICAL	24,826	79,464	4,773	1,631	345,653	137,319	0	444	7,481	70,892	2,379
	COUNTY TOTAL	24,866	82,291	4,794	1,631	353,363	141,536	0	1,298	7,924	74,309	2,379
GEORGETOWN	CRITICAL	4,781	7,159	7,741	100	24,320	13,940	10,277	8,242	3,799	17,643	830
	NON-CRITICAL	10,961	43,382	4,619	0	223,030	95,693	0	19,946	8,718	978	454,729
	COUNTY TOTAL	15,742	50,541	12,360	100	247,350	109,633	10,277	8,242	12,517	18,621	1,284
Horry	CRITICAL	8,471	227	0	0	1,927	711	1,849	0	0	1,008	898
	NON-CRITICAL	11,665	199,503	0	0	297,130	187,251	0	0	727	2,685	2,718
	COUNTY TOTAL	20,136	199,730	0	0	299,057	187,962	1,849	0	727	3,693	3,616
TOTAL BY LAND USE	IN ACRES	171,478	776,747	58,588	93	11,358,845,712	935,889	325,984	34,650	54,000	337,094	31,153
	SQ. MILES	268	1,245	93	18	2,915	1,463	509	54	85	261	48

* Forested Wetlands are essential for many environmental planning activities; they are separated from other categories of forest land.

GIS World Claims Success



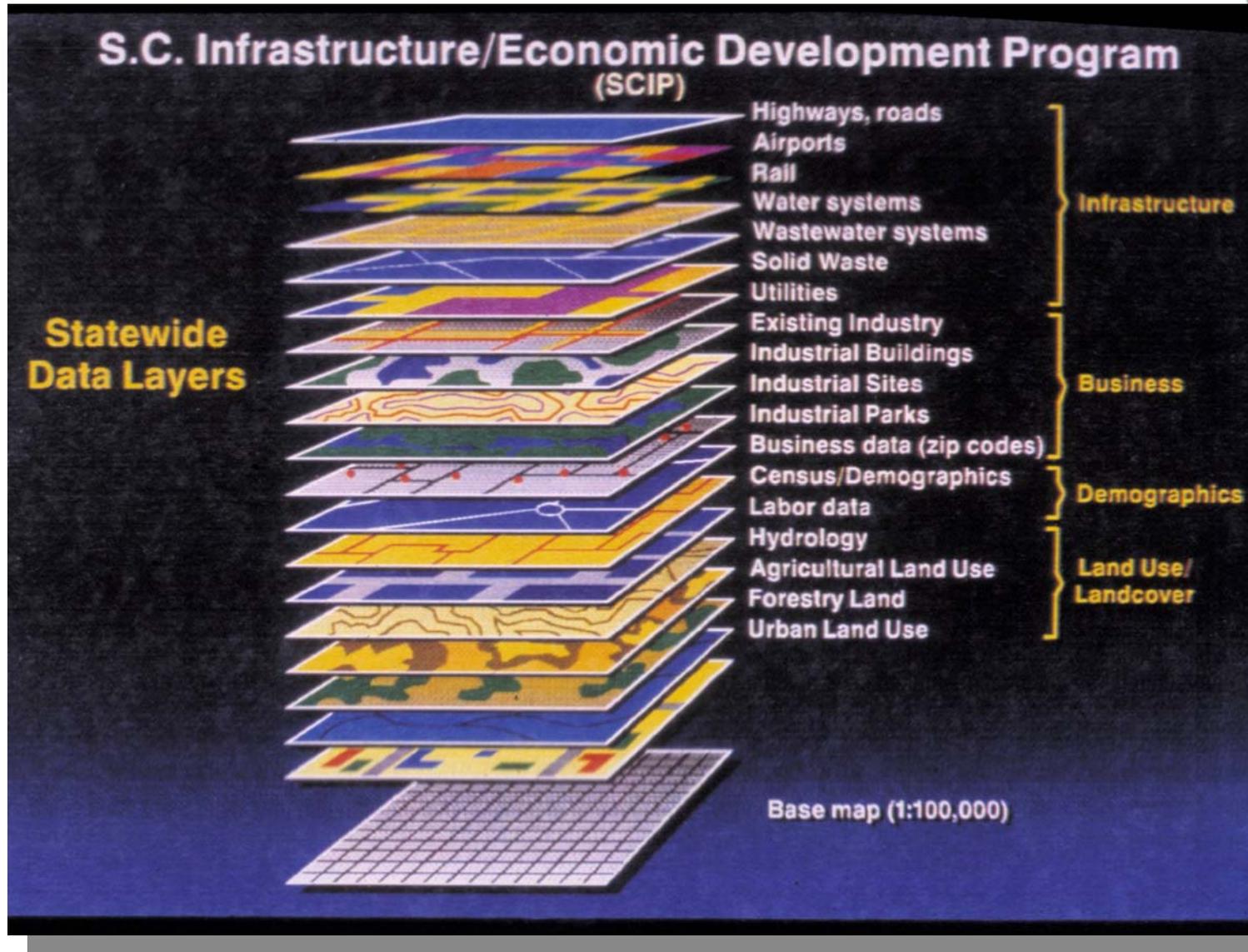
South Carolina's Statewide GIS Project a Success

“A successful GIS strategy must lead to a system that is an integral part of the daily operations of an organization.”

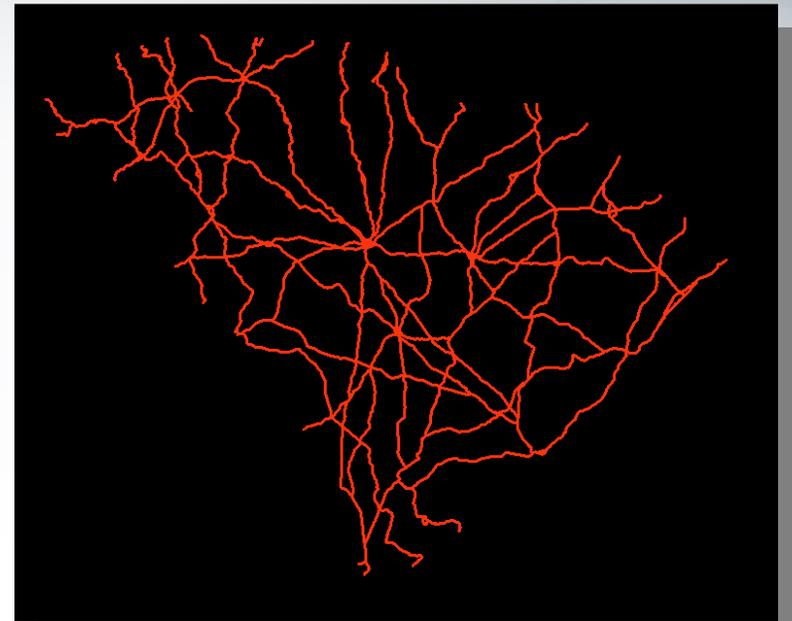
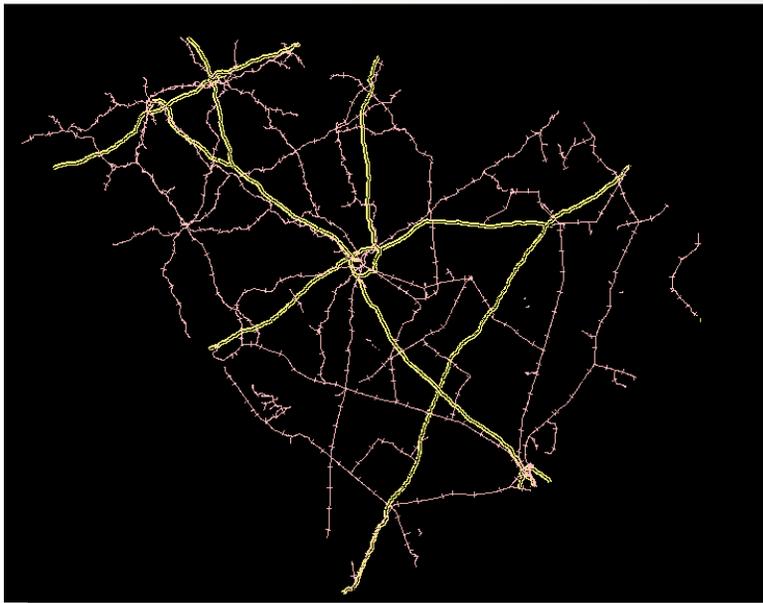
1:100,000 DLG Coast



Foundation for State Wide GIS



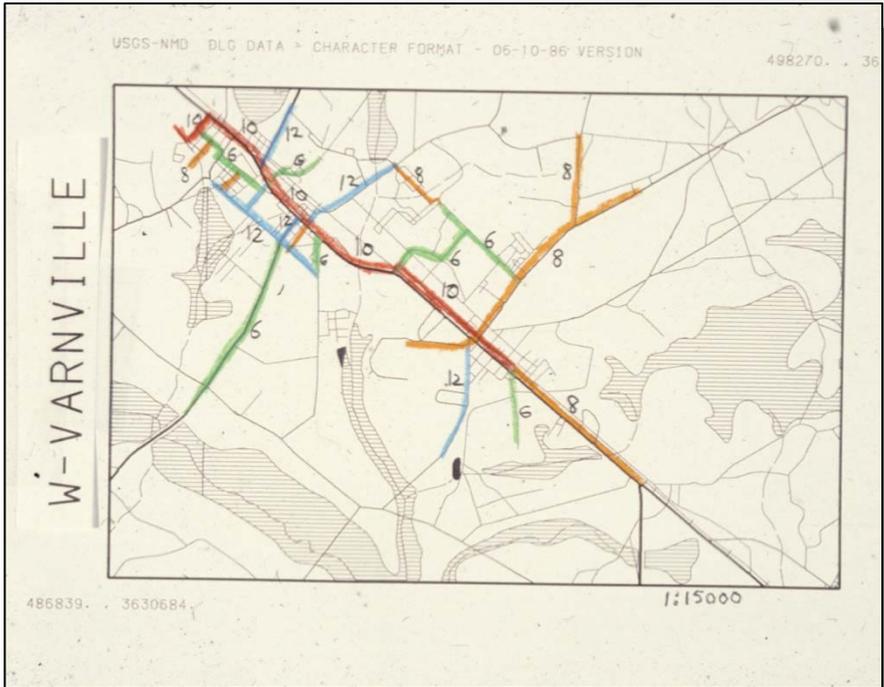
Interstates, Railroads & Highways





Foundation for Building Spatial Data

Paper Maps & Color Pencils



Digital Data

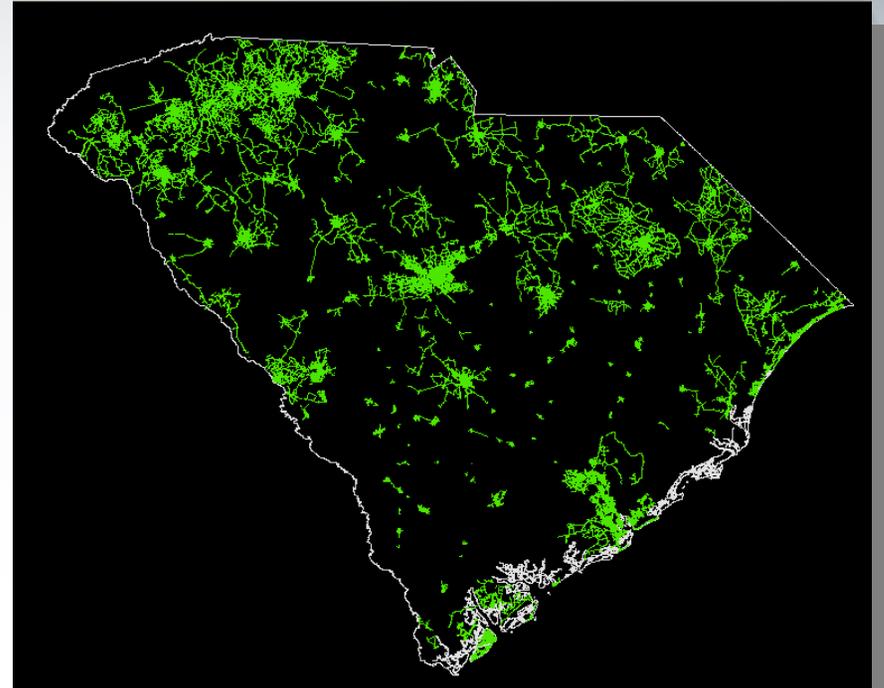
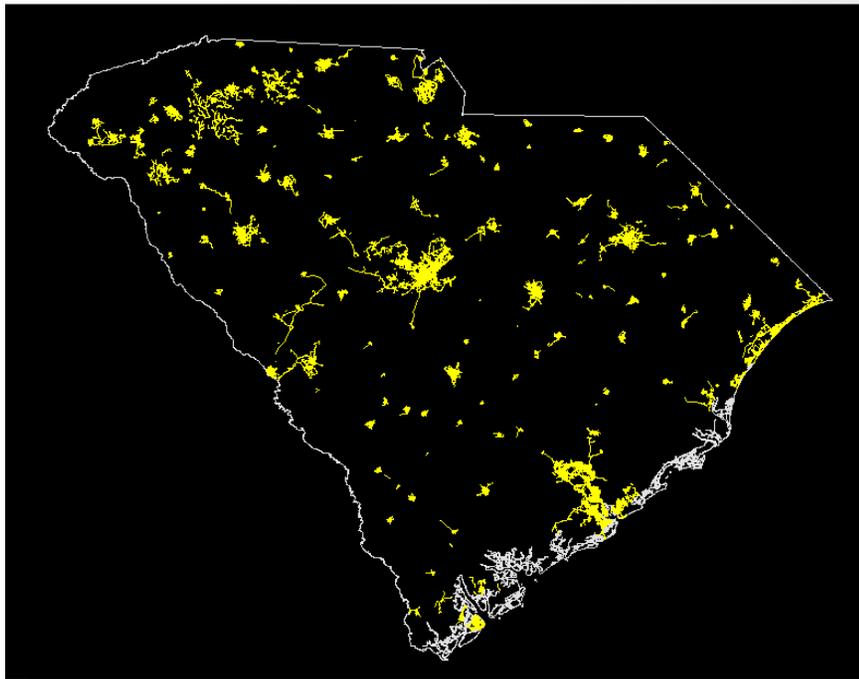


Sewer & Water Lines

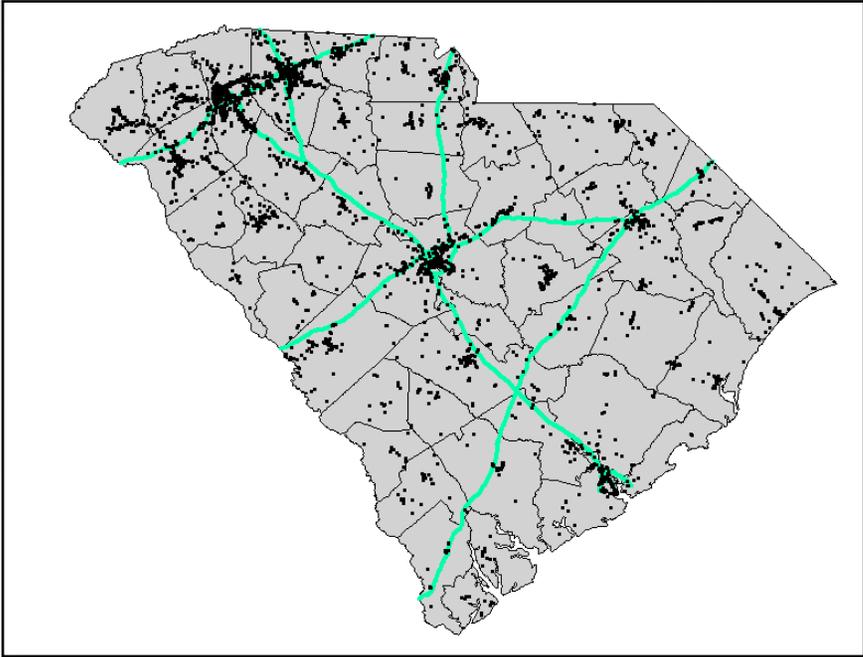
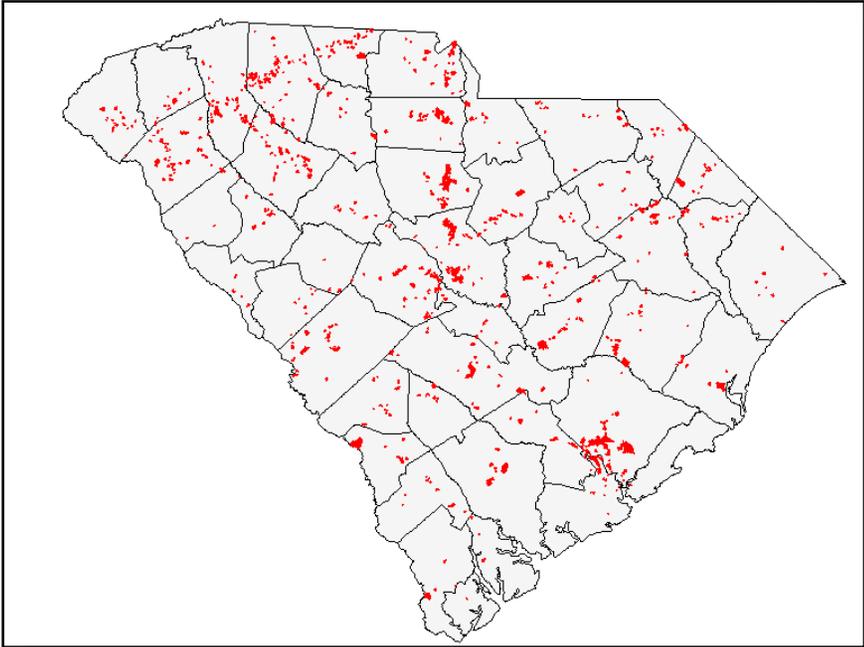


Sewer

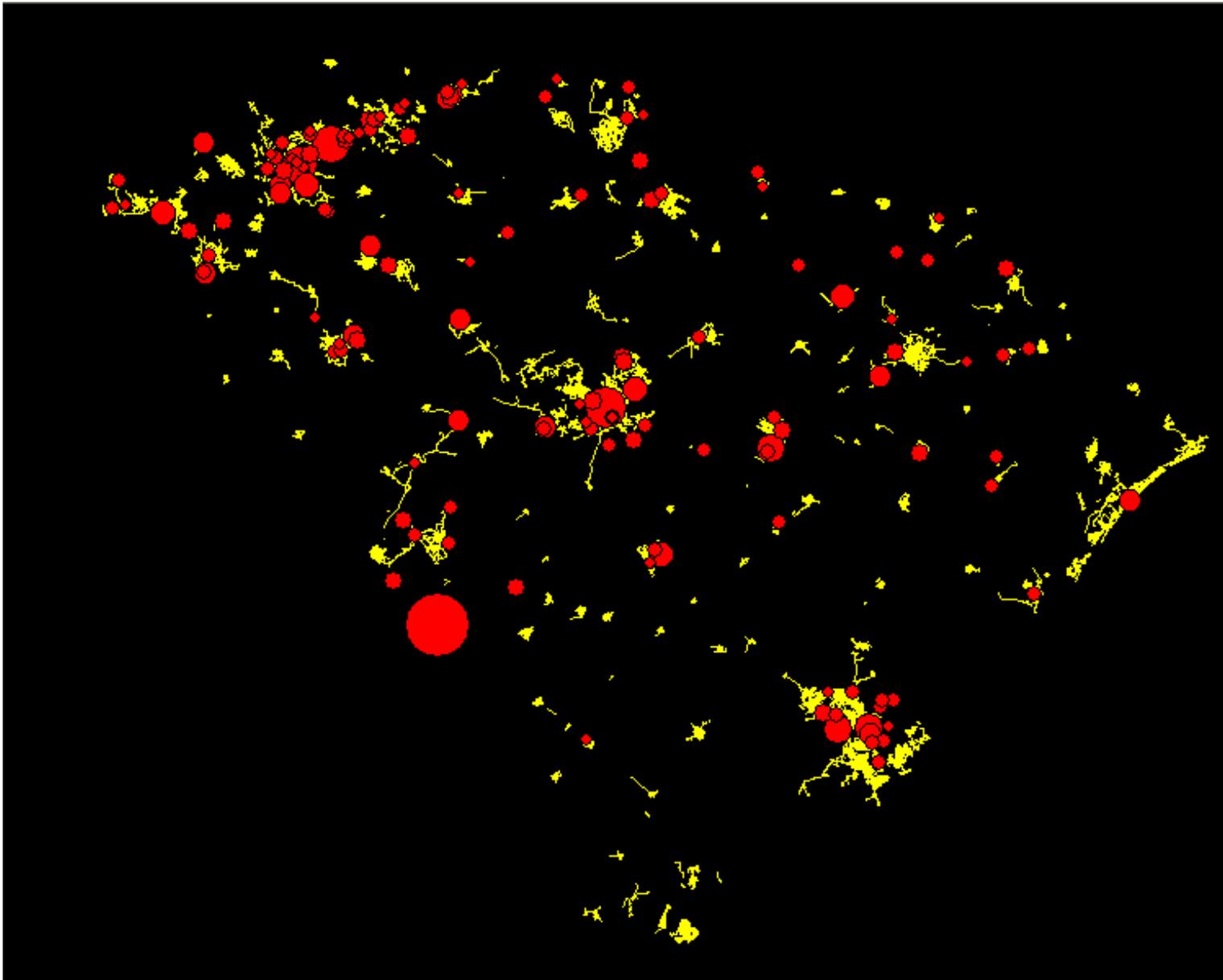
Water



State Wide Sites & Buildings



Sewer Lines and Major Employers





Still Basis of GIS Site Selection

South Carolina Commerce

Buildings & Sites GIS Locator

Commerce Resource Center SC Department of Commerce

Buildings Sites

Building Size
0.0 to 0.0 sq ft
(Includes Subdividable Buildings)

Ceiling Height Min
0.0 ft

Minimum Site Size
10 ac

County
Oconee
Orangeburg
Pickens
Richland

Municipal Sewer Required
Natural Gas N/A

Railroad Access Required
Municipal Water N/A

Crane N/A

Building Name
Search

[View Bldgs. in Google Earth](#)

Help

You searched for all buildings with the following attributes:
Property size \geq 10.00 ac
Sewer: Required
Railroad: Required
Located in the following counties: 'Richland'

(New Search) Richland County

You searched for all buildings with the following attributes:
Property size \geq 10.00 ac
Sewer: Required
Railroad: Required
Located in the following counties: 'Richland'

(New Search) Richland County

Imagepoint (2 Buildings)

County: Richland
Building Size: 122,100.00 sq ft / 11,343.46 sq m
Property Size: 29.00 ac / 11.74 ha
Ceiling Height: 29.50 ft / 8.99 m
Zoning: Light Industrial

DOWNLOAD

Kirco Spec Building

County: Richland
Building Min.: 20,000.00 sq ft / 1,858.06 sq m
Building Max.: 184,000.00 sq ft / 17,094.15 sq m
Property Size: 12.00 ac / 4.86 ha
Ceiling Height: 35.16 ft / 10.72 m
Zoning: M-1

DOWNLOAD

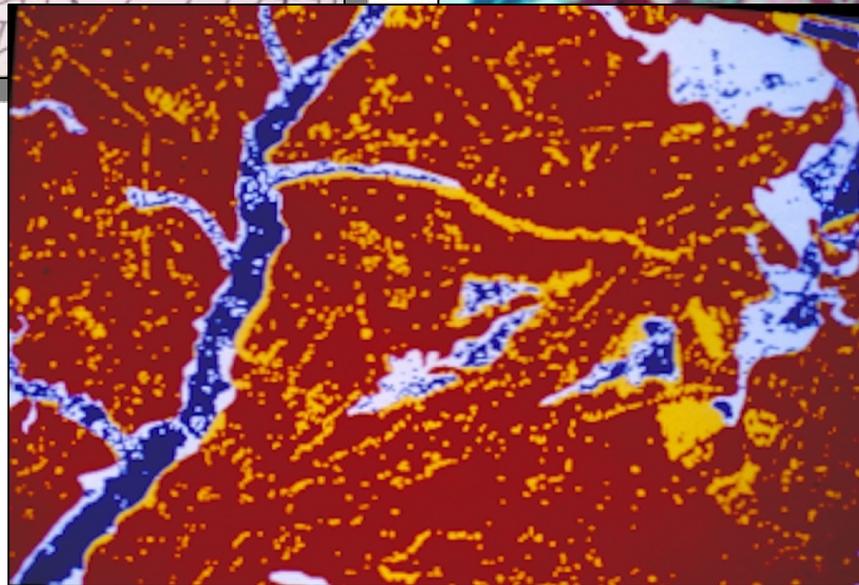
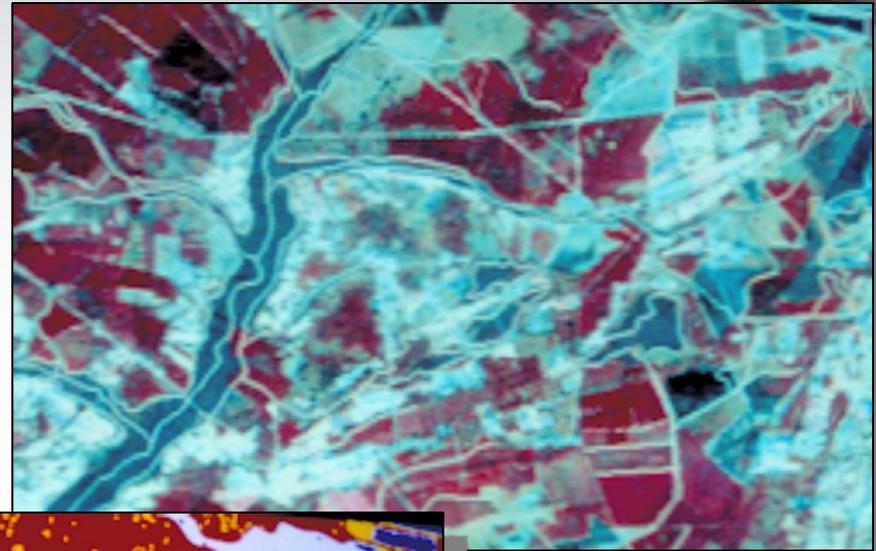
Little Tykes

County: Richland
Building Size: 285,000.00 sq ft / 26,477.36 sq m
Property Size: 26.00 ac / 10.52 ha
Ceiling Height: 25.00 ft / 7.62 m
Zoning: Heavy Industrial

DOWNLOAD

1988 Raster / Vector integration

1:100,000 DLG – ESRI / ERDAS Live Link

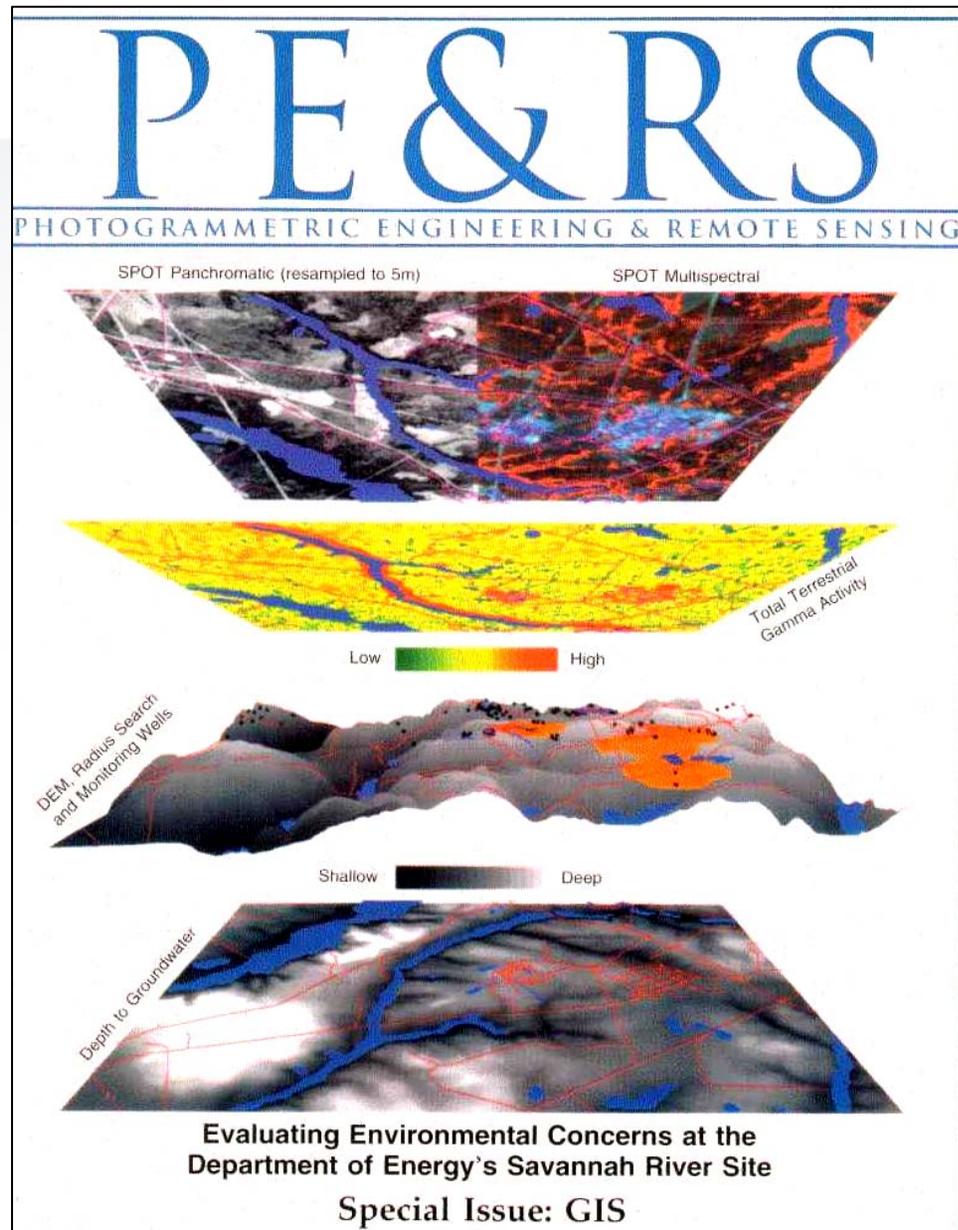


1992 Environmental Data Atlas

DOE - Savannah River site

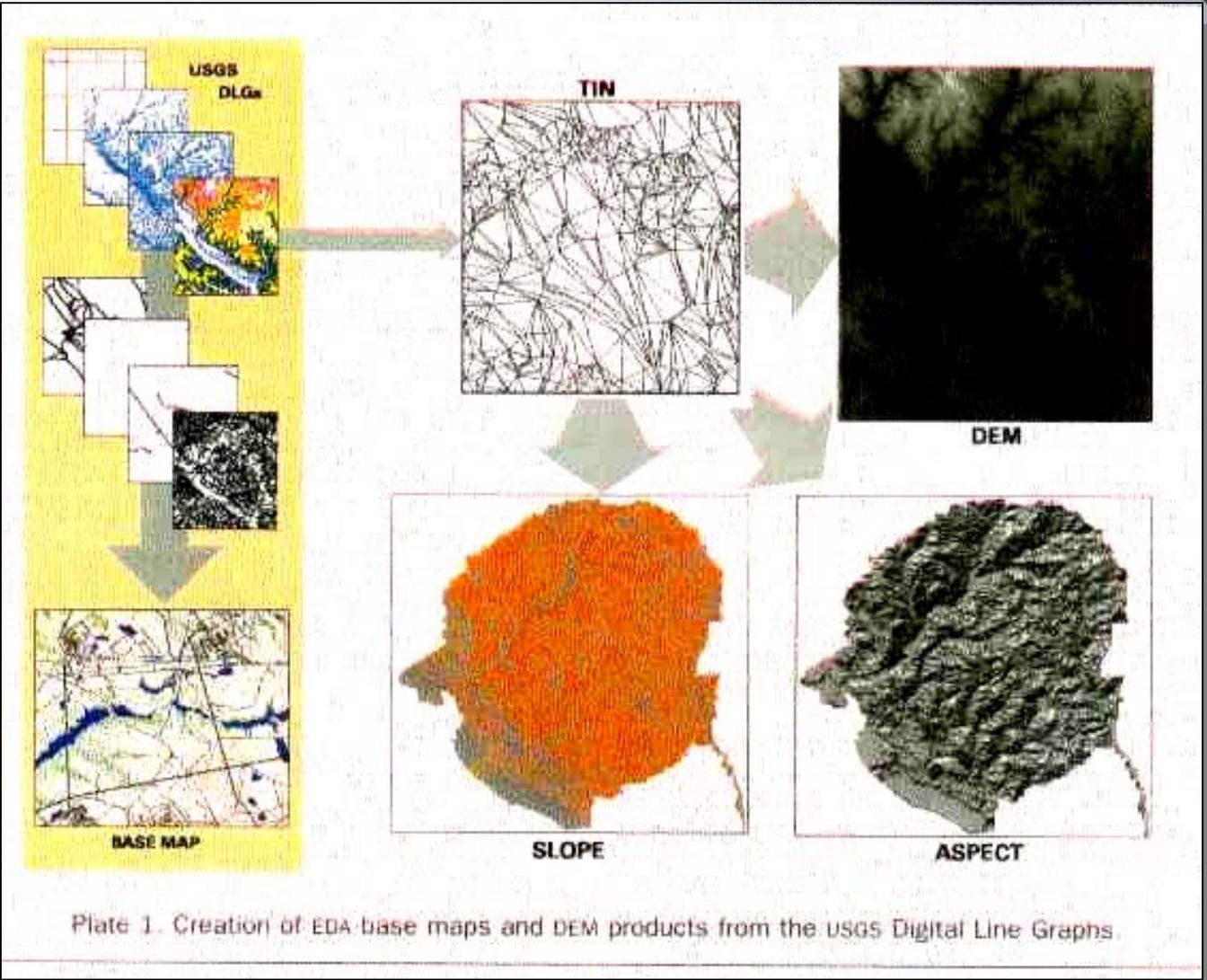


- Objectives - Data integration, standardization, elimination of duplication
- Mandated from DOE
- Data rich environment
- Multiple scales - facilities to 1:24,000

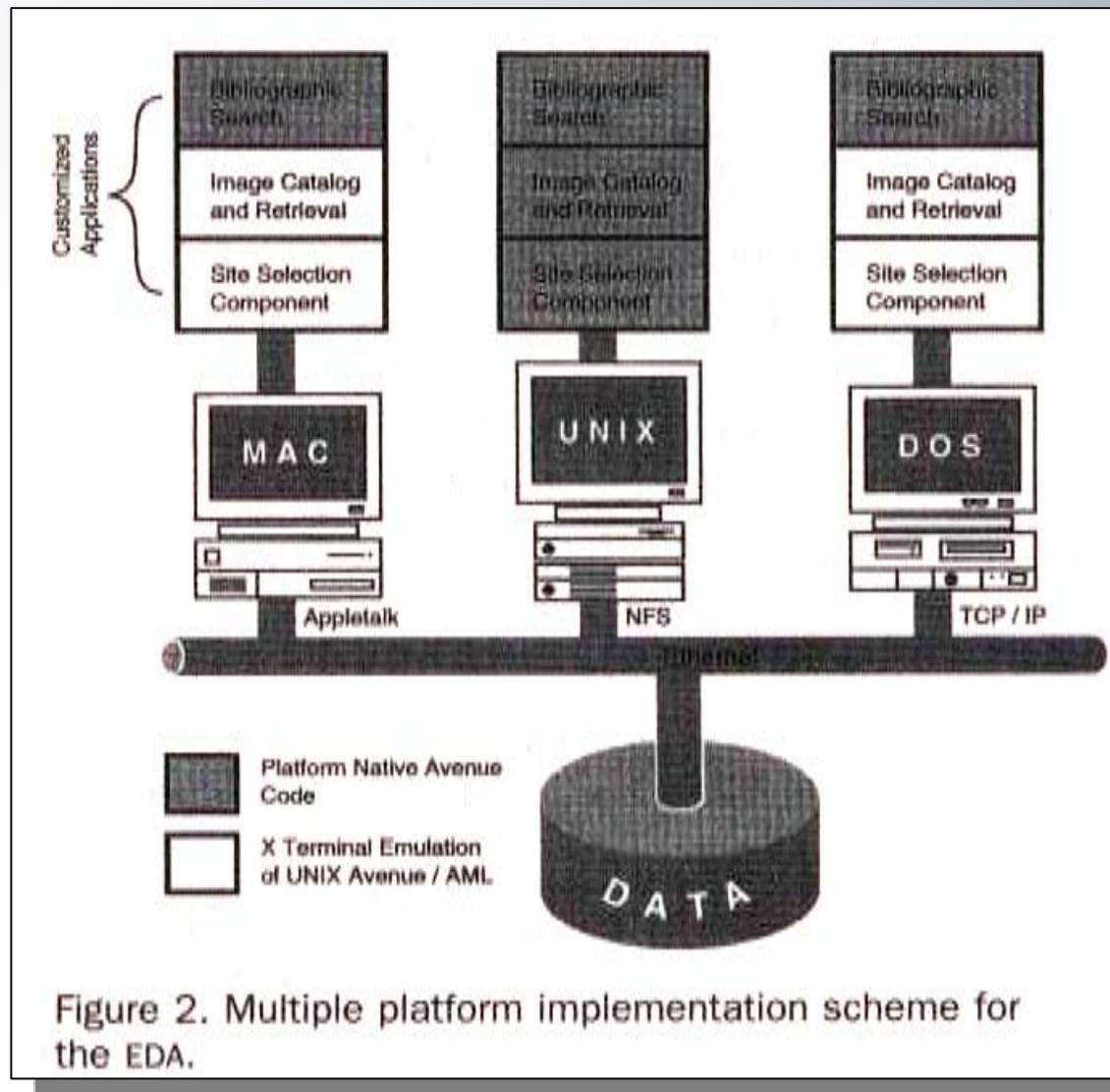


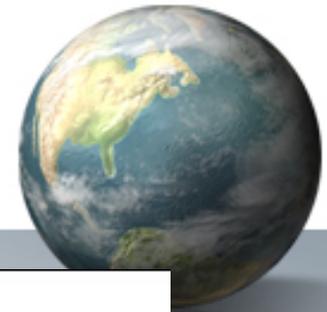


USGS 1:24K DLG Base



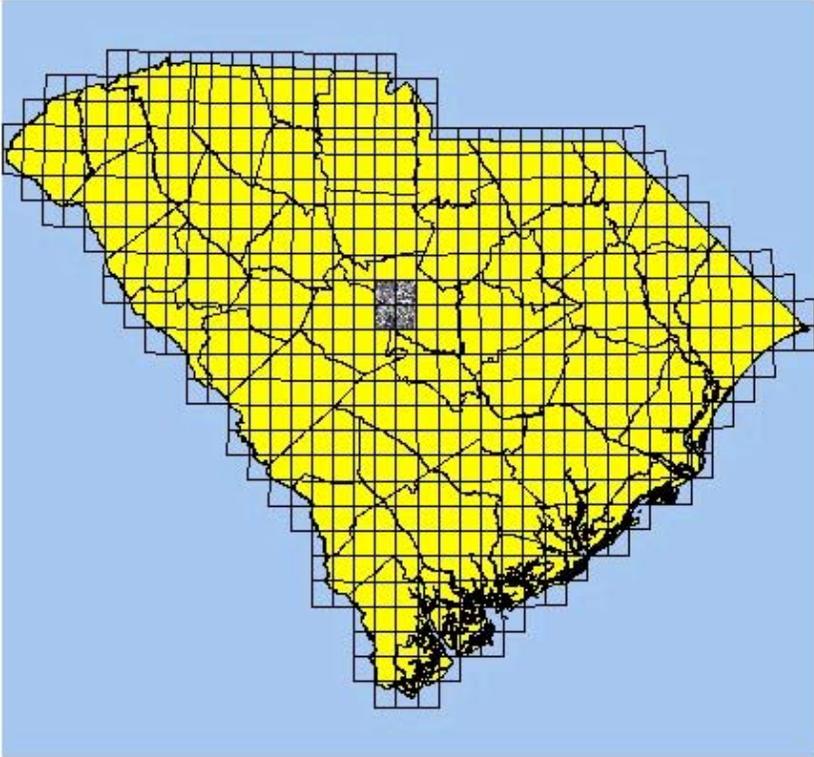
Cross Platform





Mid 1990's State Wide SPOT & Topo

SC SPOT 10m Panchromatic Imagery Browse System



Select one operation, then click on the map.

- County
- Zoom In Quad
- Zoom In
- Zoom Out
- Recenter
- Identify Quads

[Full Extent](#)

Locator

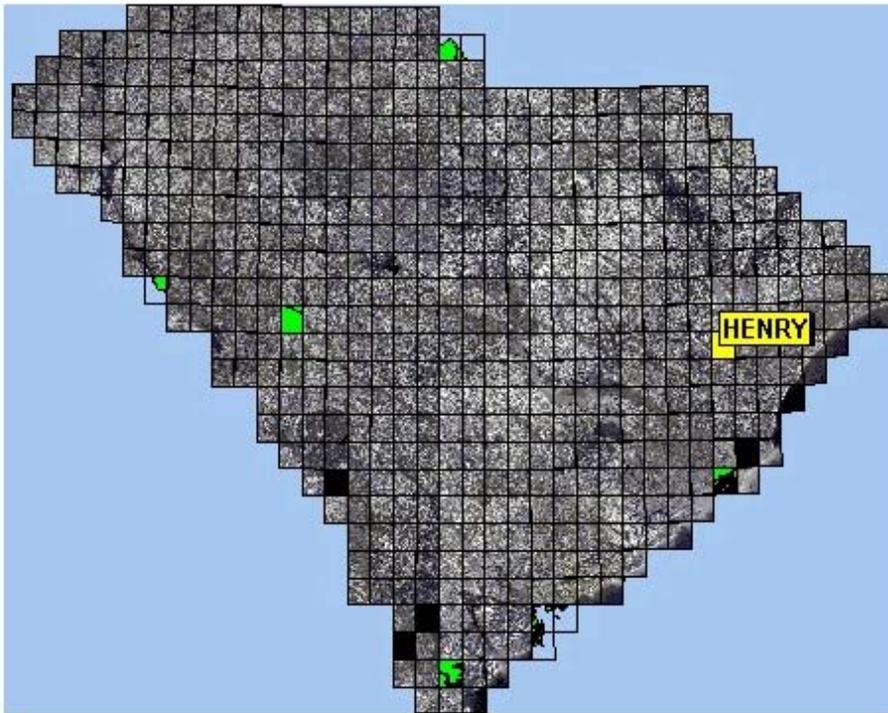


County **Richland** Toggle **10m Panchromatic SPOT** **Go!** [HOME](#)

Access to SPOT



SC SPOT 10m Panchromatic Imagery Browse System



Select one operation, then click on the map.

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[Full Extent](#)



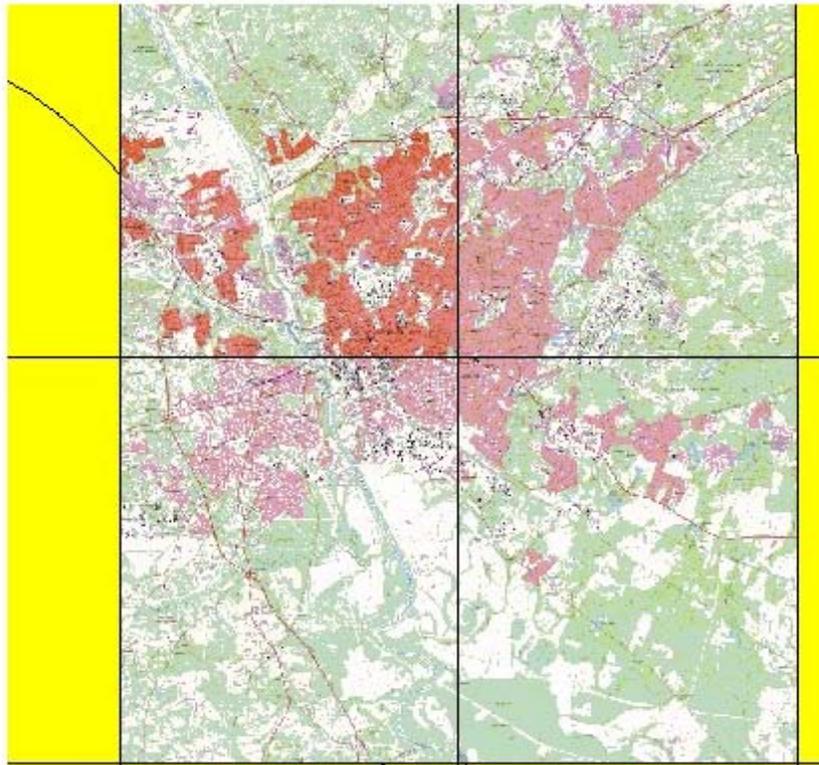
Toggle

[BACK TO HOME](#)



Access to Quads

SC Toposid Browse System



Select one operation, then click on the map.

- County
- Zoom In Quad
- Zoom In
- Zoom Out
- Recenter
- Identify Quads

[Full Extent](#)

Locator



County **Richland** ▼

Toggle **Toposid** ▼

Go!

[HOME](#)

LiDAR

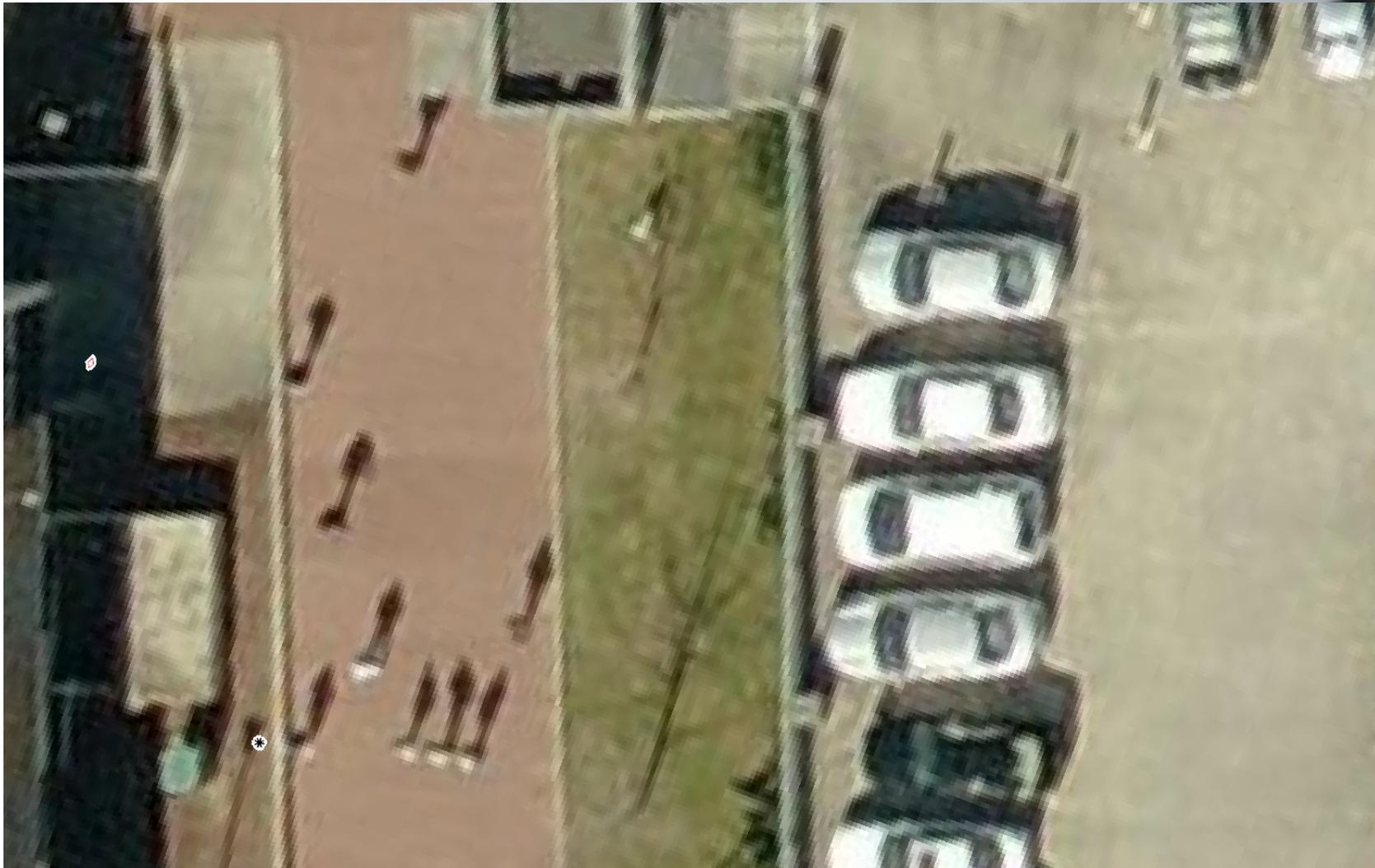


Rooms





Aircraft - Four Inch Pixels -

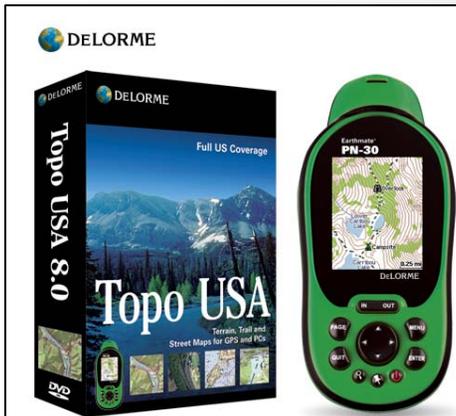


2. From Maps to Digital Products

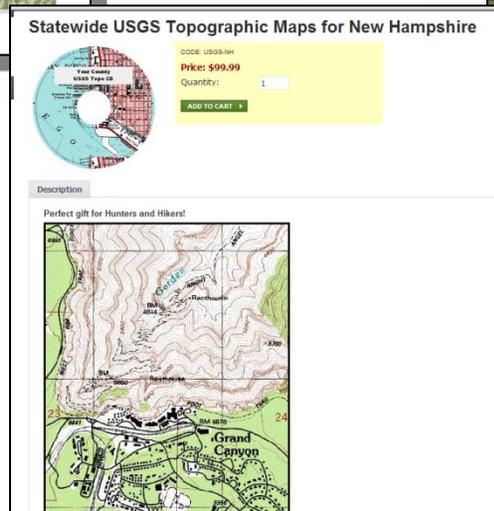
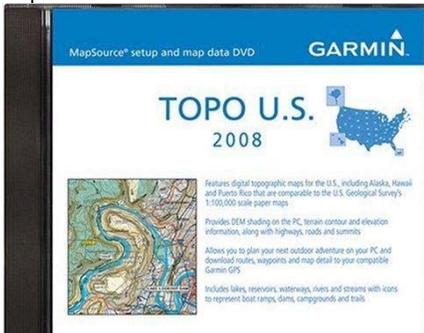
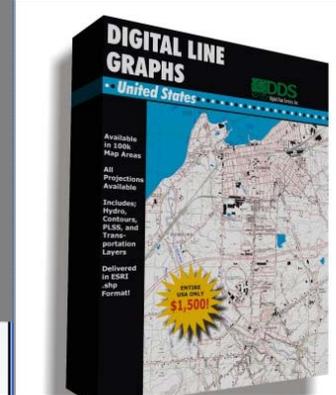
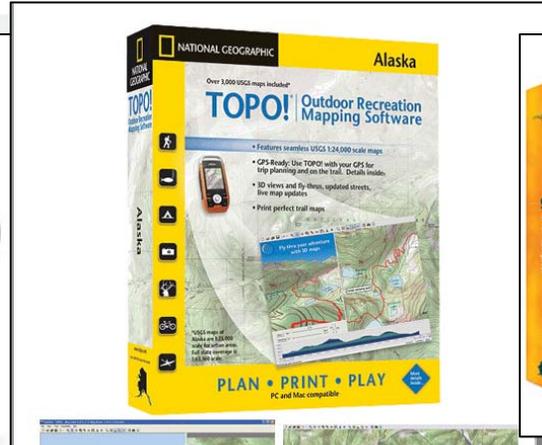


- Raster Images
- Digital Line Graphs

Fostered a robust commercial market



GPS for All Your Favorite Activities



Changed the way we take quads into the field



Current mapping setup: 76CSx & PN40



3 GPS Trail Mapping setup
Garmin 76CSx - Garmin Colorado 400t - DeLorme PN-20
Street maps - 3D View w/hillshading - USGS Topo Quads

Google Map – Pedometer Topo is just one of six views



Gmaps Pedometer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.gmap-pedometer.com/

Most Visited Customize Links Free Hotmail Windows Marketplace Windows Media Windows

Google pedometer Search Sidewiki Bookmarks Check Translate AutoLink AutoFill pedometer Sign in

Ads by Google Calories Jogging Calories Aerobics Berlin Map Fat Calories Burned Calories Workout

Gmaps Pedometer

Start recording
Undo last point

english metric

Total Distance: 0 miles

Draw route: automatically (for runners) automatically (for cyclists) manually (straight lines)

Turn off mile markers
Turn on calorie counter
Elevation: off [small](#) [large](#)
[Complete](#) there and back route

[Save route](#)
[Clear points and start over](#)
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(All links open in a new window)

NEW feature: **Open Street Map** overlay!
[Find out](#) why your friendly neighborhood map nerd is excited about this!

Been there, done that, [bought the shirt](#). Shop the new gmap-pedometer [t-shirt shop](#).

Jump to: [] zoom: 12 go [more options](#)

Map Satellite Hybrid **Topo** Terrain OSM

POWERED BY Google 20 mi 20 km

Pedometer



Gmaps Pedometer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.gmap-pedometer.com/

Most Visited Customize Links Free Hotmail Windows Marketplace Windows Media Windows

Google pedometer Search Sidewiki Bookmarks Check Translate AutoLink AutoFill pedometer Sign in

Ads by Google Calories Jogging Calories Aerobics Berlin Map Fat Calories Burned Calories Workout

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NEW feature: **Open Street Map** overlay!
[Find out](#) why your friendly neighborhood map nerd is excited about this!

Been there, done that, [bought the shirt](#). Shop the new gmap-pedometer [t-shirt shop](#).

Jump to: [] zoom: 12 go [more options](#)

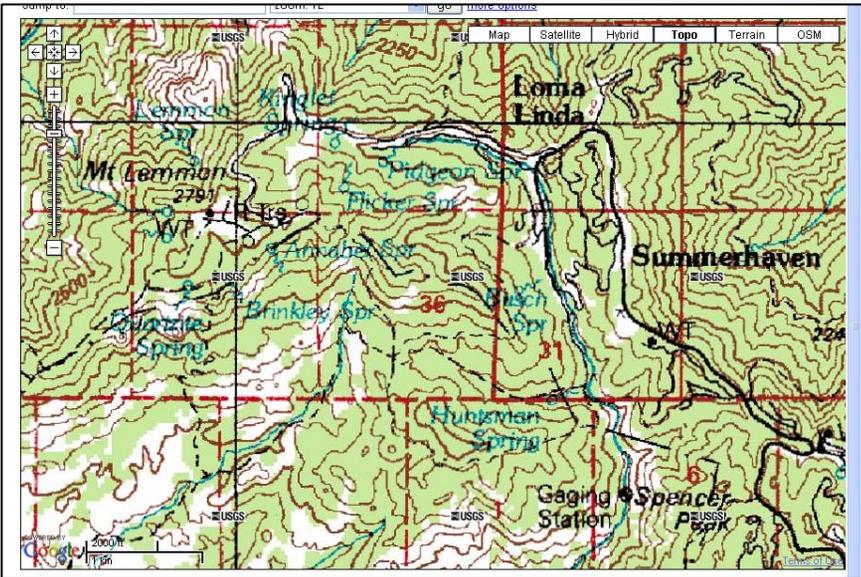
Map Satellite Hybrid **Topo** Terrain OSM

Google 2000ft Terms of Use



Two Views of Mt. Lemon

USGS



Google



DLG – Extract features from map products





Digital Line Graphs – Vecors

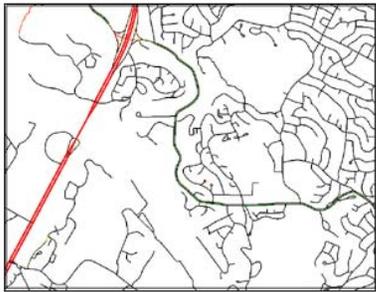
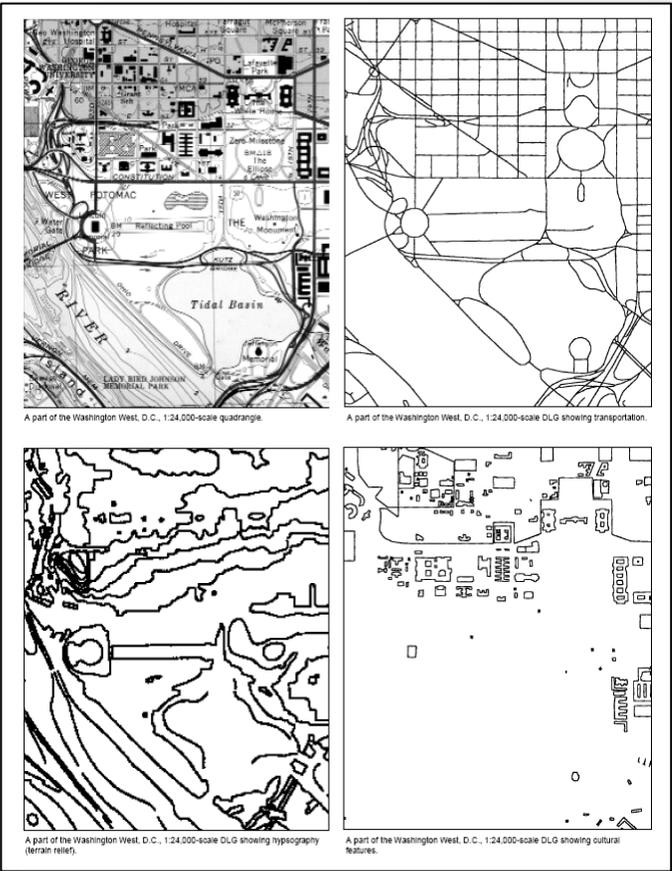


Figure 1a. U.S. Geological Survey (USGS) digital line graph (DLG) data of roads.

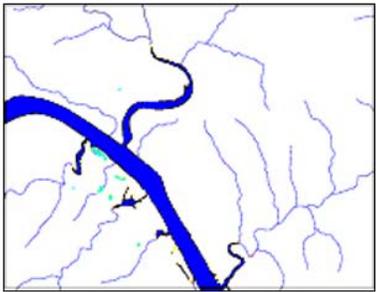


Figure 1b. USGS DLG of rivers.



Figure 1c. USGS DLG of contour lines (hypsography).

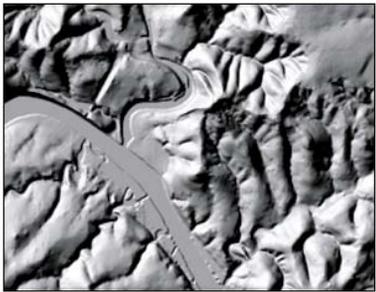
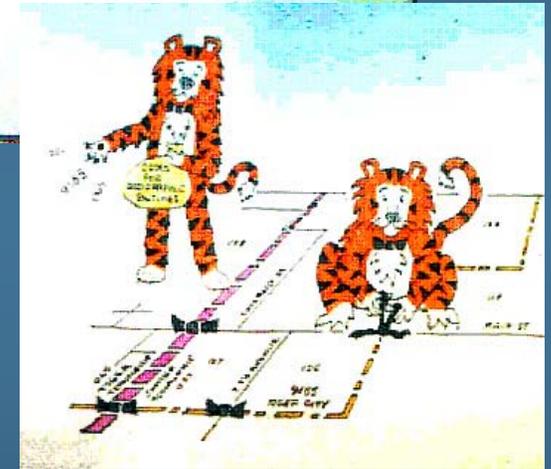
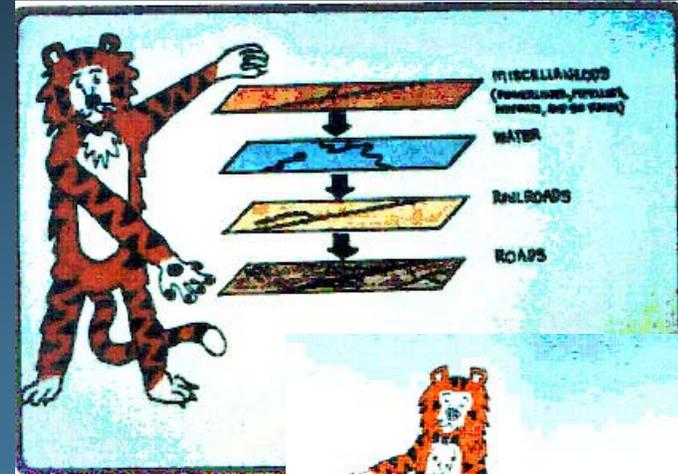
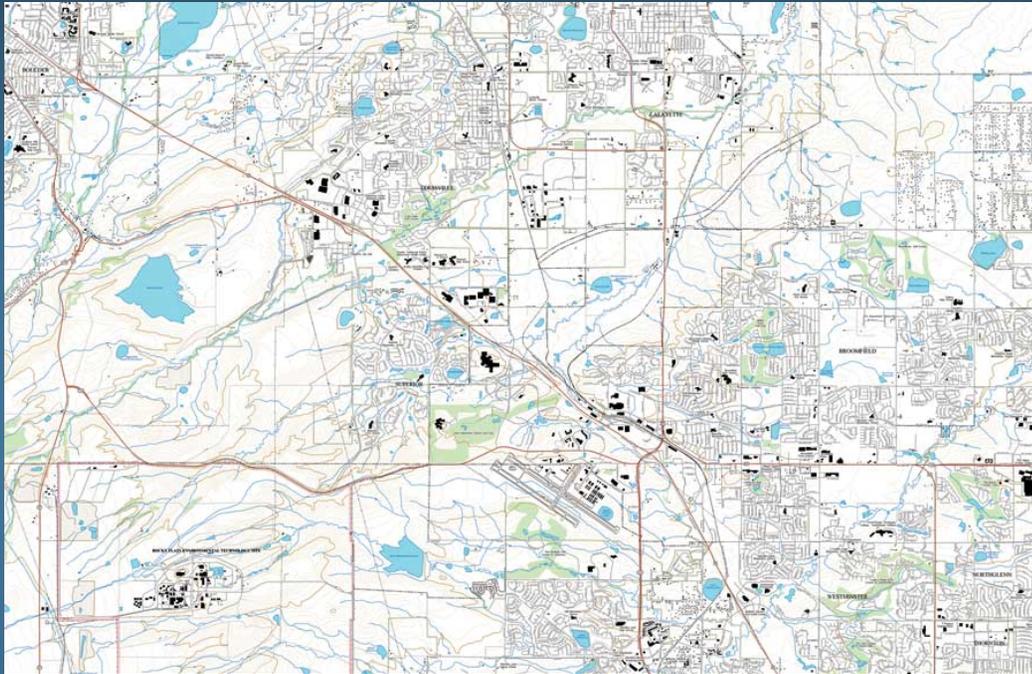


Figure 1d. USGS digital elevation (DEM).

Triumphs – Bob Marx and Eric Anderson



USGS/Census Effort – 100K coverage of conterminous US
Began 1983 – only 960/1823 quads available for digitizing
Completed 1987 – basis of TIGER and NHD

3. What are you doing now?



- Topo Maps to The National Map

Self Promotion



The screenshot shows a web browser window displaying the USGS National Hydrography Dataset website. The page features the USGS logo with the tagline 'science for a changing world' and a navigation menu with links for Home, Technical References, Data, Tools, Applications, Tutorial Series, Technical Support, and Stewardship. The main content area is titled 'The Nation Needs *The National Map*' and includes a paragraph describing the map's purpose and availability. The footer contains links for Accessibility, FOIA, Privacy, and Policies and Notices, along with the USA.gov logo and an American flag.

USGS
science for a changing world

USGS Home
Contact USGS
Search USGS

National Hydrography Dataset

Home Technical References Data Tools Applications Tutorial Series Technical Support Stewardship

[Home](#) » The Nation Needs *The National Map*

The Nation Needs *The National Map*

The National Map provides the nation with access to basic geographic information describing the landscape of the United States and its territories. It has many uses ranging from recreation to scientific analysis to emergency response. *The National Map* is easily accessible for display on the Web, printed products, and as downloadable data. The geographic information available from *The National Map* consists of terrain elevations, aerial imagery, hydrography, transportation, boundaries, structures, geographic names, and land cover. Other types of geographic information also can be added to create specific types of maps.

Accessibility FOIA Privacy Policies and Notices

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

URI : http://nhd.usgs.gov/nation_needs_the_national_map.html

USA.gov
Department of the Interior

Good NHD – Widely used by scientific community



Active Layer details for selected feature(s)

NHD Subbasins

Rec	HUC 8 Code	HUC 8 Name	Source	FID	#SHAPE#
1	03050106	Lower Broad, South Carolina.	Watershed Boundaries Dataset	2876	[Geometry]
2	03050109	Saluda, South Carolina.	Watershed Boundaries Dataset	4286	[Geometry]
3	03050110	Congaree, South Carolina.	Watershed Boundaries Dataset	4318	[Geometry]

Zoom to these records

NHD Geodatabase Extract:
This utility will extract NHD features based on the reference polygon(s) listed above.

(1) Please select one of the data resolution options:
(Note: High and Local resolution data is NOT available in all areas - please review NHD Status)

- Medium Resolution - refer to NHD Status layer for availability
- High Resolution - refer to NHD Status layer for availability
- Local Resolution - refer to NHD Status layer for availability

(2) Please select one of the three data format options to extract your data:

- Personal Geodatabase - will extract data in ESRI 9.2 personal geodatabase format
- File Geodatabase - will extract data in file geodatabase format.
- Shapefile - will extract data in shapefile format, compatible to geodatabase content.

(3) Please indicate Flow Table option:

Populate Flow Table Keep turned off for faster processing. [What is the Flow Table?](#)

(4) Please enter your Email address and hit Extract (do not press Enter).

cowend@sc.edu

(R91)

NHD Data Model



One of eight themes of *The National Map*

FEATURE CLASSES

Simple feature class: NHDPoint

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
COMID	Long Integer	No	0		0	0	8
FLSRM	Date	No			0	0	8
Resolution	Long Integer	No		Resolution			
GMS_ID	String	Yes					10
GMS_Name	String	Yes					65
ReachCode	String	Yes					14
FType	Long Integer	No	455		0		
FCode	Long Integer	Yes	4500		0		

Contains points representing NHD hydrographic landmark features.

Subtypes of NHDPoint

Subtype Code	Subtype Description	Field name	Default value	Domain
545	DamWeir	Resolution FCode	34305	Resolution DamWeir FCode
367	Gaging Station	Resolution FCode	32750	Resolution Gaging Station FCode
369	Gate	Resolution FCode	36900	Resolution Gate FCode
398	Lock Chamber	Resolution FCode	39800	Resolution Lock Chamber FCode
451	Rapids	Resolution FCode	43100	Resolution Rapids FCode
456	Reservoir	Resolution FCode	45600	Resolution Reservoir FCode
441	Rock	Resolution FCode	44101	Resolution Rock FCode
450	Sinkhole	Resolution FCode	45000	Resolution Sinkhole FCode
455	Spring	Resolution FCode	45500	Resolution Spring FCode
465	Water Intake/Outflow	Resolution FCode	46500	Resolution Water Intake/Outflow FCode
487	Waterfall	Resolution FCode	48700	Resolution Waterfall FCode
488	Well	Resolution FCode	48800	Resolution Well FCode

Definitions of features

- Dam/Weir:** Barrier constructed to control the flow or raise the level of water.
- Gaging Station:** Structure used to measure the characteristics of a hydrographic feature.
- Gate:** Structure that may be swung, drawn, or lowered to block an entrance or passage-way.
- Lock Chamber:** Enclosure or a waterway used to raise or lower a vessel as they pass from a larger to smaller.
- Rapids:** Any of such element in a stream or near management by standing waves, boulders, or rocks.
- Reservoir:** Conventional basin formed to contain water or other liquids.
- Rock:** Concentrated mass of stony material.
- Sinkhole:** Place at which a stream disappears underground, or reappears at the surface in a karst area.
- Spring:** Place where water issues from the ground naturally.
- Water Intake/Outflow:** Structure through which water enters or exits a conduit.
- Waterfall:** Vertical or near vertical descent of water over a ledge or the bed of a river.
- Well:** Pit or hole, dug or bored into the earth for the extraction of water or other fluids, or gases.

Simple feature class: NHDLine

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
COMID	Long Integer	No	0		0	0	8
FLSRM	Date	No			0	0	8
Resolution	Long Integer	No		Resolution			
GMS_ID	String	Yes					10
GMS_Name	String	Yes					65
LengthM	Double	Yes			0	0	
FType	Long Integer	No	411		0		
FCode	Long Integer	Yes	41100		0		
Shape_Length	Double	Yes			0	0	

Contains routes representing linear NHD hydrographic landmark features.

Subtypes of NHDLine

Subtype Code	Subtype Description	Field name	Default value	Domain
518	Bridge	Resolution FCode	31800	Resolution Bridge FCode
545	DamWeir	Resolution FCode	34305	Resolution DamWeir FCode

Definitions of features

- Bridge:** Structure spanning and allowing passage over a waterway, railway, or other obstacle.
- Dam/Weir:** Barrier constructed to control the flow or raise the level of water.

Simple feature class: NHDArea

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
COMID	Long Integer	No	0		0	0	8
FLSRM	Date	No			0	0	8
Resolution	Long Integer	No		Resolution			
GMS_ID	String	Yes					10
GMS_Name	String	Yes					65
AreaSqrM	Double	Yes					
Elevation	Double	Yes		ElevationRange	0	0	
FType	Long Integer	No	460		0		
FCode	Long Integer	Yes	46005		0		
Shape_Length	Double	Yes			0	0	
Shape_Area	Double	Yes			0	0	

Contains NHD hydrographic landmark features.

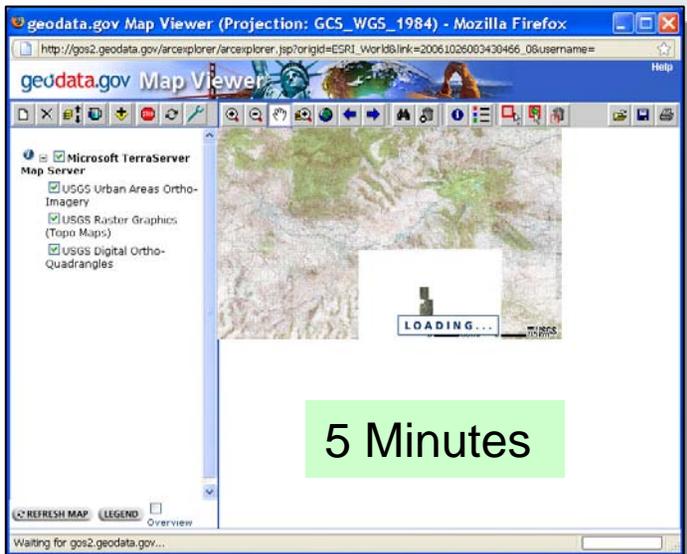
Subtypes of NHDArea

Subtype Code	Subtype Description	Field name	Default value	Domain
537	Area of Complex Channels	Resolution FCode	53700	Resolution Area of Complex Channels FCode
307	Area to be Submerged	Resolution FCode	30700	Resolution Area to be Submerged FCode
312	Bay/Niel	Resolution FCode	31200	Resolution Bay/Niel FCode
318	Bridge	Resolution FCode	31800	Resolution Bridge FCode
336	Canal/Ditch	Resolution FCode	33600	Resolution Canal/Ditch FCode
343	Dam/Weir	Resolution FCode	34305	Resolution Dam/Weir FCode
362	Flume	Resolution FCode	36200	Resolution Flume FCode
364	Foreshore	Resolution FCode	36400	Resolution Foreshore FCode
373	Hazard Zone	Resolution FCode	37300	Resolution Hazard Zone FCode
403	Inundation Area	Resolution FCode	40308	Resolution Inundation Area FCode
568	Levee	Resolution FCode	56800	Resolution Levee FCode
398	Lock Chamber	Resolution FCode	39800	Resolution Lock Chamber FCode
431	Rapids	Resolution FCode	43100	Resolution Rapids FCode
448	Sea/Ocean	Resolution FCode	44800	Resolution Sea/Ocean FCode
454	Special Use Zone	Resolution FCode	45401	Resolution Special Use Zone FCode
465	Spillway	Resolution FCode	46500	Resolution Spillway FCode
460	Stream/River	Resolution FCode	46005	Resolution Stream/River FCode

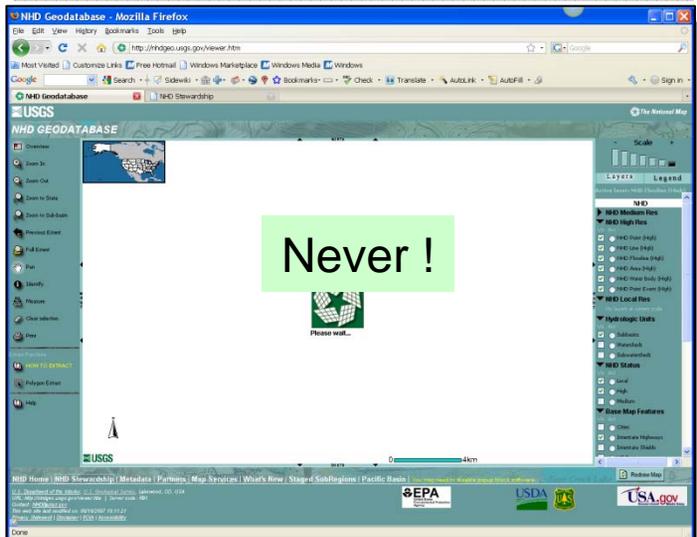
Doesn't Cut it – Delays & User Interfaces



Quickstart: Page 1 Of 6



5 Minutes



Never!

The National Hydrography Dataset
NHD QuickStart

The National Hydrography Dataset (NHD) is a vector geospatial theme for surface water hydrography obtained from topographic maps and additional sources. It is available Nationwide as medium resolution at 1:100,000-scale, and as high resolution at 1:24,000-scale or better. In Alaska, the NHD is available at 1:63,360-scale. A few "local resolution" areas also are available at varying scales. The hydrography of the United States is organized by drainage areas. The subbasin ((8-digit Hydrologic Unit Code (HUC)) drainage area is the most practical area for high resolution NHD. Subregions (4-digit HUCs) are composed of varying numbers of subbasins.

The NHD is available in Environmental Systems Research Institute (ESRI) personal geodatabase format known as NHDinGEO, a file-based geodatabase format, and in ESRI shapefile format known as NHDGEOinShape. The NHD is organized by hydrologic units, but can be downloaded in various extents.

Accessing NHD Data

There are two ways to access the NHD:

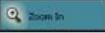
Go to <http://nhd.usgs.gov/data.html> then click on the Go to the NHD viewer link. The viewer provides the ability to check on the status of the data, view the data directly, and obtain the data. Using this option allows for selecting subbasins from a map display.

Note: this Web application uses popup windows - you will need to disable popup block software to fully use this site.

Another option is to download pre-staged personal geodatabases by subregion from the NHD ftp site, <ftp://nhdftp.usgs.gov/SubRegions>. Select the High, Local (limited availability), or Medium resolution folder. The pre-staged subregion geodatabases will be kept up-to-date as revised data become available. You also can go to this site by clicking the link on the NHD Data Availability page.

Note: if you have trouble accessing the ftp site you may need disable your passive FTP setting in Internet Explorer. To change this setting click Tools -> Options -> Advanced and scroll down about half-way until you find a checkbox for "Use Passive FTP...". If you uncheck this box, you should be able to get to the site.

Viewing NHD Data in NHD Viewer

 to your region of interest. The tool is located in the upper left hand column of the viewer.

Under the Layers tab in the upper right part of the viewer, check the box (under "Vis") to make visible the layers you want to view. Visible layers include those listed under the headings: Hydrologic Units, Base Map Features, and Shaded Relief. (Layers are scale dependent, you may need to zoom in to see all options.)

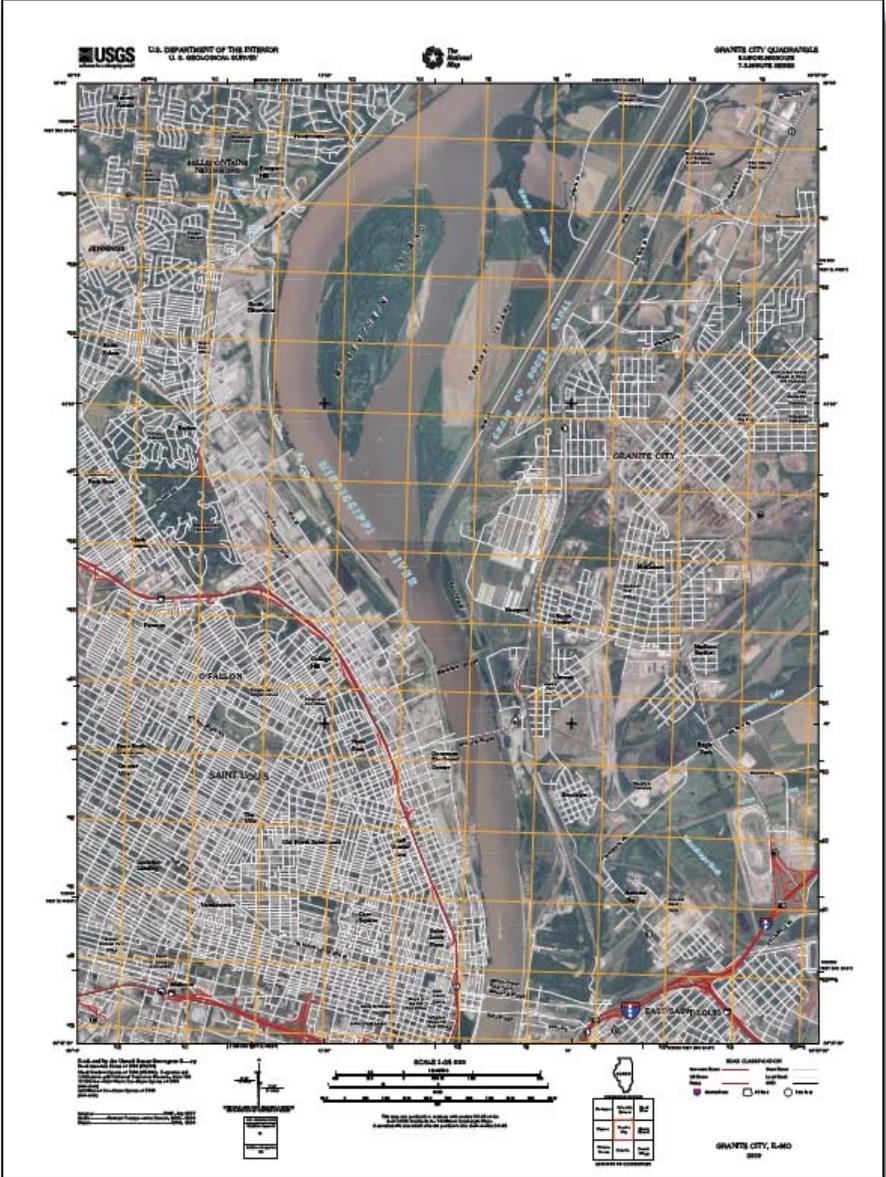
Click Redraw Map at the bottom of the right column in the viewer to refresh the map.

Click on Legend tab adjacent to the Layers tab to view the legend.

4. What are your plans?



Orthophoto Quads



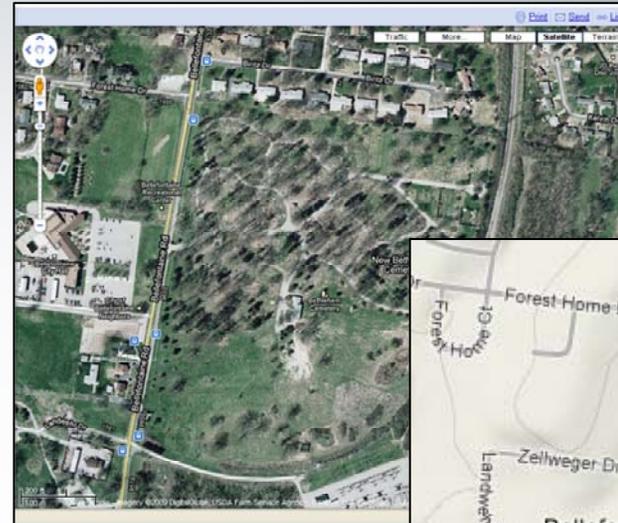
Beta Orthophoto Quad vs Google Map

Which would you use?



USGS

Google



What Would Google Do?

Jeff Jarvis

- New relationship
 - Give the people control and we will use it
 - ***Your worst customer is your best friend***
 - ***Your best customer is your partner***
- New Architecture
 - The link changes everything
 - ***Do what you do best and link to the rest***
 - Join the network
 - ***Be a platform***
 - Think distributed
- New Publicness
 - If you're not searchable you won't be found
 - Life is public so is business
 - ***Your customers are your ad agency***
- New Society
 - Elegant organization
- New Economy
 - Small is the new big
 - 'Join the open-source, gift economy
 - The mass market is dead- long live the mass of niches
 - Google commodifies everything
 - Welcome to the Google economy

New National Map Viewer



The screenshot displays the USGS National Map Viewer interface. At the top left, the USGS logo and 'The National Map Viewer' title are visible, along with a search bar and a 'Find a Place' button. The main map area shows a detailed view of the United States with various layers overlaid, including roads, water bodies, and administrative boundaries. A left-hand sidebar contains a 'Layers' panel with a list of categories and sub-layers, such as 'US Topo: Current Available', 'Geographic Names (GNIS)', and 'Structures'. A 'GIS Toolbox' is also present at the bottom left. The top right of the map area includes navigation controls and a 'Base Map' dropdown menu. The bottom of the interface shows a status bar with 'Done', 'Internet', and '100%' zoom level.

National Map layers



The screenshot displays the USGS National Map Viewer interface. The main map area shows a detailed view of the Southeastern United States, including parts of Georgia, North Carolina, and South Carolina. Major cities like Atlanta, Charlotte, and Columbia are visible, along with a network of highways and water bodies. The interface includes a search bar at the top with the text "Find a Place" and a search button. Below the search bar, there are map style options: "Base Map", "Topo/Shaded", "Imagery", and "Imagery/Hybrid". On the left side, there is a sidebar menu with a "Layers" section containing a list of various data layers, such as "LAYERS.HYDRO_LINES_TEMP", "LAYERS.ANTARCTICA_FEATURE", and "LAYERS.CULTURAL_FEATURE". Below the layers list, there are sections for "Structures" and "Overlays". At the bottom of the map, there is a status bar showing the current position and scale.

New Viewer – Good performance



The screenshot displays the USGS National Map Viewer interface. At the top left, the USGS logo and 'The National Map Viewer' title are visible, along with a search bar and a 'Find a Place' button. The main map area shows a topographic map of the Southeastern United States, including parts of Tennessee, Georgia, North Carolina, and South Carolina. Major cities like Atlanta, Charlotte, and Raleigh are labeled. The map is overlaid with several data layers, including transportation routes (red lines), hydrography (blue lines), and administrative boundaries. A left-hand sidebar contains a 'Layers' panel with a list of data layers, many of which are checked. At the bottom, a status bar shows the cursor position and scale.

National Map as a Platform / Service



USGS TNM 2.0 Beta Viewer

USGS The National Map BETA Viewer

Find a Place

Powered by Palantir™ x3

e.g., Phoenix, AZ or -11

Base Data GIS Toolbox

Download Selectable Polygons

- US Topo: Current Available
 - GeoPDFs in Store
- Reference Polygons
 - Governmental Units
 - State or Territory (Low res)
 - Federal Lands
 - 109 Congressional Districts
 - Counties
- Map Indices
 - Hydrologic Units

Overlays

Transparency

Delete

Map Service Metadata

Filter

Select All Layers

Deselect All Layers

View In

- ArcMap
- ArcGIS Explorer
- Google Earth

Download Layer

Inventory Services

Emergency Operations

Featured Federal Services

User Added Content

Content Reorder Layers

Cursor Position 88.99707 -81.03424

Transferring data from tnm2beta.cr.usgs.gov...

USGS TNM 2.0 Beta Viewer

USGS The National Map BETA Viewer

Find a Place

Powered by Palantir™ x3

e.g., Phoenix, AZ or -115.14.36.17

Search

Base Data GIS Toolbox

Download Selectable Polygons

- US Topo: Current Available
 - GeoPDFs in Store
- Geographic Names (GNIS)
- Structures
 - Public Attractions
 - Water Supply
 - Health and Medical
 - Emergency Res.
 - Education
 - Educational
 - College
 - Schools
- Transportation
 - Airport
 - Airport label
 - Interstate
 - Interstate labels
 - US Route
 - US Route labels
 - State Route
 - State Route labels
 - County Route
 - County Route labels
 - Local Road
 - Local Road labels
- Governmental Units
- Hydrography (NHD)
- Land Cover (NLCD)
- Large Scale Shaded Relief
- Large Scale Imagery
 - 1_meter_imagery
 - Scanned Map (Bets)

Overlays

Zoom To Initial Extent

Zoom To Full Extent

Zoom To Visible Scale

Transparency

Delete

Map Service Metadata

Filter

Select All Layers

Deselect All Layers

View In

Download Layer

ArcGIS Services Directory

Home > tnm > structures (MapServer)

tnm/structures (MapServer)

View In: [ArcMap](#) [ArcGIS Explorer](#) [ArcGIS JavaScript](#) [Google Earth](#)

View Footprint In: [Google Earth](#)

Service Description: National Map structures layers

Map Name: Layers

Layers:

Content Reorder Layers

Cursor Position 88.10118 -81.09240

Scale 1:86,812

Link to Google Earth



Google Earth

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., Tokyo, Japan

Places

- My Places
- USGS Quadrangles
- About QUADS
- Refresh Mode
- Manual
- Automatic
- Search Results
- Overlays
- Layers
- Extents
- Temporary Places
- Unselectable polygons

Layers

- Primary Database
- Geographic Web
- Roads
- 3D Buildings
- Street View
- Borders and Labels
- Traffic
- Weather
- Gallery
- Global Awareness
- Places of Interest
- More
- Terrain

34°00'36.67" N 81°10'43.25" W

http://www.google.com/irrliev/

Advanced Search
Language Tools

Google Search I'm Feeling Lucky

Advertising Programs - Business Solutions - About Google

Make Google my homepage

©2009 - Privacy

5. What others have recommended?



NRC 2001 – From Transition to Transformation



FUTURE ROLES AND OPPORTUNITIES FOR THE U.S. GEOLOGICAL SURVEY



NATIONAL RESEARCH COUNCIL

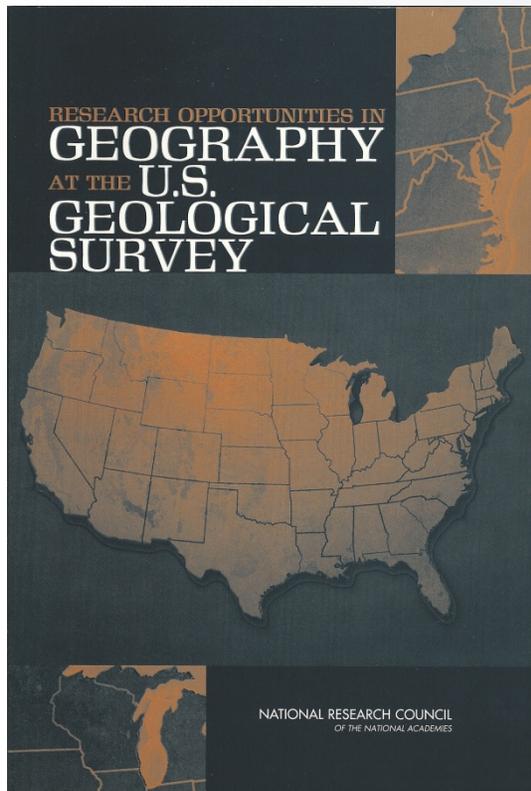
SIDEBAR 4.3

NATIONAL MAPPING DIVISION: FROM TRANSITION TO TRANSFORMATION

The traditional role of USGS as a mapmaker needs to be redefined for a variety of reasons. First, the role of traditional cartographers has changed dramatically and will continue to change. The mapping sciences are rapidly converging into the spatial information sciences because of the advent of advanced technologies including automated cartography, GISs, GPS, and digital data from terrestrial, airborne, and satellite sensors. Essentially, the role and form of a map have changed. Maps were at one time the products of a cartographer who selected what features to portray at specific scales; today, the map user is empowered to construct a map from a series of data elements drawn from geospatial databases. Once a matter of symbols and line work representing natural and human-made features, the “modern” map can be a dynamic and multidimensional ensemble of symbolized data and imagery. Mapping is now primarily the integration and portrayal of multiscalar, multimedia, and multisource geospatial data, created by retrieval of data from databases and manipulated by GIS tools to create tailored information products.

The USGS is now in a position to become the lead civil agency for undertaking both basic and applied research leading to the development of methodologies and the promulgation of standards for the development of geospatial databases. Because many USGS data collection and mapping activities can now be privatized (e.g., the production of basic topographic quadrangle maps), the traditional role of the USGS as a primary production facility is dated. In the future, the USGS can maximize its influence and stature as a standard-setting and quality assurance body and as the primary conservator of the nation's geospatial science data.

NRC 2002 – Integration of Spatial Data

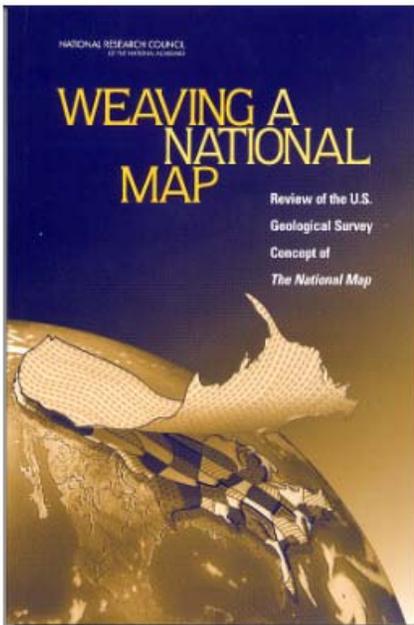


Integration of Spatial Data

In addition to collection and representation, another critical aspect of maintaining and enhancing spatial data is the integration of a variety of data types in a single product. For many years the production of 1:24,000 topographic maps was the framework for the nation's spatial data. The coverage of the continental United States by topographic maps was completed by 1991, but this paper-based method is now obsolete. It is impossible to adequately update the 55,000 topographic quadrangles in a timely fashion. Government agencies, companies, and private citizens require digital products. In response, USGS is developing *The National Map* (see [Chapter 4](#)). (The USGS refers to the programs and people in the Geography Discipline as “the National Map” but the committee believes it would be more appropriate to label only the product, “*The National Map*.”)

The National Map demands a seamless database with thematic layers that will require substantial research and time for development. The first phase of the project is the creation of the National Elevation Dataset (NED), a seamless raster product for the entire nation that was assembled for the continental United States based on 7.5-minute Digital Elevation Model (DEM) source data (10-m and 30-m spacings). The committee recognizes that a major challenge is integrating source data other than standard USGS DEMs into the NED. For example, joining digital raster graphic (DRG) quads into seamless images is not a simple procedure. DRGs are reprojected to Universal Transverse Mercator (UTM) coordinates setting up a conflict between the data and the map frame. Attributes in a national seamless database must be rectified and standardized, creating another challenging research problem. For example, many resource classifications do not have clear, mutually exclusive definitions for each class of feature, and there is little standardization among the many state and private generators

NRC 2003 Review of the National Map



- The USGS should move expeditiously to develop an implementation strategy for its *National Map* concept in collaboration with USGS's many partners
- The USGS should make a priority of building the necessary partnerships for an integrated spatial database, while continuing to use small steps and pilot studies to gain experience in revision, integration, and updating procedures and partnerships.
- The USGS leadership should increase its participation in FGDC processes to nurture the partnerships needed to accomplish its vision
- Partnerships with FDLP institutions should be explored for digital archiving and archival maintenance of *The National Map* and enhanced National Atlas through cooperation with the U.S. Government Printing Office.
- Federal and state chief information officer councils and associations should be invited to participate in FGDC meetings and other strategic planning meetings for building out *The National Map* and enhanced National Atlas.
- A component of the USGS's implementation plan should address the phasing out of updates and printing of paper 1:24,000 topographic maps

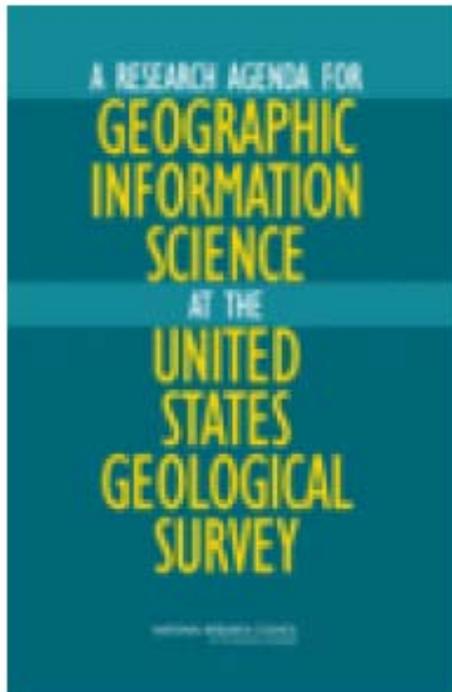


2003 House Government Reform Subcommittee on Technology, Information Policy, Intergovernmental Relations and Census

Geospatial Information: Are we headed in the right direction or are we lost?

Dr. David J. Cowen – Chair, National Research Council
Mapping Science Committee
Chair, Dept. of Geography
University of South Carolina
Cowend@sc.edu

NRC 2007



RECOMMENDATION 1. CEGIS should initially focus on research that will improve the capabilities of *The National Map*.

RECOMMENDATION 3: The two priority research topics within the area of information access and dissemination should be to reinvent topographic maps in an electronic environment and to investigate user-centered design for *The National Map* web services.

RECOMMENDATION 4: The two priority research topics for CEGIS within the area of data integration should be generalization and fusion.

*6. What should you be doing?
(What do your users want?)*



So What are you saying ?



The National Map Customer Requirements: Findings from Interviews and Surveys

By Larry Sugarbaker,¹ Kevin E. Coray,² and Barbara Poore³

USGS Open-File Report 2009–1222

Your Own Words



- The digital age has fundamentally changed mapping as we understood it 30 years ago.
- Spatial analysis has moved from a tabletop exercise to fully automated geospatial analysis and scientific modeling.
- Maps are created today to convey the results of analyses that are performed routinely by consumers of geospatial services.
- The role of the USGS as the Nation's primary map producer has shifted toward geospatial services.

Your own words



- The demand for geographic information system (GIS) products and services is higher than ever, and the demand for traditional paper products has rapidly declined.
- In the emerging Web 2.0 world, the service provision model is shifting. The USGS, while having a long-recognized leadership role in mapping, is taking this opportunity to define its role as a premier geospatial data and application service provider.
- The shift from maps to geospatial services challenges the notion that a general-purpose base map should be the end result of the service offerings.

Big Picture



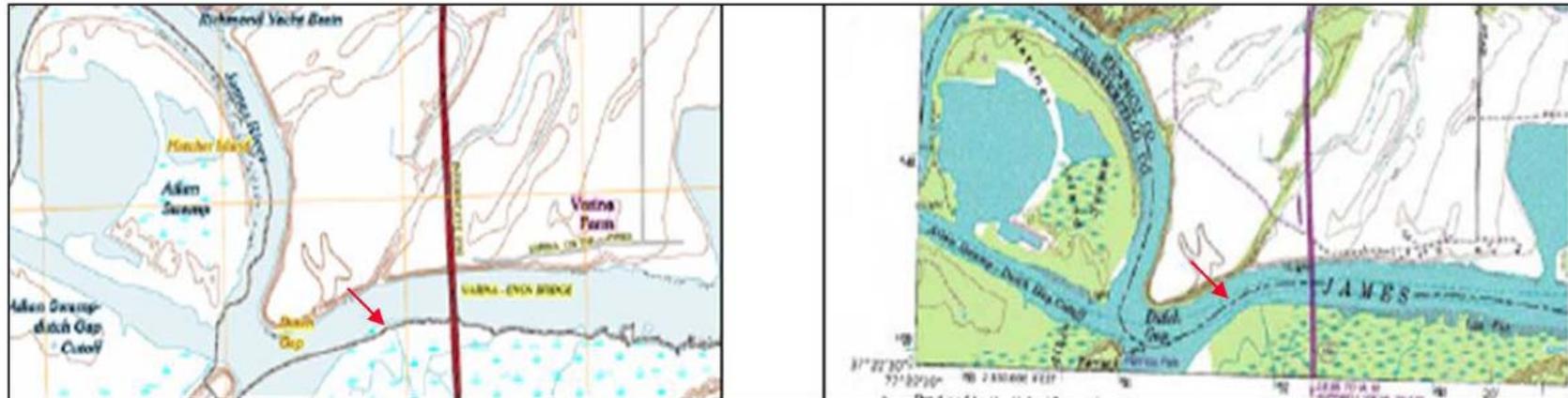
- *The National Map as a geospatial base data framework for the Nation.*
- *Consumers of these geospatial services will use nationally consistent base data with their own services to create products like*
 - *disaster response maps,*
 - *task orders,*
 - *trail maps*
 - *mortgage foreclosure forecast maps*
 - *flood inundation maps,*
 - *resource management plans*
 - *census field maps*
 - *topographic maps*
- *The participation of State, Federal, and private sector partners will be critical to the successful creation of unified services that span the levels of government and use that is envisioned.*

Maps are a bad source of data

Boundaries don't align



14 The National Map Customer Requirements: Findings from Interviews and Surveys

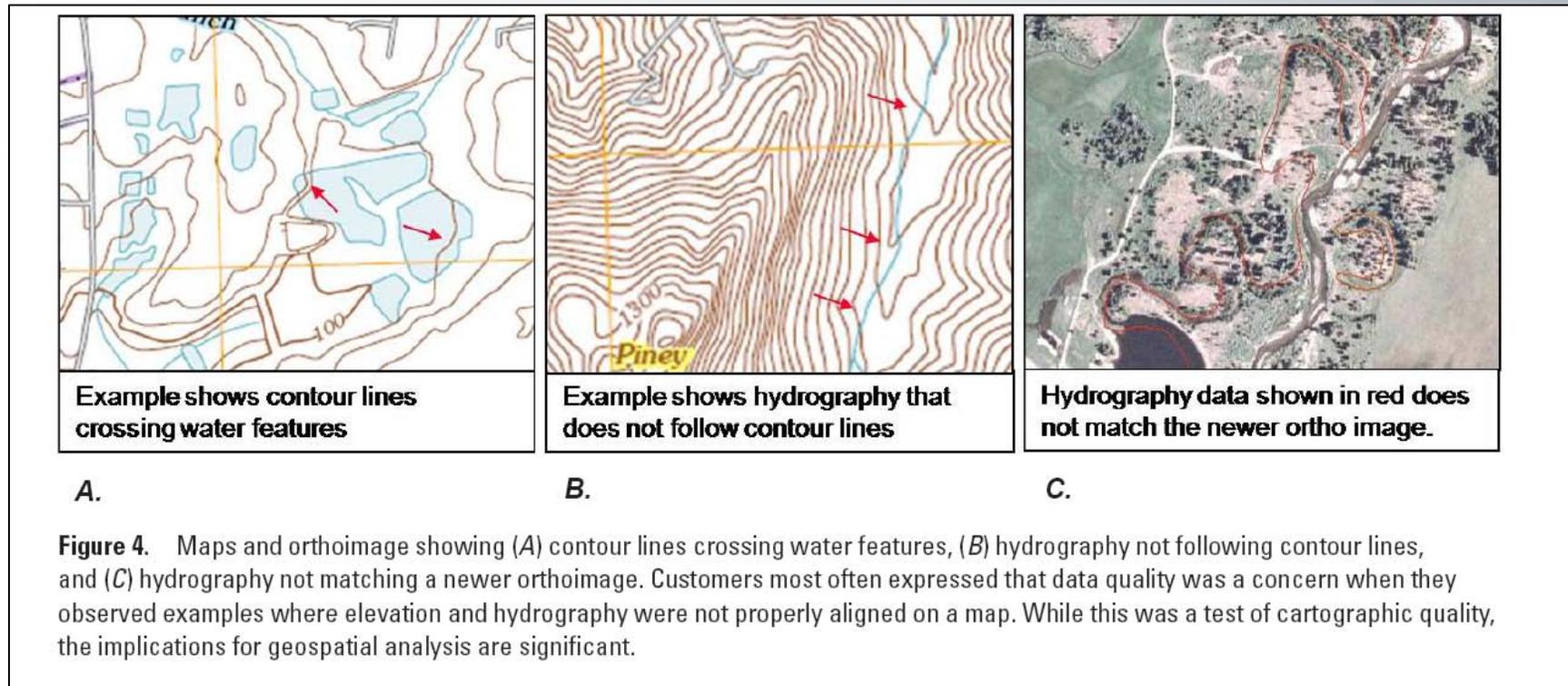
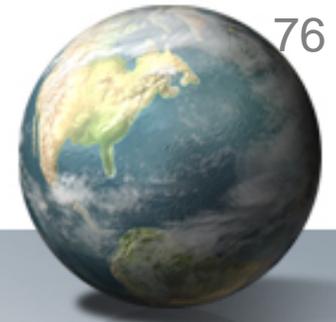


Example of a county boundary in different places from two data sources

Figure 3. Maps depicting a county boundary in two locations from different sources. Customers expressed the lowest level of acceptance for boundary errors when presented with a number of scenarios.

Maps are a bad source of data

Water doesn't follow contours



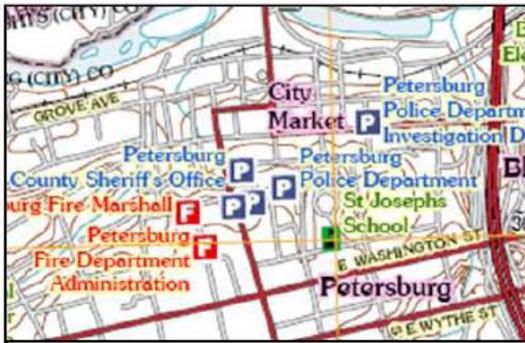
Maps are a bad source of data

Not current, Labels, Misalignment



Example of contour lines that were not updated to show the road cuts

A.



Names are "over posting" other cartographic features in this example

B.



Shoreline data in red does not align with the orthoimage shoreline

C.

Figure 5. Maps and orthoimage showing (A) contour lines that were not updated to show roadcuts, (B) names over posting other features, and (C) shoreline data that do not align with the orthoimage shoreline. Customers were more tolerant of contours that have not been updated for a transportation feature cut and fill when compared to contour and hydrography conflicts. Cartographic over posting and shorelines that do not match an orthoimage were more acceptable than other kinds of errors.

Survey - customer requirements



- Nationally consistent geospatial data
- Quality-assured and integrated geospatial data
- Frequency of update
- Geospatial data delivery services
- Analytical service support through enhanced data models and other features
- Published (digital) map products

What do users say?

Performance, User Interface, Download, Feature Services,

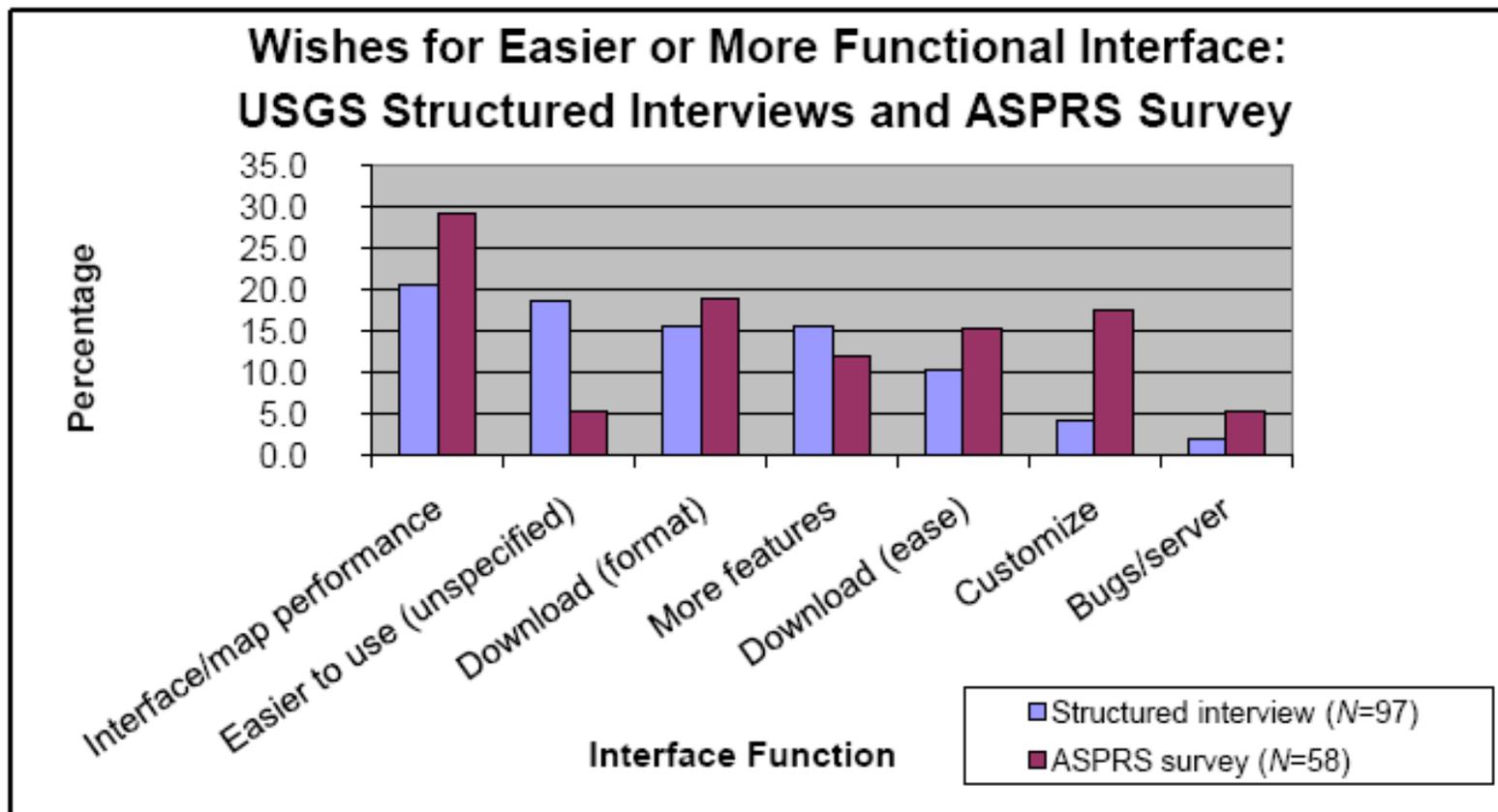


Figure 17. Wishes for easier or more functional interface. Source: USGS interview question 16, ASPRS survey question 12.4.

Users love Google Don't like National Map



Table 14. Customer ratings of Web services relative to their business requirements.

[The viewer for the National Atlas of the United States® targets a consumer audience and has received high ratings from those groups. Commercial services were preferred by customers primarily because of superior usability and performance. *N*, number of participant responses. Source: USGS interview question 24, ASPRS survey question 15.4]

Web services 5 - very important, 4 - quite important, 3 - somewhat important, 2 - not very important, 1 - do not use	Structured interviews		ASPRS survey	
	<i>N</i>	Mean	<i>N</i>	Mean
Google Maps/Google Earth, Microsoft TerraServer	143	3.81	191	3.76
State map viewer/services	143	3.38	189	3.56
County/city map viewers	144	3.24	191	3.43
Geographic Names Information System (GNIS)	105	3.01	194	2.76
USGS seamless server	137	3.00	209	3.52
Geospatial One-Stop	139	2.58	203	2.89
National Atlas of the United States®	141	2.53	202	2.85
<i>The National Map</i> viewer	139	2.40	186	2.91

Users want Imagery, Elevation, Hydro, transportation, and parcels

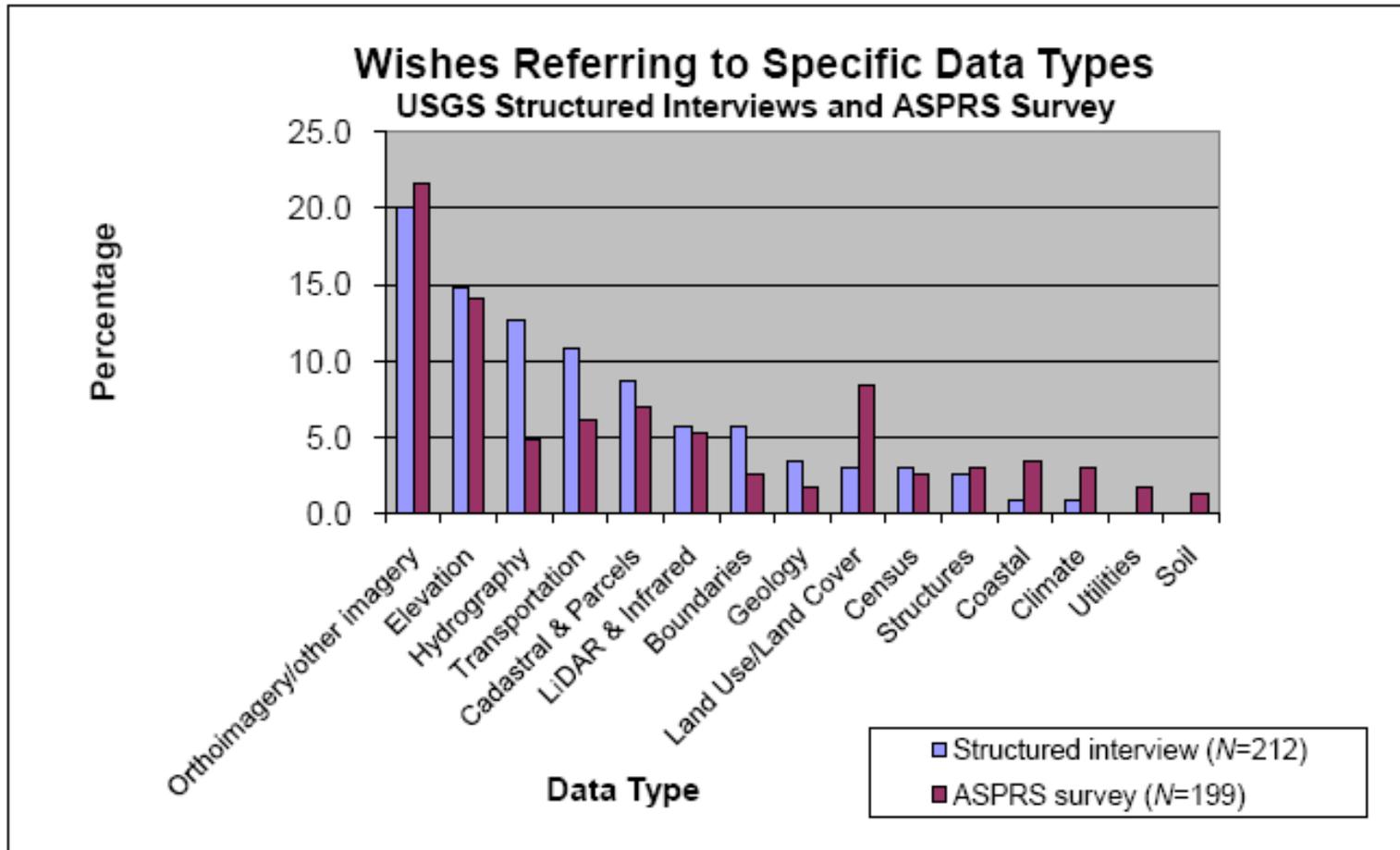
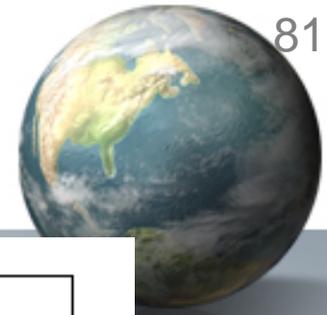
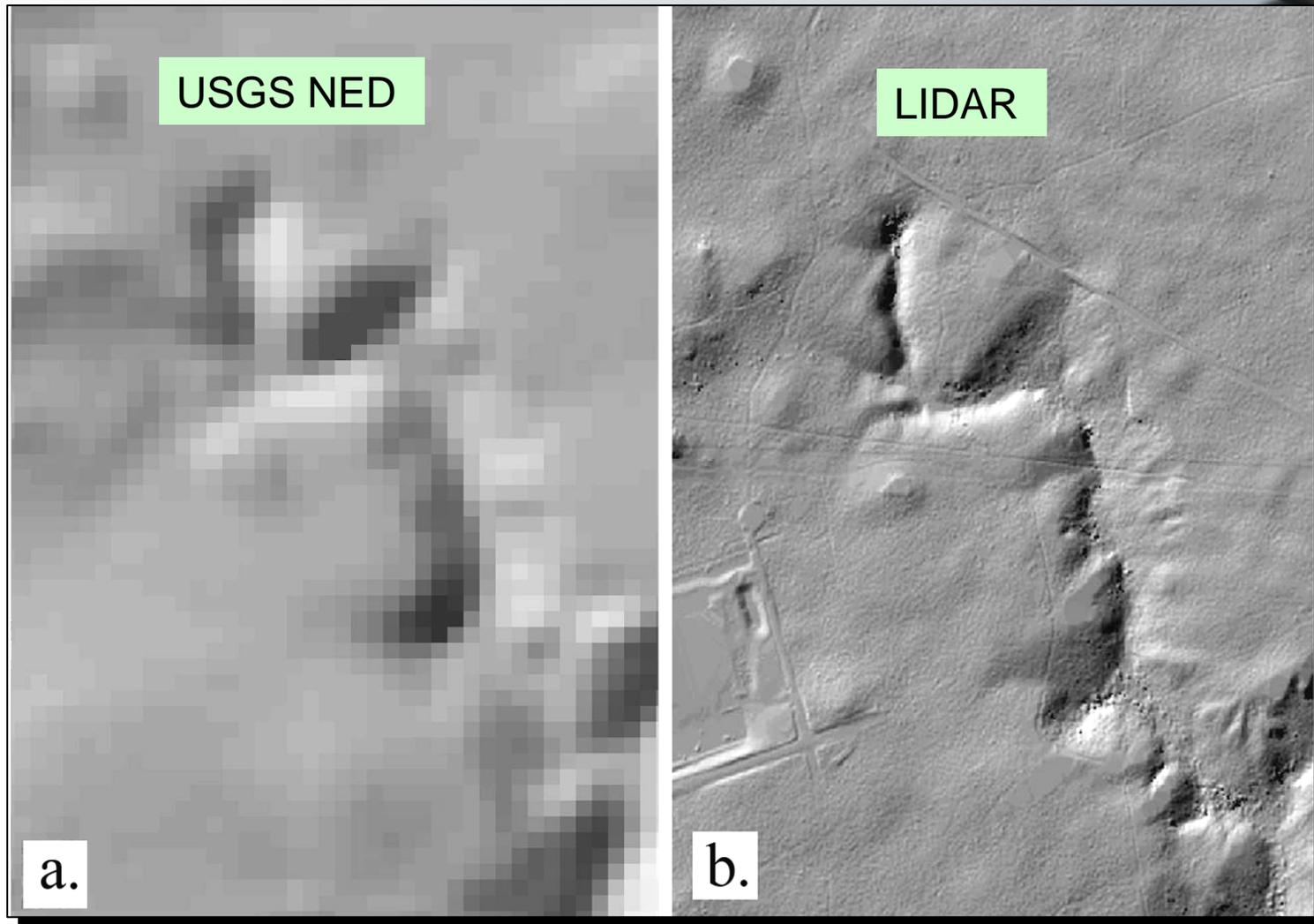
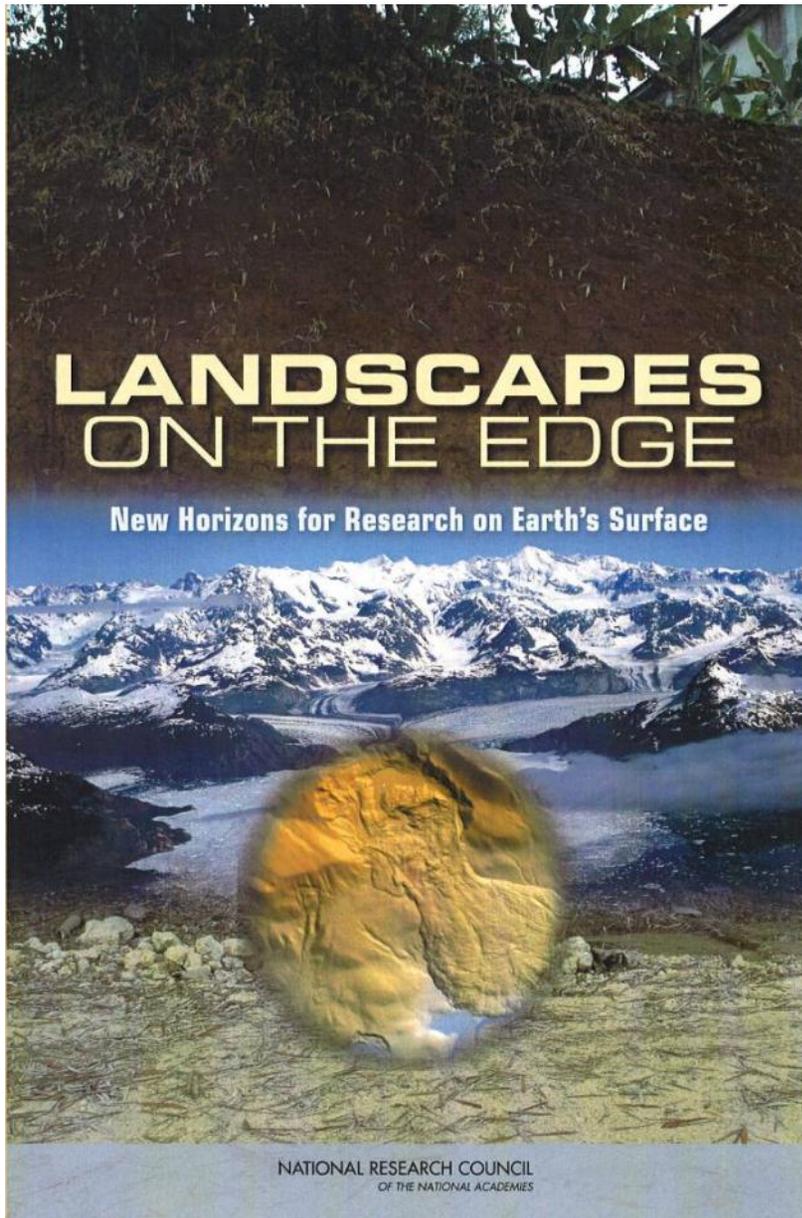


Figure 12. Wishes referring to specific data types. *N*, number of participant responses. Source: USGS interview question 16, ASPRS survey question 12.4.

Give us data appropriate for the task





Landscapes on the Edge: New Horizons for Research on Earth's Surface

Board on Earth Sciences and Resources
Division on Earth and Life Studies
National Research Council

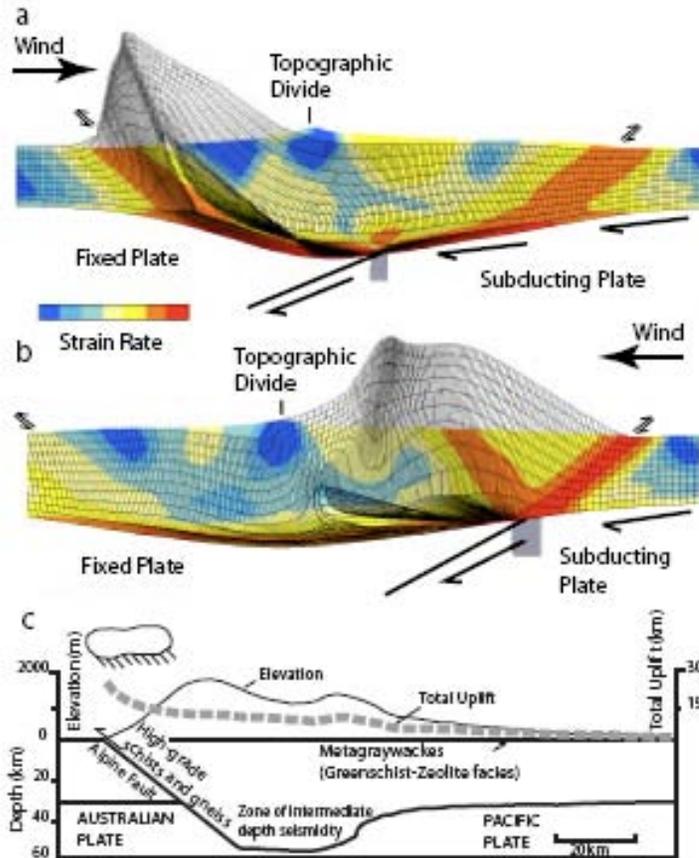
Conducted by Committee on Challenges and
Opportunities in Earth Surface Processes

Sponsor
National Science Foundation

November 16, 2009

Grand Challenge 3

How Do Landscapes Influence and Record Climate and Tectonics?



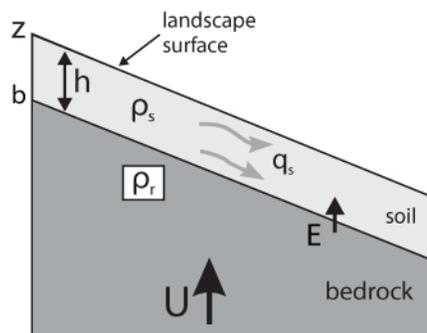
- Relatively recent recognition of broad connections among interacting processes of climate, tectonics, and landscapes
- Opportunities to quantify role of climate in surface processes, and interactions among mountain building, surface processes, sedimentation, mantle dynamics, and climate

The rate and pattern of erosion can influence the rate and spatial distribution of tectonic motions

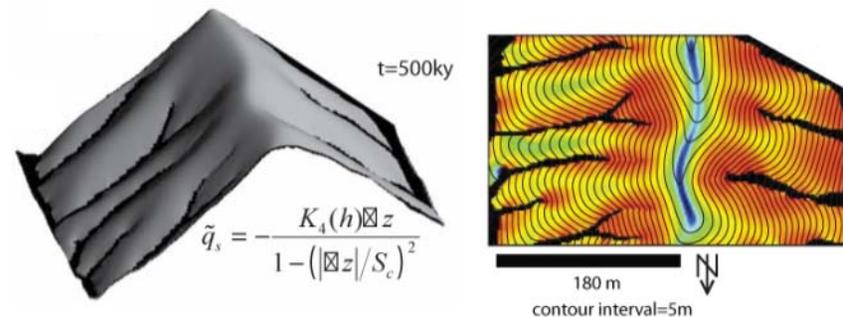
Grand Challenge 5

What Are the Transport Laws That Govern the Evolution of the Earth's Surface?

- We are discovering the governing equations for transport of material on Earth's surface
- Mathematical laws describing fundamental processes such as landsliding, glacial erosion, chemical erosion, etc. are needed to advance beyond observation/correlation
- Quantitative and process-based (mechanistic) understanding of links among climate, hydrology, geology, biota, land use, topography, and erosion/deposition remains a challenge



Hillslope profile, soil formation and transport

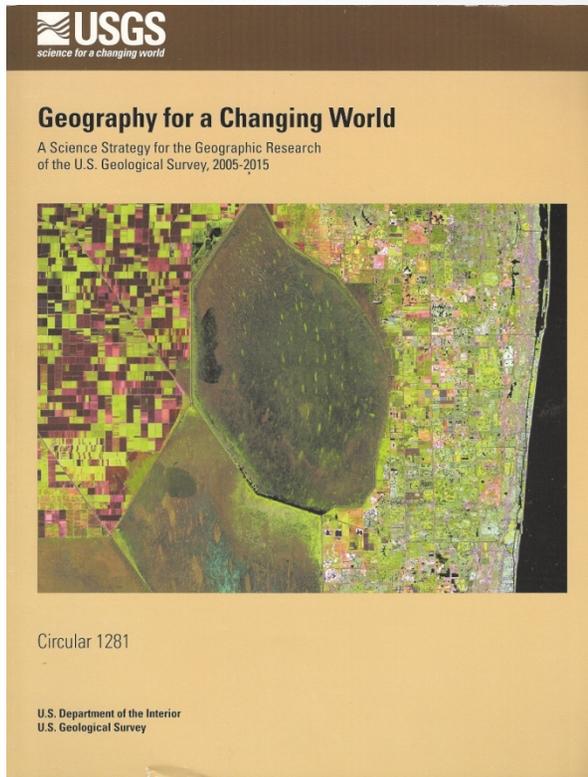


Simulated topography (left) and spatial variation of simulated soil depth (right) for a given transport model

7. How should you be evaluated ?



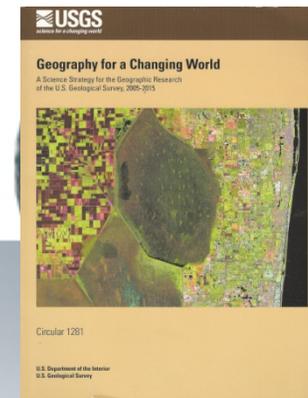
USGS 2005 – Geography for a Changing World



Goal 8: Provide timely, intelligent access to new and archived USGS geographic data needed to conduct science and support policy decisions.....

Goal 9: Develop innovative methods of modeling and information synthesis, fusion, and visualization to improve our ability to explore geographic data and create new knowledge

Vision ... By 2015



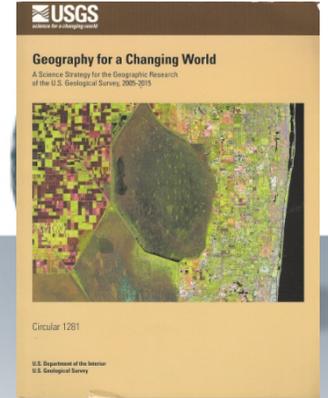
- *.. a host of consumer items will have integrated spatial data into their operations by taking advantage of wireless communications technology, mobile and portable computing devices, global positioning systems (GPS)*
- *The National Map will become the preferred gateway for popular access into geographical data for everyday tasks.*
- *The National Map's goal of 7-day update will be achieved, meaning that data are timely and accurate.*

Vision Continued



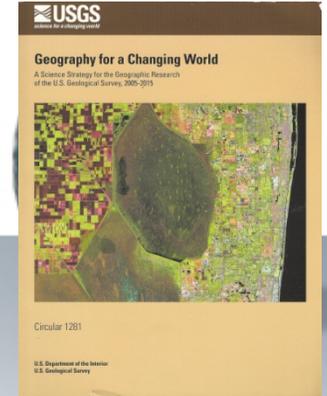
- *This will be possible because automated software agents will have “data” data sources, seeking out changes on the Earth surface and extracting new map information with only minimal human intervention.*
- *This timeliness will lead to myriads of new applications in real estate, emergency management, policing, environmental management, and commerce*

Performance Measures:



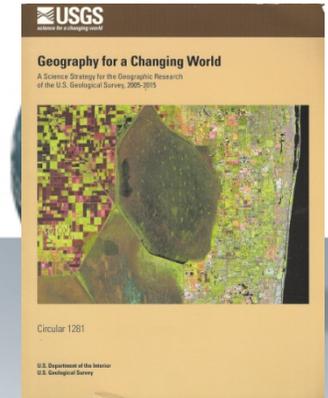
- Establish a single Web point-of-access to the data in *The National Map* and other Federal environmental data (*within 1 year*).
- Develop an ongoing user needs assessment methodology for *The National Map* (*within 1 year*).

Performance Measures:



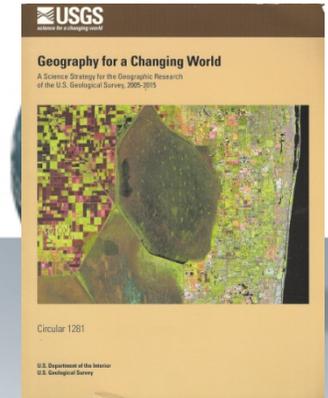
- An operational data-management protocol is established to manage and access information from continental- and global-scale databases, using geographic data mining techniques (*within 2 years*).
- Create tools for error detection and elimination, and for automated updates of core base data sets (*within 2 years*).
- Multiple resolution data integration methodology is developed (*within 3 years*).

More Performance Measures



- Appropriate representation and symbolization are developed for multiple-scale display of data that are a part of *The National Map* and other USGS products (*within 4 years*).
- Complete ontology of features, attributes, and relations for all layers in *The National Map* at all possible resolutions (*within 5 years*).

More Performance Measures



- Develop appropriate representation and symbolization methods for multiple-scale display of data that are a part of *The National Map* and other USGS products (*within 5 years*).
- Develop methods to automatically generate maps at any scale from *The National Map* (*within 7 years*).

8. *The institutional setting*



FGDC Mission or Lip service ?



“Building a viable NSDI to serve the needs of all levels of government and the private sector requires a solid foundation that is strategic, deliberate, and assembled in discrete, manageable units.”



OMB Circular A- 16

GAO

United States General Accounting Office
Report to Congressional Requesters

June 2004

GEOSPATIAL INFORMATION

Better Coordination
Needed to Identify and
Reduce Duplicative
Investments

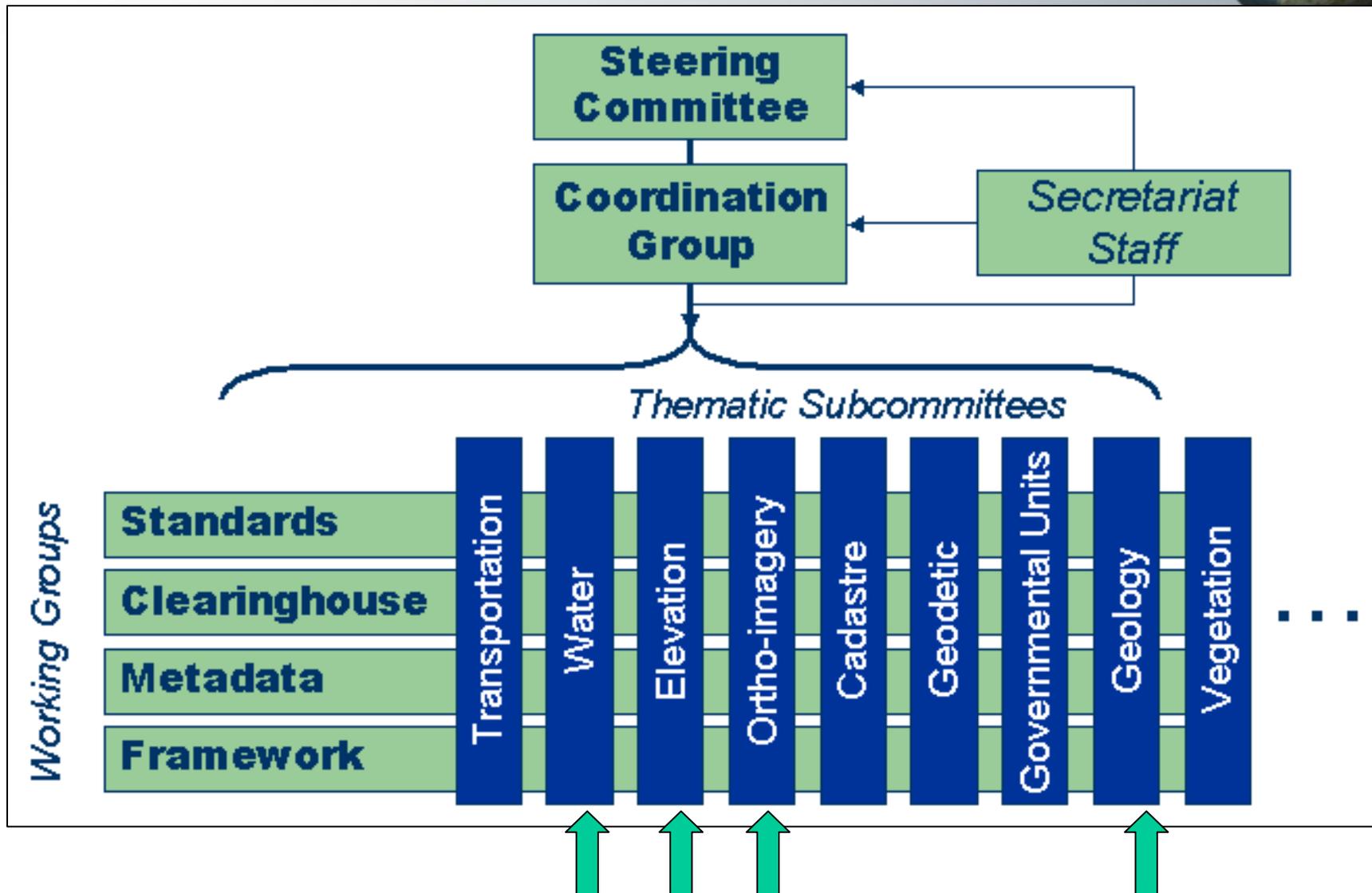
A-16 Same as User Survey Orthoimagery / Earth Cover Elevation & Hydrology



Framework ?

Digital orthoimagery	Georeferenced images of the Earth's surface, where image object displacement has been removed for sensor distortions, orientation, and terrain relief.	DOI/USGS	Yes
Earth cover	The Earth Cover theme uses a hierarchical classification system based on observable form and structure, instead of function or use. This system transitions from generalized to more specific and detailed class divisions, and provides a framework within which multiple land cover and land use classification systems can be cross-referenced. This system is applicable everywhere on the surface of the Earth. This theme differs from the vegetation and wetlands themes, which provide additional detail.	DOI/USGS	No
Elevation terrestrial	Georeferenced digital representations of terrestrial surfaces, natural or manmade, that describe vertical position above or below a datum surface.	DOI/USGS	Yes
Hydrography	Includes surface water features such as lakes, ponds, streams and rivers, canals, oceans, and coastlines.	DOI/USGS	Yes

FGDC Organization



1994 – Executive order 12906

Why Don't Deadlines Matter ?



COORDINATING GEOGRAPHIC DATA ACQUISITION AND ACCESS: THE NATIONAL SPATIAL DATA INFRASTRUCTURE

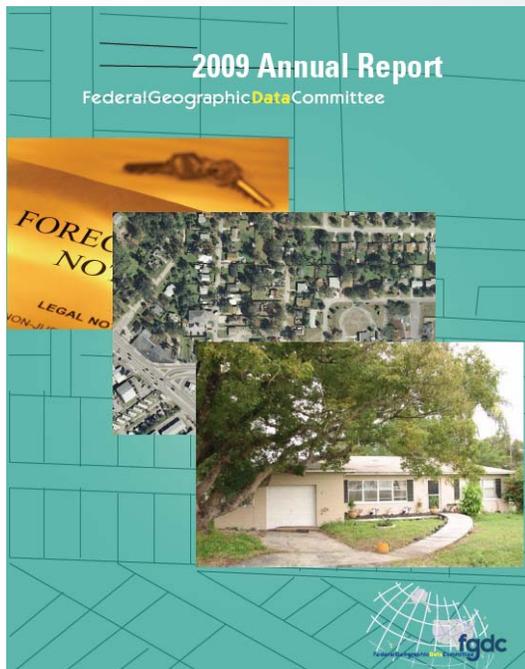
Sec. 3. Development of a National Geospatial Data Clearinghouse. (a) Establishing a National Geospatial Data Clearinghouse. The Secretary, through the FGDC, and in consultation with, as appropriate, State, local, and tribal governments and other affected parties, shall take steps within 6 months of the date of this order, to establish an electronic National Geospatial Data Clearinghouse ("Clearinghouse") for the NSDI. The Clearinghouse shall be compatible with the National Information Infrastructure to enable integration with that effort.

Sec. 5. National Digital Geospatial Data Framework. In consultation with State, local, and tribal governments and within 9 months of the date of this order, the FGDC shall submit a plan and schedule to OMB for completing the initial implementation of a national digital geospatial data framework ("framework") by January 2000 and for establishing a process of ongoing data maintenance. The framework shall include geospatial data that are significant, in the determination of the FGDC, to a broad variety of users within any geographic area or nationwide. At a minimum, the plan shall address how the initial transportation, hydrology, and boundary elements of the framework might be completed by January 1998 in order to support the decennial census of 2000.

9. What about parcels?

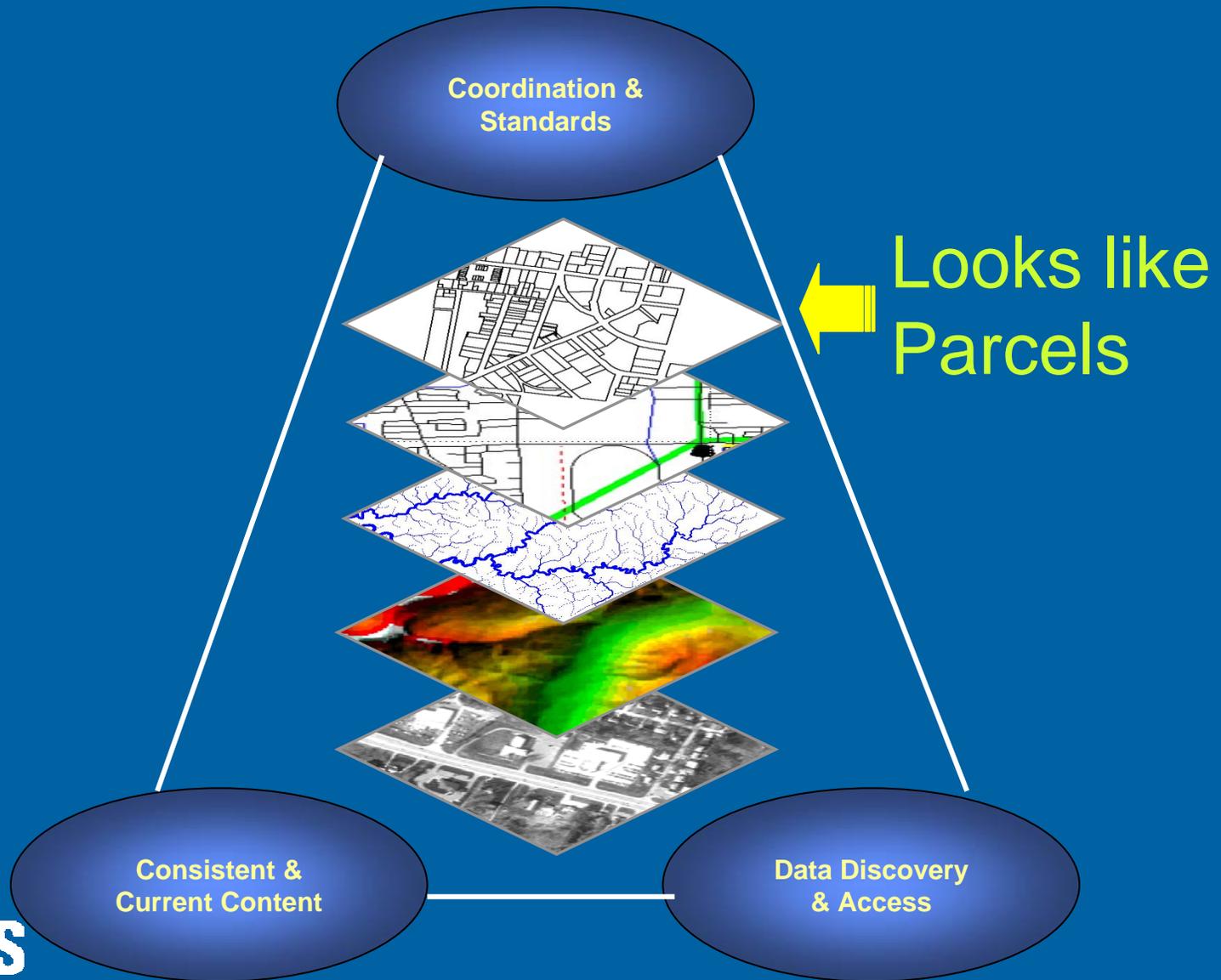


FGDC – 2009 Annual Report



- Message from the FGDC Chair
- Land parcel data combined with other geographic information are *essential* to such functions as the management of emergency situations, development of domestic energy resources, management of private and public lands, support of business activities, and monitoring of regulatory compliance.
- The feature story of this year's report underscores the need for a coordinated system of land parcel information across the country.

Connecting the Components



N.C. / S.C. Parcels :NC One Map & USGS National Map it is possible!!!



nc ONE map
The National Map

NC OneMap Viewer Back to the Main Page The National Map Viewer

Zoom
Query
Tools
Docs

ncONEmap UserSurvey

Charlotte
Mecklenburg County
York County

Scale Information
Scale = 1:9,149

Layers
Location-Geodetic
Structures
Transportation
NC OneMap - Bridge
NC OneMap - Airp
Mecklenburg Co, N
Streets
Classification for
Mecklenburg Co, N
Streets
York Co, SC - Stre
Principal_Arterie
Principal_Arterie
Principal_Arterie
Major_Arterial
Minor_Arterial
Major_Collector
Railroad
Minor_Collector
Local_Streets
NC DOT - Road Na
NC DOT - Roads
NC OneMap - Rail
National Atlas and
Road Labels
National Atlas and
Roads
Limited Access
Principal Highway
Other Highway
Other Roads
Ferry
Light Duty Road
Primary Highway

- Zoom in for higher resolution data -
Participating local governments outlined in orange

U.S. Department of the Interior || U.S. Geological Survey || EROS Data Center
URL: <http://gisdata.usgs.net/website/NC%5FOneMap/> || Maintainer: webmapping@usgs.gov || Modified: June 28, 2004



Better Marketing?

Dijon France: Institut Géographique National



Summary



- Be proud of the past accomplishments
- Thanks for giving me a career
- You have responded to user needs
- Remember
 - Data are like milk
 - Stick to your mission
 - Act like Google
 - Embrace public/private partnerships
 - Pay attention to performance measures
 - Users vote with a click of a mouse