United States Department of Agriculture
Natural Resources Conservation Service

National Geospatial Management Center …. Moving into the Future

2011 National Cooperative Soil Survey Conference (Asheville NC)

May 23, 2011

Sam Brown, Soil Scientist

"Web Services to support Soil Survey Program "

National Geospatial Management Center (NGMC)

National Geospatial Management Center (NMGC)

Mission

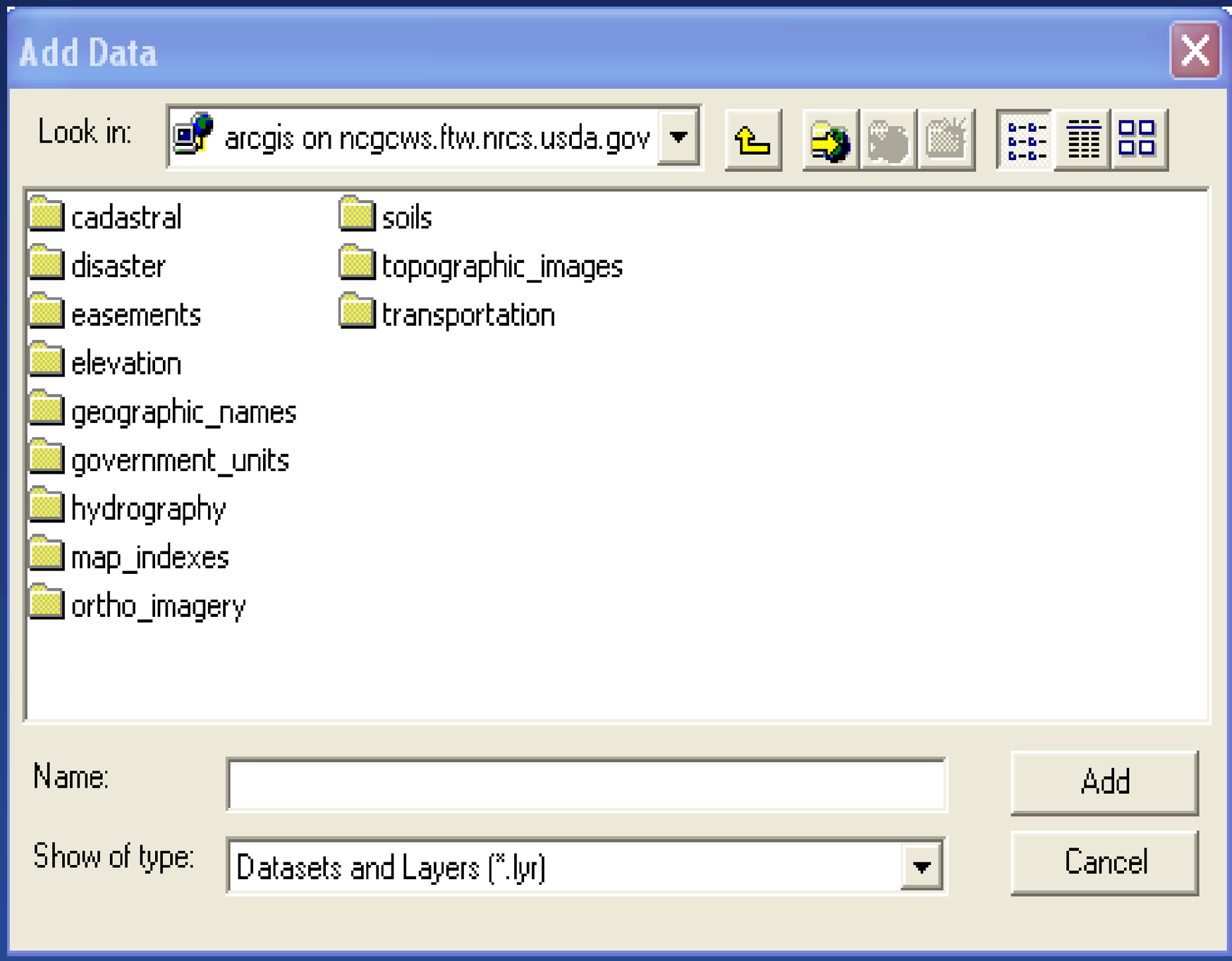
To provide consumers with accessible, always available, up-to-date, authoritative, and trusted geospatial data and value-added cartography and geospatial services:

Key Services

- Mapping sciences (cartography, GIS, remote sensing, PNT technology)
- Aerial photography, elevation data, imagery, remote sensing, global positioning systems, training, and **Web Services (ArcMap and URL Internet access)**
- Natural resources data, geospatial technology, National Resources Inventory
- **Provide support for Soil Survey,** Engineering, Conservation Planning (CDSI), and Other agency programs
- Geospatial Data Warehousing & Distribution

Web Services

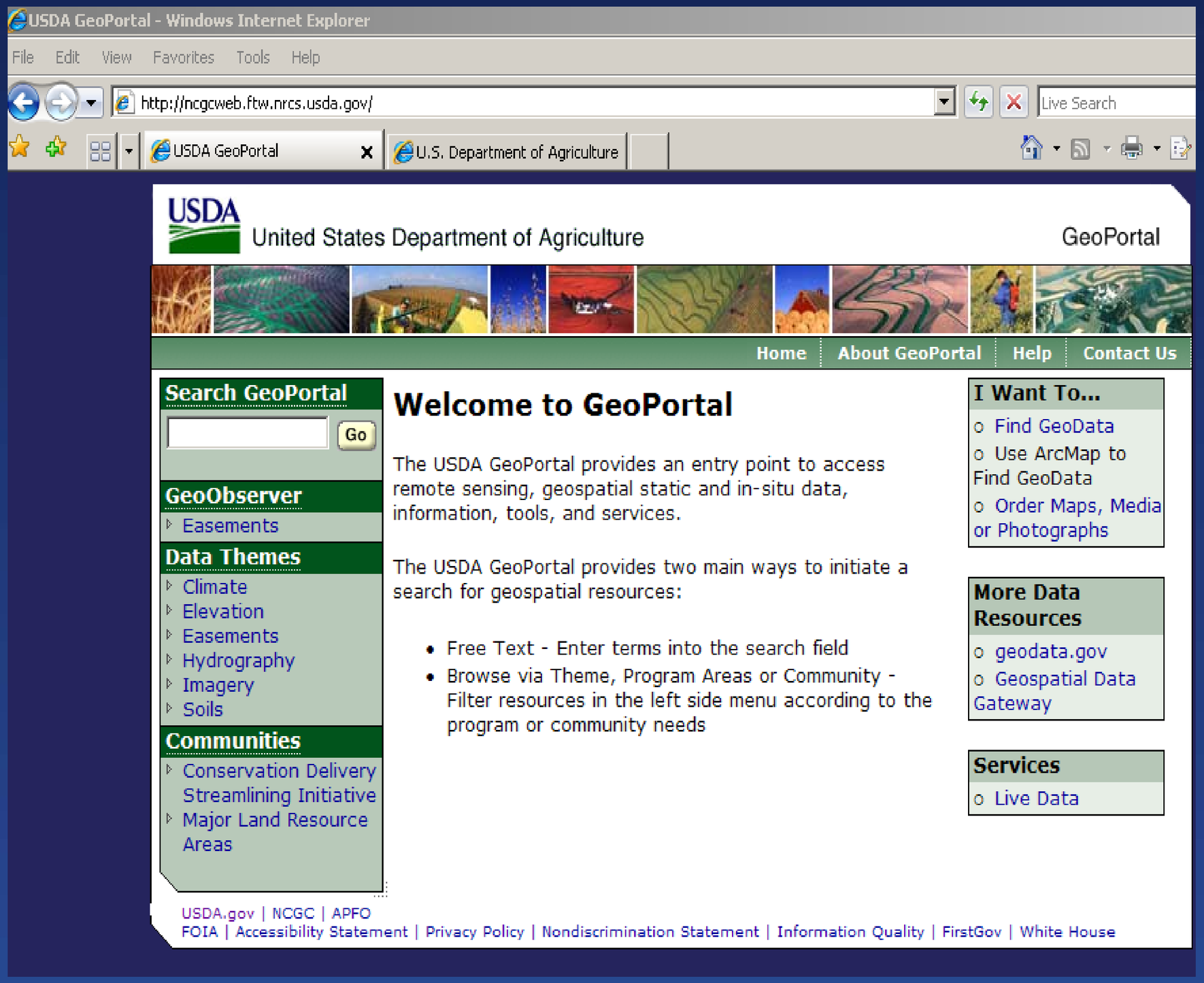
In 2007, NGMC (former NCGC) began to inventory our data themes and expand the availability for increased NRCS programs use



http://ncgcweb.ftw.nrcs.usda.gov/

"GeoPortal"

The GeoPortal provides access to NRCS Web Services



Registry of Web Services – USDA GeoPortal

Access to more than 50 Web Services

Step One, Log on to:

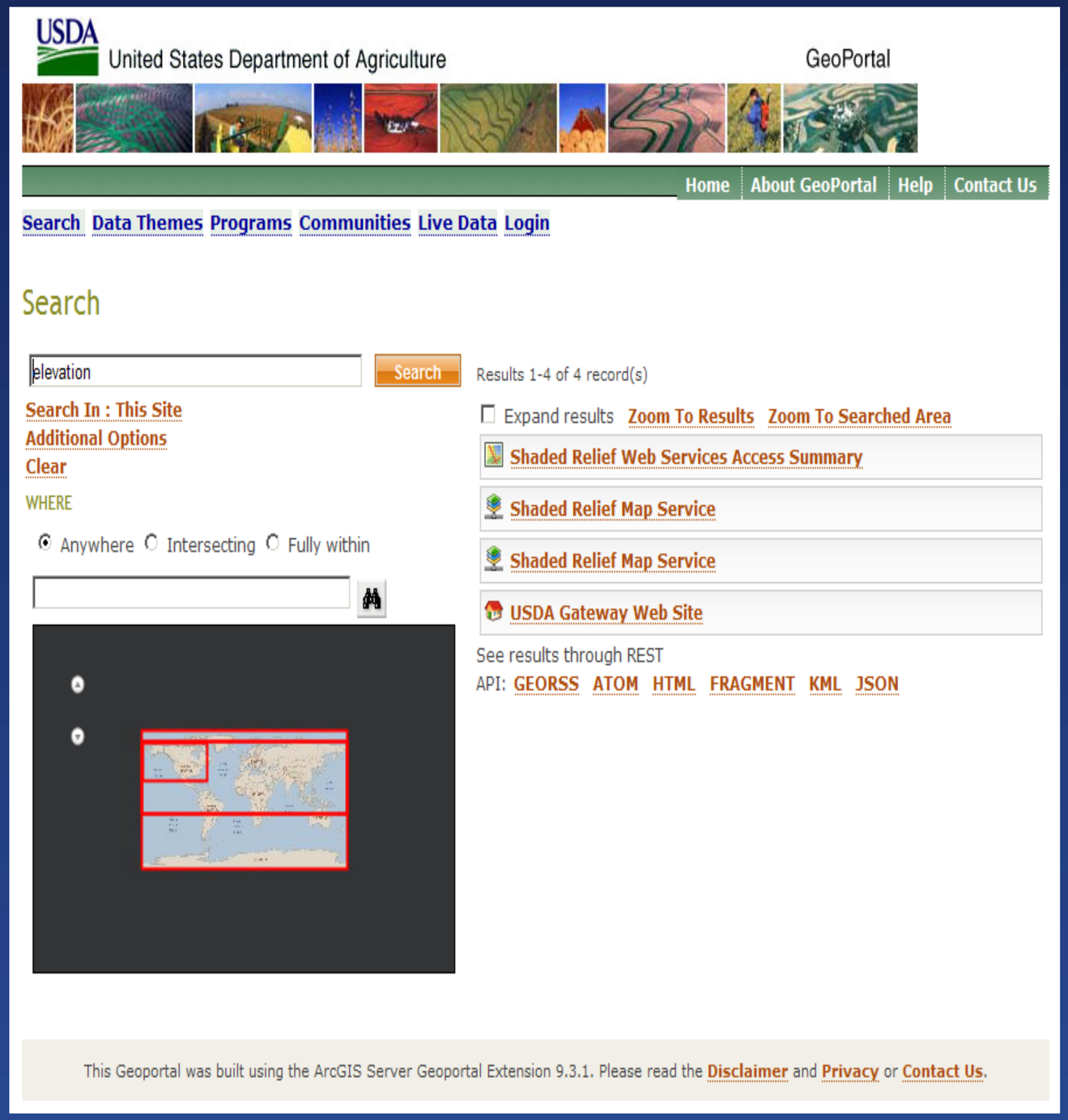
http://ncgcweb.ftw.nrcs.usda.gov/

Step Two,
In the Search GeoPortal window enter a data theme, Example: "Elevation," and Click the Go Button!

Registry of Web Services – USDA GeoPortal

Step Three

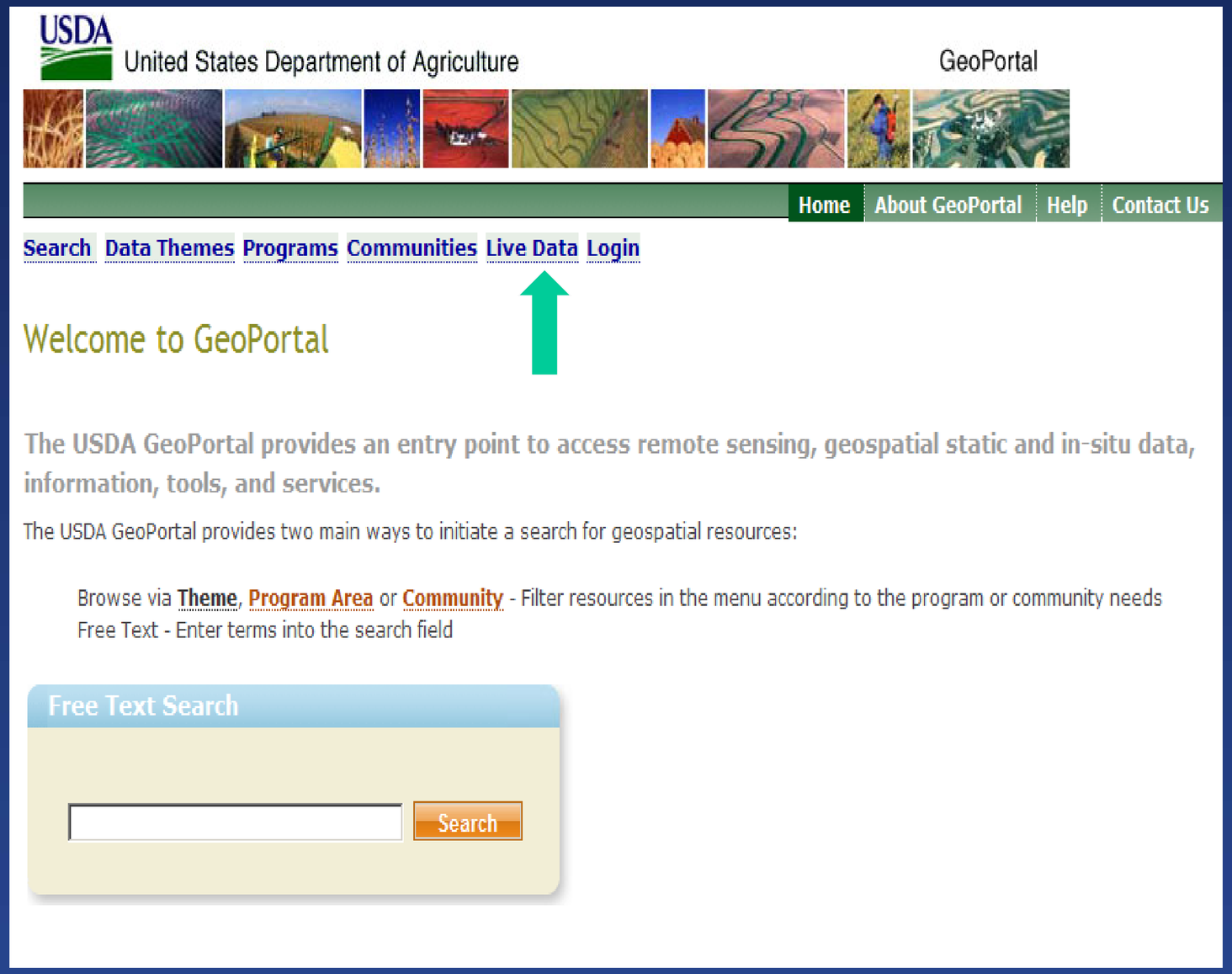
On the menu bar
Click on "**Live Data**"



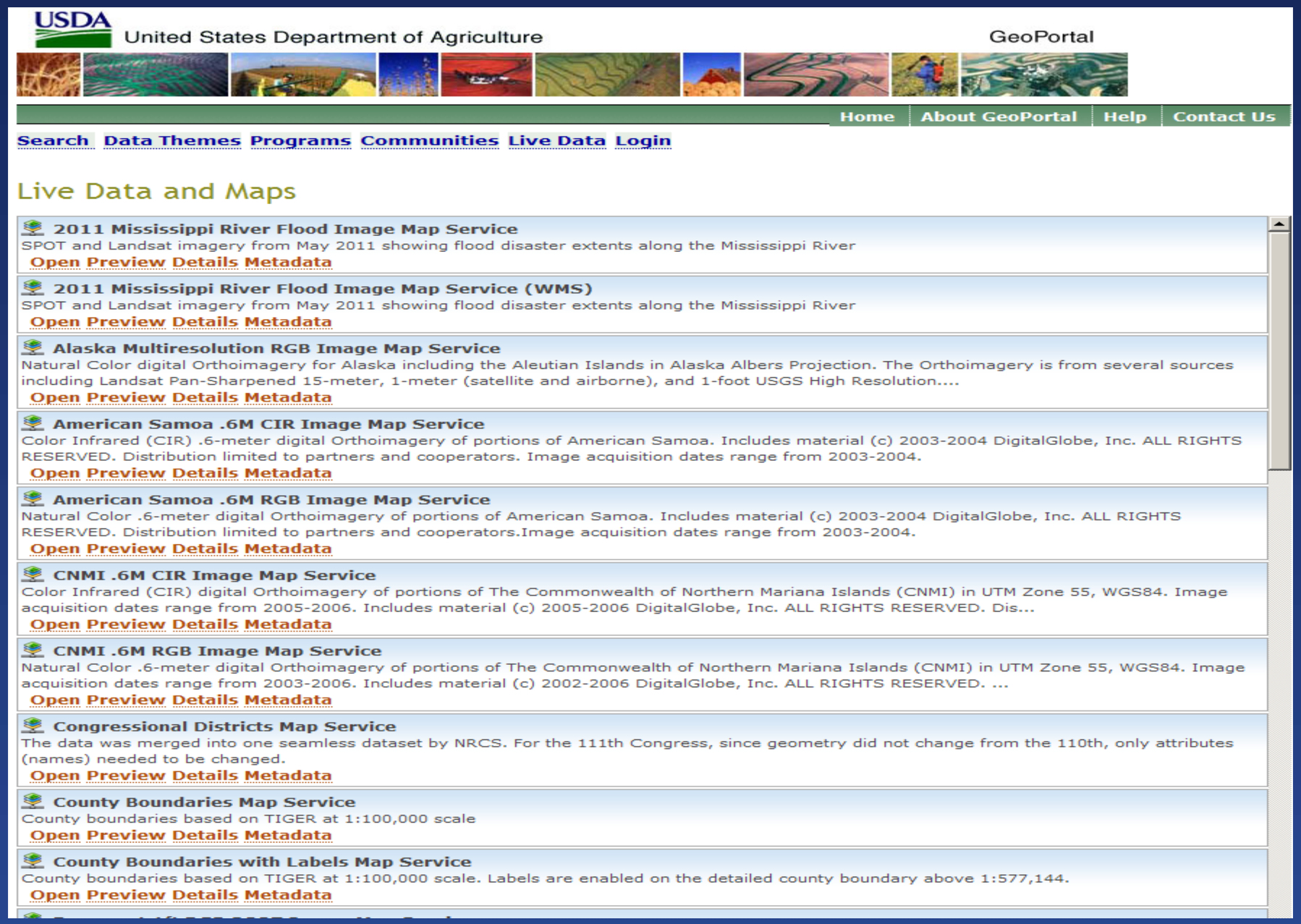
Registry of Web Services – USDA GeoPortal

Step Three

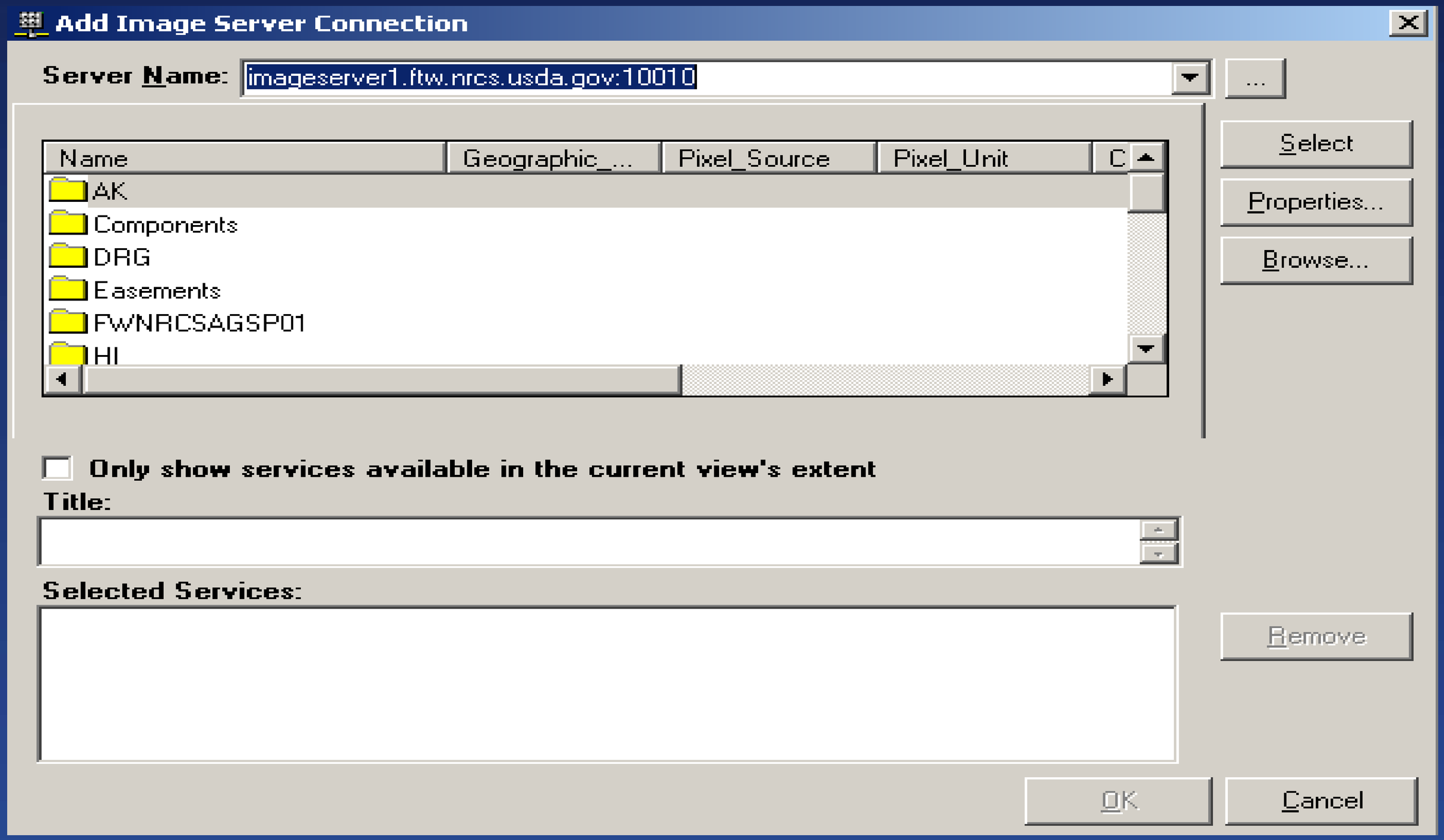
On the menu bar
Click on "**Live Data**"



Registry of Web Services – USDA GeoPortal



NGMC Image Server Web Services

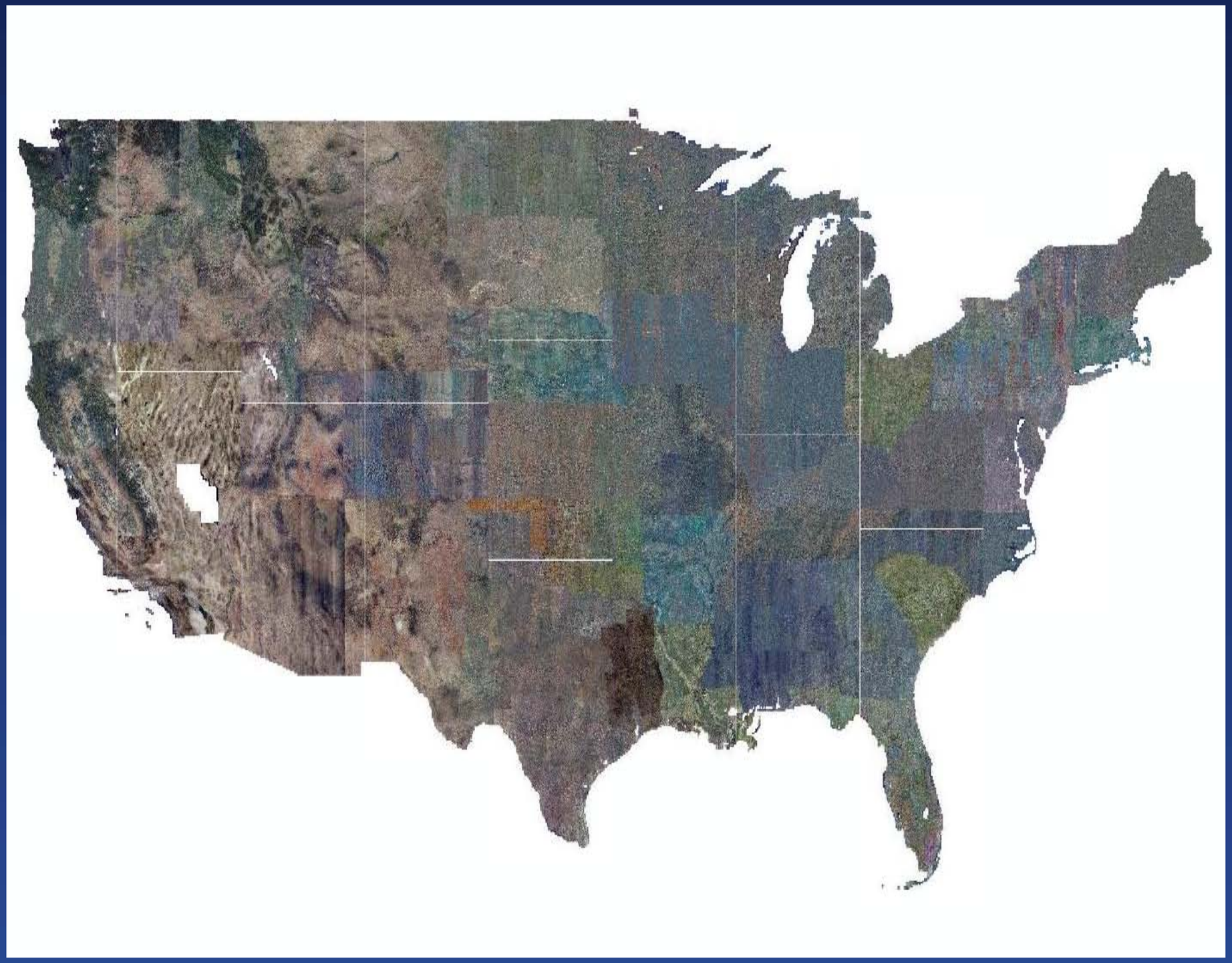


Current Image Service Connections (ArcMap)

Name	Geographic_...	Pixel_Source	Pixel_Unit	C
AK				
Components				
DRG				
Easements				
FWNRCSAGSP01				
HI				
IFSAR				
MSRiverFlood201105				
NAIP				
PacificBasin				
USA_HighRes				
WEB1				
WebSoilSurvey				
Landsat_321	USA, includin...	Landsat	False Color	U
Landsat_432	USA, includin...	Landsat	False Color	U
Landsat_453	USA, includin...	Landsat	False Color	U
MODIS	CONUS	MODIS	True Color	R
USA_Hillshade10m	USA mainland			G
USA_Hillshade_10m_USGS				G
USA_NLCD_2001	Conterminous ...	Landsat and ...	Color	R

2009 and 2010 NAIP IMAGERY

NGMC (former NCGC) began to serve NAIP imagery in 2007 as part our discovery business in order to provide an authoritative image base to assist NRCS program areas with visualization and area wide assessments.



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NAIP 2010, Northeast Minnesota

What ground features can you identify easier with CIR Imagery?

Natural Color (Bands 1,2,3) **Color Infrared/CIR (Bands 2,3,4)**

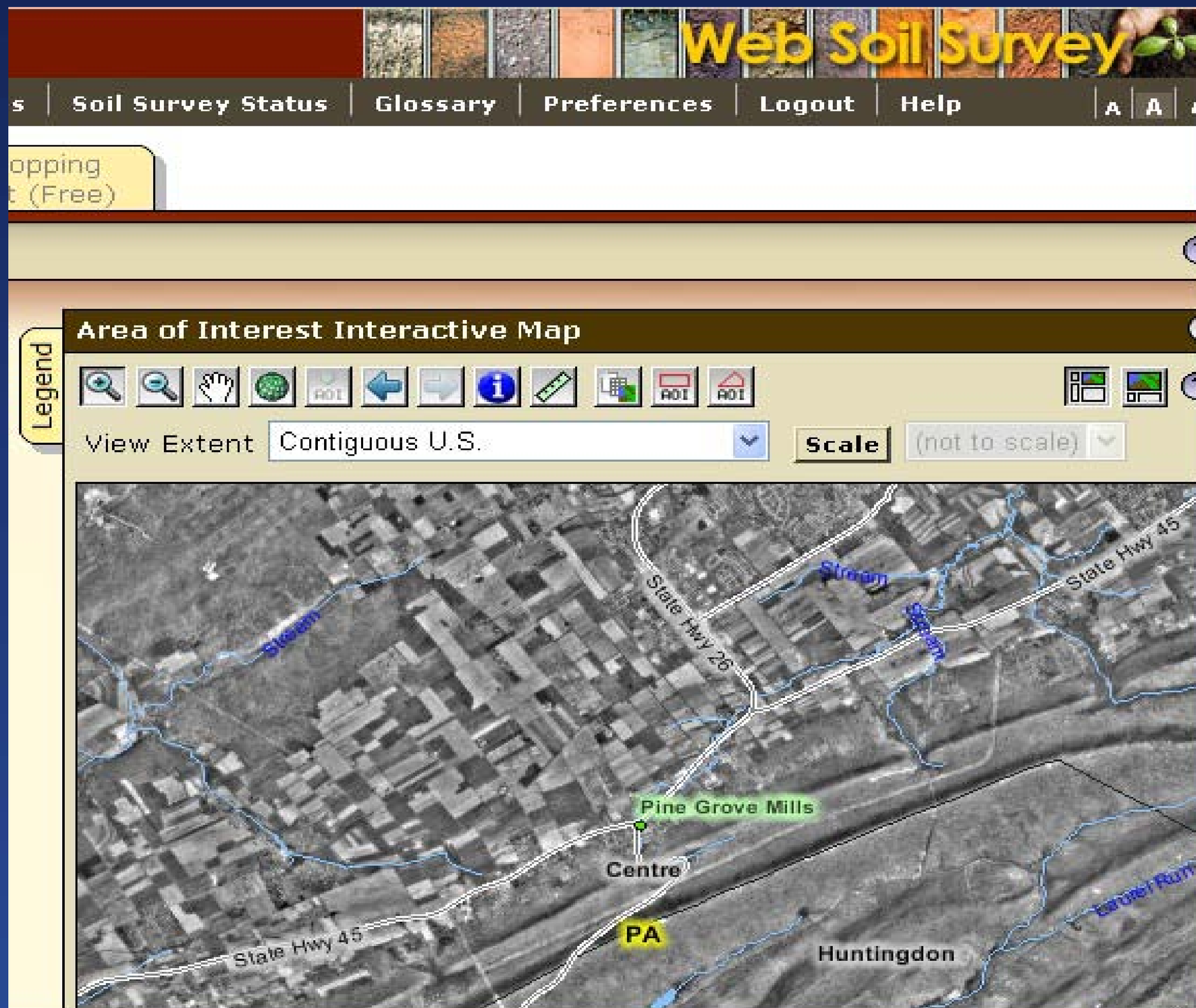
Ground Feature Type

1) Hydric Soil with Vegetation
2) Hydric Soil with Submerged Vegetation
3) Mixed Hardwood/Coniferous Forests
4) Hardwood Forest
5) Coniferous Forest

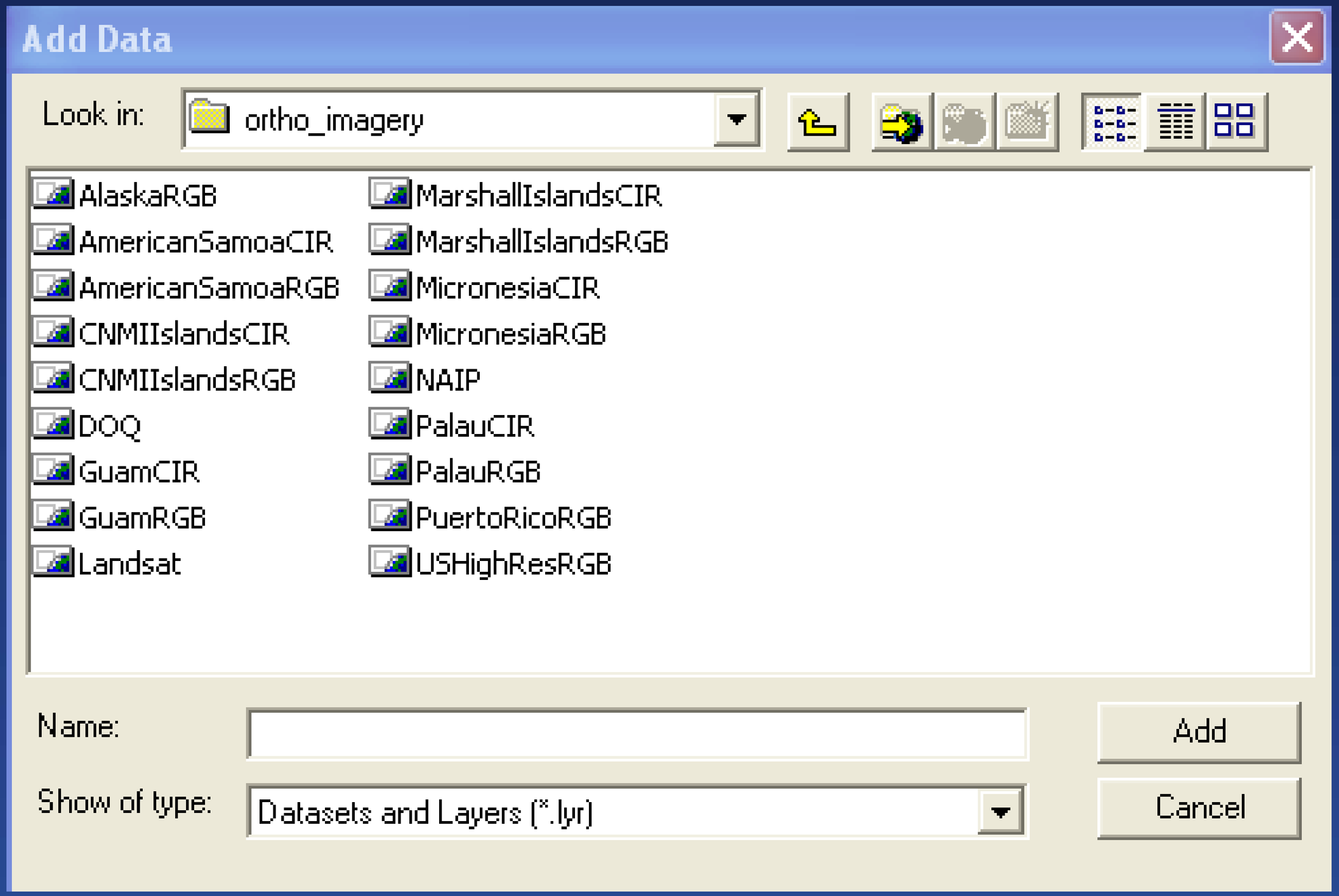
Web Soil Survey (WSS) Imagery

Some states only had black and white imagery on the WSS

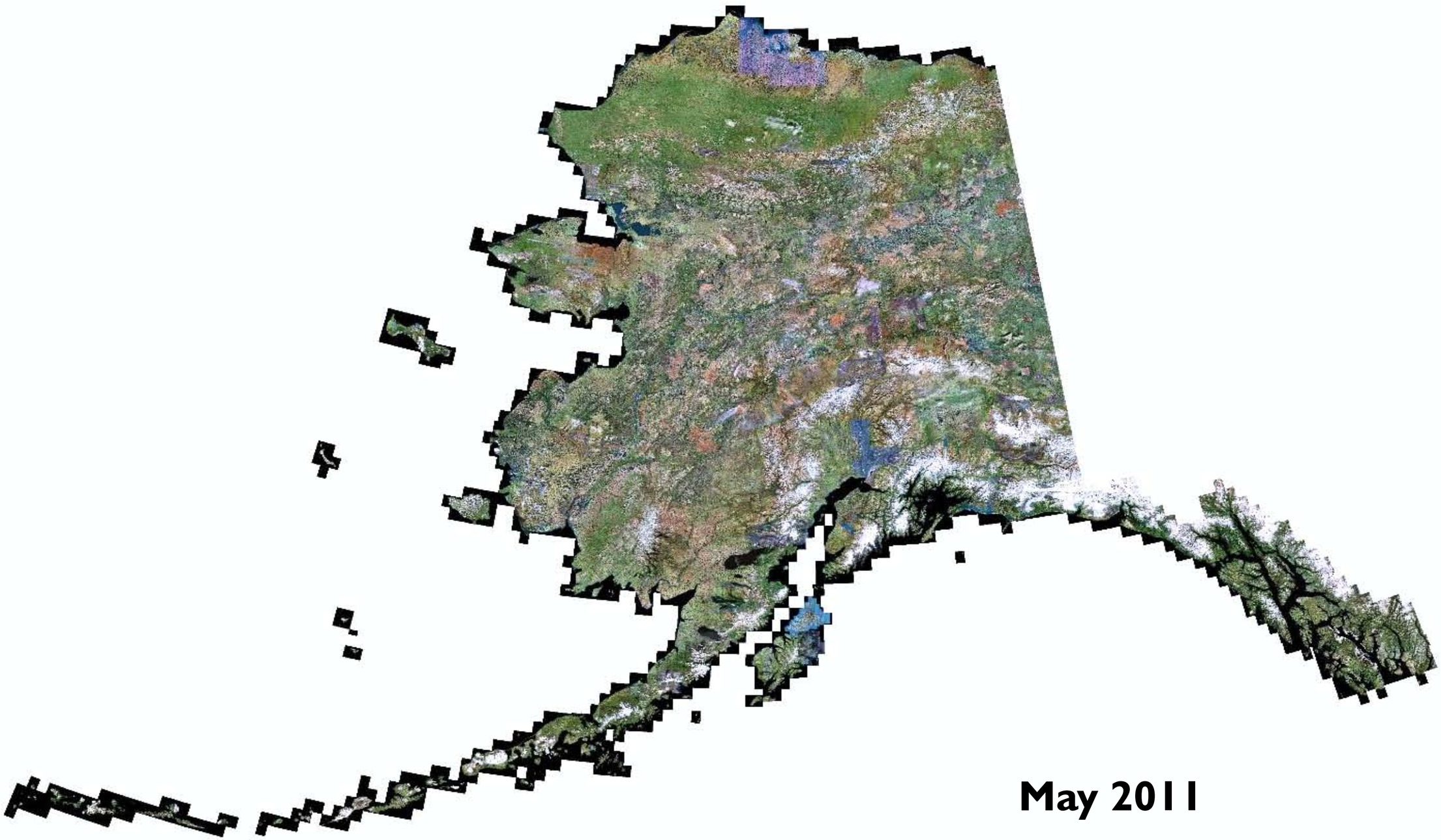
NCGC partnered with the SSD and ITC to use NAIP as the official the official back ground imagery for the Web Soil Survey



Web Services (Arc Map) to Support NRCS Imagery for Programs Use



Alaska Web Service



Puerto Rico and Virgin Islands Web Service

May 2011

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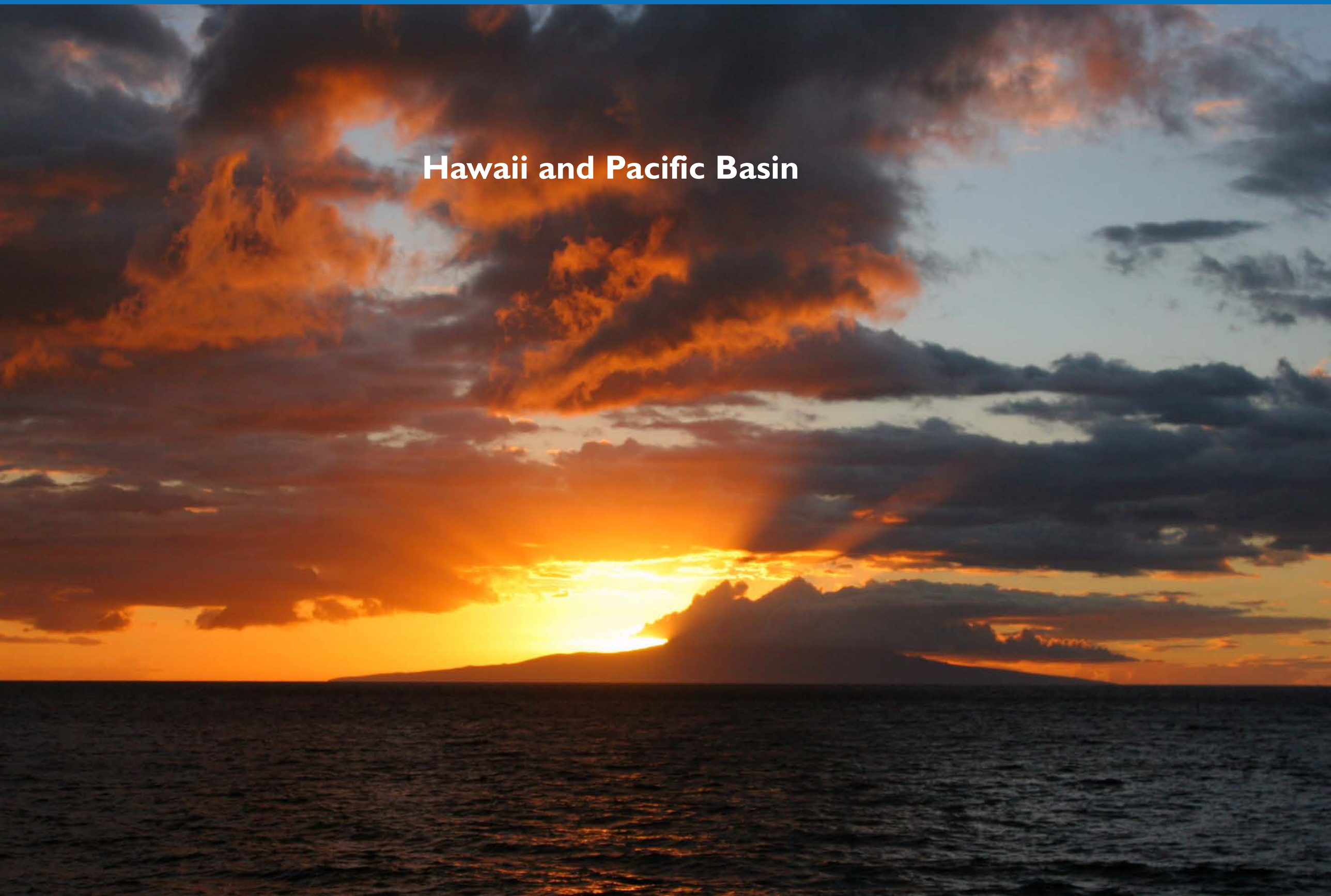
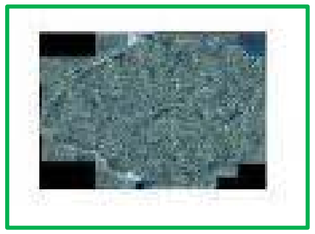
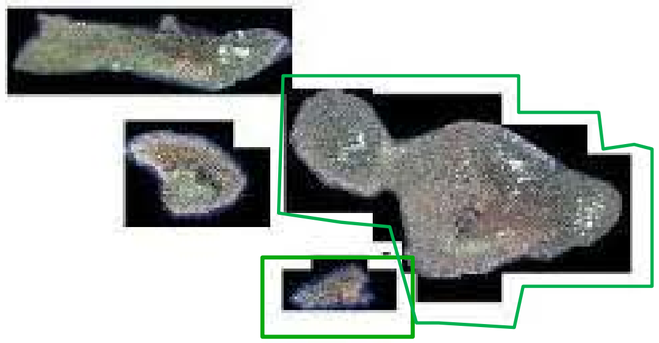


Hawaii and Pacific Basin

Hawaiian Islands Orthoimagery Status
DigitalGlobe WorldView-2 Status
April 2011

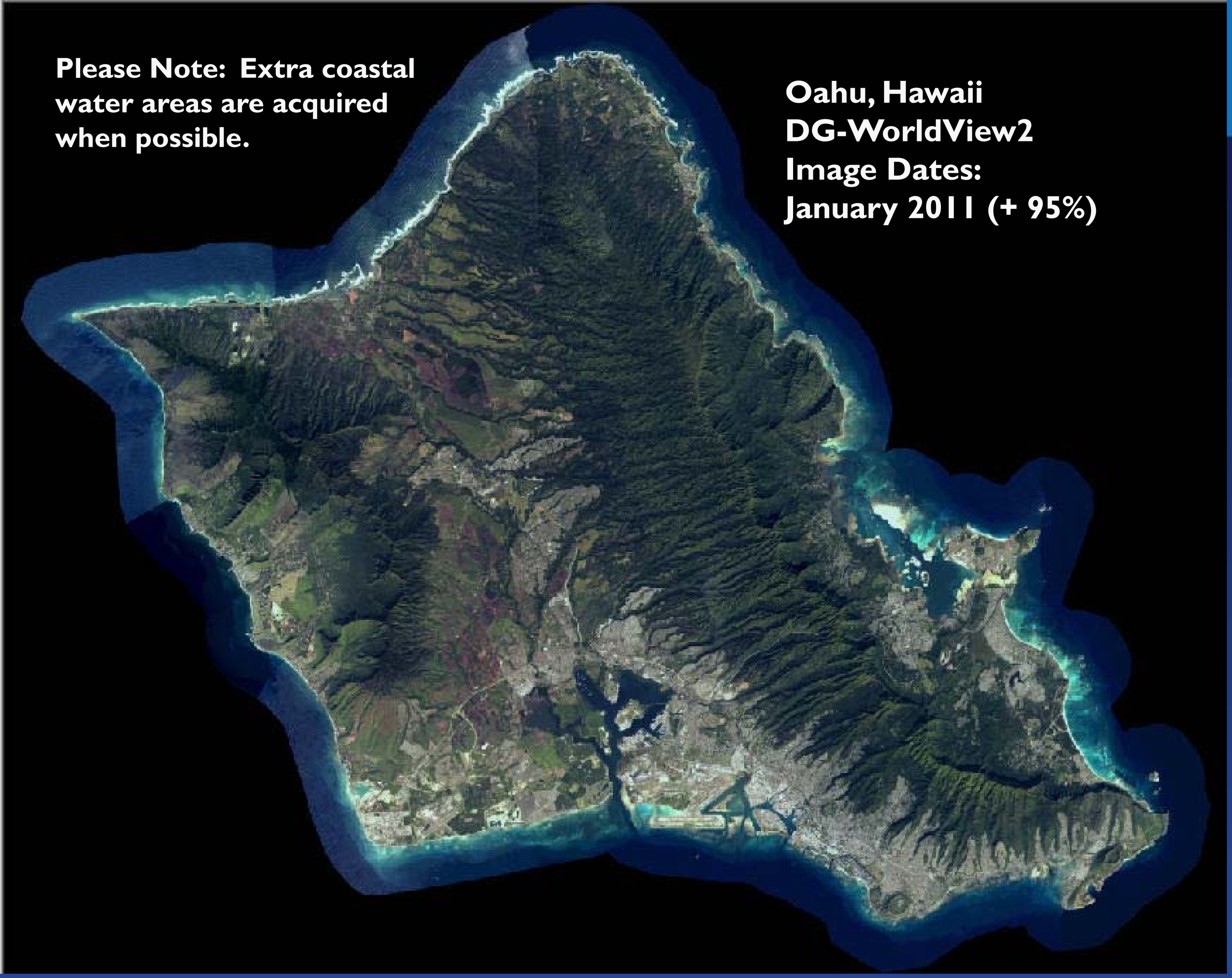


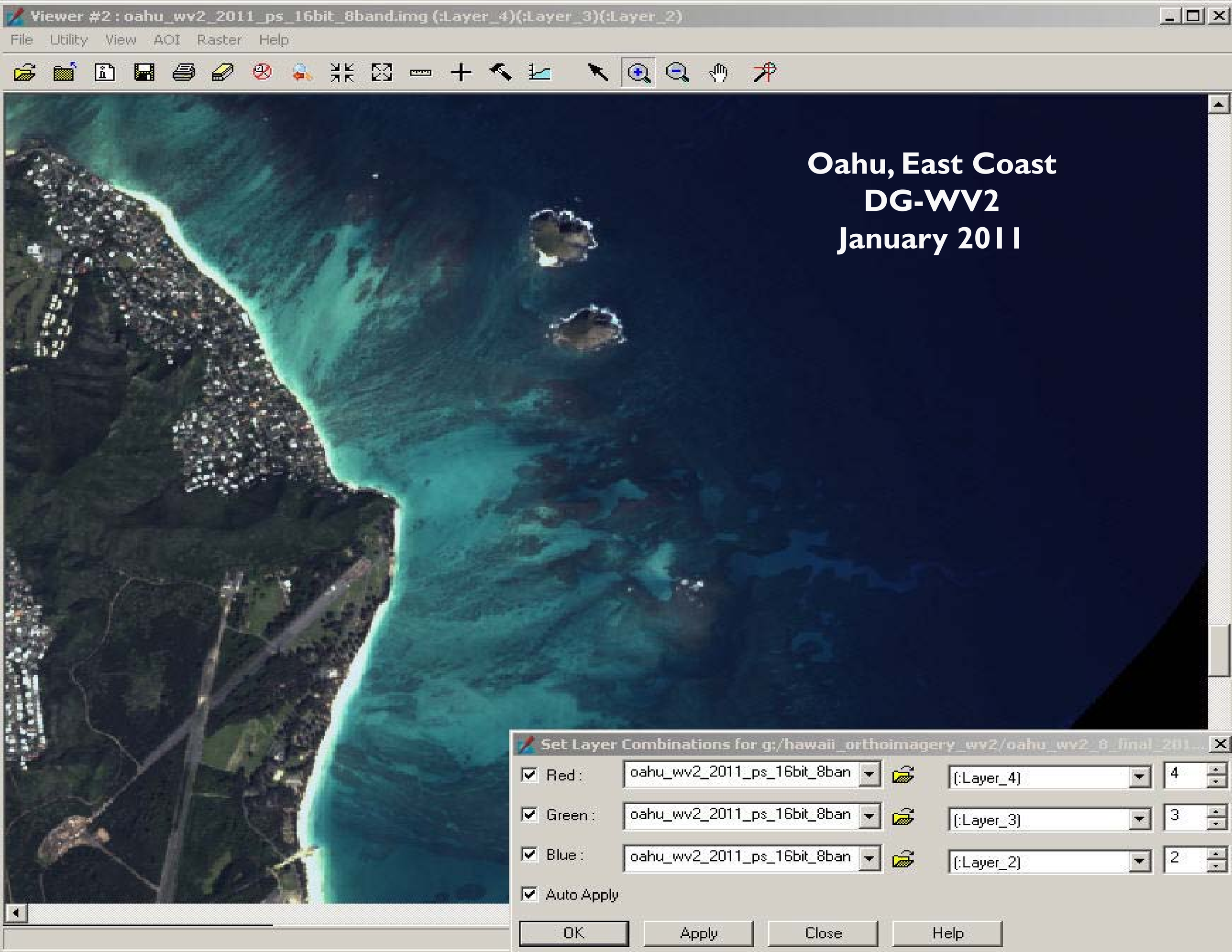


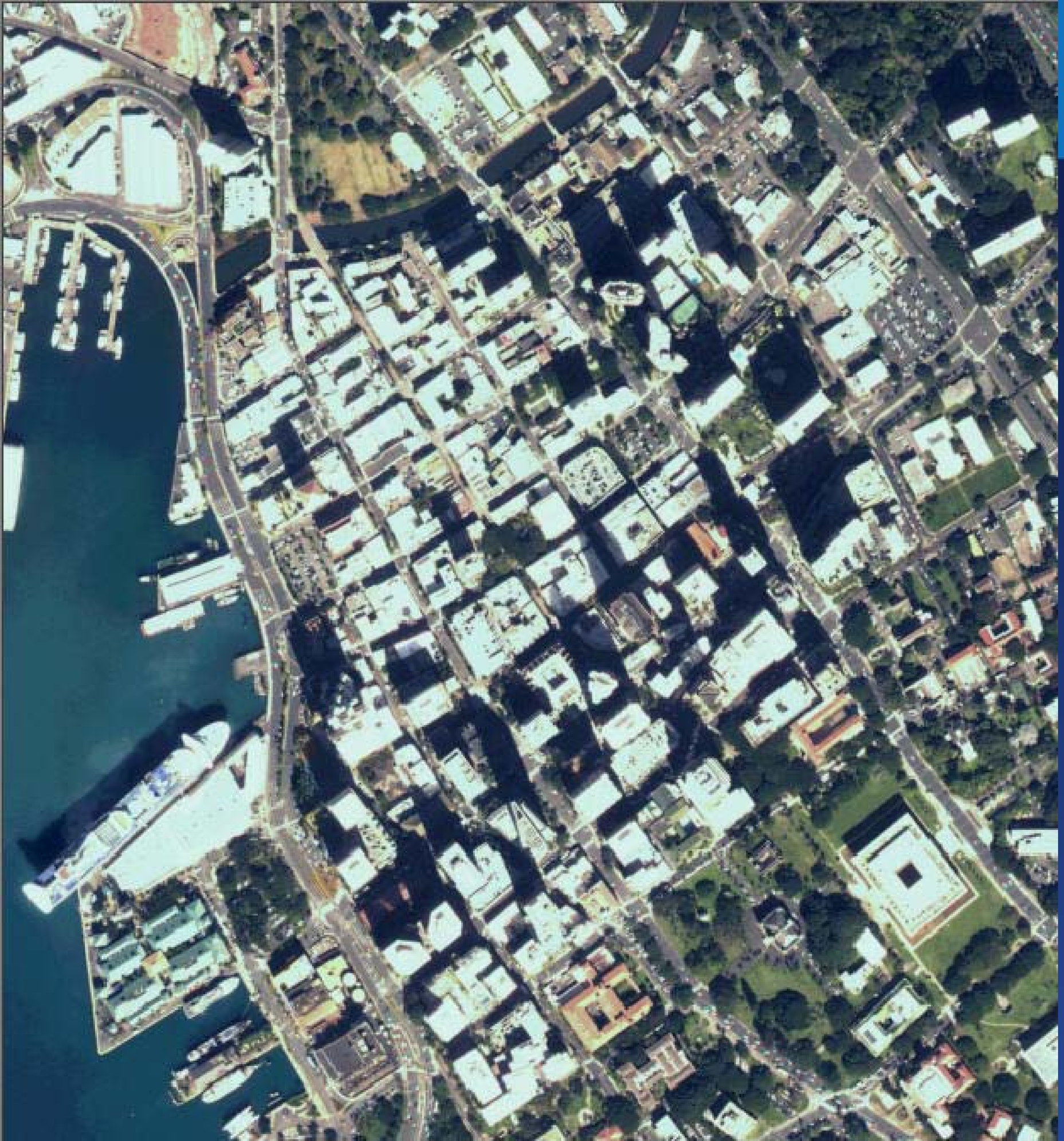
Orthoimagery Delivered and Accepted
Oahu, Kauai, Niihau, Kahoolawe, Maui and the East End of Hawaii

- **USGS, State of Hawaii and USDA have contracted for complete coverage of all 8 major Hawaiian Islands with DigitalGlobe/WorldView-2 Satellite Orthoimagery.**

- **Hawaii will be first state with complete collection with DigitalGlobe – WorldView-2 (.5 Meter GSD), 8 Band Multi-Spectral Imagery!**


Please Note: Extra coastal water areas are acquired when possible.
Oahu, Hawaii
DG-WorldView2
Image Dates:
January 2011 (+ 95%)


Viewer #2 : oahu_wv2_2011_ps_16bit_8band.img (:Layer_4)(:Layer_3)(:Layer_2)
File Utility View AOI Raster Help
Oahu, East Coast
DG-WV2
January 2011
Set Layer Combinations for g:/hawaii_orthoimagery_wv2/oahu_wv2_8_final_201...
Red : oahu_wv2_2011_ps_16bit_8ban (:Layer_4) 4
Green : oahu_wv2_2011_ps_16bit_8ban (:Layer_3) 3
Blue : oahu_wv2_2011_ps_16bit_8ban (:Layer_2) 2
Auto Apply
OK
Apply
Close
Help



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Satellite Imagery:

- Always collected at same everyday (10:30 Local Time).

- NADIR was fairly good on some/most of Oahu.

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Maui, New Version, 2/07/2011

Kauai
DG-WV-2

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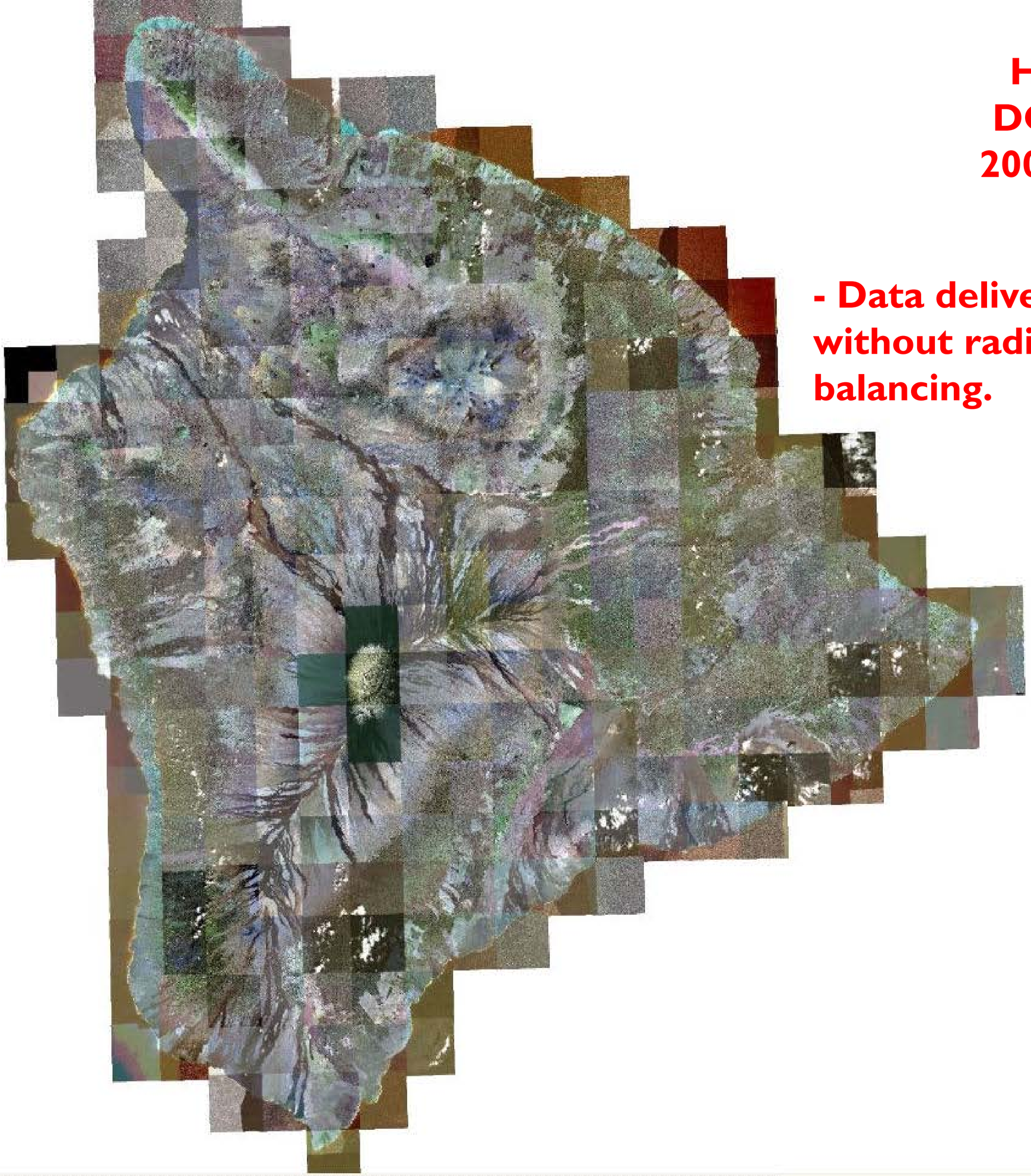
Hawaii
DG-WV2, Partial

Volcano's National Park (4 Band)

East End, Hilo



Hawaii
DG-QB2
2003-2008

- Data delivered by DOQQ without radiometric balancing.

Guam, 2/07/2011

☐	☑ 3 View	☐ 1030010009CF2A00	WV02	2011/02/05	17.43°	15.33°	55.25°	1%	4%	Pan_MS1_MS2
☐	☑ 2 View	☐ 103001000912DC00	WV02	2011/02/05	15.07°	14.25°	55.18°	1%	3%	Pan_MS1_MS2
☐	☑ 1 View	☐ 1030010009C2DA00	WV02	2011/02/05	17.90°	17.74°	55.25°	0%	1%	Pan_MS1_MS2
☐	☐ View	☐ 1030010009B7C100	WV02	2011/02/05	19.31°	17.89°	55.08°	0%	0%	Pan_MS1_MS2
☐	☐ View	☐ 1030010009C10B00	WV02	2011/02/05	15.12°	15.12°	55.1°	1%	1%	Pan_MS1_MS2
☐	☐ View	☐ 10300100096C6300	WV02	2011/02/05	21.17°	21.17°	55.1°	0%	0%	Pan_MS1_MS2

Close

Error on page. Internet 100%

Help | Close

NORTH

6 0 6 12 km

WEST

EAST

SOUTH

ZOOM IN

ZOOM OUT

Please Note:
All data from 2/5/2011

Search Filter

Acquisition Date: 10/1/10 - 2/8/11
Off Nadir Angle: 0.0 - 25.0 degrees
Cloud Cover: 0 - 10 %

SEARCH MODIFY FILTER

Map Status

Lon:
Lat:
Area: 791 km^2
Scale: 1:493,435

Pacific Ocean
Indian Ocean

SUBMIT Email an order inquiry to Customer Service.

Pacific Basin Status

- USDA has collected approximately ~ 98% of all land mass within the jurisdiction of the United States:

  - Guam
  - Commonwealth of the Northern Mariana Islands
  - Northwestern Hawaiian Islands
  - Palau
  - American Samoa
  - Federated States of Micronesia
  - Marshall Islands
  - US Trusts (Palmyra, Wake, etc..)

- Most islands acquired also contain any visible shallow water reef areas.
- All data is Satellite 1 Meter or higher resolution (DG-QB2, DG-WV2, GeoEye-1)
- USDA upgraded most but not all DG-QB2 data to Enterprise Premium License in Fall 2009.
- Funding would not allow complete Enterprise Premium Licenses in Pacific Basin.
- Enterprise Premium (100% DG-QB2, DG-WV2) for: Guam, CNMI, Palau, American Samoa, NWHI (except 1)
- The following have a mixture Enterprise Premium and NGA NextView/Civil Government: Marshall Islands, Federated States of Micronesia and US Trusts.

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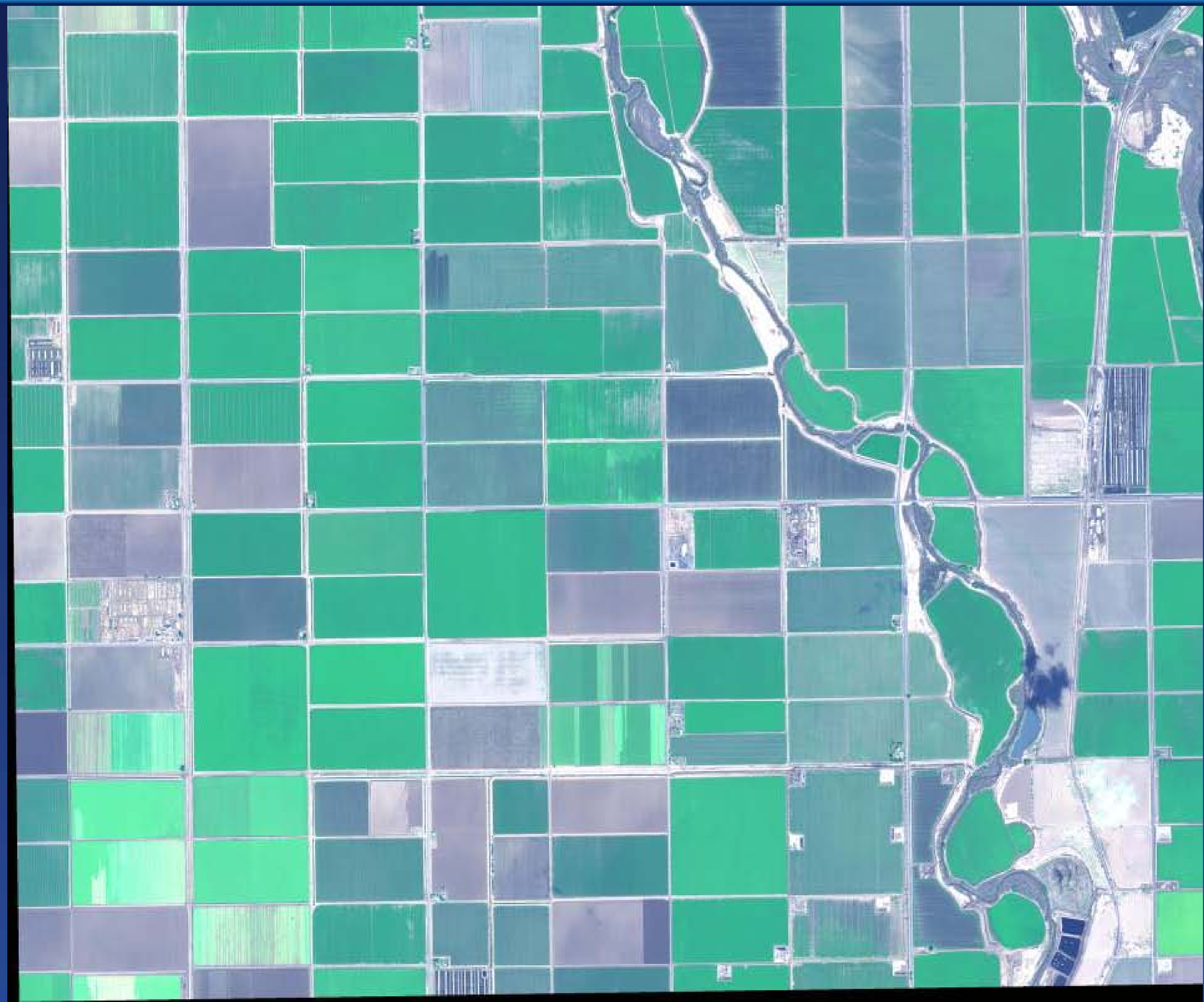
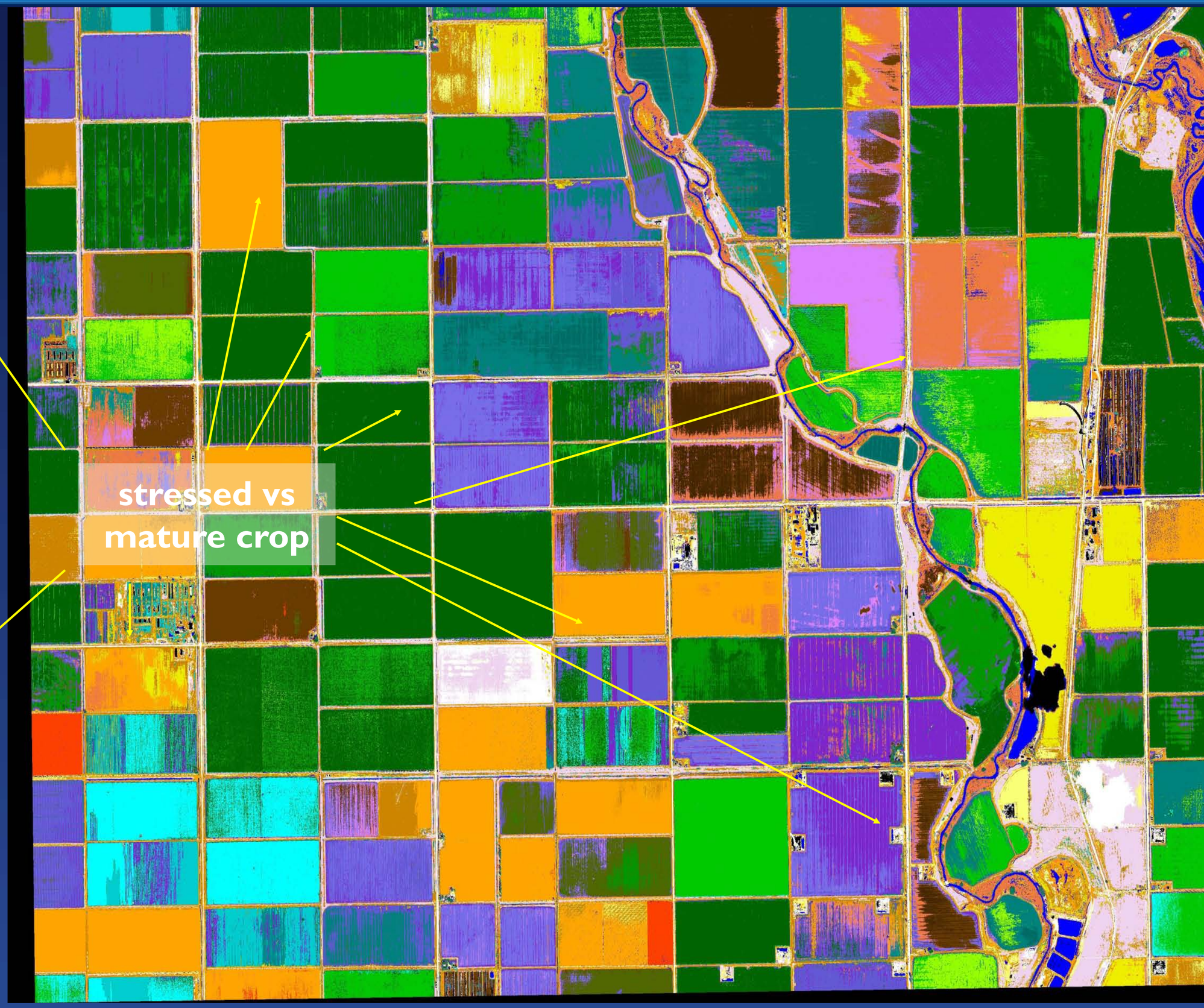
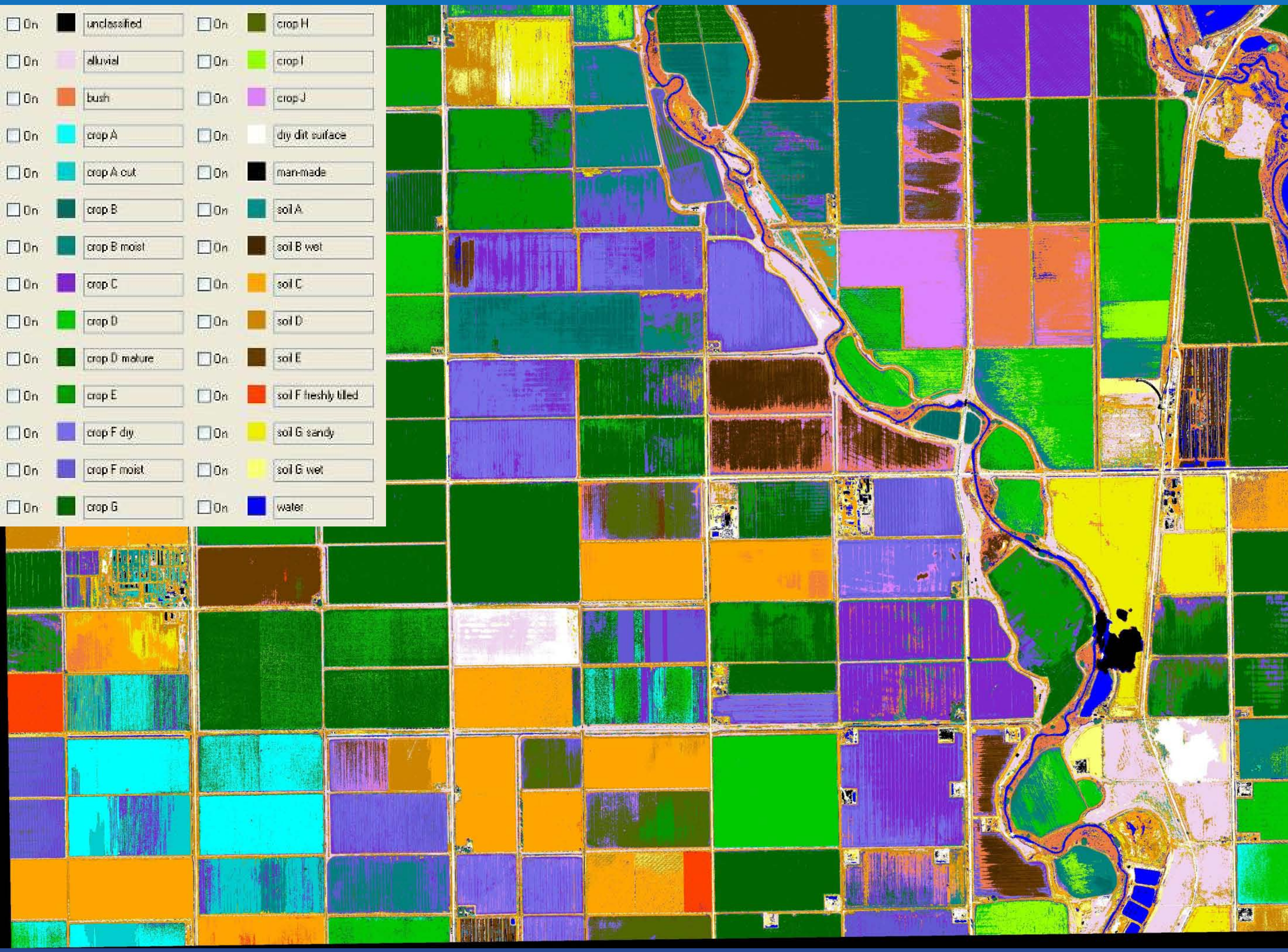
WorldView-2
True Color
0.6 meter, 8 band
to expand field
remote activities



WorldView-2 uses reflectance returns to provide an array of soil and plant condition indicators



WorldView-2
land covers
Salton Sea
Feb 20, 2010


On unclassified
On alluvial
On bush
On crop A
On crop A cut
On crop B
On crop B moist
On crop C
On crop D
On crop D mature
On crop E
On crop F dry
On crop F moist
On crop G
On crop H
On crop I
On crop J
On dry dirt surface
On man-made
On soil A
On soil B wet
On soil C
On soil D
On soil E
On soil F freshly tilled
On soil G sandy
On soil G wet
On water

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Natural Resources Conservation Service

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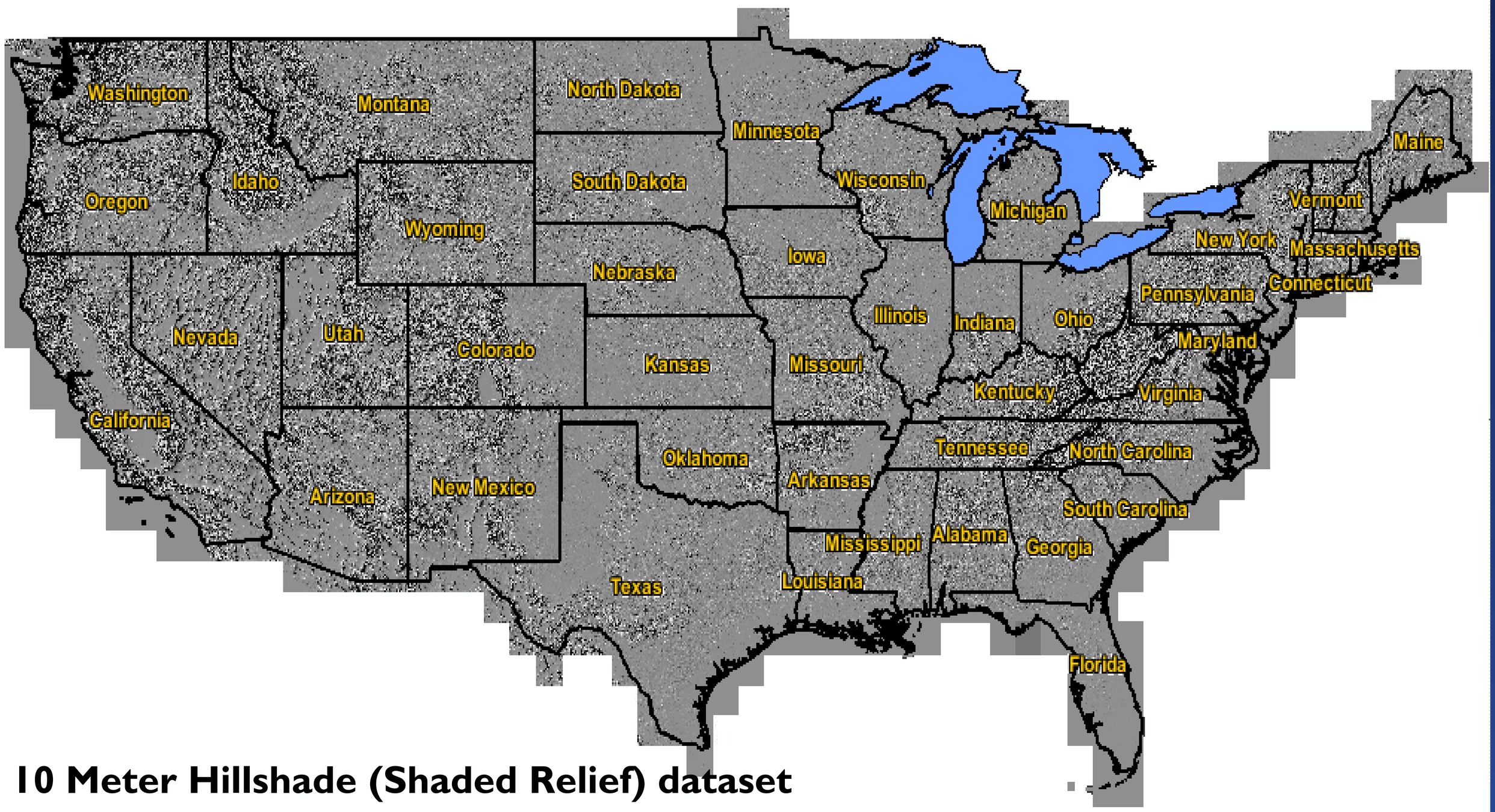
Elevation Data - Hillshade



10 Meter Hillshade (Shaded Relief) dataset

State Geology Layer

NGMC worked with the Gateway Team to add the State Geology Layer on the Gateway in 2010 to support the soil survey MLRA update Inventory

Is there a business requirement to make the State Geology Layer available in a Web Service?

State Geology Layer

WHAT

Here are the available map layers for your selected area of interest.

- 2008 National Ag. Imagery Program Mosaic, 254 maps 307914.918 MB
- 2010 National Ag. Imagery Program Mosaic, 254 maps 230678.666 MB

Geographic Names

- Geographic Names - Populated Places, 254 maps 5.290 MB
- Geographic Names - Non-Populated Places, 254 maps 51.577 MB

Land Use Land Cover

- National Land Cover Dataset by State, 1 map 1682.567 MB
- Cropland Data Layer by State, 1 map 81.486 MB

Geology

- National scale Geology by State, 1 map 80.591 MB

Soils

- Major Land Resource Areas by State, 1 map 3.578 MB
- Common Resource Areas by State, 1 map 4.093 MB
- Soil Survey Spatial and Tabular Data (SSURGO 2.2), 232 maps 7345.210 MB
- Soil Survey Tabular Data Only, 233 maps 4570.250 MB
- U.S. General Soil Map (STATSGO) - State Subset, 1 map 50.005 MB

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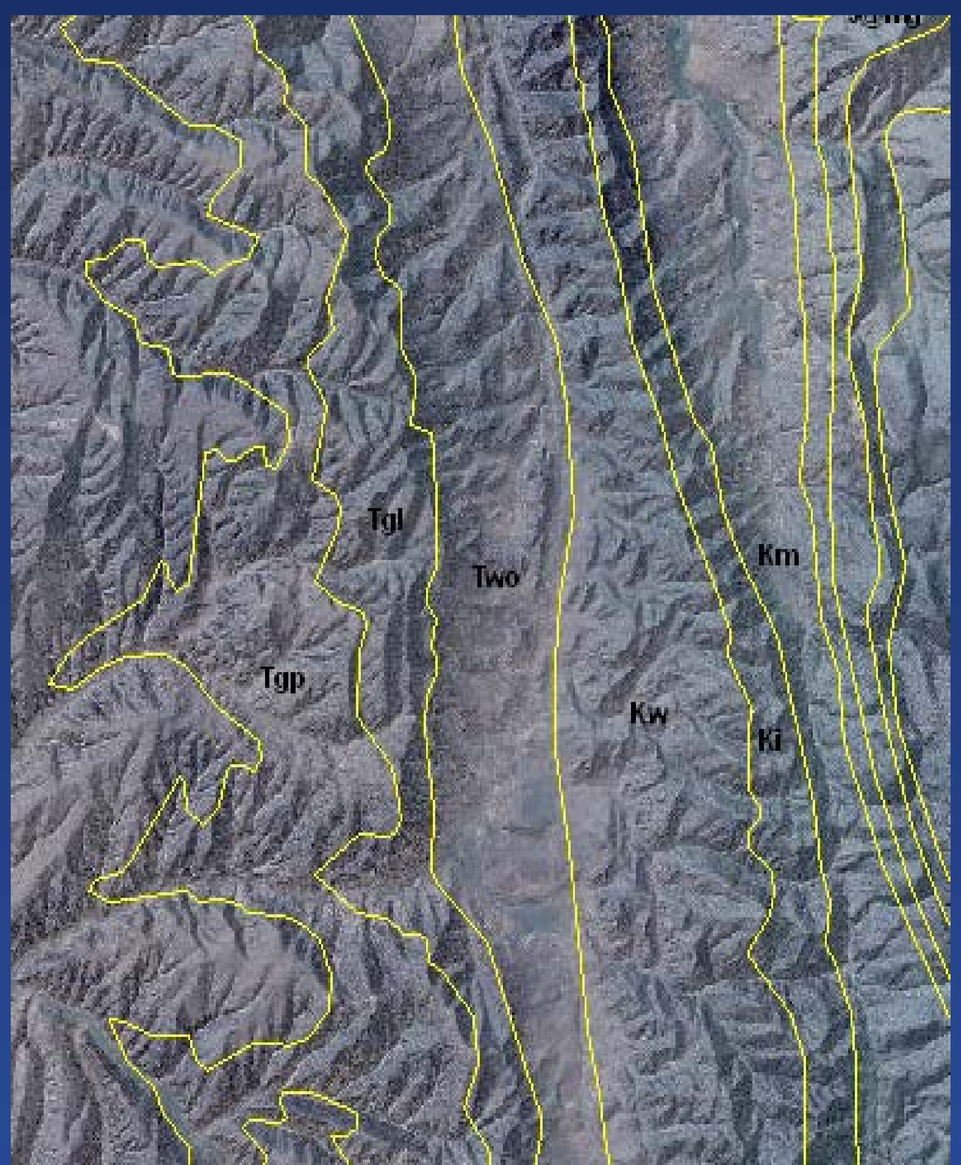
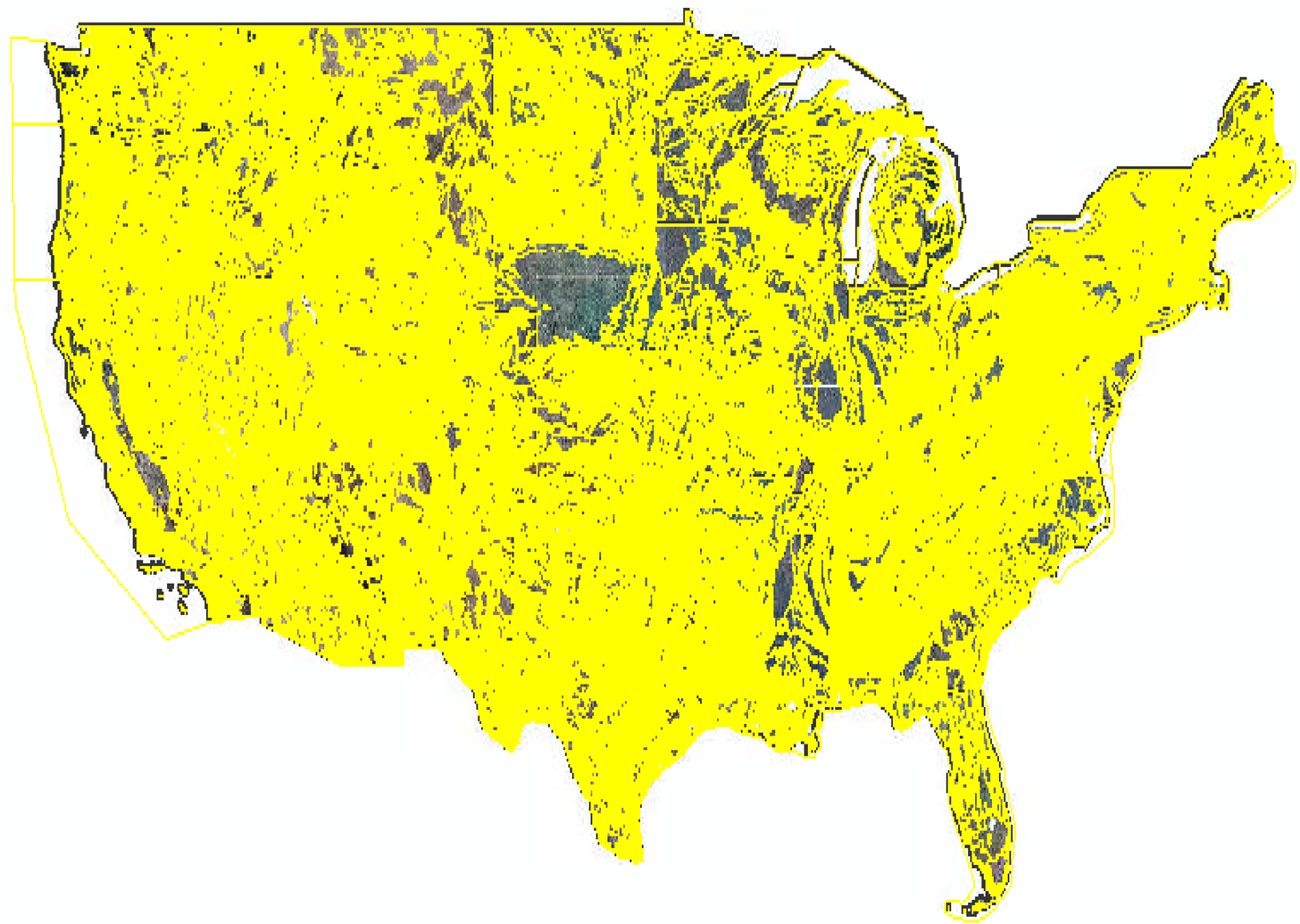
Geology_USA48

AOI in Colorado





Connecting to Services

- Connect to services through ArcCatalog or ArcMap by adding an ArcGIS connection to:

  http://ncgcws.ftw.nrcs.usda.gov/arcgis/services

  When connected, click on folder to view data.

- When using Image Server Plug-in (fast connection) to access the imagery, the connection can be in ArcMap. Click the "Add Image Server Connection" button and enter:

  http://ncgcimg01.ftw.nrcs.usda.gov:10010/

- Note: The Image Server Plug-in is standard in ArcGIS 9.3. In ArcGIS 9.2, NRCS users must request ITS installation.

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NRCS CDSI EQIP (FA) Ranking Pilot – Eight States

The purpose of the pilot is to demonstrate a GIS solution to automate financial assistance (FA) using a ranking tool and provision priority national, state and local data layers in a scientific manner based on resource concerns to support area-wide assessments and conservation planning.

Objectives includes:

-Test the applicability of NRCS' new resource concerns and planning criteria list

-Evaluate the concept of automated ranking for financial assistance using state and local criteria in a geospatial environment

-Capture and evaluate time savings for the ranking of EQIP applications

-Test and evaluate geospatial data provisioning options, methodologies, and services to support automated FA ranking and conservation planning functions

Select
EPA: 303d waters Pesticides, Salinity, Nutrients, Sediment impairments by HUC 12
EPA: 303d Waters w Nutrients, Phosphorus or Sediment Impairments by 50ft 2010
EPA: 8 Hour Ozone Non Attainment Areas - 1997
EPA: Particulate Matter 2.5 Areas - 2006
FEMA: 100 yr floodplain
FWS: Wildlife Refuges with 180ft and 300ft Buffers
NPS: 50 Mile Buffer of Class I Federal Lands - 2007
NRCS: Easements (buffered at 180 and 300) - 2011
NRCS: Soils
NRCS: USDA Prism Annual Precip
States: AL Land Cover
States: AL Land Use
States: AL Out Natural Resource Waters
States: AL Outstanding Waters
States: AL TE Species - 2010
States: AL Wild Scenic Rivers
States: CA Anadromous Fish
States: CA CRCC Priority Areas - 2010
States: CA Public Use Buffers All - 2011
States: CO BLM - 2006
States: CO Geo Poli WBD
States: CO Greater Sage Grouse Core - 2010
States: CO Greater Sage Grouse Overall Minus Core - 2010
States: CO RMBO Playa 30ft - 2009

More than 50 priority data layers, including the **SSURGO Layer (Attributes)** were integrated into the CDSI EQIP FA Ranking Tool

States: CO Salinity Geology - 2010
States: CO Salinity Project Areas - 2008
States: CO Sparrow - 2009
States: IN Karst
States: IN Land Use / Land Coverage - 2011
States: KS CRP - 2009
States: KY DOW Identified Watersheds - 2004
States: KY DOW Impaired Waterbodies - 2004
States: KY DOW Wellhead Protection Areas - 2004
States: KY Forest Priority Areas - 2010
States: KY Forestland Bird Cons Areas - 2005
States: KY Grassland Bird Cons Areas - 2005
States: KY USGS Sinksheds - 2005
States: OR Groundwater Mngmt Areas - 2008
States: OR Groundwater Vunlnerability - 2003
States: OR Juniper Removal Potential - 2011
States: OR Sage Grouse Habitat - 2011
States: OR Tualatin Stream Reach Rating – 2005
States: OR WERI - 2011
States: UT BLM USFS Buffers
States: UT Habitat Gap
States: UT Invasives Cheatgrass - 2007
States: UT Lakes 305B WBD
States: UT Sage Grouse - 2011
States: UT Sensitive Wildlife
States: UT Shallow Groundwater SGID 500 - 1988

CDSI Services Description

- NGMC received a file geodatabase with 24 pre-processed soils interps for 8 pilot states based on requests from the states (as needed for the ranking pilot)
- The data was loaded into SQL Server 2008 / ArcSDE
- NGMC created a service for each of the eight CDSI EQIP Ranking Tool Pilot states (AL, CA, CO, IN, KS, KY, NE, OR, UT) in ArcGIS Server 10
- The service contains 24 web service layers, each representing one of the soil interps
- Each Interp can be viewed as a separate sublayer in the service

4. Accessing the Data - via the NRCS Ranking Mart or Internet Map Service

Accessing the Data

Access via the NRCS Ranking Mart
Start Internet Explorer and go to http://web1.ftw.nrcs.usda.gov/nrcsrankingmart

Or

Access via the Internet Map Service Using a GIS such as ArcCatalog or ArcMap
There are web services available using this method.

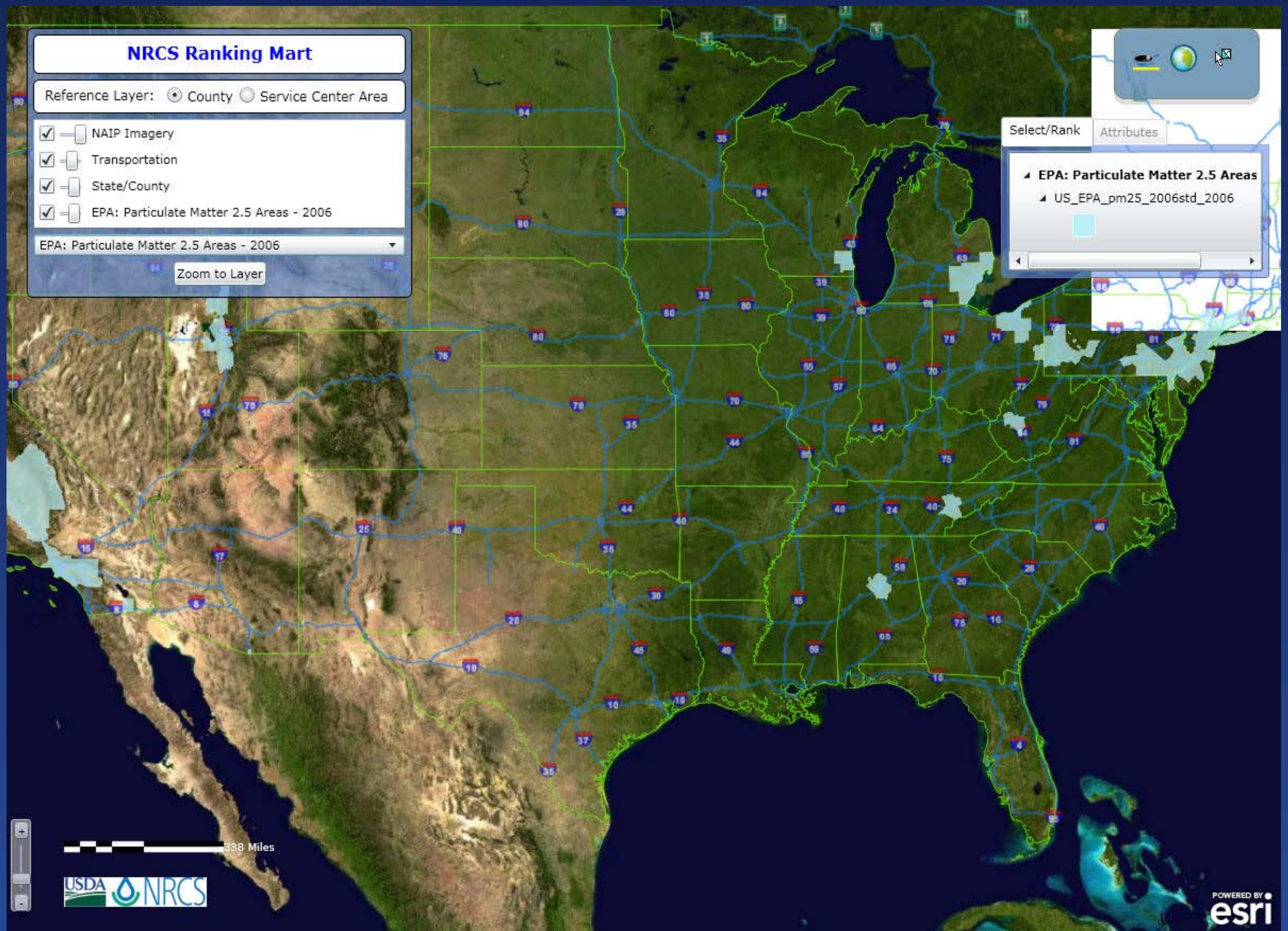
Each service contains different data to allow advanced users to recombine and use the data as necessary to accomplish their work.

Data can be accessed through ArcCatalog 9.3 or ArcMap 9.3 by adding an ArcGIS Server connection.

In ArcCatalog, click on GIS Servers>Add ArcGIS Server in the catalog tree.
Select "Use GIS Services" and click "Next".
Choose "Internet" as the type of ArcGIS Server connection and enter http://gisapps1.ftw.nrcs.usda.gov/arcgis/services
Click "Finish".

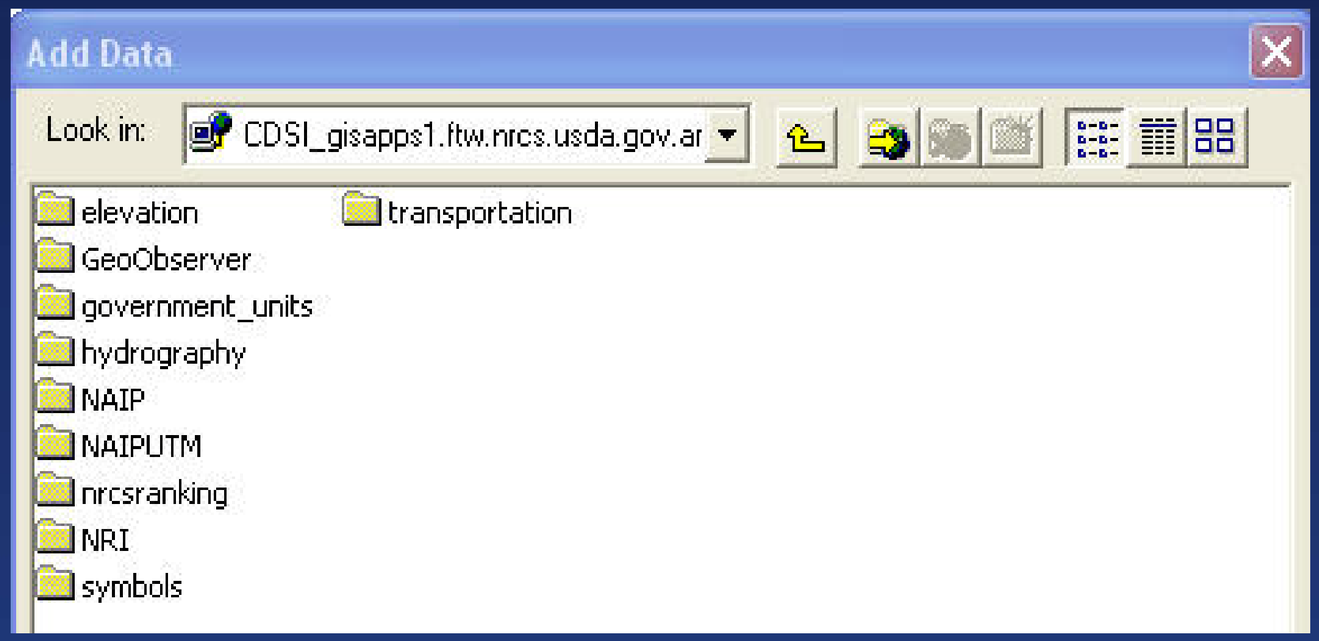
4. Accessing the Data –

NRCS Ranking Mart http://web1.ftw.nrcs.usda.gov/nrcsrankingmart2/

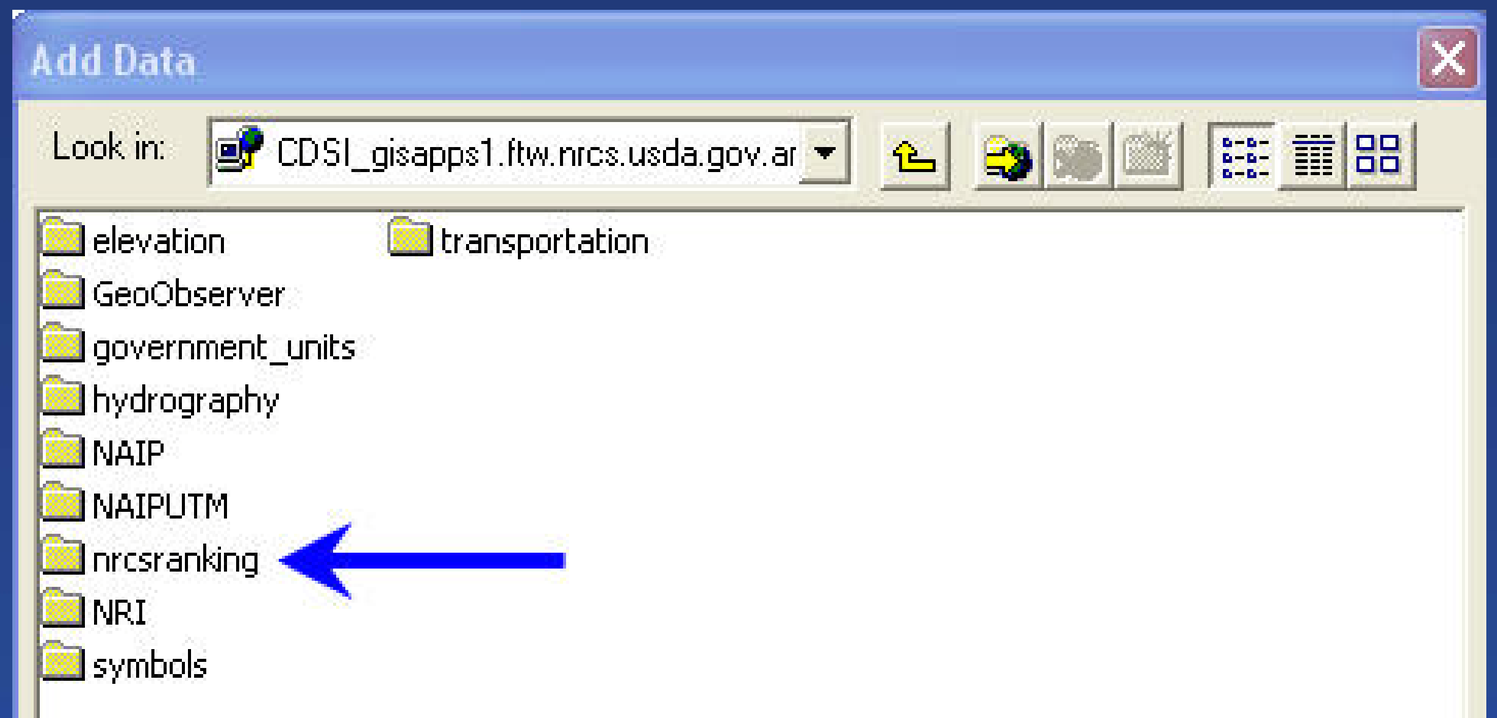


4. Accessing the Data

Web Map Service – Data Available using a GIS such as ArcMap



Data in nrcsranking is specific to the FA Ranking Pilot



4. Accessing the Data

Data in **nrcsranking** is specific to the FA Ranking Pilot
Contents of nrcsranking :

Contents | Preview | Metadata

Name	Type
epa	Map Service
fema	Map Service
fws	Map Service
nps	Map Service
nrcs	Map Service
nrcs_soils_us_2010	Map Service
reference	Map Service
states	Map Service
states_habitats	Map Service

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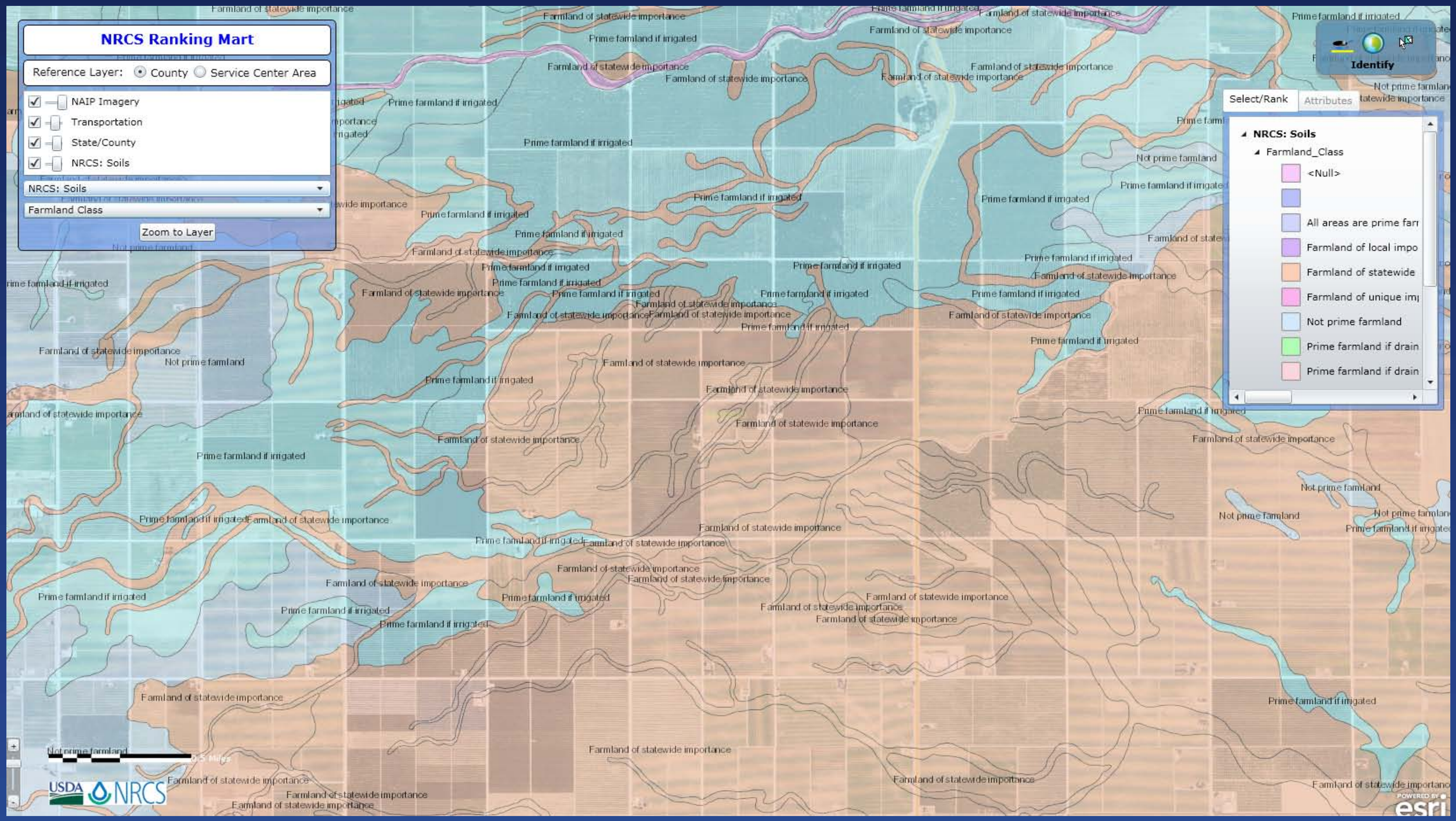
NRCS CDSI EQIP Ranking Mart Soil Attributes
Farmland Class



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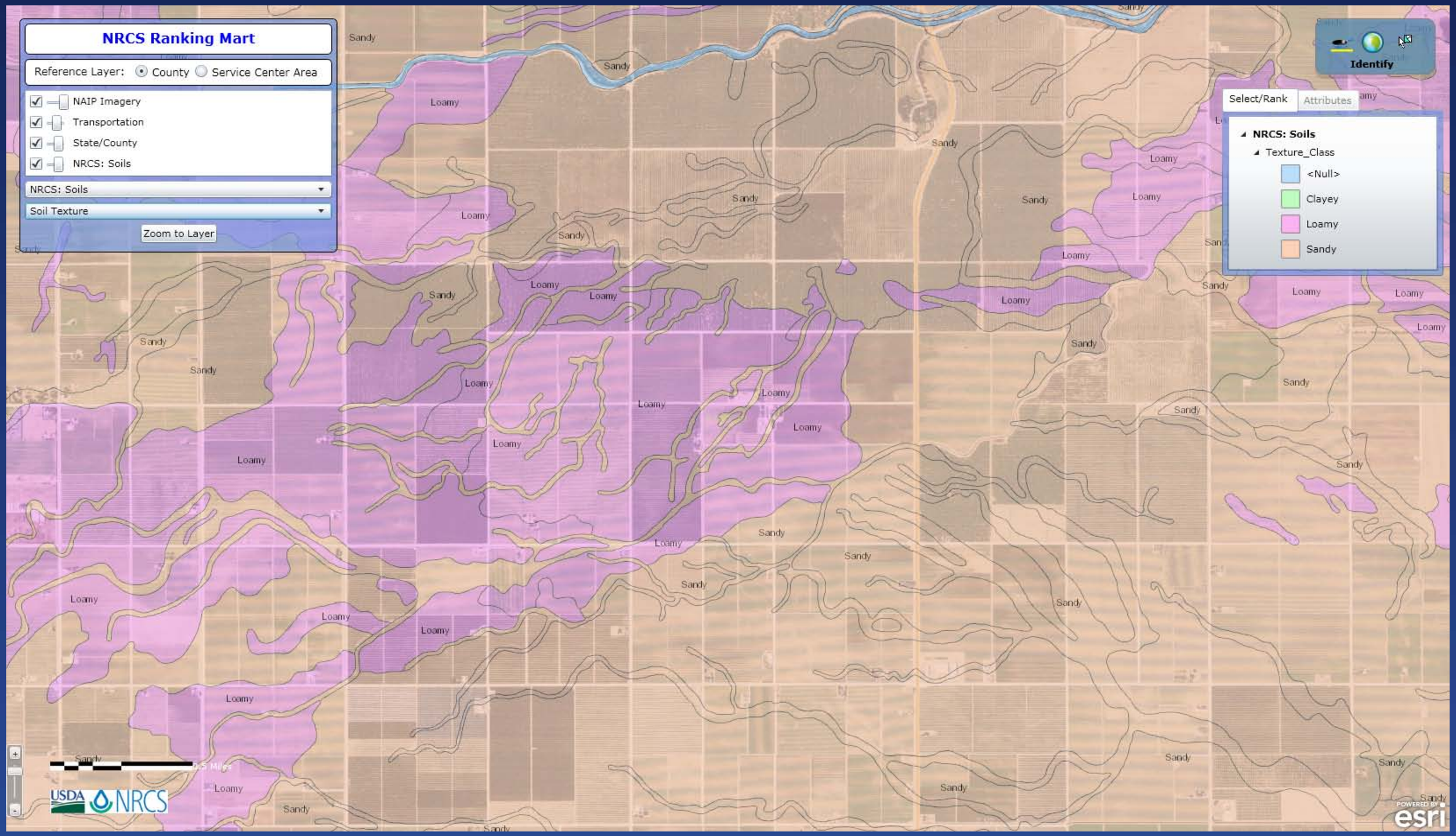
NRCS CDSI EQIP Ranking Mart Soil Attribute Soil Texture



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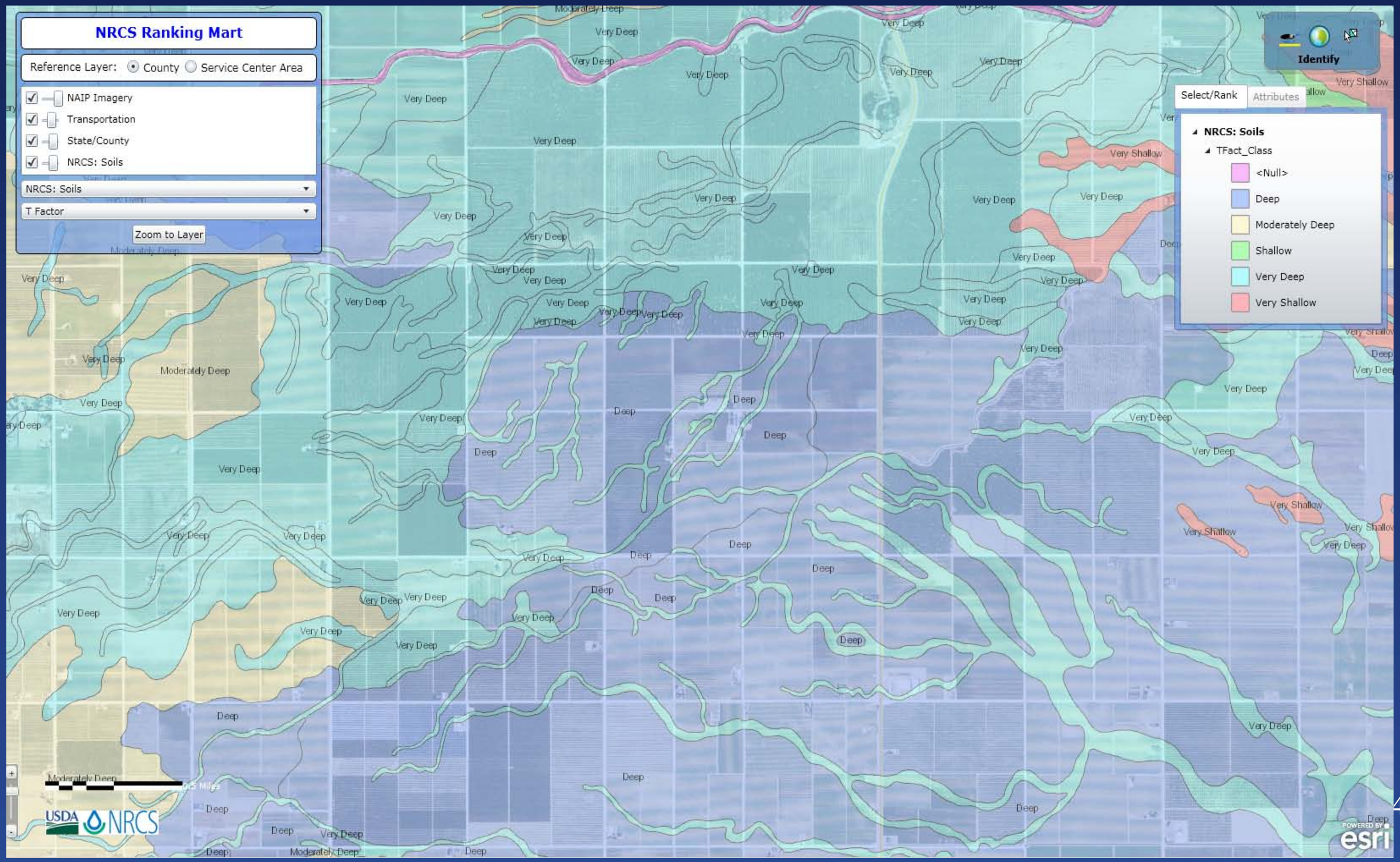
NRCS CDSI EQIP Ranking Mart Soil Attributes
T Factor



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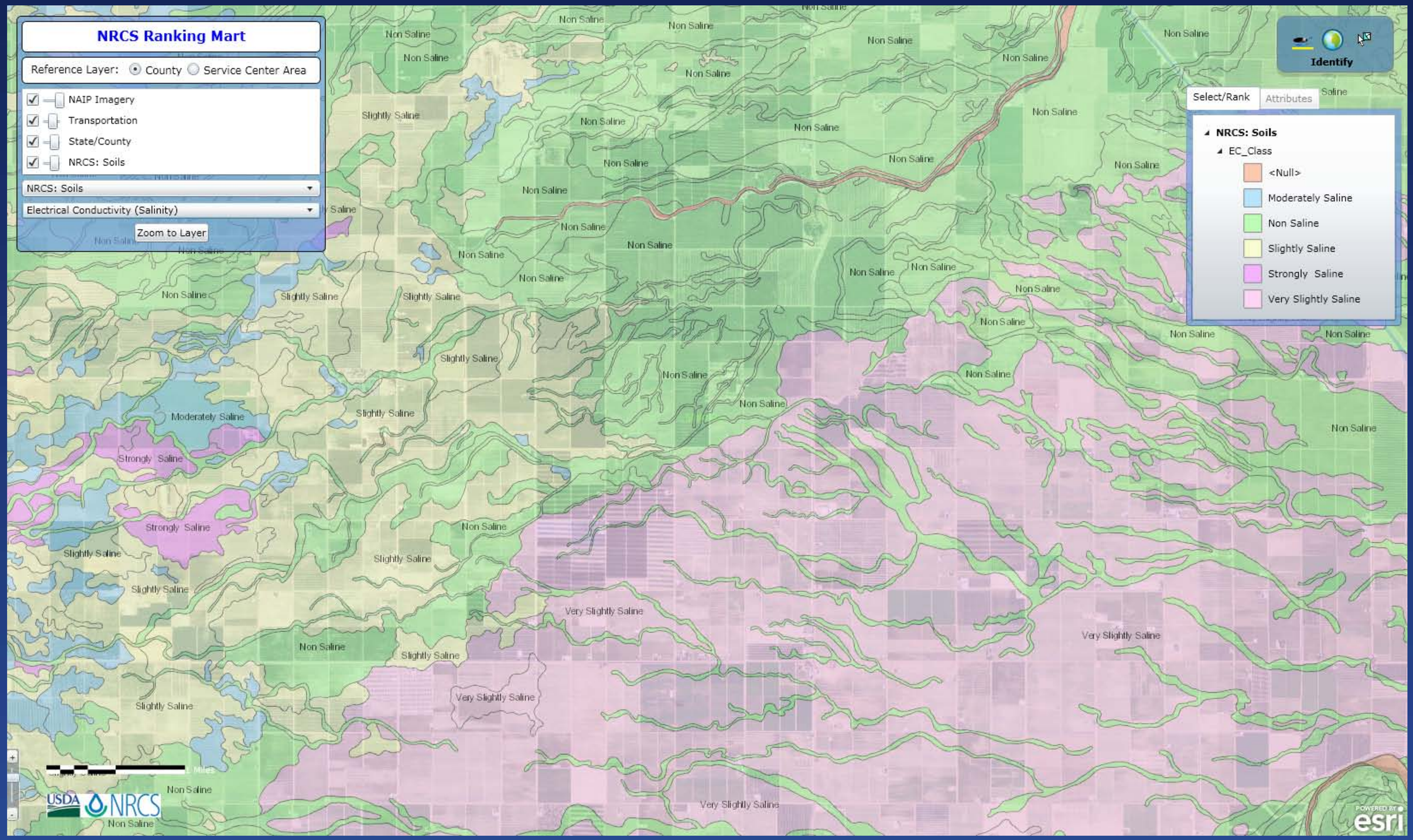
NRCS CDSI EQIP Ranking Mart Soil Attribute Salinity EC_Class



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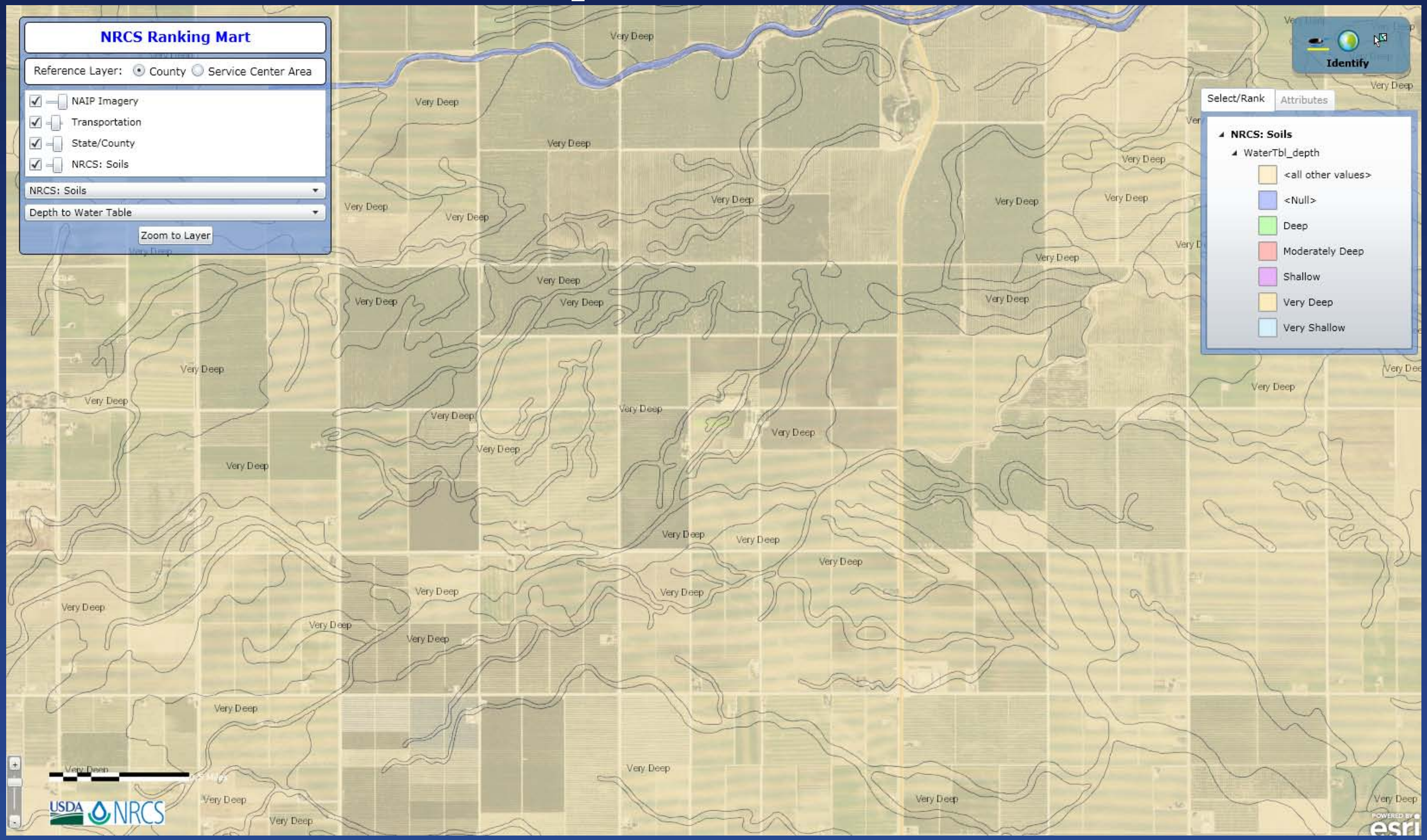
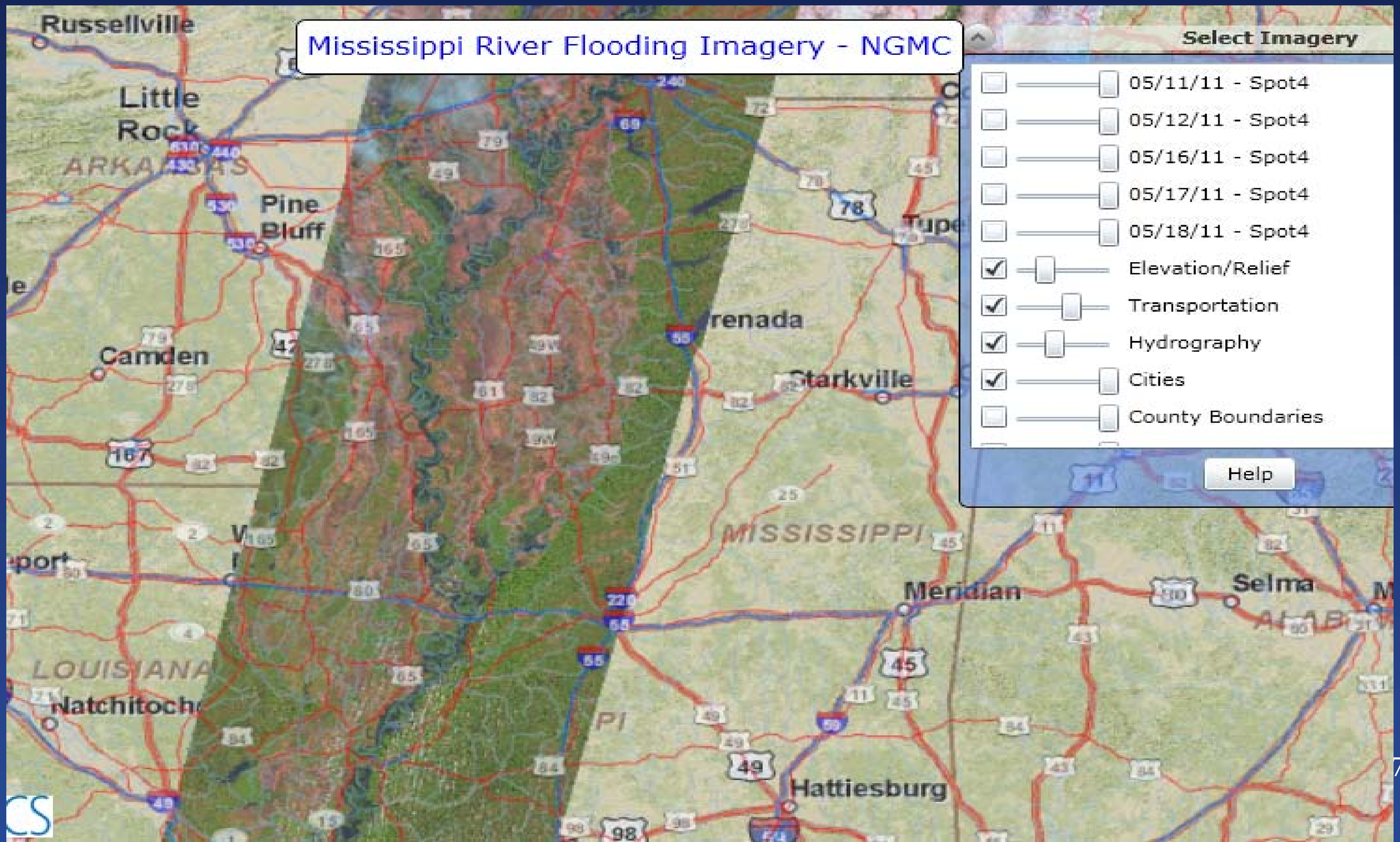
NRCS CDSI EQIP Ranking Mart Soil Attribute Depth to Water Table



Mississippi River Flooding



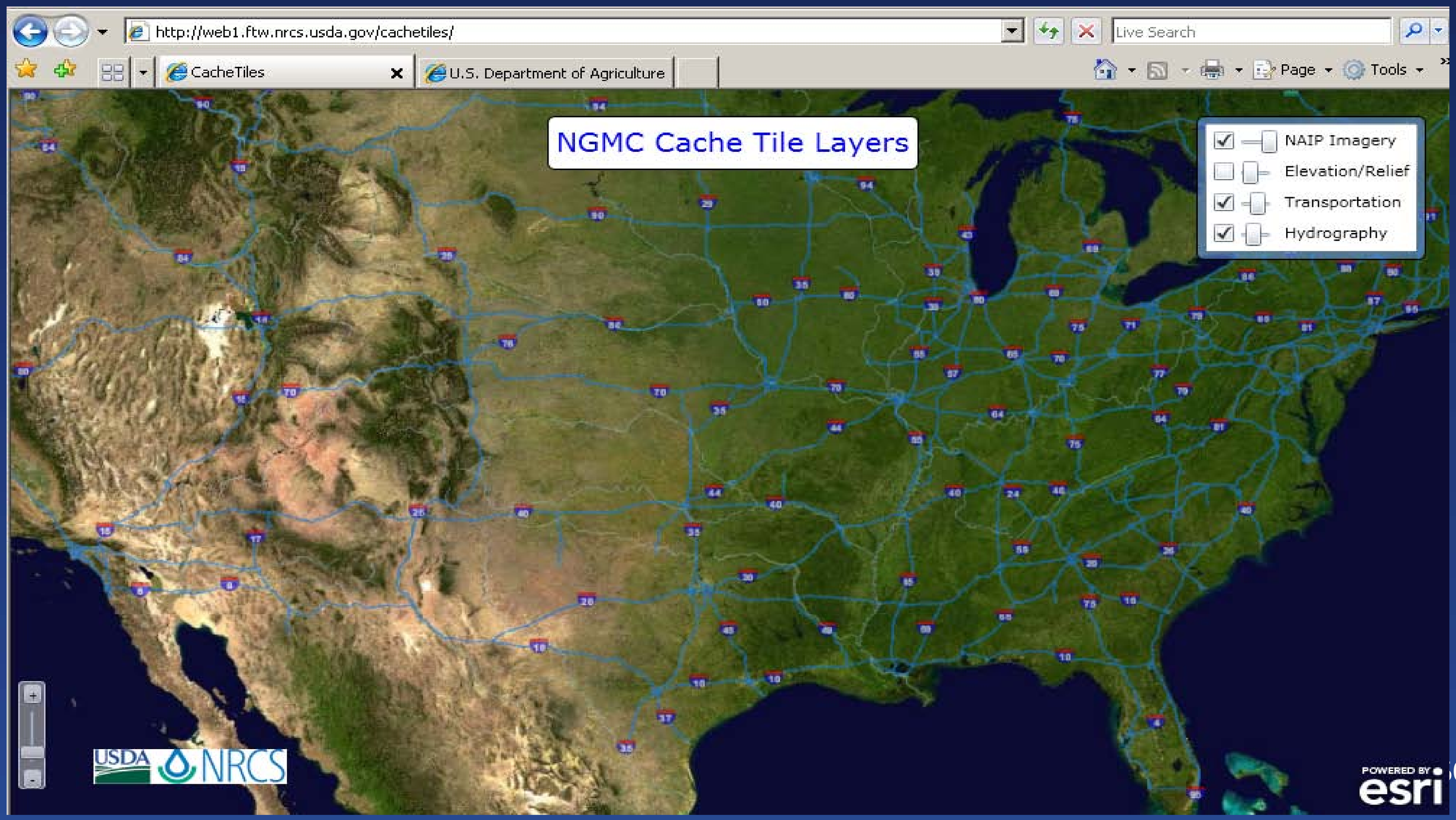
NGMC Web Services

Slides

NGMC Cache Tile Service

Slides

http://web1.ftw.nrcs.usda.gov/cachetiles/



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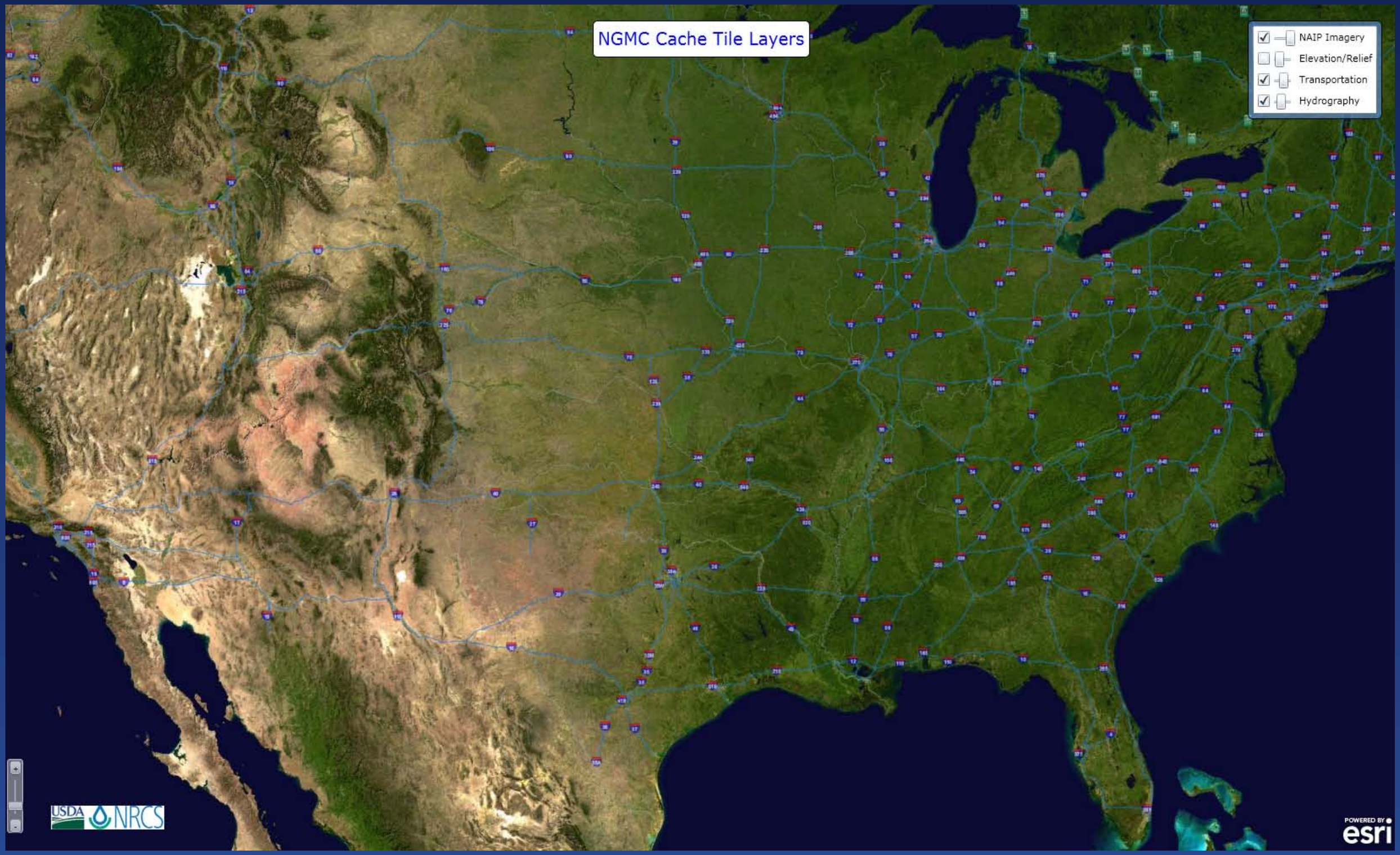
NGMC Cache Tile Service



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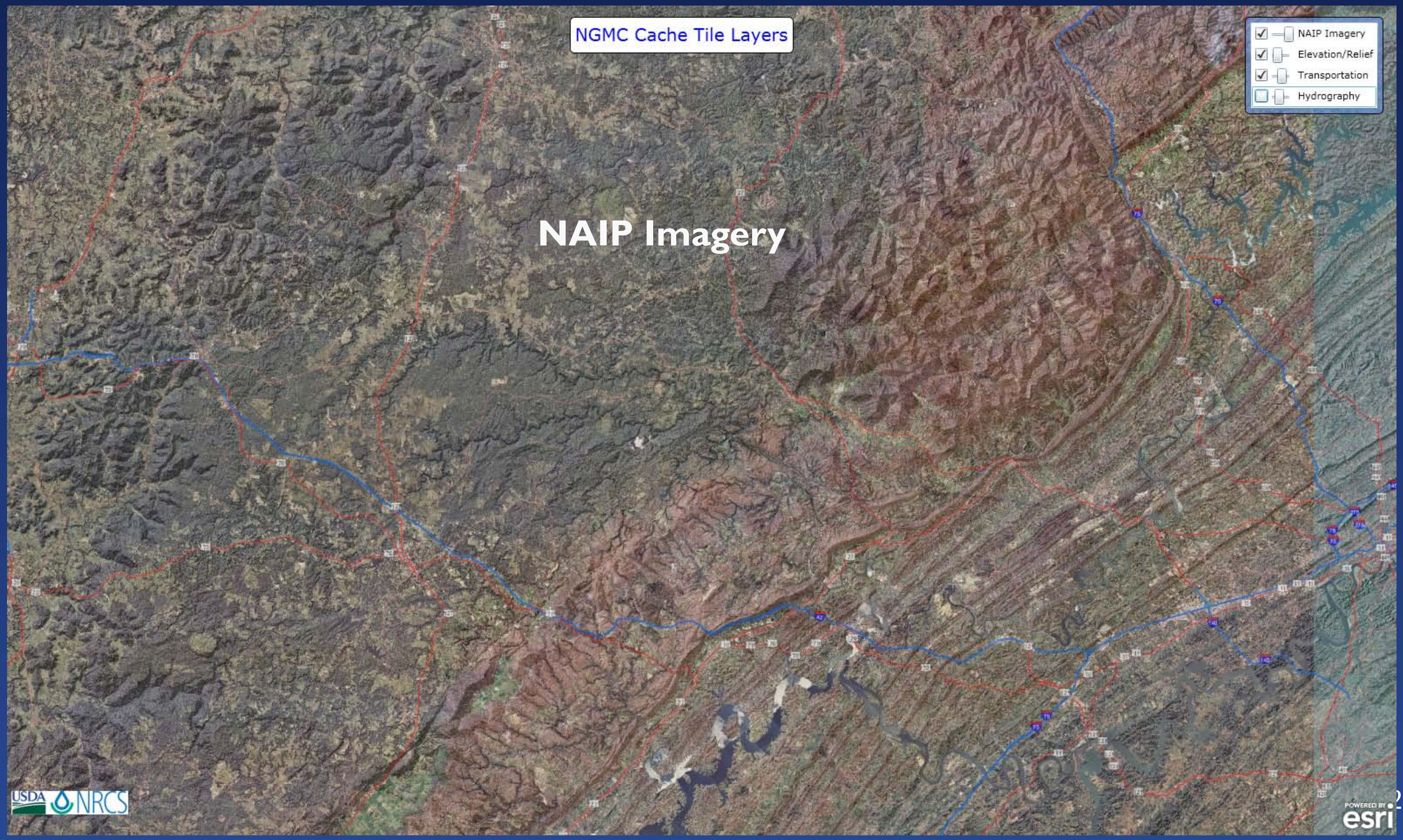
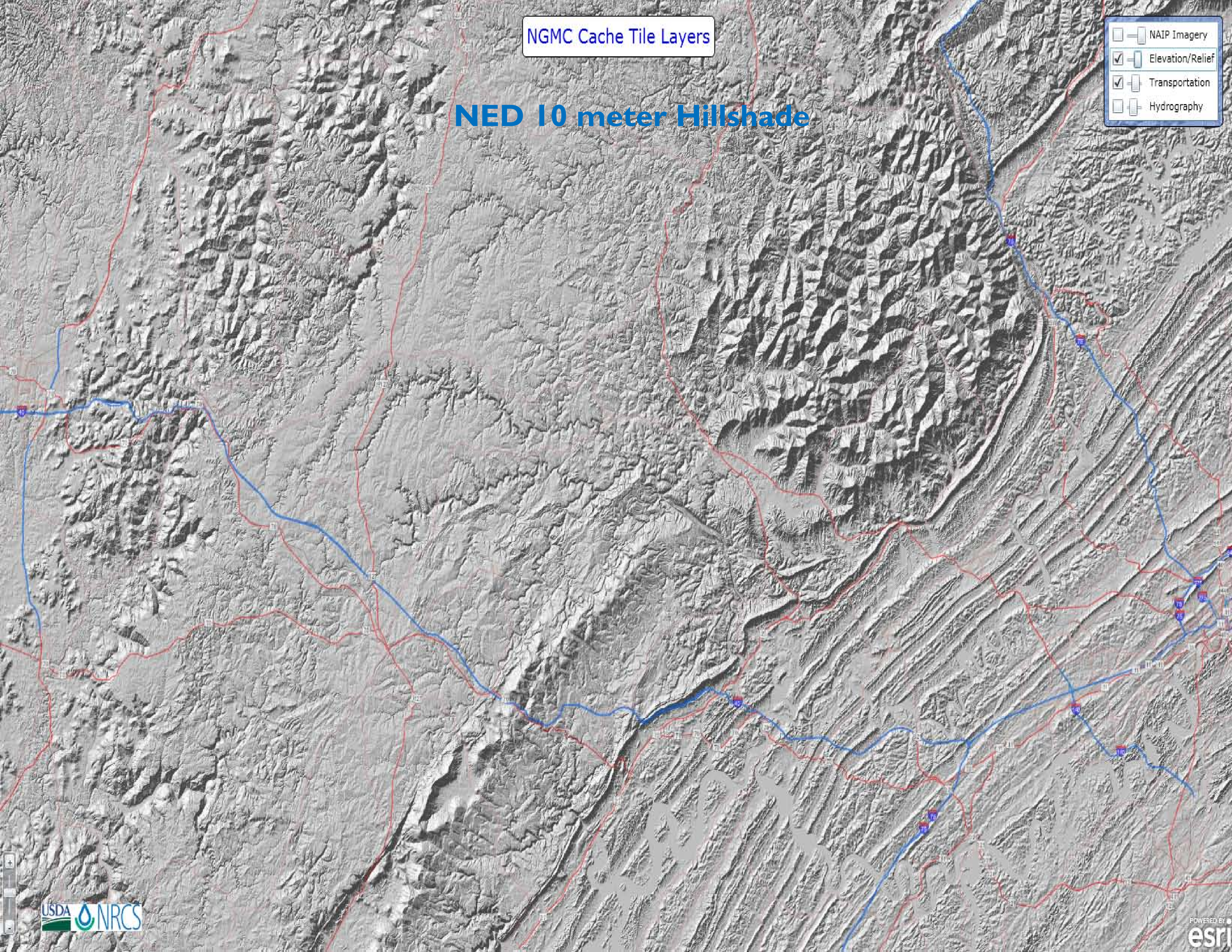
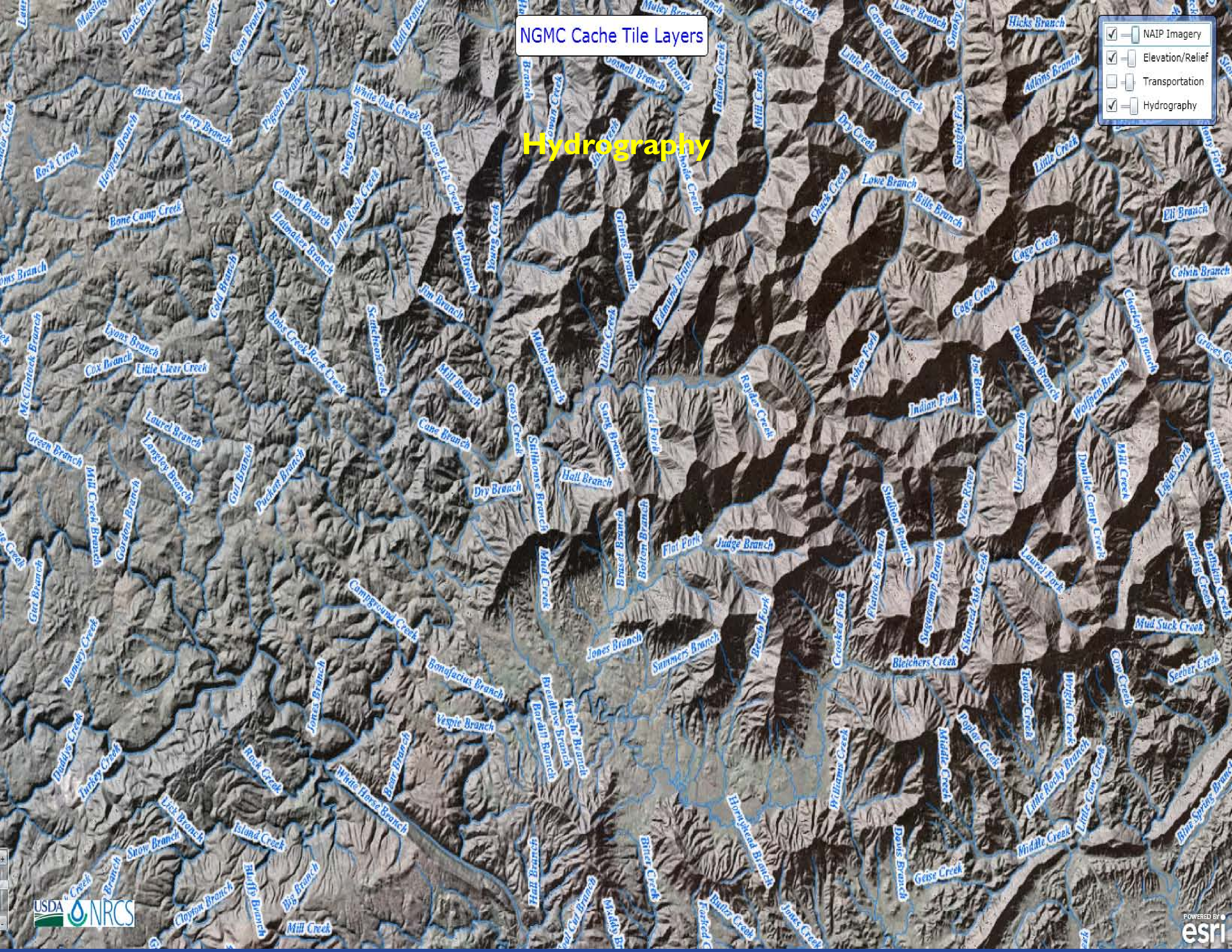
Eastern Oklahoma




NGMC Cache Tile Layers
NED 10 meter Hillshade
NAIP Imagery
Elevation/Relief
Transportation
Hydrography
USDA NRCS
POWERED BY esri


NGMC Cache Tile Layers
Hydrography
NAIP Imagery
Elevation/Relief
Transportation
Hydrography
Hicks Branch
Little Brimstone Creek
Adkins Branch
Dry Creek
Straight Fork
Little Creek
Lowe Branch
Bills Branch
Shack Creek
Eli Branch
Cage Creek
Calvin Branch
Charleys Branch
Patterson Branch
Wolfpen Branch
Joe Branch
Indian Fork
Asher Fork
Rayder Creek
Laurel Fork
Little Creek
Edmund Branch
Grimes Branch
Indian Creek
Mill Creek
Gosnell Branch
Cowan Creek
Young Creek
Tom Branch
Jim Branch
Sprace Lick Creek
White Oak Creek
Negro Branch
Little Rock Creek
Convict Branch
Halmaher Branch
Pigeon Branch
Jerry Branch
Alice Creek
Happen Branch
Rock Creek
Bone Camp Creek
Cold Branch
Bobs Creek
Rock Creek
Scratchen Creek
Lyons Branch
Cox Branch
Little Clear Creek
Mill Branch
Maden Branch
Little Creek
Greasy Creek
Sang Branch
Laurel Fork
Cane Branch
Laurel Branch
Langley Branch
Gul Branch
Puckett Branch
Green Branch
Mill Creek Branch
Gordon Branch
Gut Branch
Ramsey Creek
Dry Branch
Stillhouse Branch
Hall Branch
Mud Creek
Braset Branch
Bolton Branch
Flat Fork
Judge Branch
Campground Creek
Jones Branch
Summers Branch
Beech Fork
Crooked Fork
Platrock Branch
Stallion Branch
Sugarcamp Branch
Skinned Ash Creek
New River
Laurel Fork
Ursery Branch
Double Camp Creek
Mill Creek
Ligias Fork
Phillips Branch
Roaring Creek
Buffalkin Creek
Mud Suck Creek
Bletchers Creek
Seeber Creek
Cow Creek
Taylor Creek
Wright Creek
Poplar Creek
Middle Creek
Little Rocky Branch
Little Cow Creek
Blue Spring Branch
Middle Creek
Geise Creek
Davis Branch
Williams Creek
Horsehead Branch
Butler Creek
Jones Creek
Biter Creek
Hall Branch
Middy Branch
Bonafacius Branch
Vespic Branch
Breedlove Branch
Bardill Branch
Knight Branch
Jones Branch
Bear Branch
White Horse Branch
Rock Creek
Island Creek
Snow Branch
Lick Branch
Turkey Creek
Daddys Creek
Clayton Branch
Bluffy Branch
Big Branch
Mill Creek
McClintock Branch
Lyons Branch
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USDA NRCS
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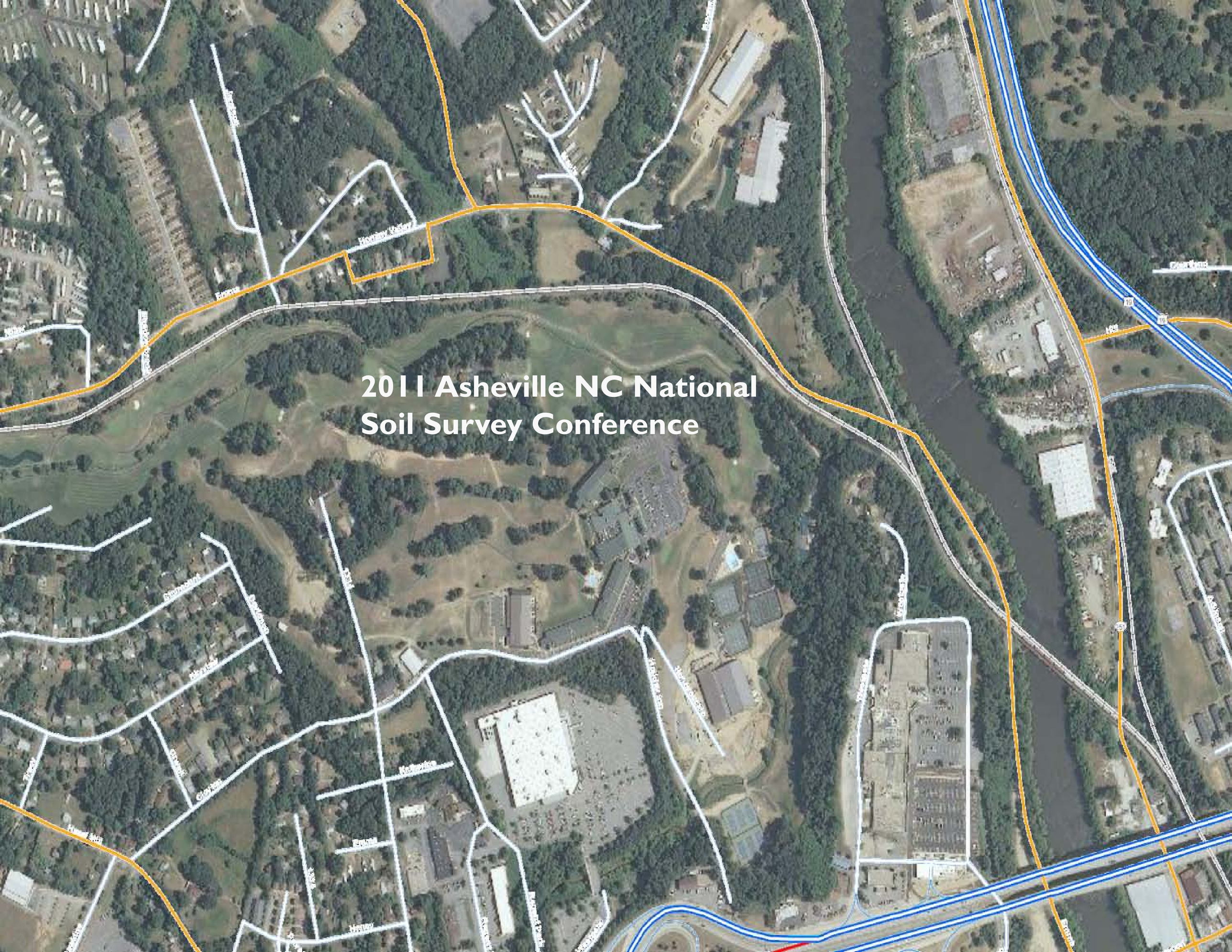

2011 Asheville NC National Soil Survey Conference

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National Geospatial Management Center

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