Geospatial Collaboration
Open Source Tools
Great Lakes Basin

James Klassen
Alison Slaats

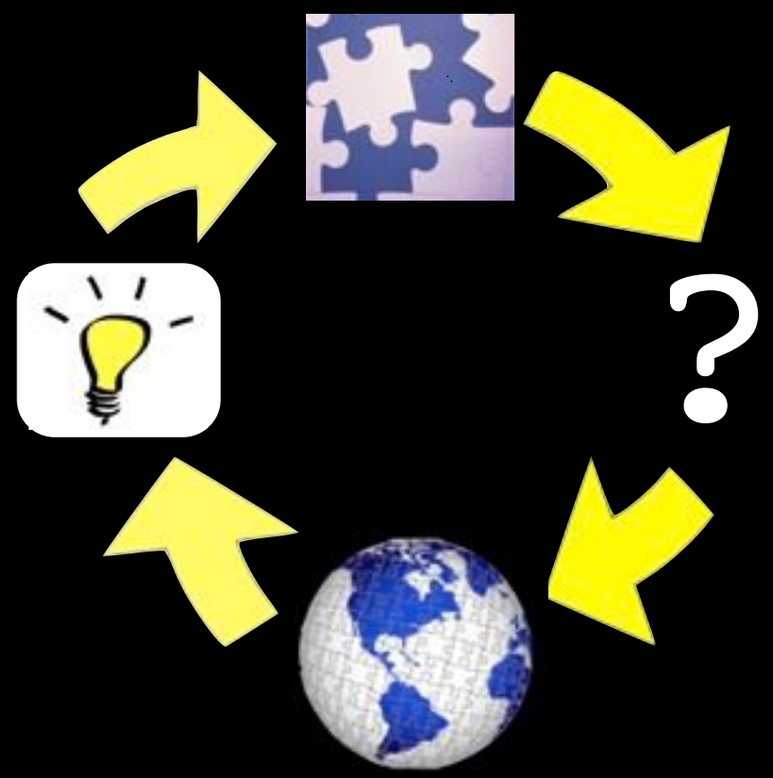
SharedGeo

SharedGeo

About SharedGeo

- 501(c)(3) Non Profit
- Facilitate sharing and use of geospatial data
- Focus on Open Source Development
- Goal is to support the common good

SharedGeo



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SharedGeo

Innovative delivery of CAP imagery

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National leader in U.S. National Grid products that support the Emergency Services Sector

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National leader in U.S. National Grid products that support the Emergency Services Sector

Specializes in Open Source mapping and web services solutions.

Great Lakes Restoration Initiative (GLRI)

SharedGeo

- Clean up toxic substances
- Combat invasive species
- Restore wetlands and shore habitats

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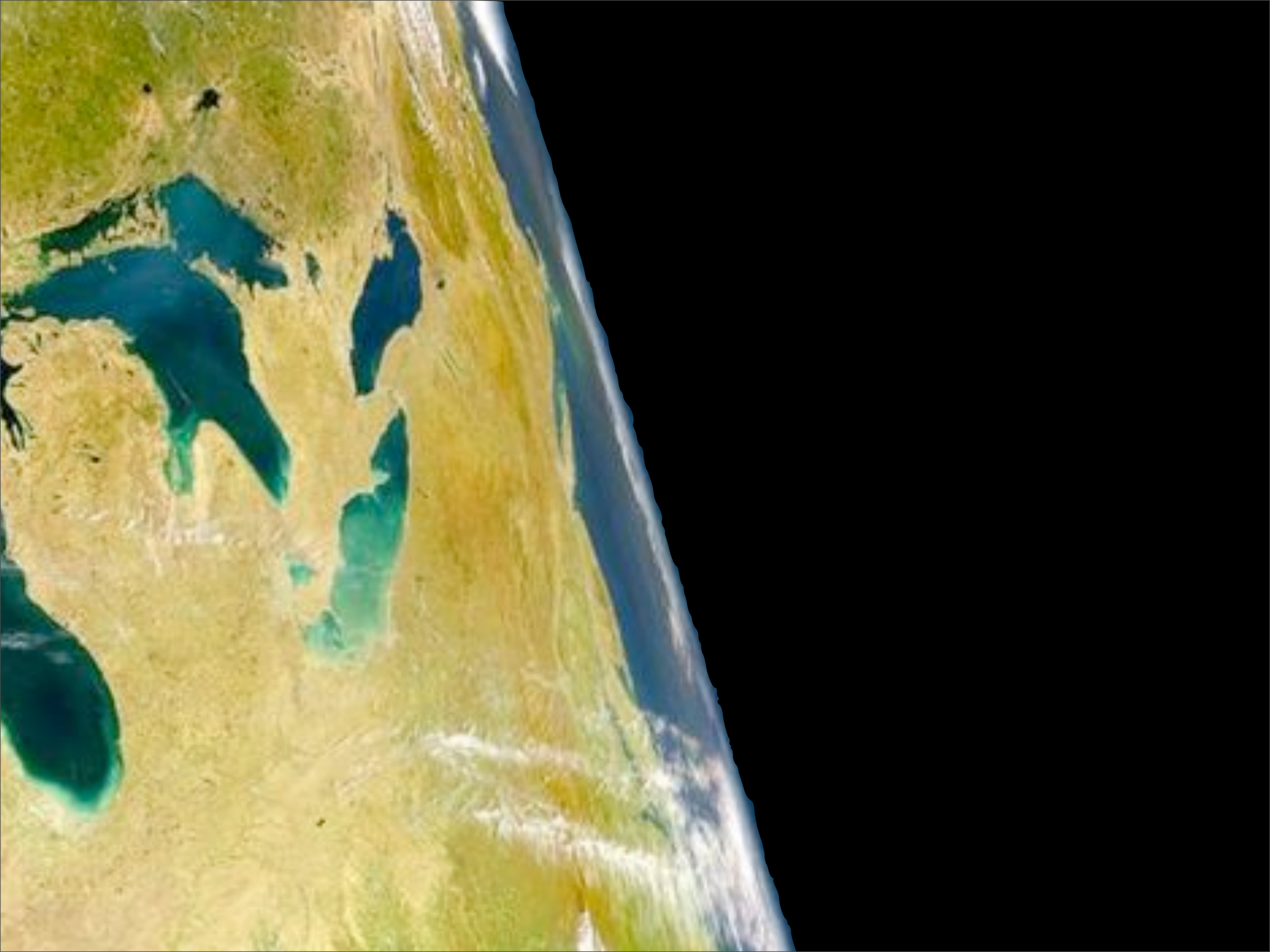
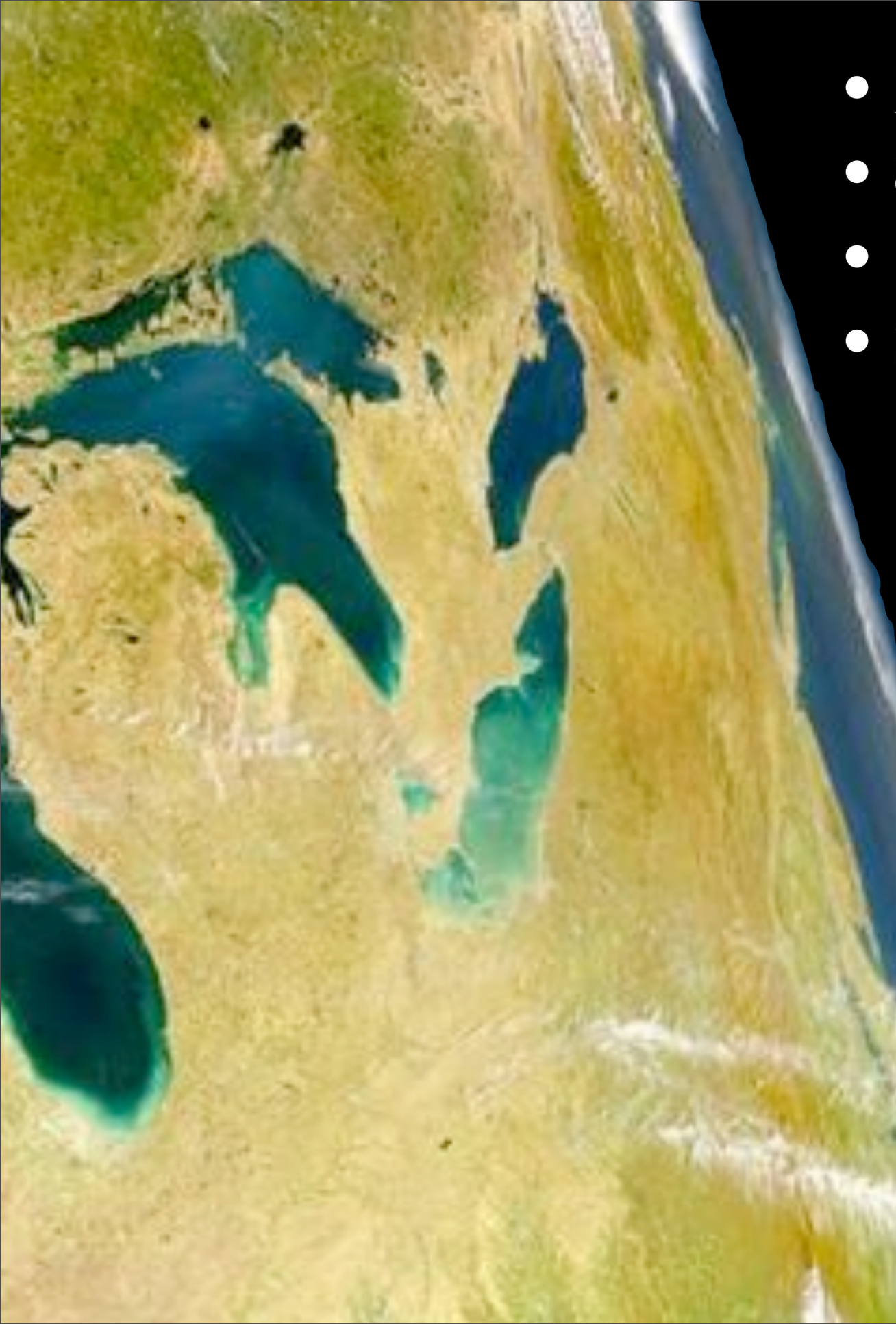


- 2 countries

- 2 countries
- 8 states

- 2 countries
- 8 states
- 1 province



- 2 countries
- 8 states
- 1 province
- Several regional organizations

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- 8 states
- 1 province
- Several regional organizations
- Lots of counties, watershed districts, cities ....

GLRI - SharedGeo's Tasks

- Relate these data to available spatial data across the region
- Create a viewer in which to browse and evaluate data
- Make current and historical imagery and remotely sensed data available for download and use in map services

Project parts

- Map Viewer (CoMap)
- Data Catalog (GeoNetwork)
- Imagery (Imagery Services)

SharedGeo Services
(imagery, data, metadata)

Services

Internet

Other Services
(TNM, GeoBase)

Services

metadata

GeoNetwork Node

Search for data

Search results

CoMap

Collaborative Mapping (CoMap)

- Web map integration tool built with GeoMoose
- Data catalog tool built in to search for data sources
- Web map services (WMS) can be added to the map
- Transparent reference map built

Thunder Bay

Sault Sainte Marie

Green Bay

Rochester

Madison

Milwaukee

Grand Rapids

Flint

Detroit

Rockford

Chicago

South Bend

Toledo

Cleveland

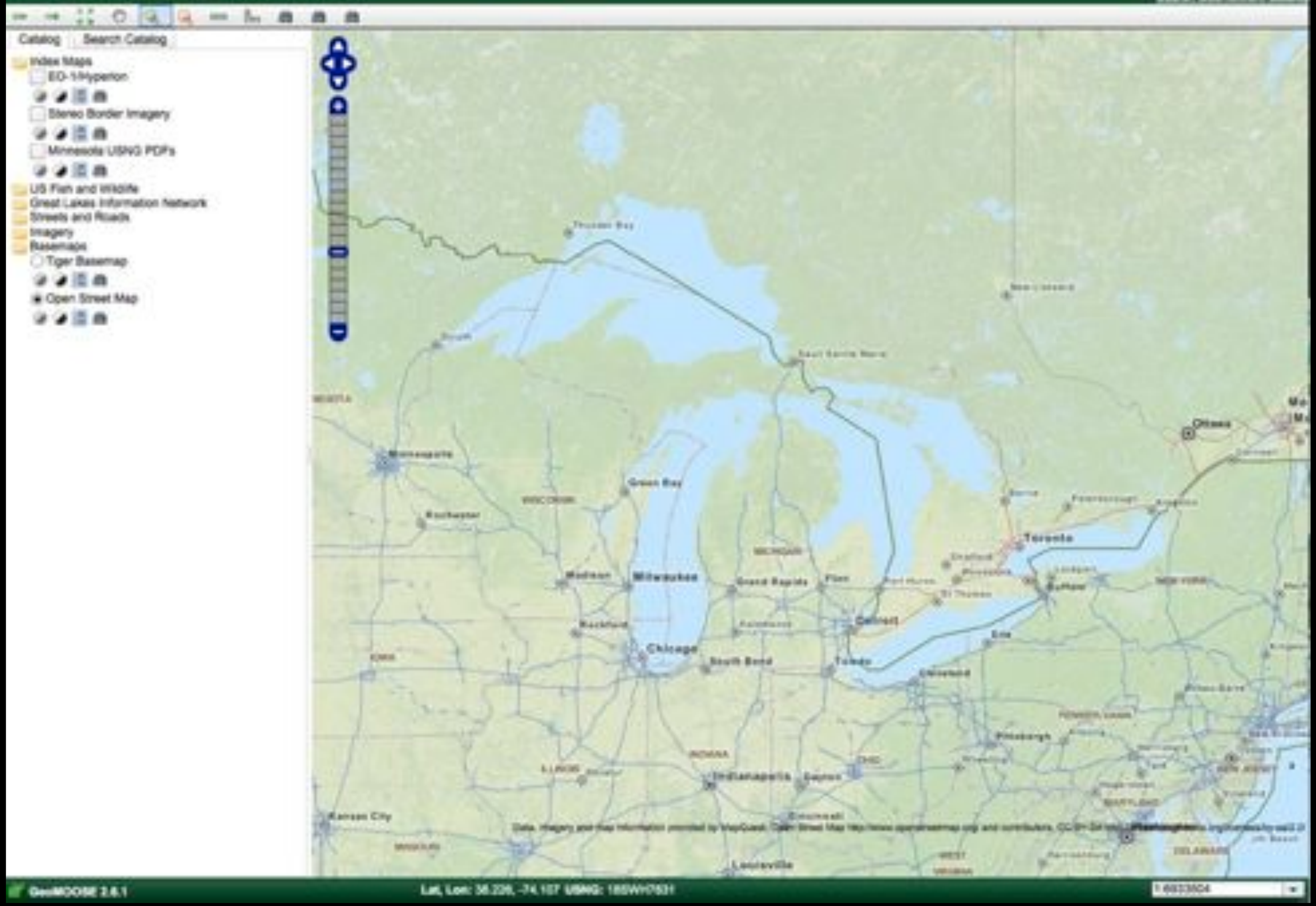
Erie

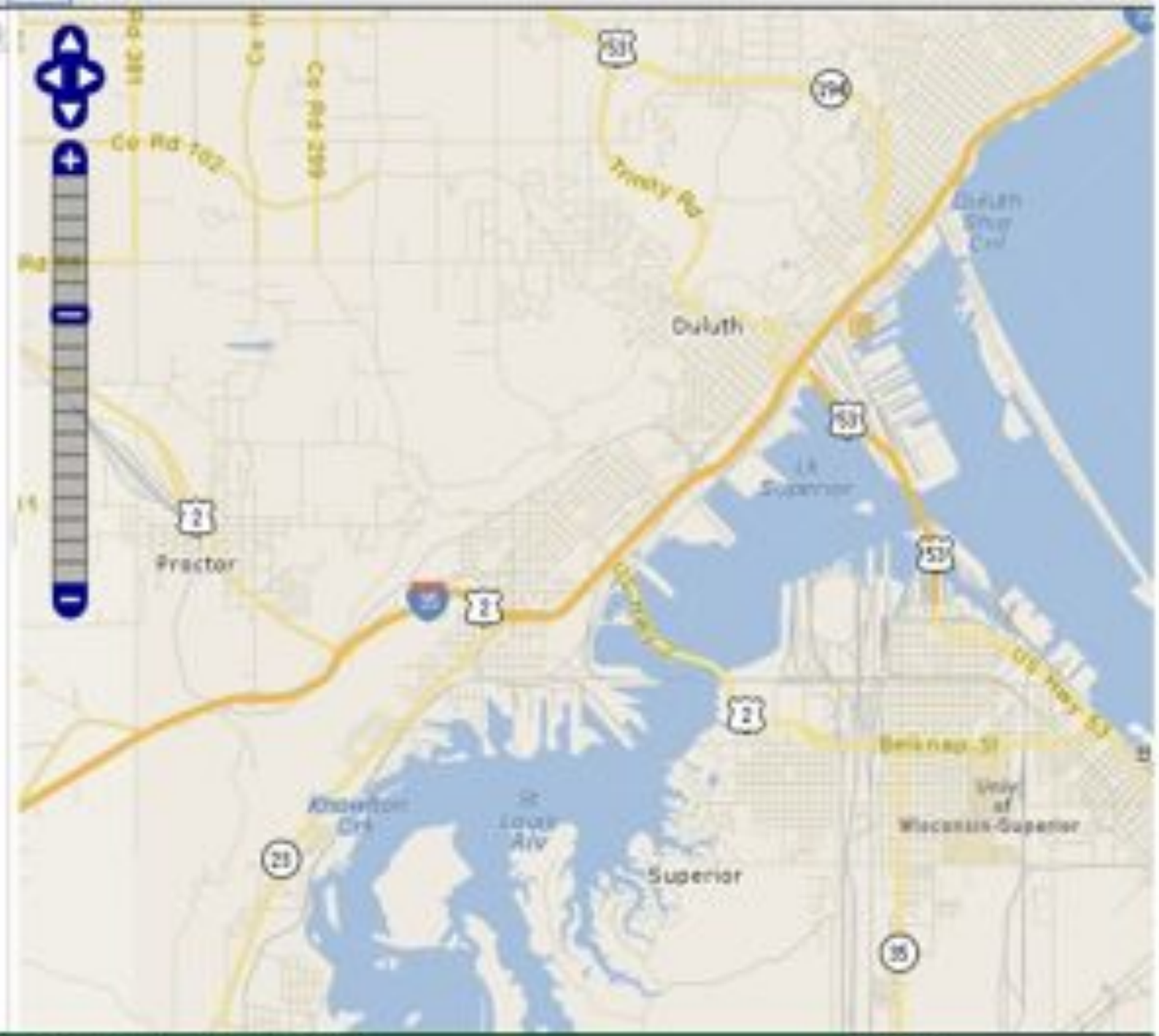
Toronto

Buffalo

Pittsburgh

Collaborative Mapping





Collaborative Mapping

Search GeoNetwork Catalog

- Index Maps
- US Fish and Wildlife
- Great Lakes Information Network
- Streets and Roads
- Imagery
  - ☐ MN 2009 DOQQ 30cm (color)
  - ☐ MN 2009 DOQQ 30cm (cir)
  - ☐ MN 2009 DOQQ 50cm (color)
  - ☐ MN 2009 DOQQ 50cm (cir)
  - ☐ Border Patrol 2009 (beta)
- Basemaps
  - ● Tiger Basemap
  - ○ Open Street Map

GeoMOOSE 2.6.1

Lat, Lon: 46.687, -92.244 USNG: 15TWM57837070

1:108336

Collaborative Mapping

Search GeoNetwork Catalog

Catalog | Search Catalog | Visible La

- Index Maps
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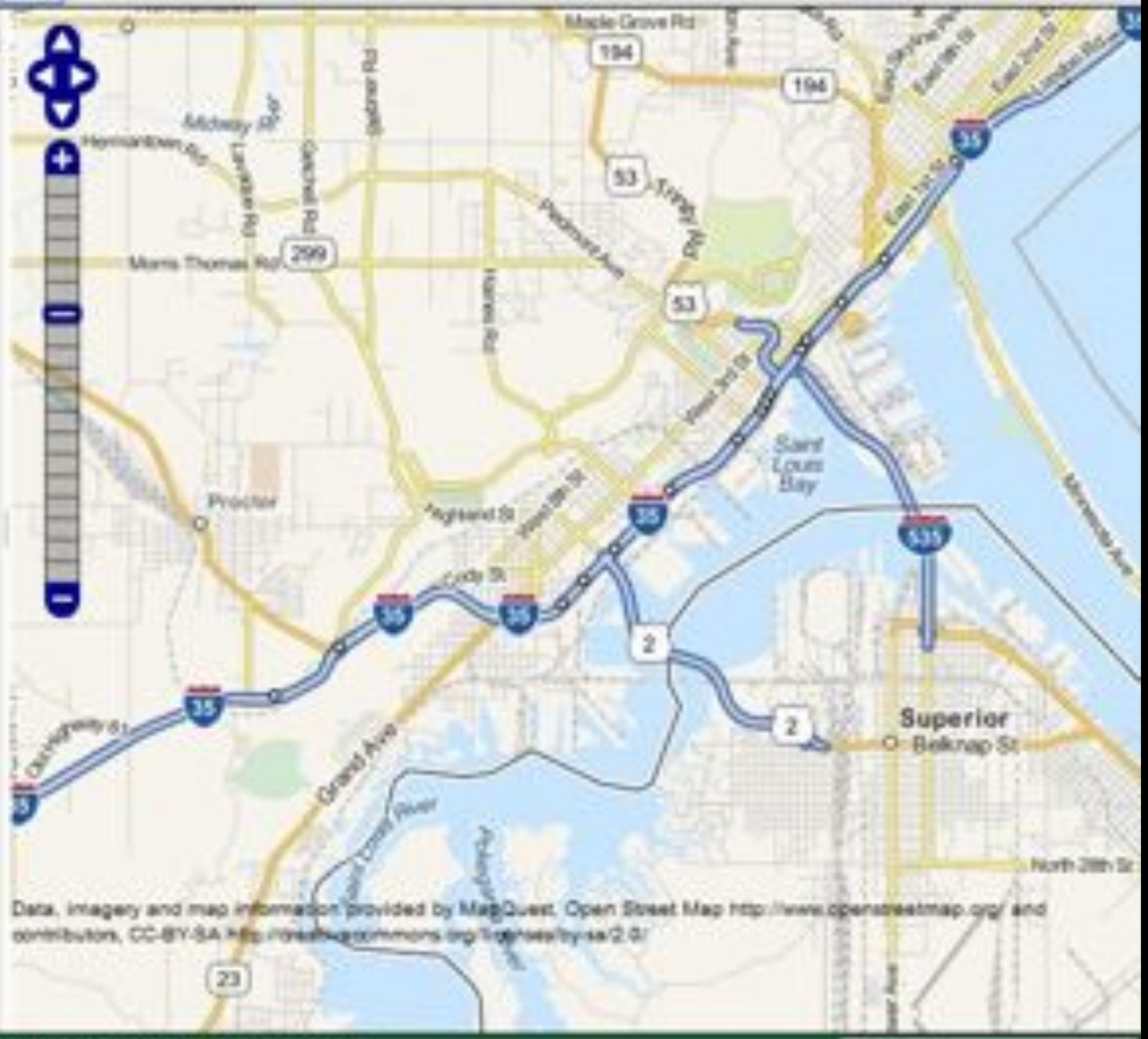

Data, imagery and map information provided by MapQuest, Open Street Map http://www.openstreetmap.org/ and contributors, CC-BY-SA http://creativecommons.org/licenses/by-sa/2.0/

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GeoMOOSE 2.6.1 Lat, Lon: 46.706, -92.247 USNG: 15TWM57587279 1:108336

Collaborative Mapping

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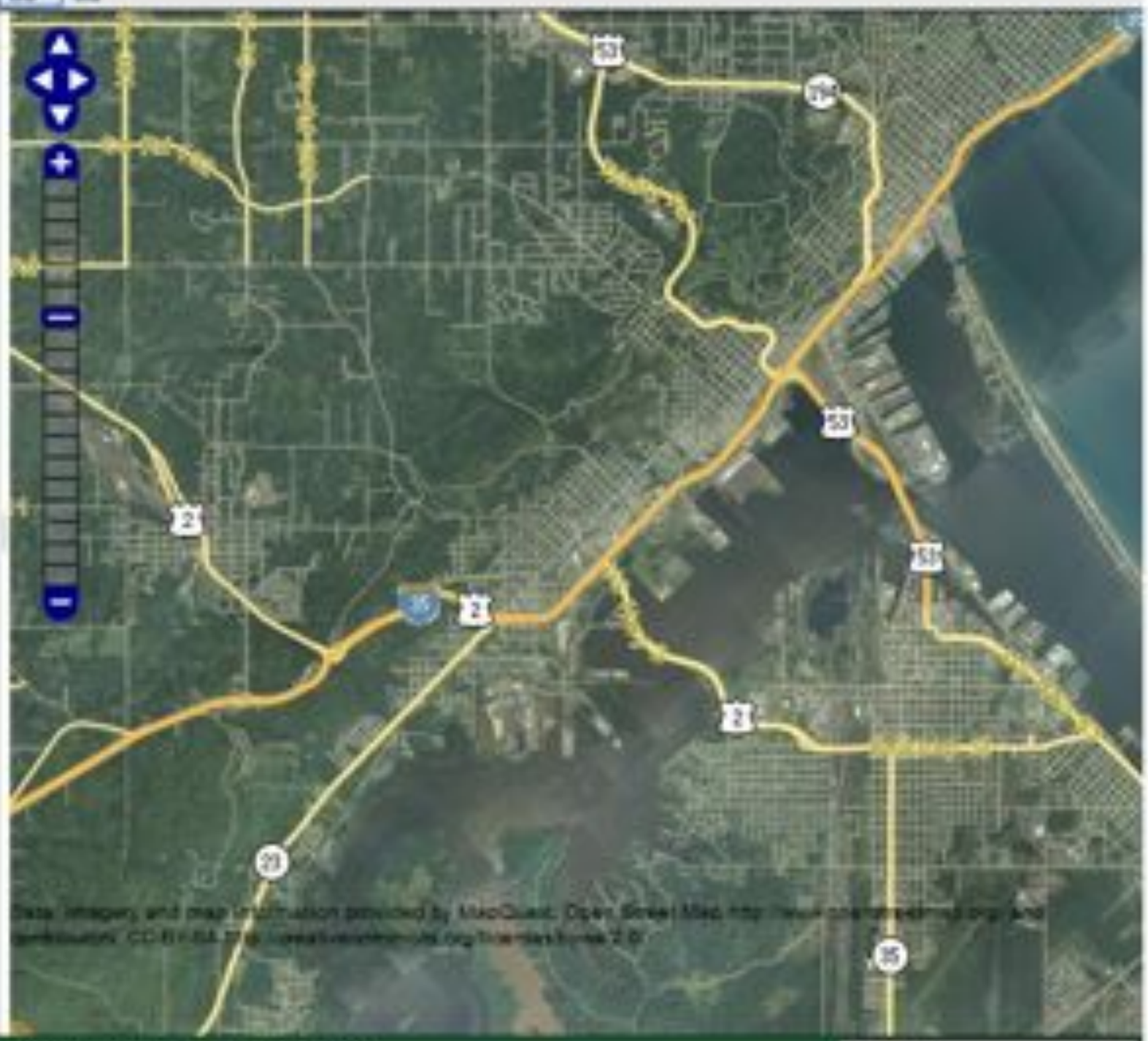
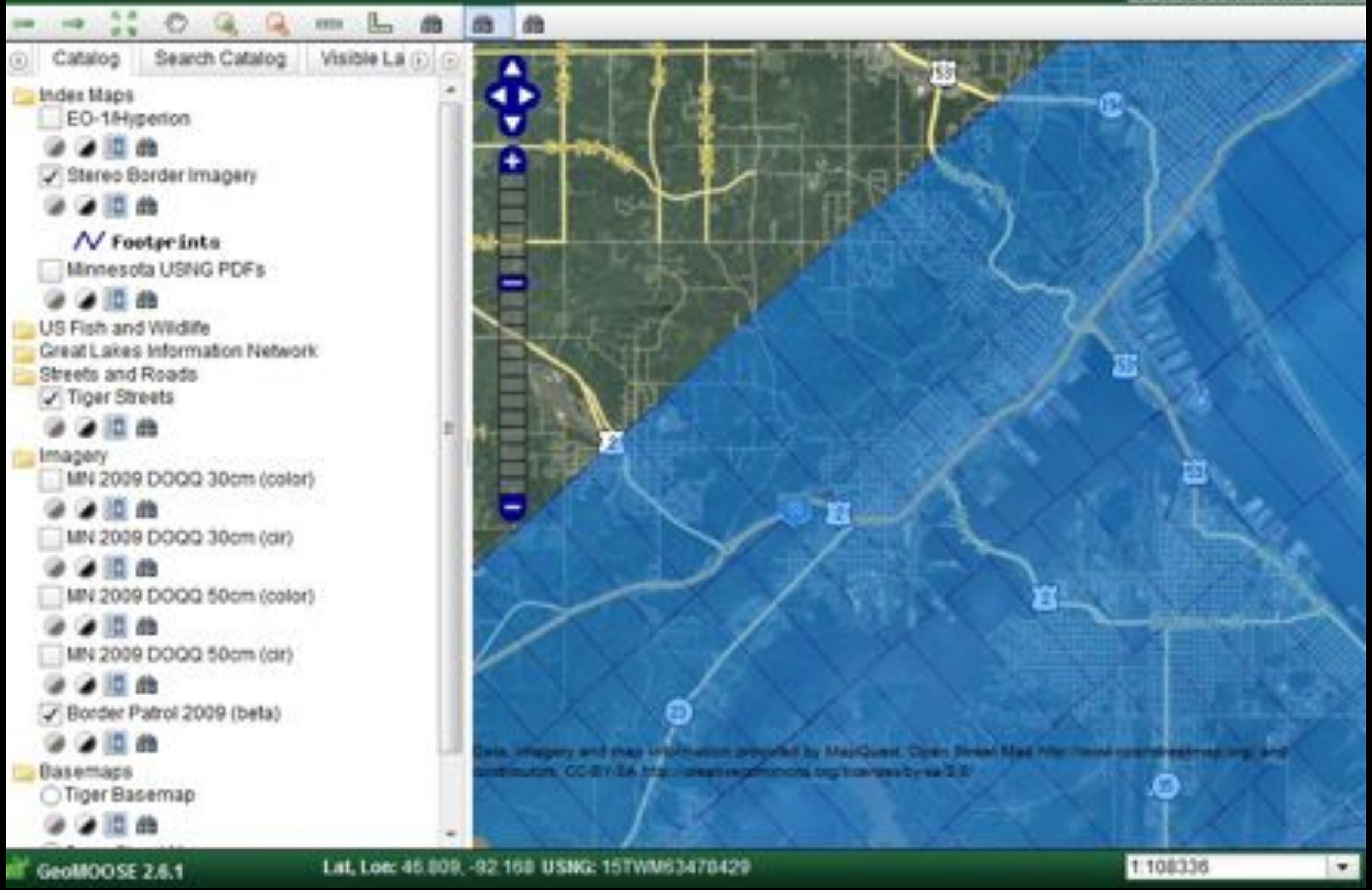


GeoMOOSE 2.6.1 Lat, Lon: 46.706, -92.247 USNG: 15TWM57587279 1:108336

Collaborative Mapping



Collaborative Mapping

Search GeoNetwork Catalog

Visible Layers | Find Image Files

Available Tools:

- Navigate
- Draw Point
- Draw Line
- Draw Polygon

Cancel | Go!

GeoMOOSE 2.6.1 | Lat, Lon: 46.809, -92.149 USNG: 15TWM6496828 | 1:108336

Collaborative Mapping

Search GeoNetwork Catalog

Visible Layers | Find Image Files

Back to Settings

Images available for the selection area:

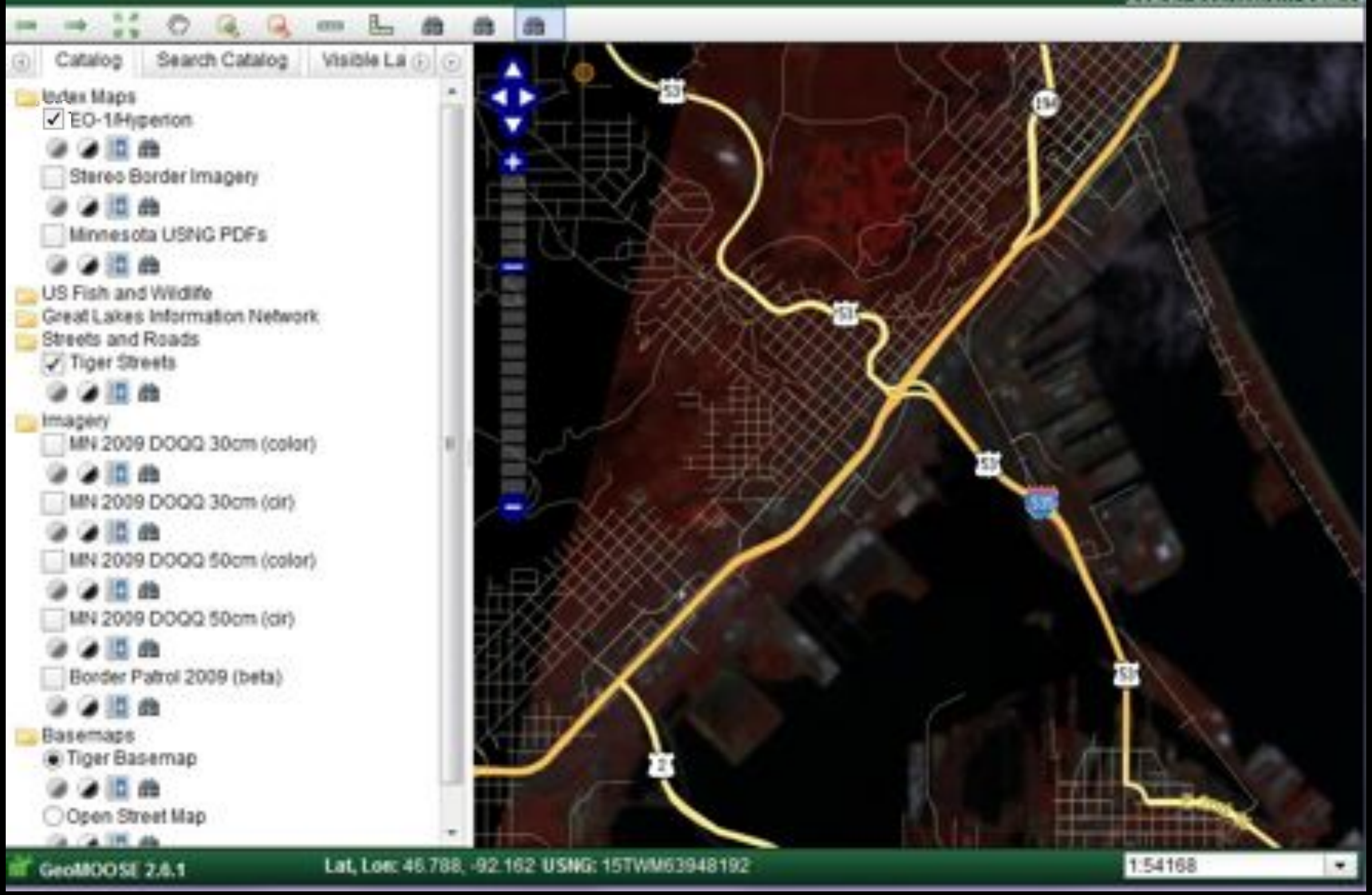
Border Patrol

- Border_Stereo/MI0904/MI0904S8005_23.tif
- Border_Stereo/MI0904/MI0904S8005_24.tif
- Border_Stereo/MI0904/MI0904S8005_25.tif
- Border_Stereo/MI0904/MI0904S8005_26.tif
- Border_Stereo/MI0904/MI0904S8005_27.tif
- Border_Stereo/MI0904/MI0904S8006_25.tif
- Border_Stereo/MI0904/MI0904S8006_26.tif
- Border_Stereo/MI0904/MI0904S8006_27.tif
- Border_Stereo/MI0904/MI0904S8006_29.tif

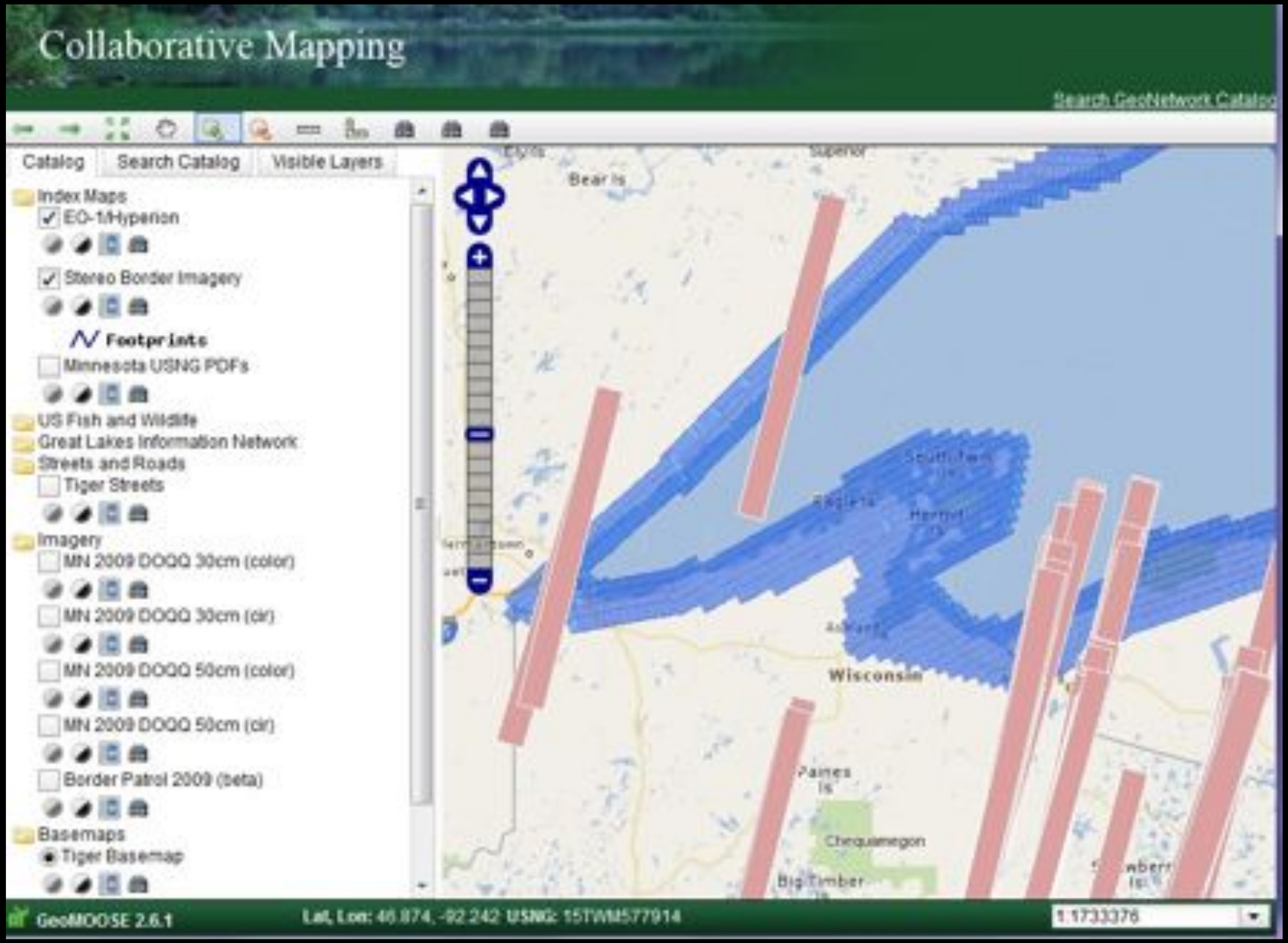
Download Checked Images

GeoMOOSE 2.6.1 Lat, Lon: 46.809, -92.179 USNG: 15TWM62608429 1:108336

Collaborative Mapping



Collaborative Mapping



Collaborative Mapping

Search GeoNetwork Catalog

Catalog | Search Catalog | Visible Layers

Contains

USGS

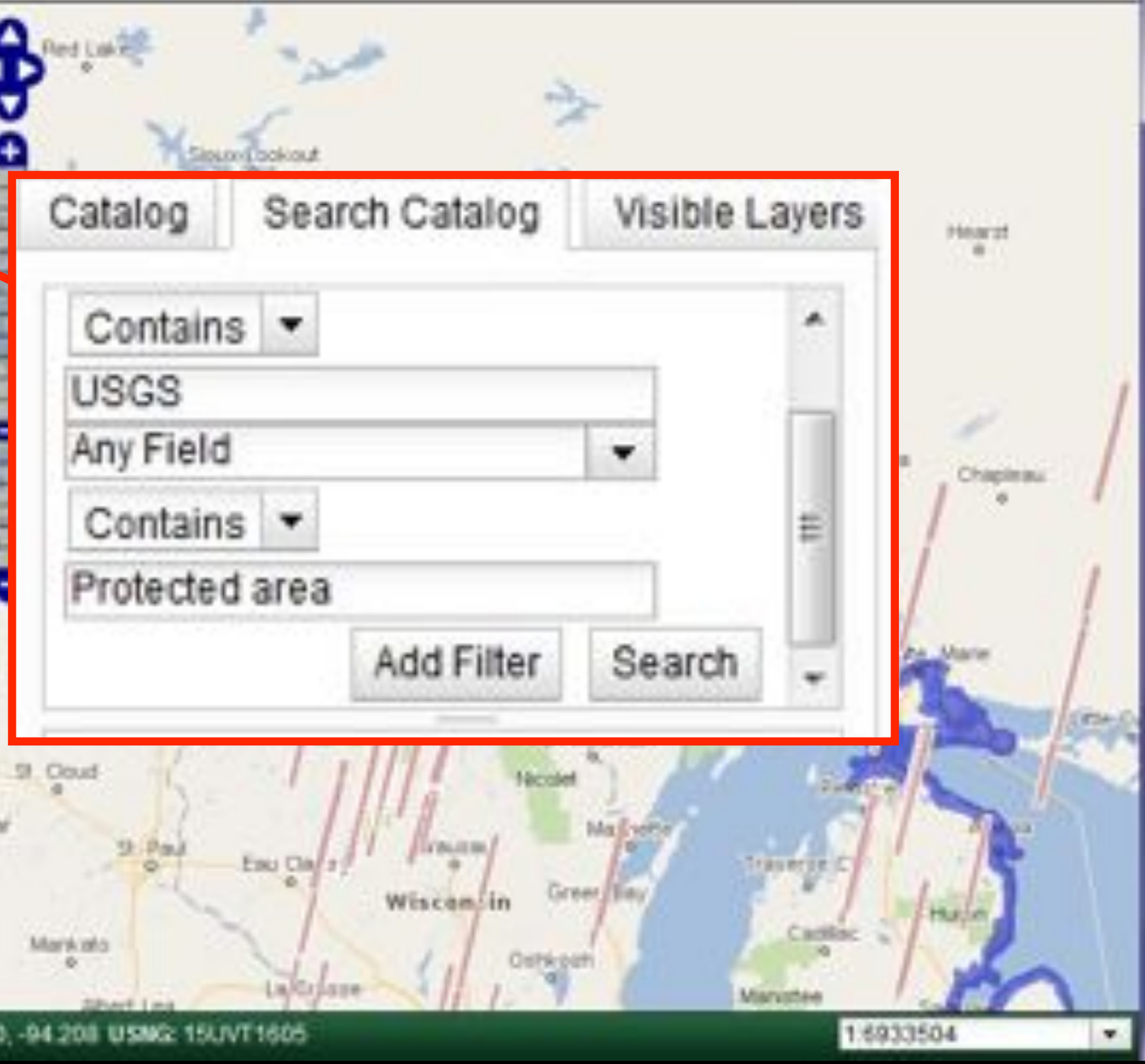
Any Field

Contains

Protected area

Add Filter | Search

Query returned about 2 results.



Catalog | Search Catalog | Visible Layers

Contains

USGS

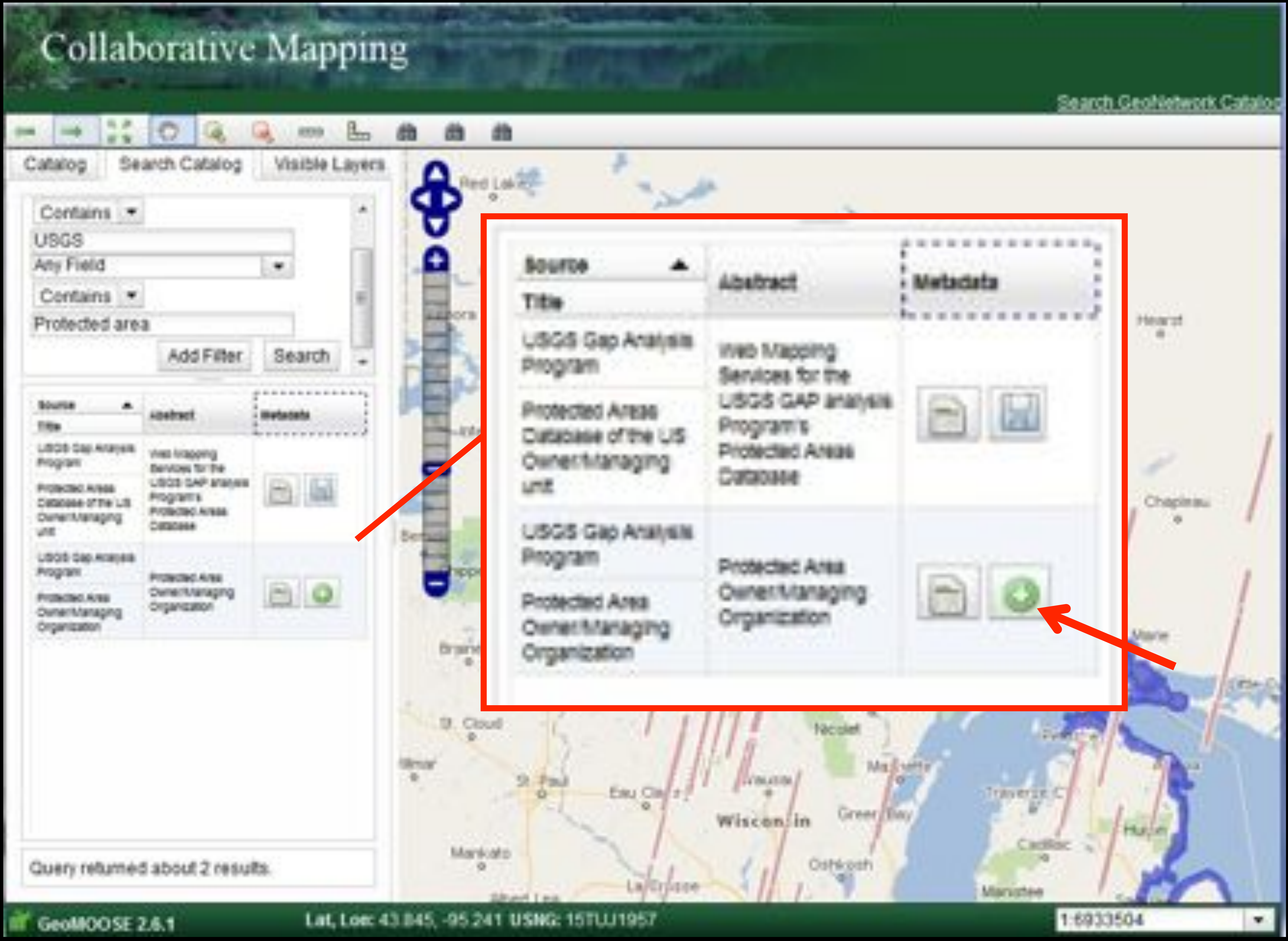
Any Field

Contains

Protected area

Add Filter | Search

GeoMOOSE 2.6.1 Lat, Lon: 51.490, -94.208 USNG: 15UVT1605 1:6933504



Collaborative Mapping
Search GeoNetwork Catalog
Catalog
Search Catalog
Visible Layers
Contains
USGS
Any Field
Contains
Protected area
Add Filter
Search
Source
Title
Abstract
Metadata
USGS Gap Analysis Program
Protected Areas Database of the US Owner/Managing unit
Web Mapping Services for the USGS GAP analysis Program's Protected Areas Database
USGS Gap Analysis Program
Protected Area Owner/Managing Organization
Protected Area Owner/Managing Organization
Query returned about 2 results.
GeoMOOSE 2.6.1
Lat, Lon: 43.845, -95.241 USNG: 15TUJ1957
1:6933504
Wisconsin
St. Cloud
St. Paul
Eau Claire
Mankato
Green Bay
Oshkosh
La Crosse
Traverse C
Cadillac
Manistee
Huron
Chapleau
Hearst
Marquette
Red Lake

Collaborative Mapping

Search GeoNetwork Catalog

Catalog | Search Catalog | Visible Layers

Contains
USCS
Any Field
Contains
Protected area
Add Filter | Search

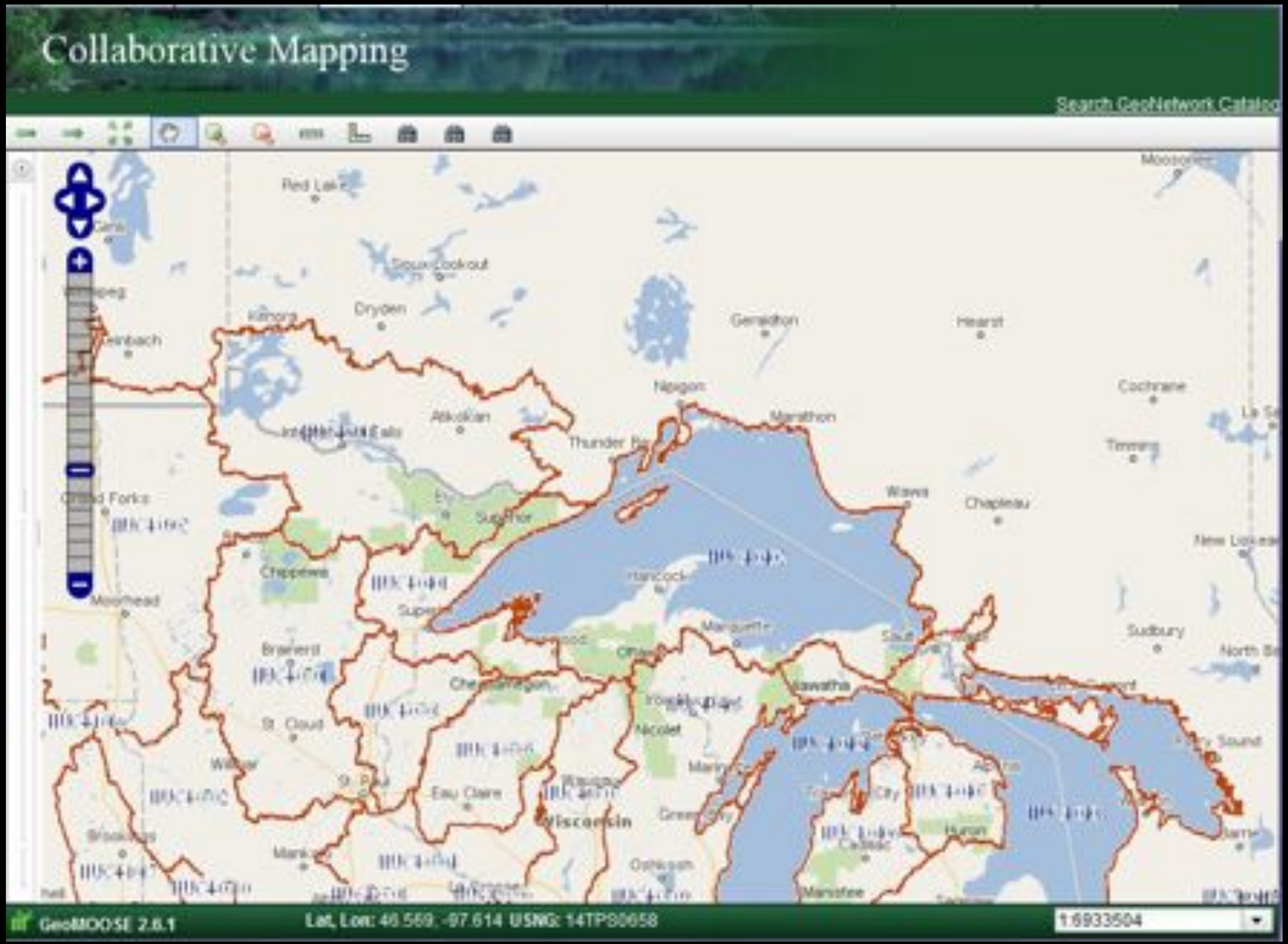
Source / Title	Abstract	Metadata
USGS Gap Analysis Program	Web Mapping Services for the USGS GAP analysis Program's Protected Areas Database	
Protected Areas Database of the US Owner/managing unit		
USGS Gap Analysis Program	Protected Area Owner/managing Organization	
Protected Area Owner/managing Organization		

Query returned about 2 results.

Red Lake
Dryden
Geraldton
Hearst
Nipigon
Marathon
Thunder Bay
International Falls
Wawa
Chapleau
St. Cloud
Wisconsin

GeoMOOSE 2.6.1 Lat, Lon: 50.954, -93.088 USNG: 15UV939344 16933504

Collaborative Mapping



Collaborative Mapping

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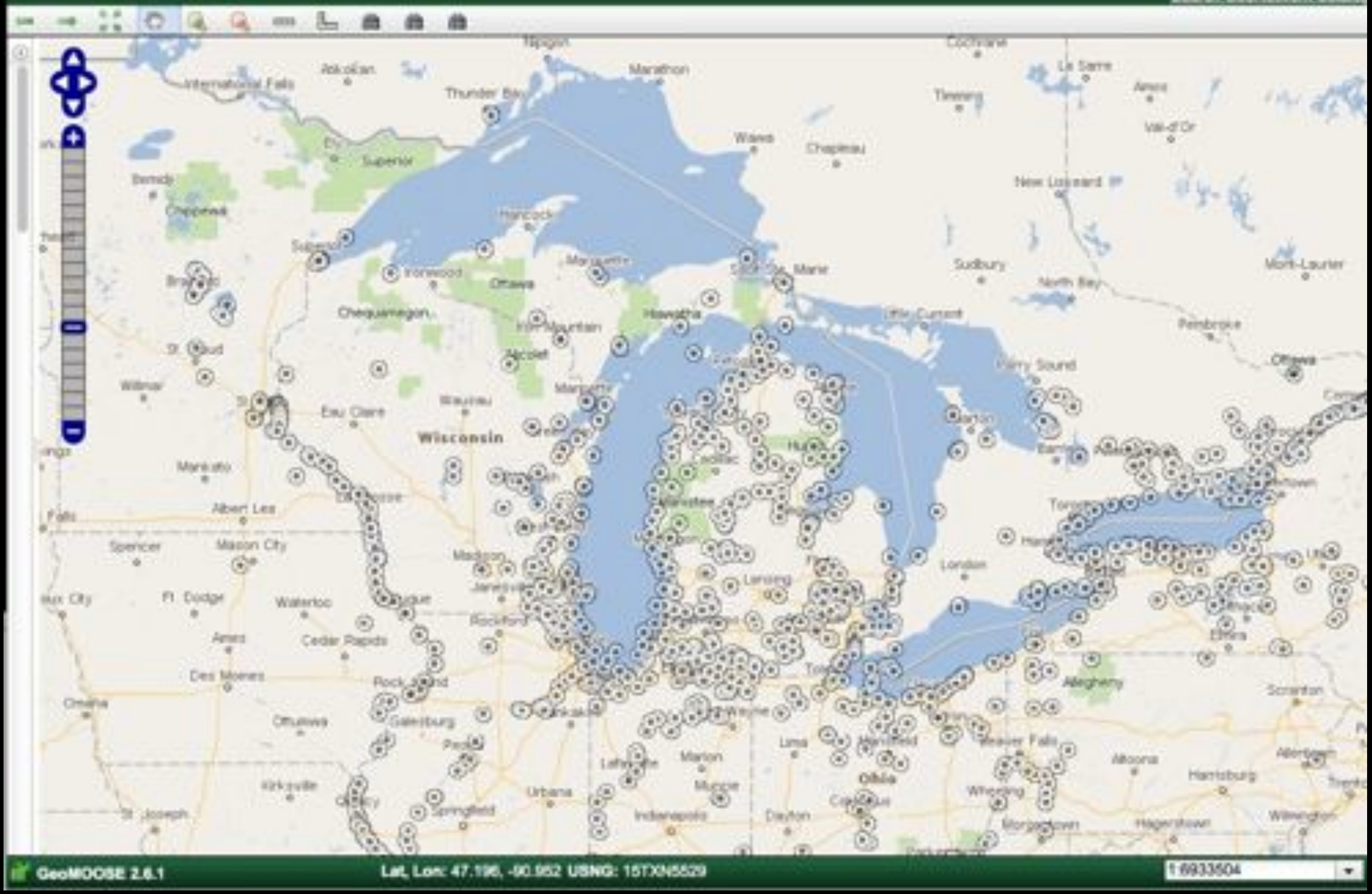


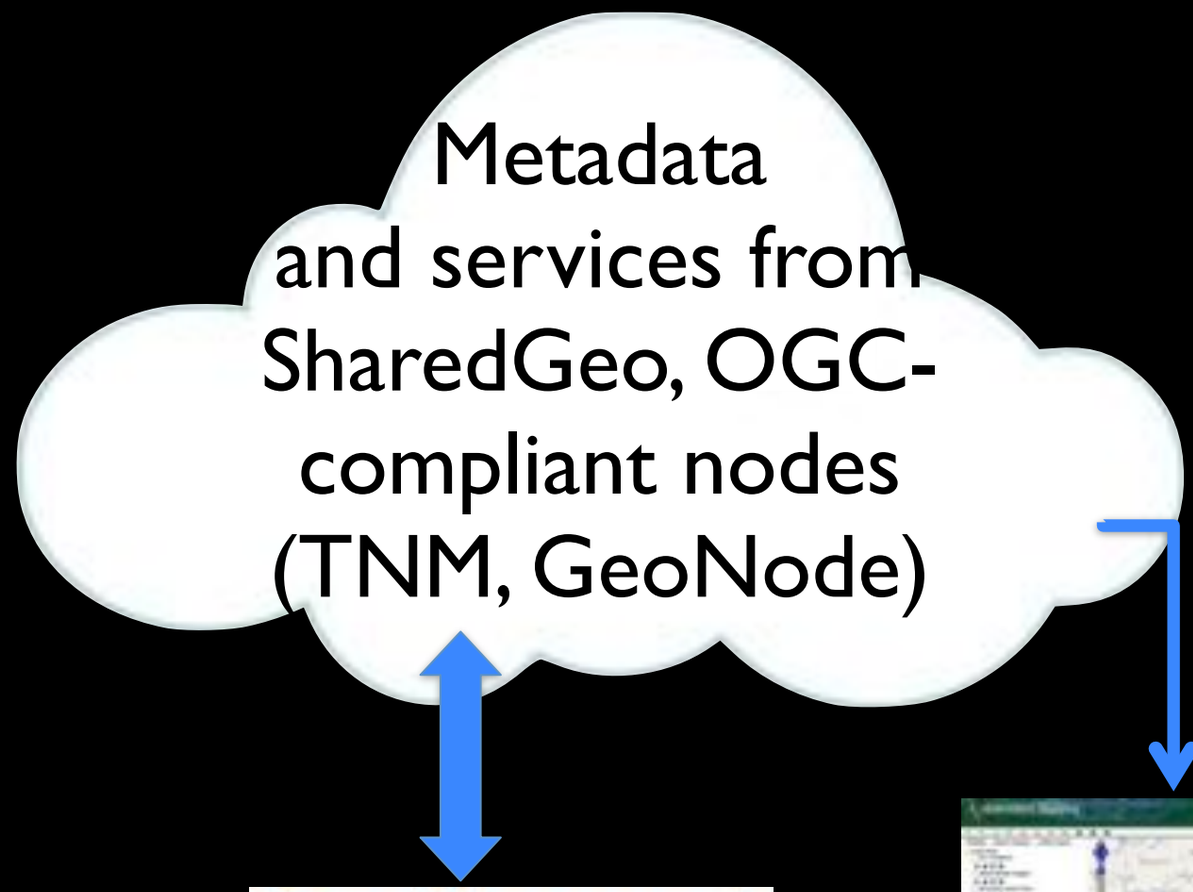
How the search works: GeoNetwork

- Is a tool to manage spatial data resources
- Outputs a Catalog Web Service (CS-W)
- CSW is a standards-compliant way to serve metadata about data, services
- Metadata can be harvested from other data catalog and/or service
    - CSW, Z39.50, WAF, WMS, GeoNetwork nodes

Spatial Data Catalog

GeoNetwork harvests and catalogs metadata and services

A catalog web service (CSW) is published. This can be queried from the web map and more



JavaScript CSW Connector

GeoNetwork Opensource

Imagery

- Imagery Exists
- Needs to be more available

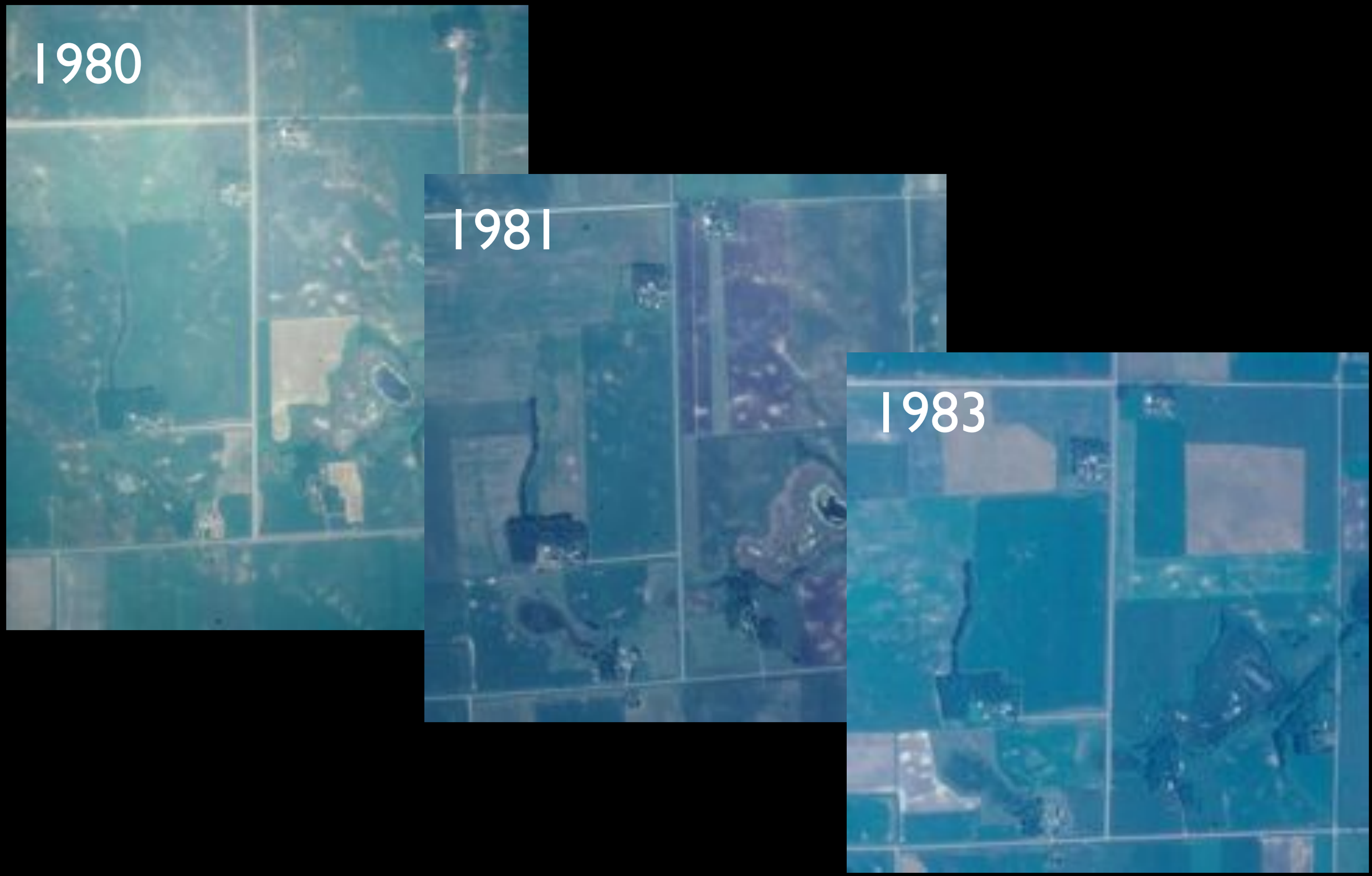
Needs to Support

- Web Mapping (WMS, Tiles)
- Classification (WCS, downloads)
- Non-Orthos
  - Linked Documents (PDFs, ground level photos, ...)
  - Perspective (for Stereo reconstruction)
  - Radar/Lidar
  - ...

Orthos

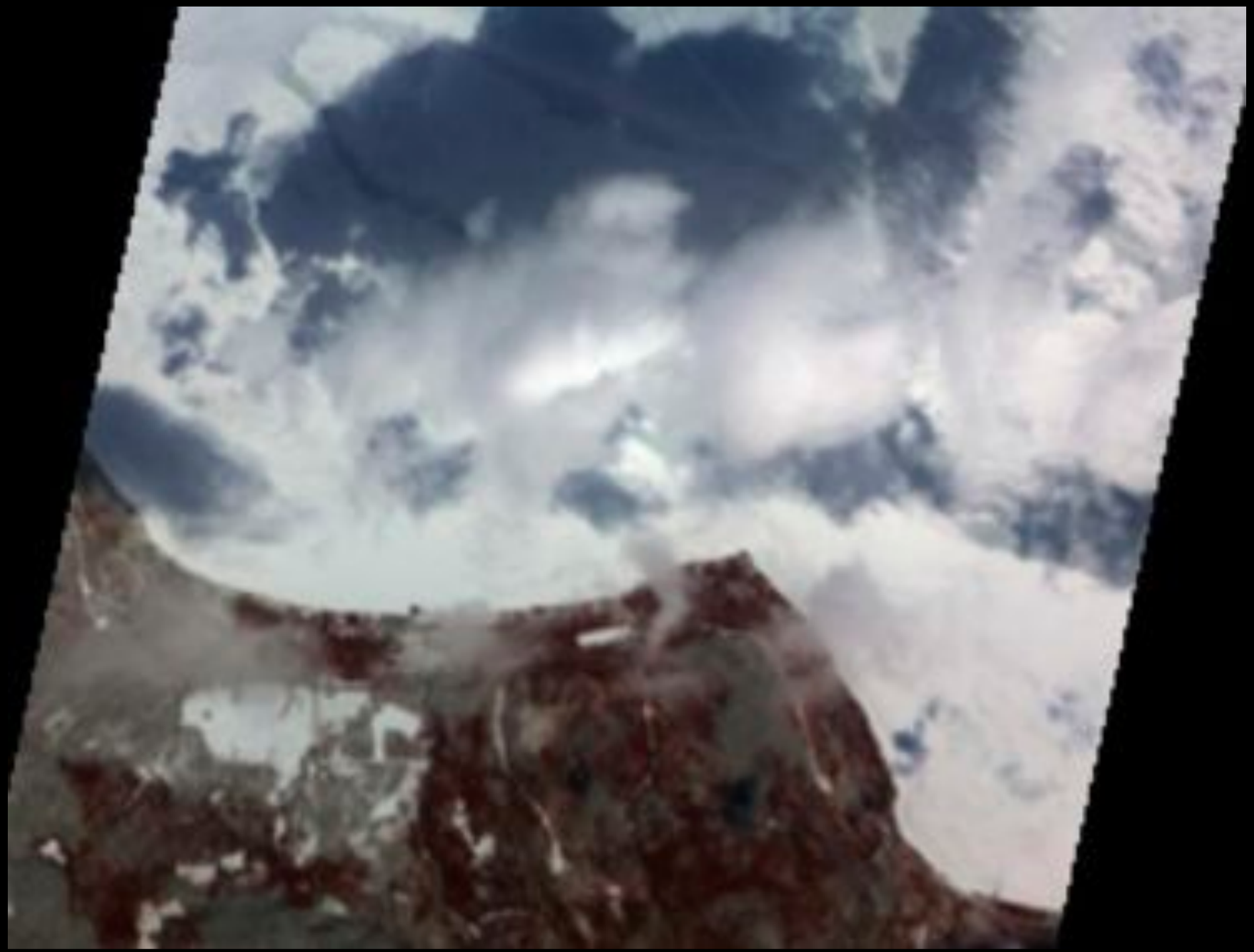
Obliques

Historical Time Series

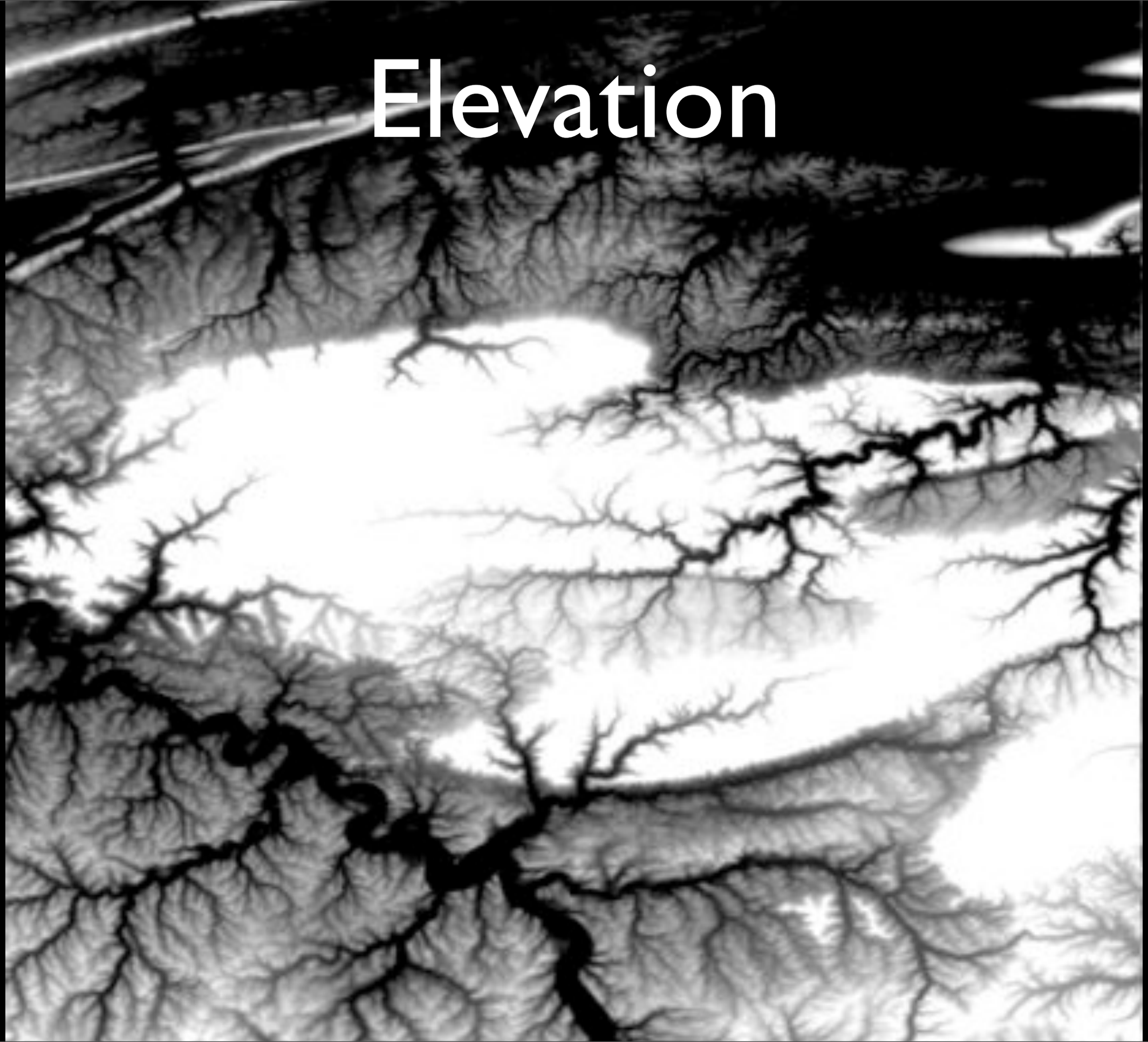


Radar

Hyperspectral (EO-1)



Elevation



Stereo

The Datasets

- Support up to 50TB of data initially
- Satellite Imagery, Aerial Ortho-photos, (and other formats: radar, stereo pairs)

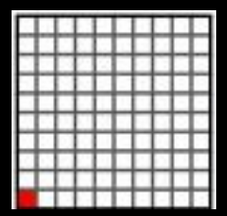
The Datasets

The Datasets

- = 1 GB

The Datasets

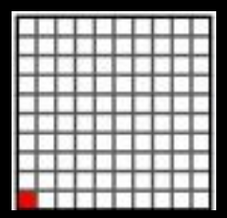
= 1 GB



= 100 GB

The Datasets

= 1 GB



= 100 GB

= 1 TB

The Datasets

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~45 GB - MN FSA MrSID (1 year)

The Datasets

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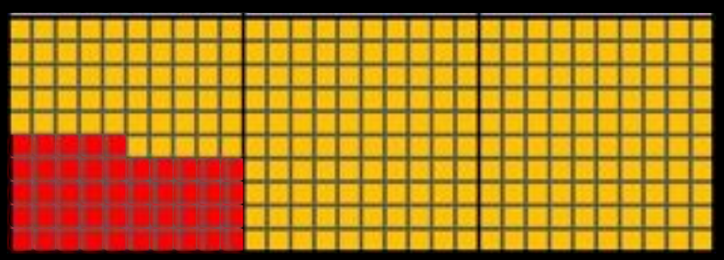
~250 GB - MN 8 Years



The Datasets

~45 GB - MN FSA MrSID (1 year)

~250 GB - MN 8 Years

~600 GB - MN Imagery WMS

The Datasets

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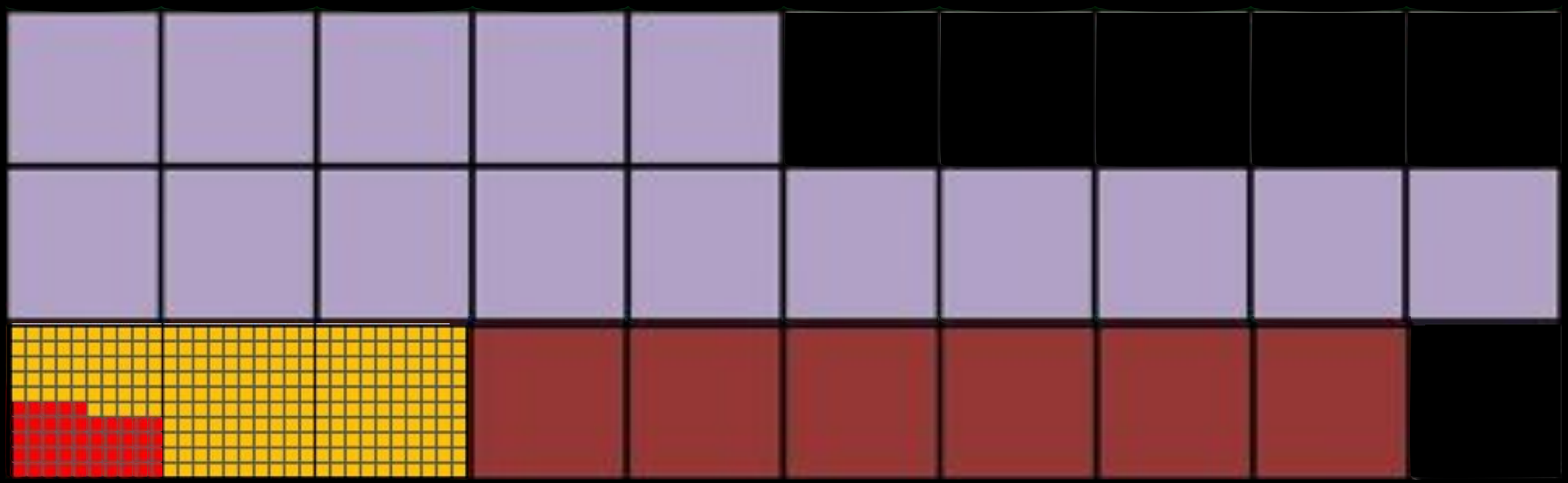
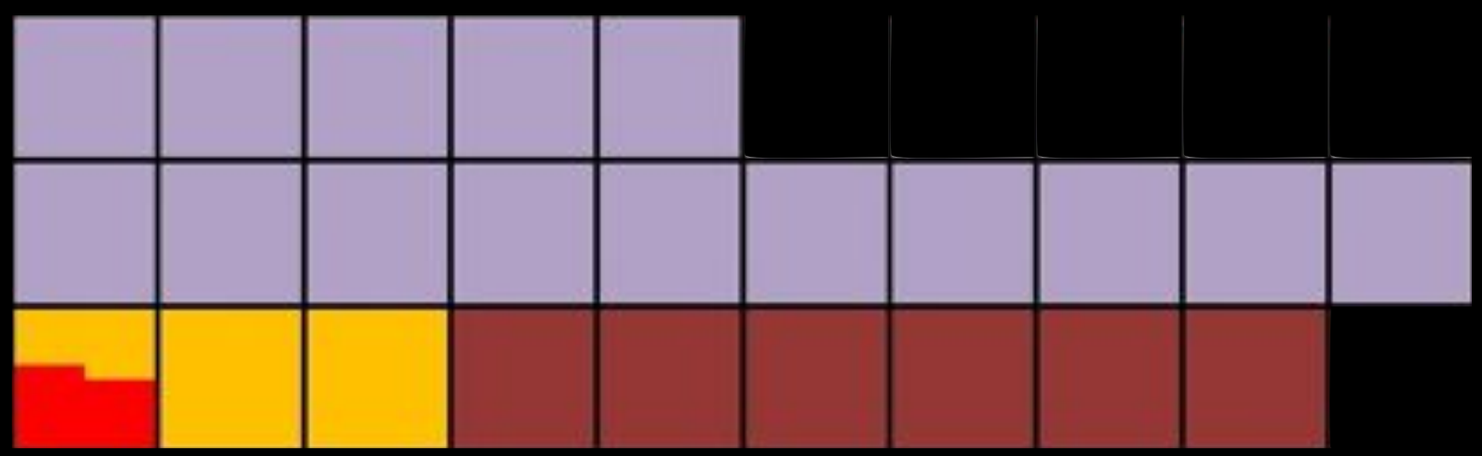
~250 GB - MN 8 Years

~600 GB - MN Imagery WMS

~1.5 TB - 2009 DOQQ Leaf Off

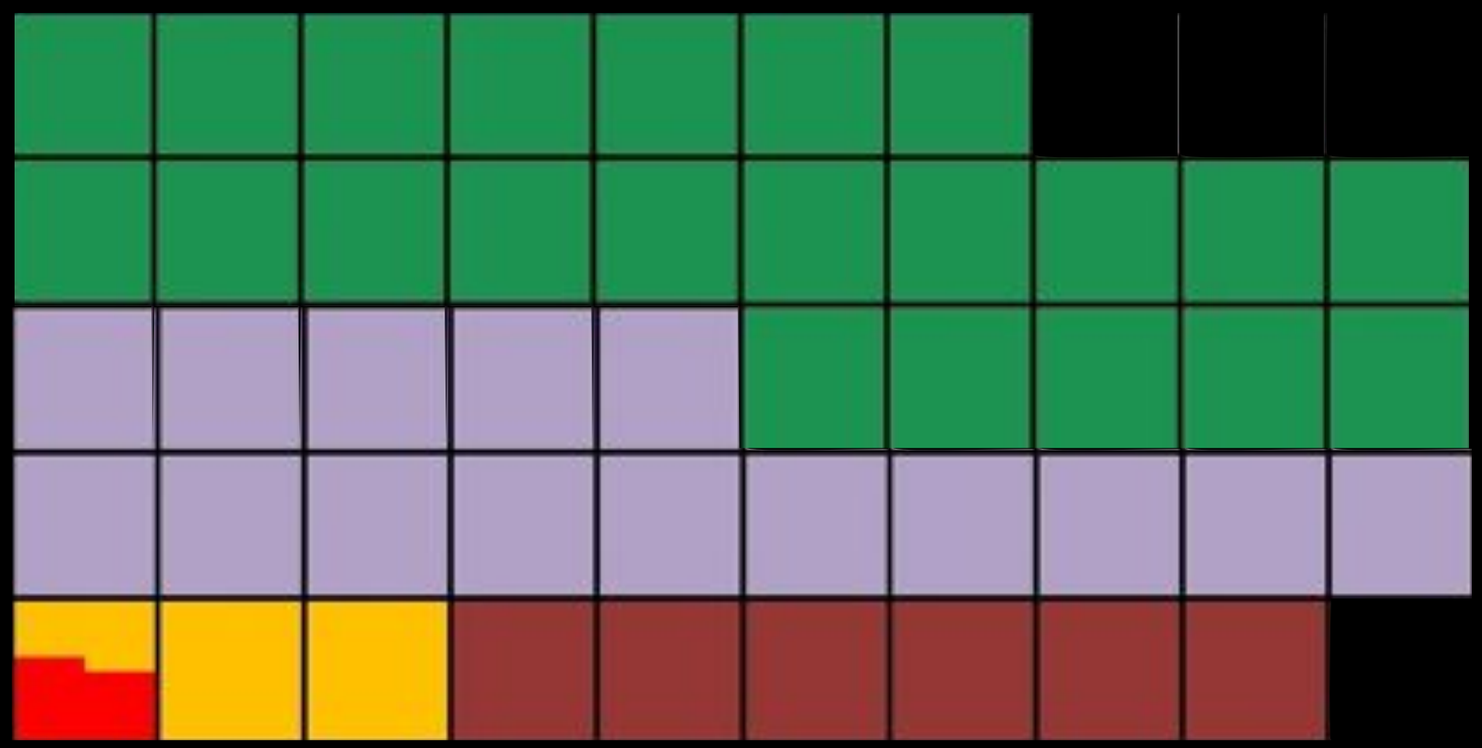


The Datasets



The Datasets

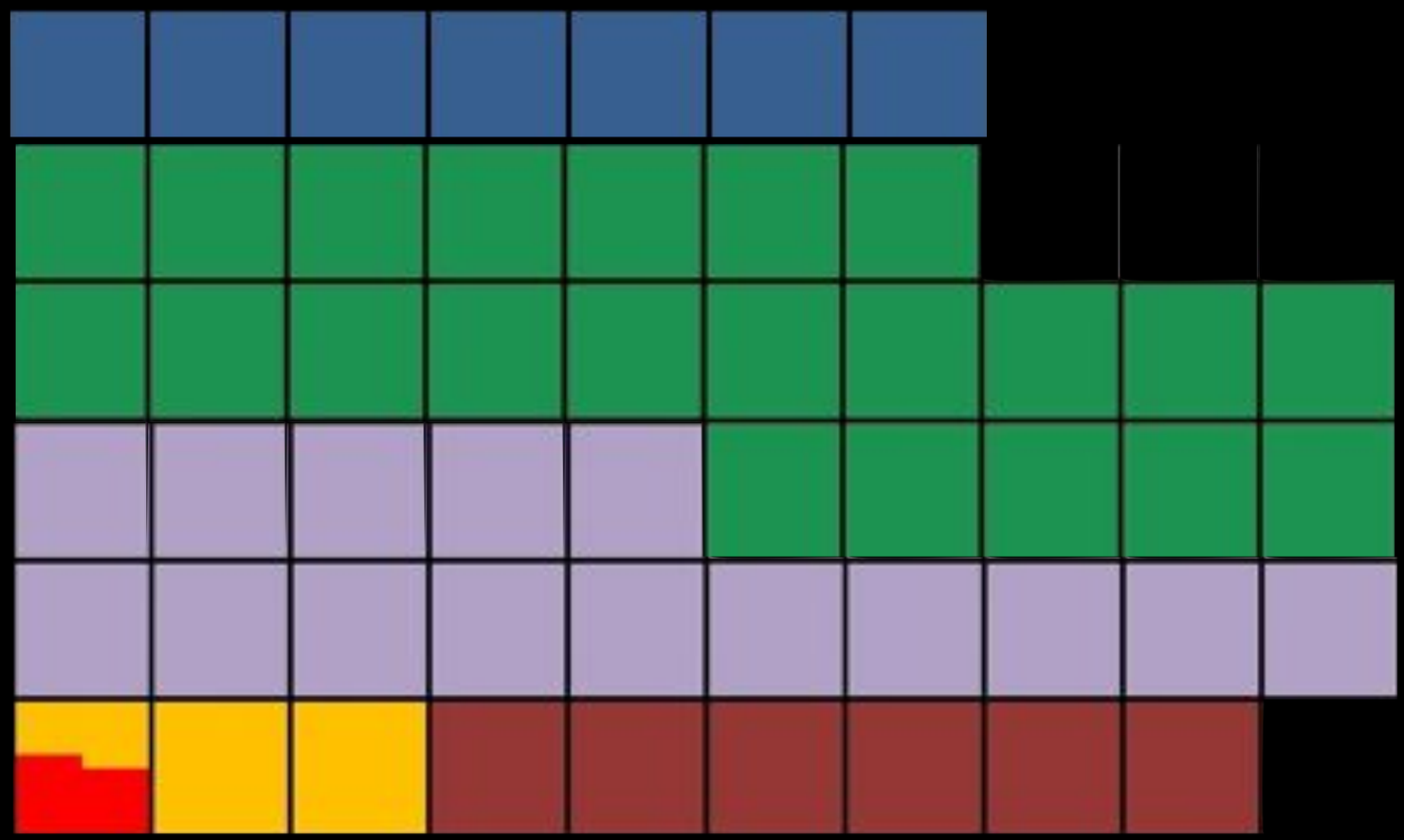
~ Satellite Imagery and Radar



The Datasets

~ Satellite Imagery and Radar

~ Border Patrol Orthos



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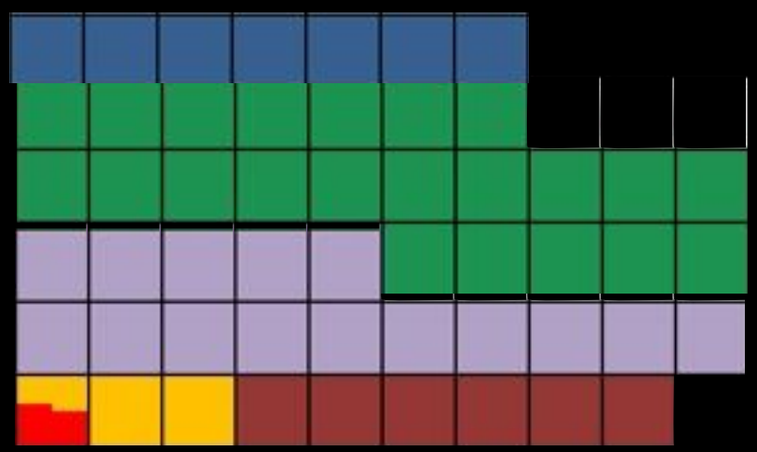
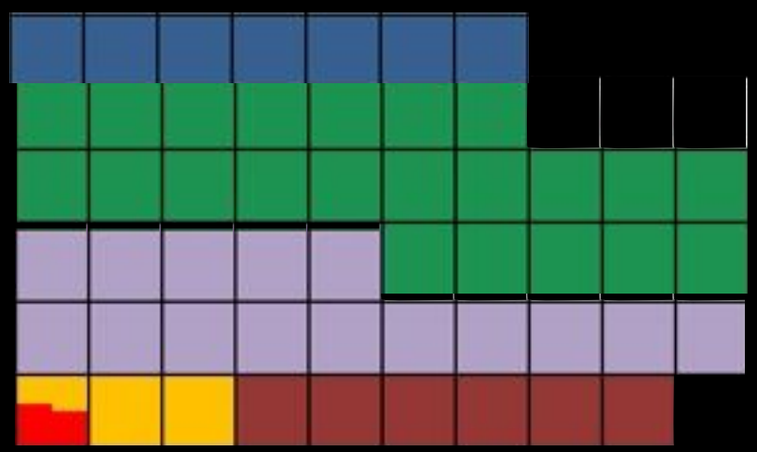


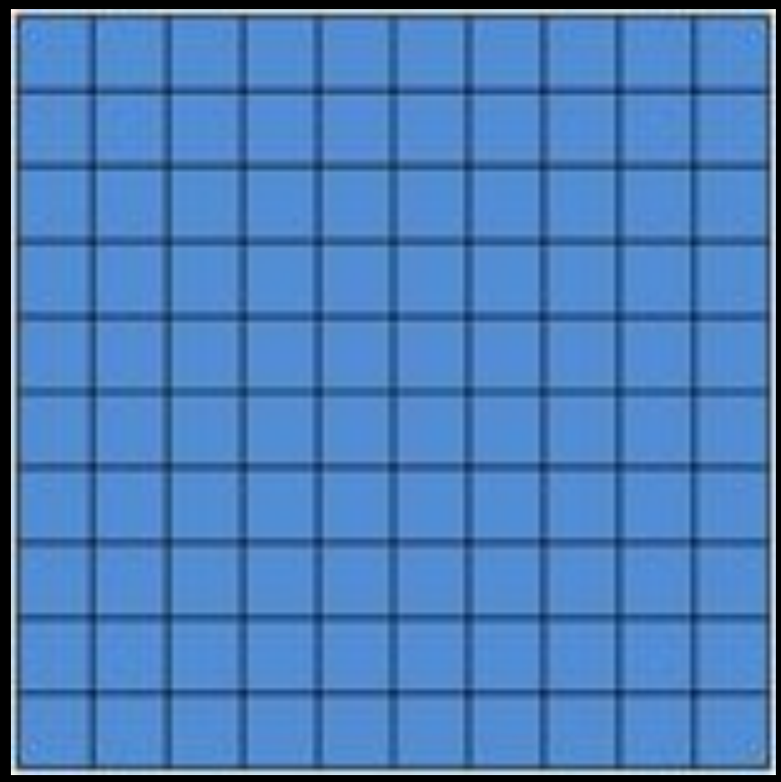
The Datasets

~ Satellite Imagery and Radar

~ Border Patrol Orthos

~ Border Patrol Stereos





The Constraints

- Limited initial budget
- Limited staff time to manage system
- Ability to grow seamlessly as data grows
- Limit access to sensitive/licensed datasets

Imagery Web Services

SharedGeo Services
(imagery, data, metadata)

MapCache

MapServer

Swift

OpenAerialMap

Raw Data

Raw Data

PostgreSQL

1. Web Mapping Services (WMS)
2. Web Coverage Services (WCS)
3. Web Tile Services (WTS)
4. Metadata
5. Raw & Processed Data Downloads

How this made imagery more available?

- Viewed Online
- WMS
  - Quantum GIS
  - Google Earth
  - ArcGIS

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- WMS
  - Quantum GIS
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  - ArcGIS

Yes!

Summary

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- Problem
  - Make current and historical imagery available
  - Catalog spatial data across the region
  - Create a map viewer

Summary

- Problem
  - Make current and historical imagery available
  - Catalog spatial data across the region
  - Create a map viewer
- Solution
  - Created a scalable solution using Open Source tools, OGC and other standards, and open data sources
  - Built our own tools when others not available
  - Will share components we created

Next Steps

- Increase number of catalogs we harvest
- Add more imagery and data
- Help the user sort out the wealth of data
- Outreach to data users

Thank you

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Alison Slaats aslaats@sharedgeo.org

SharedGeo
www.sharedgeo.org

Please visit us at the OSGeo Booth!