Examining Water Quality Issues In A Graphical Environment

Amy Keyworth

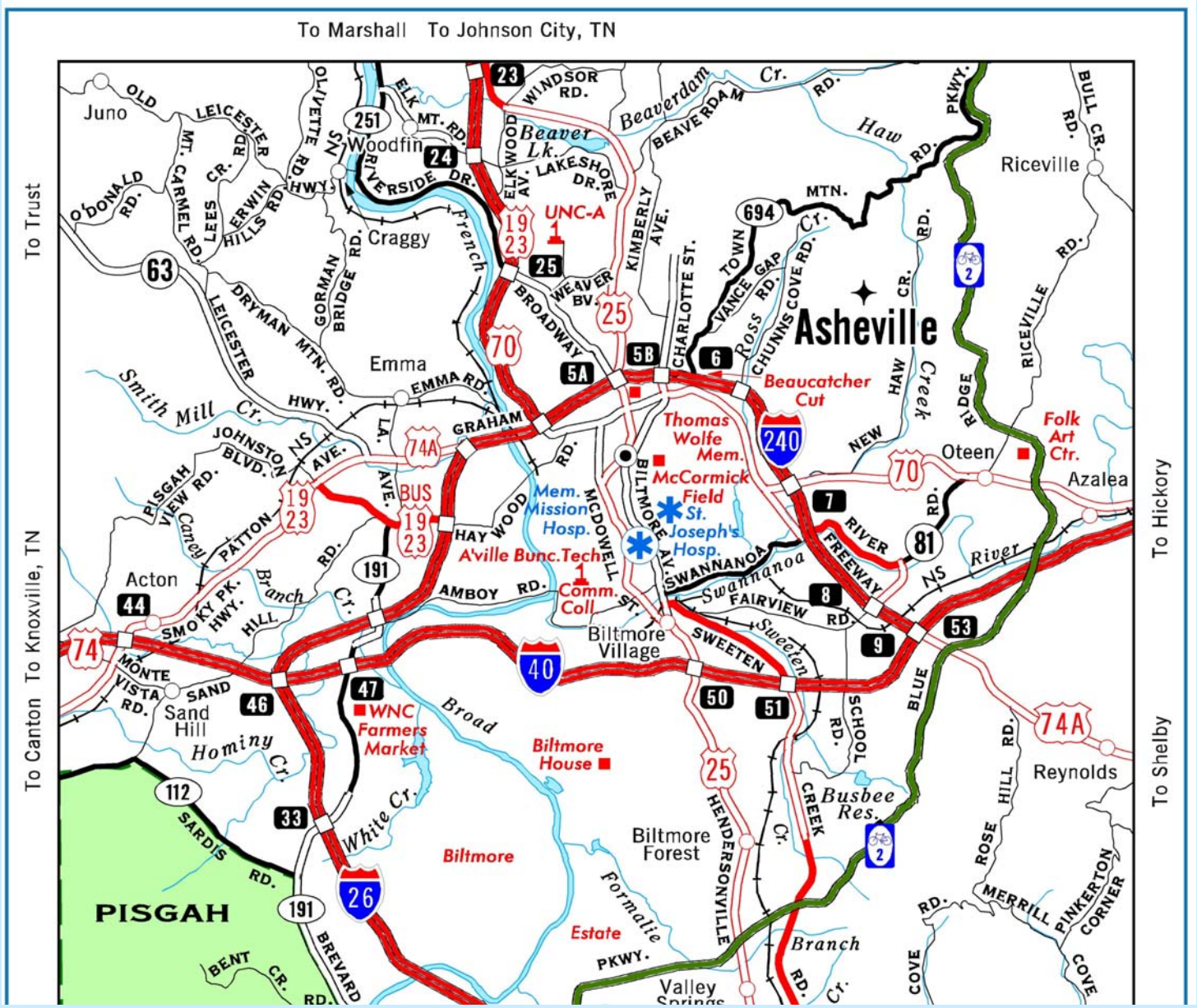
State Water Directors' Meeting

November 15, 2007

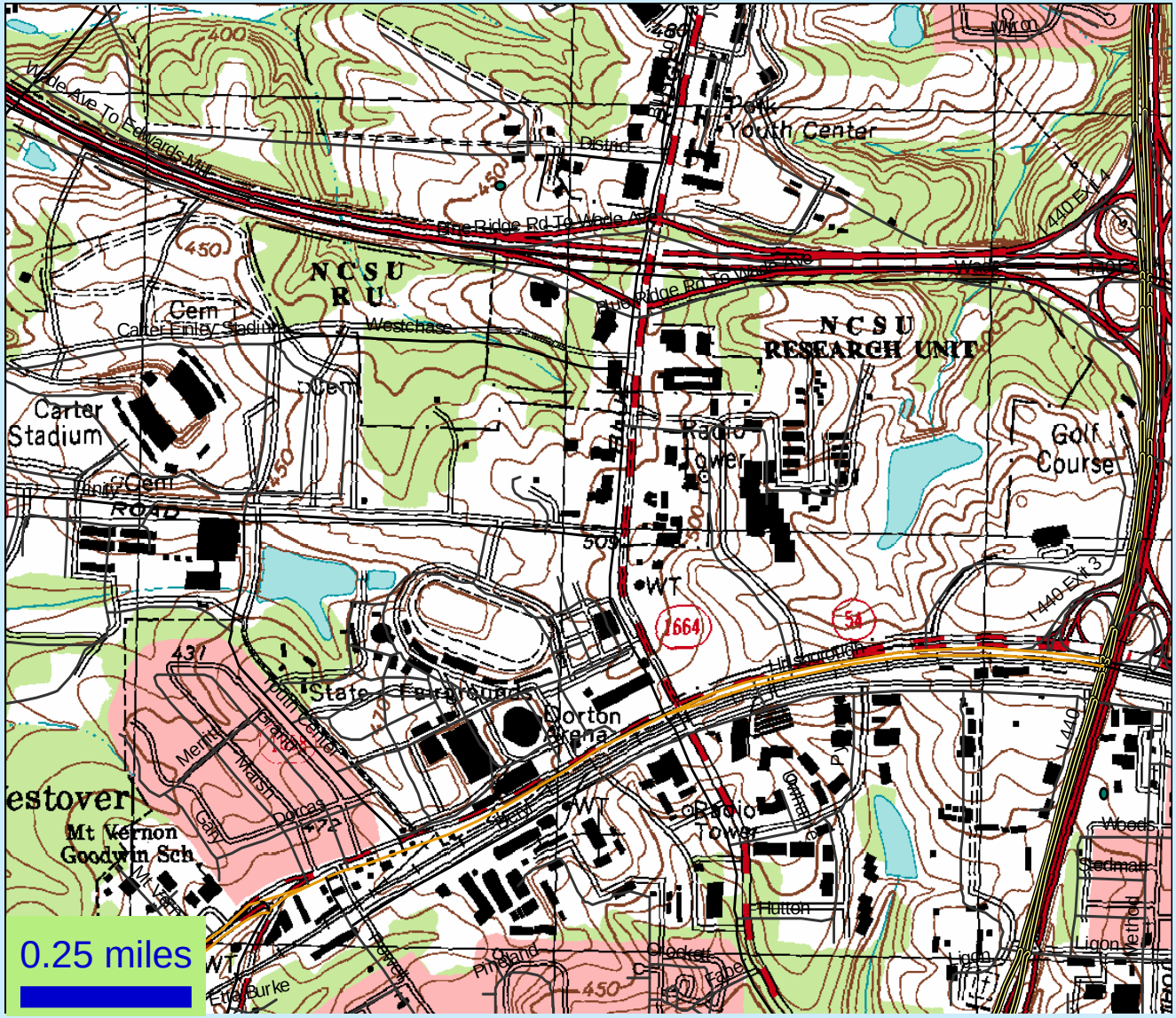
NCDENR

DIVISION OF WATER QUALITY
DWQ

Transportation

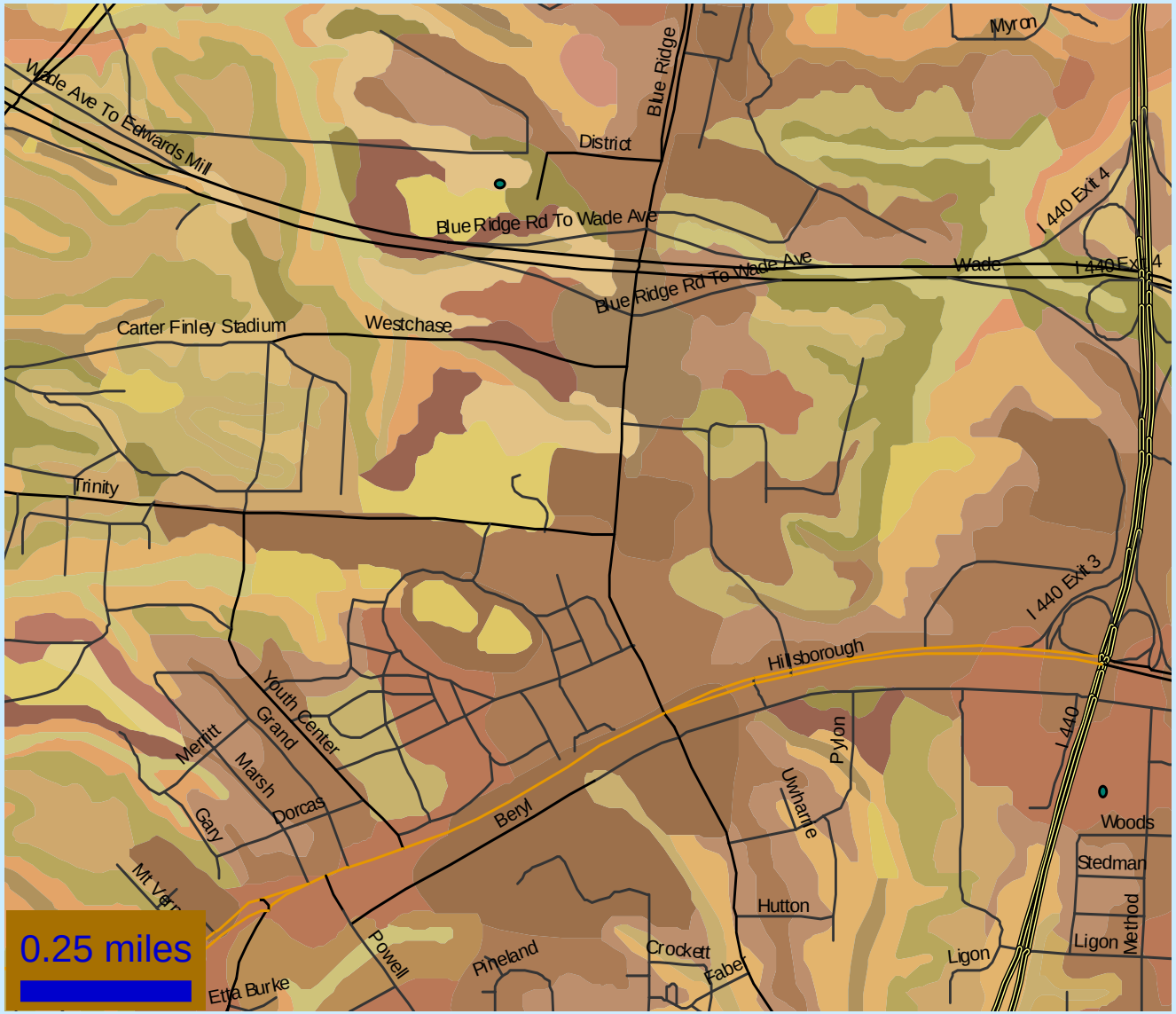


Topography

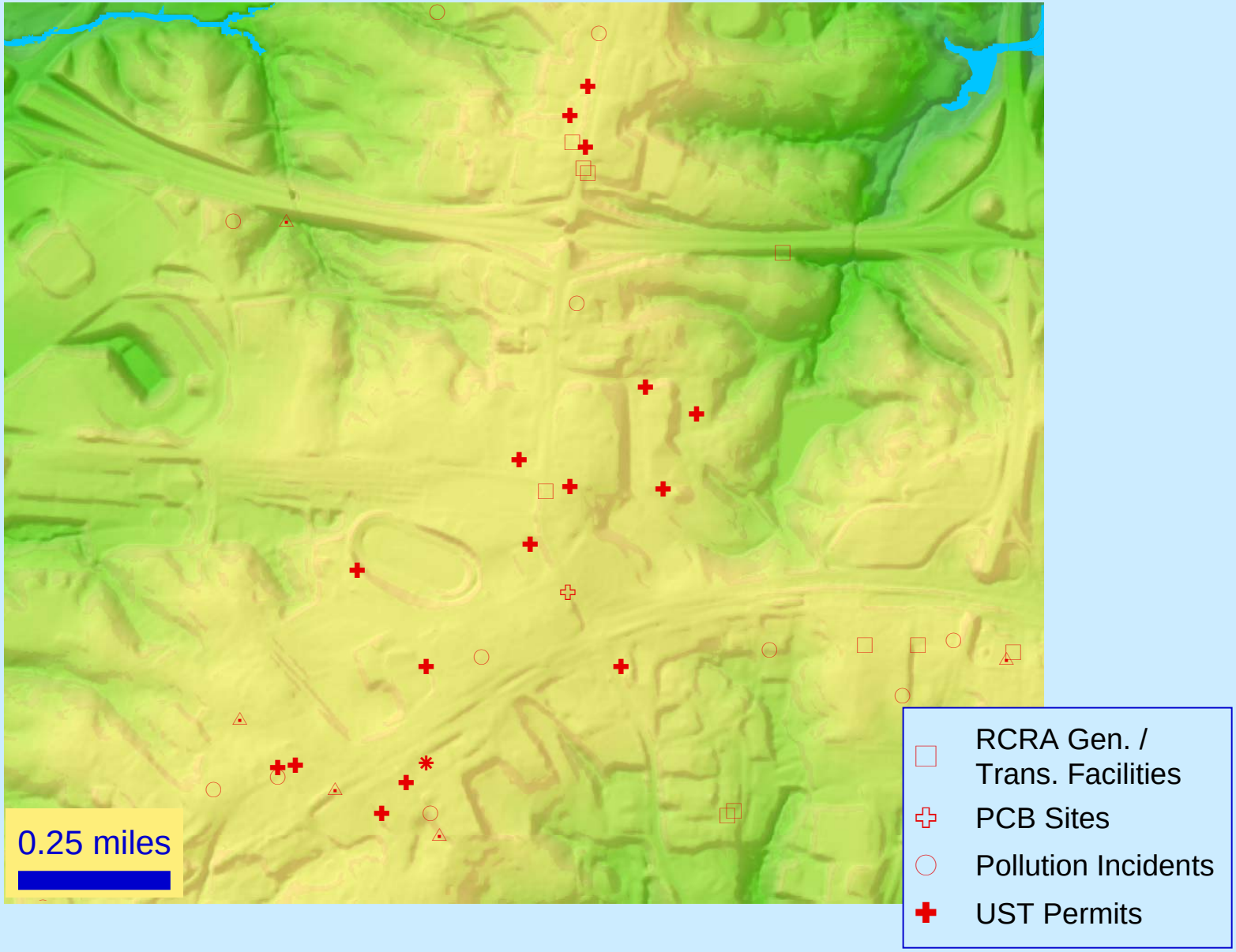


Wade Ave To Edwards Mill
Blue Ridge Rd To Wade Ave
Polk Youth Center
NCSU RU
NCSU RESEARCH UNIT
Carter Finley Stadium
Westchase
Carter Stadium
Radio Tower
Golf Course
ROAD
State Fairgrounds
Dorton Arena
Youth Center
Mt Vernon Goodwin Sch
Hillsborough
Hutton
Woods
Stedman
Ligon
Method
Pineland
Crockett
Faber
Etta Burke
I 440 Exit 4
I 440 Exit 3
I 440
0.25 miles

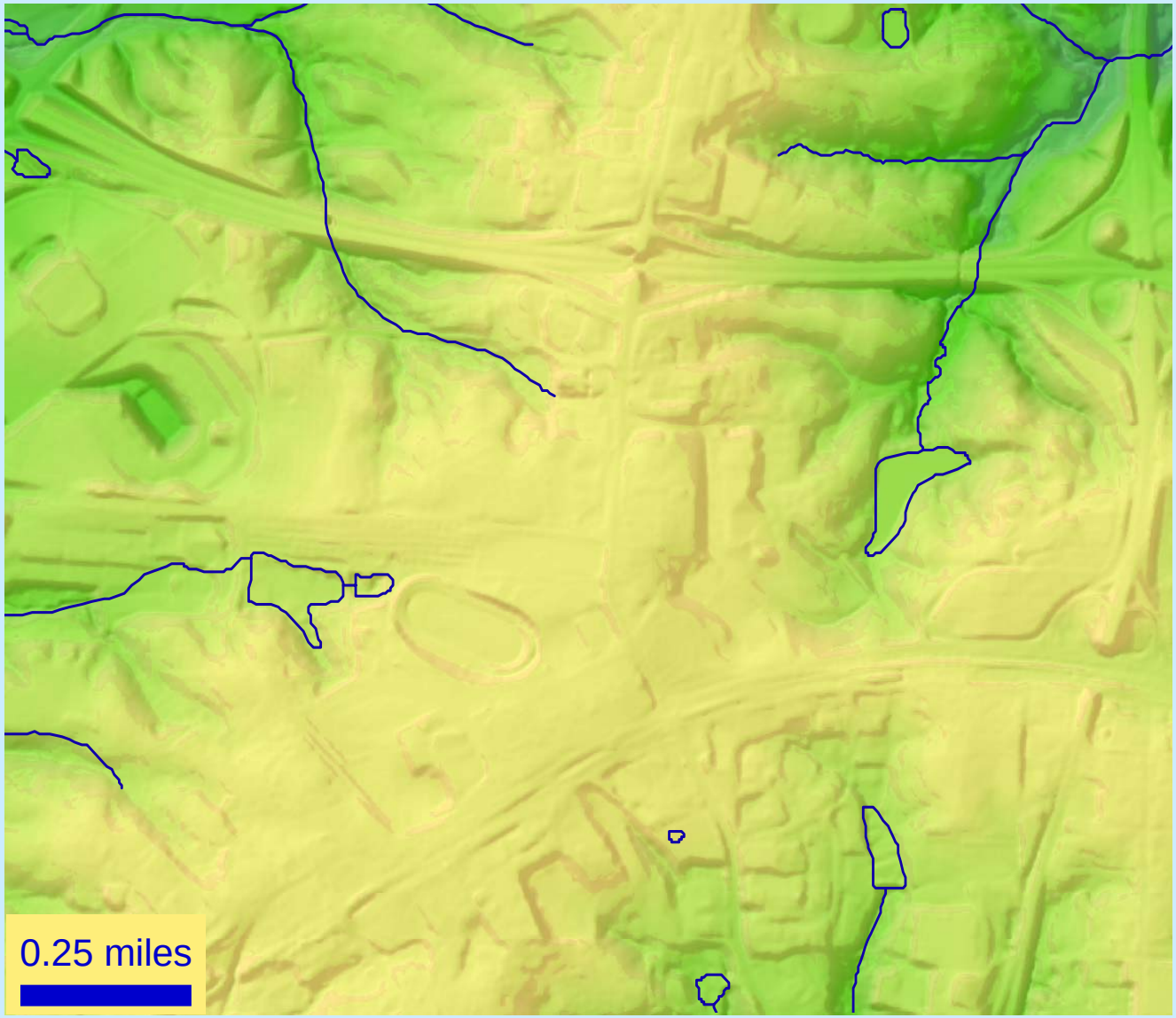
Soils


Wade Ave To Edwards Mill
District
Blue Ridge
Myron
Blue Ridge Rd To Wade Ave
Blue Ridge Rd To Wade Ave
Wade
I 440 Exit 4
I 440 Exit 4
Carter Finley Stadium
Westchase
Trinity
I 440 Exit 3
Hillsborough
Youth Center
Grand
Merritt
Marsh
Dorcas
Gary
Beryl
Pylon
Uwharrie
I 440
Woods
Stedman
Method
Hutton
Ligon
Ligon
Crockett
Fabel
Pineland
Powell
Etta Burke
0.25 miles

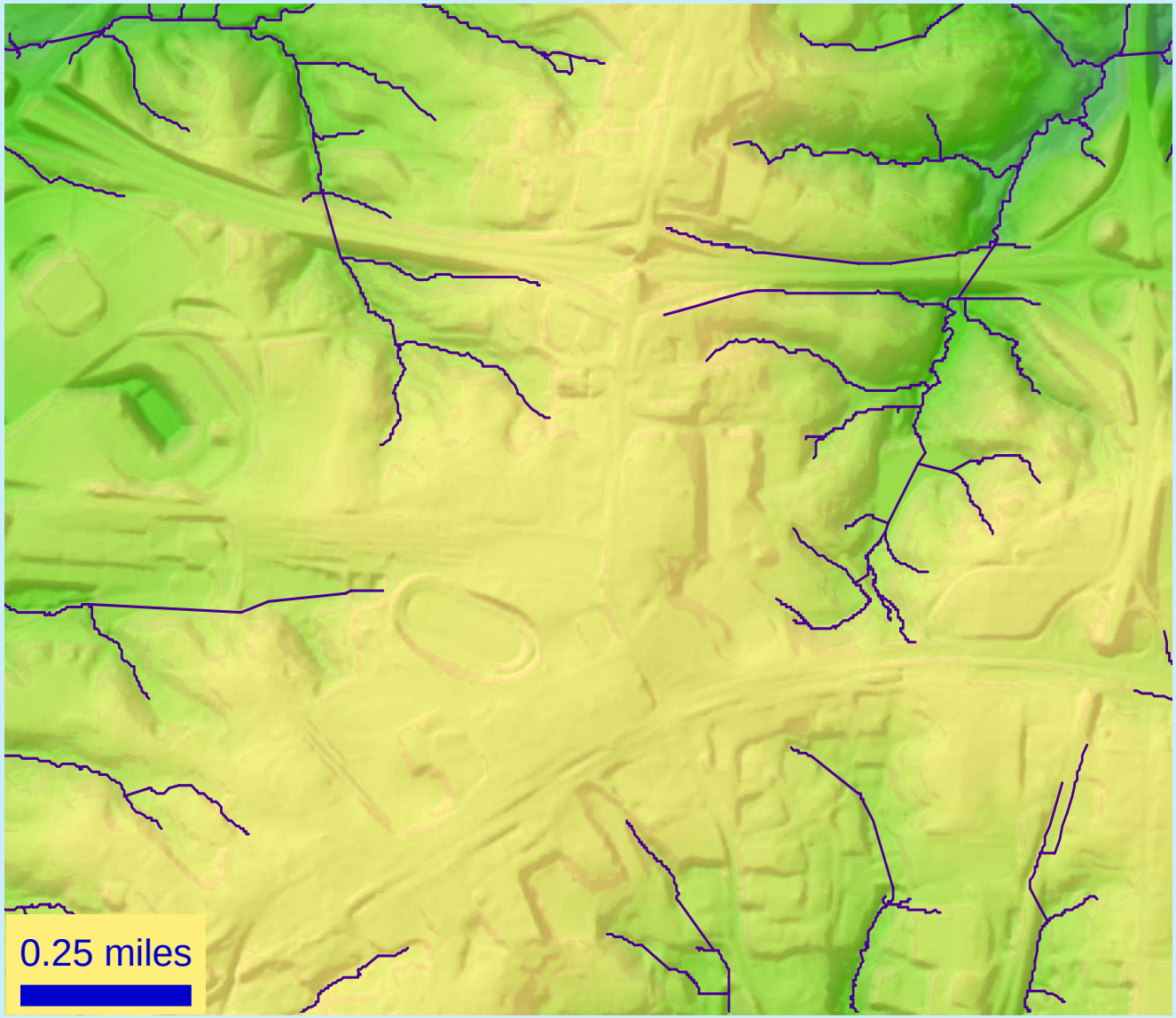
Overlays


0.25 miles
RCRA Gen. / Trans. Facilities
PCB Sites
Pollution Incidents
UST Permits

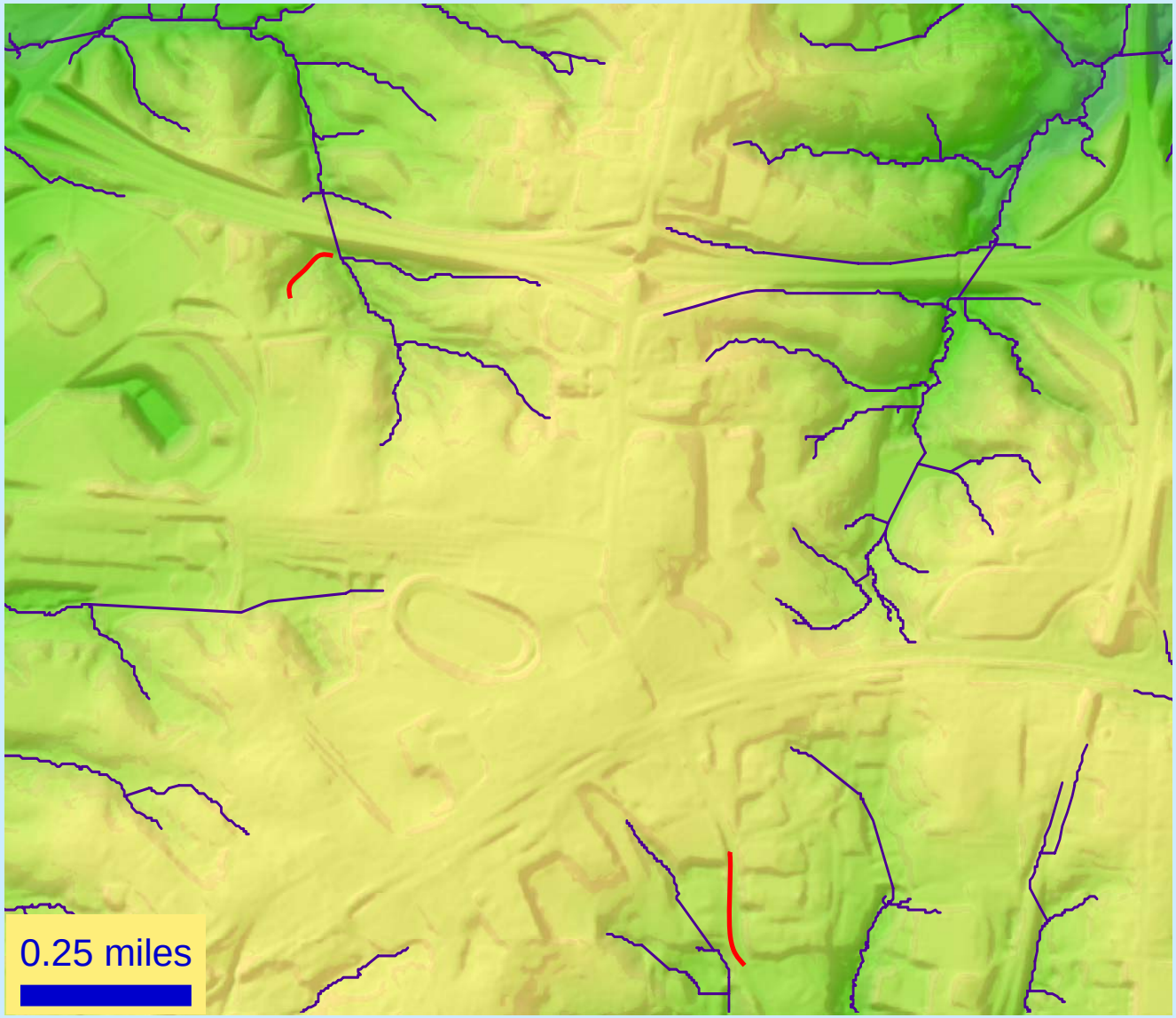
Streams – statewide dataset



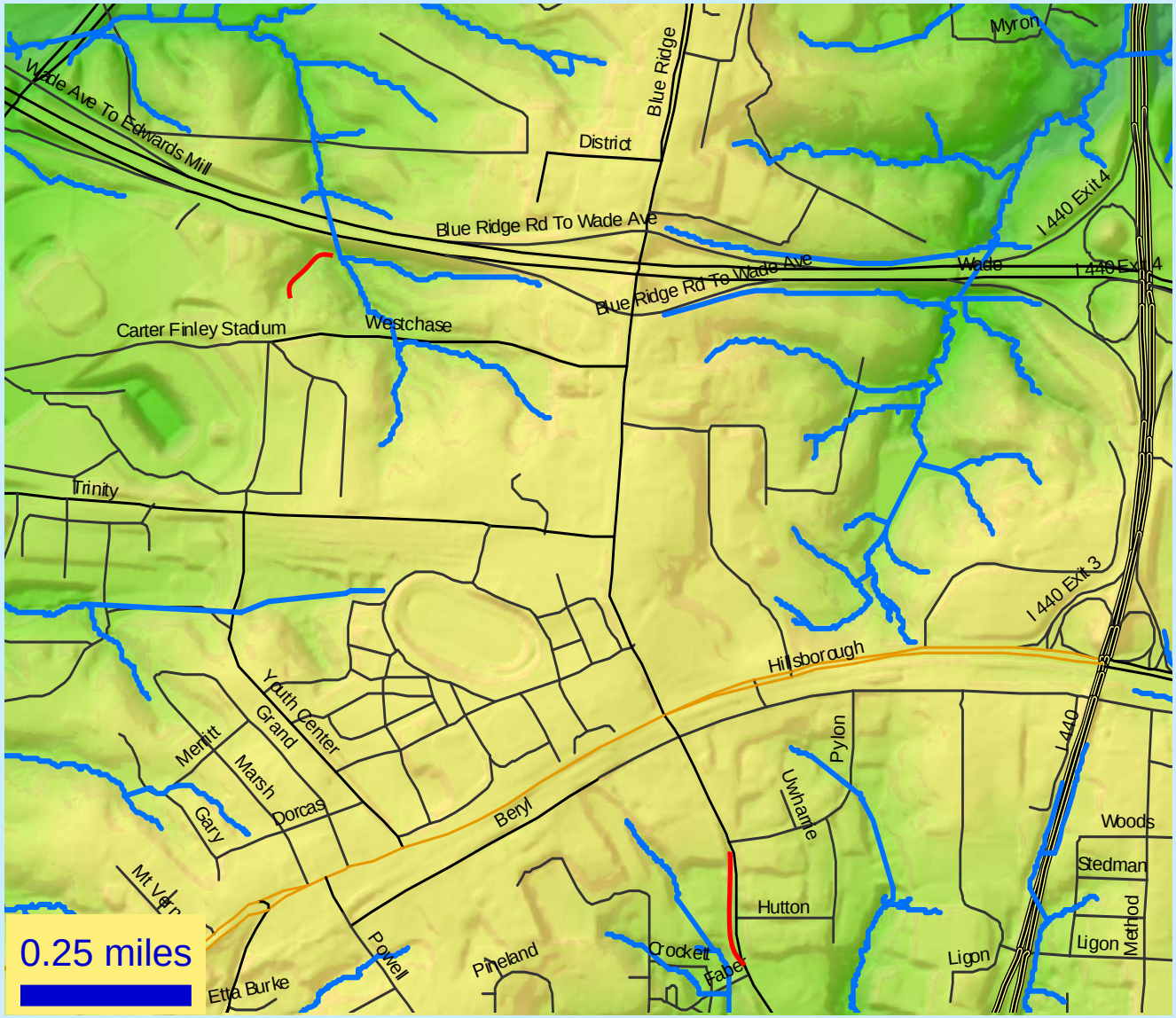
Streams – county dataset



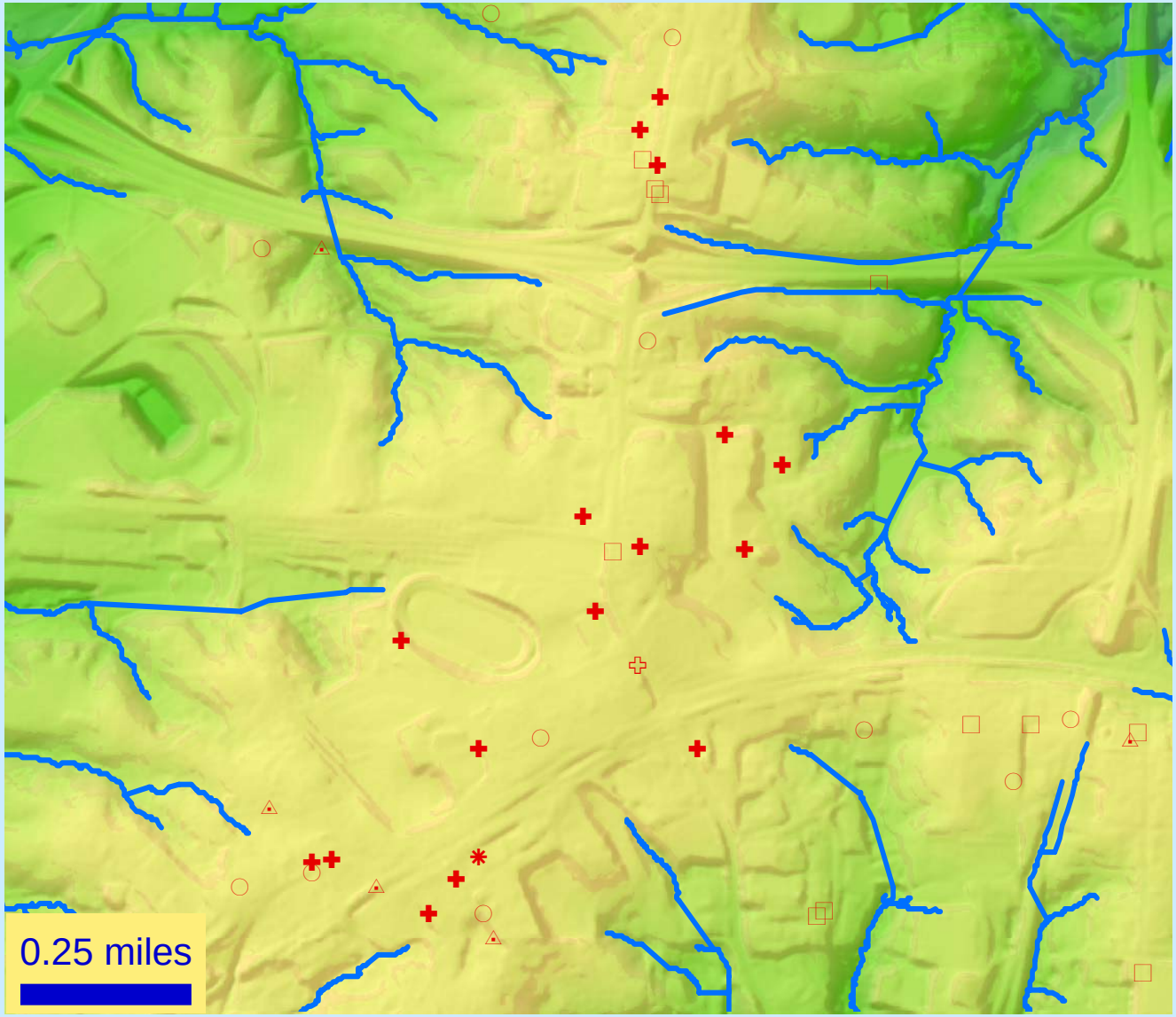
Streams – are they all mapped?



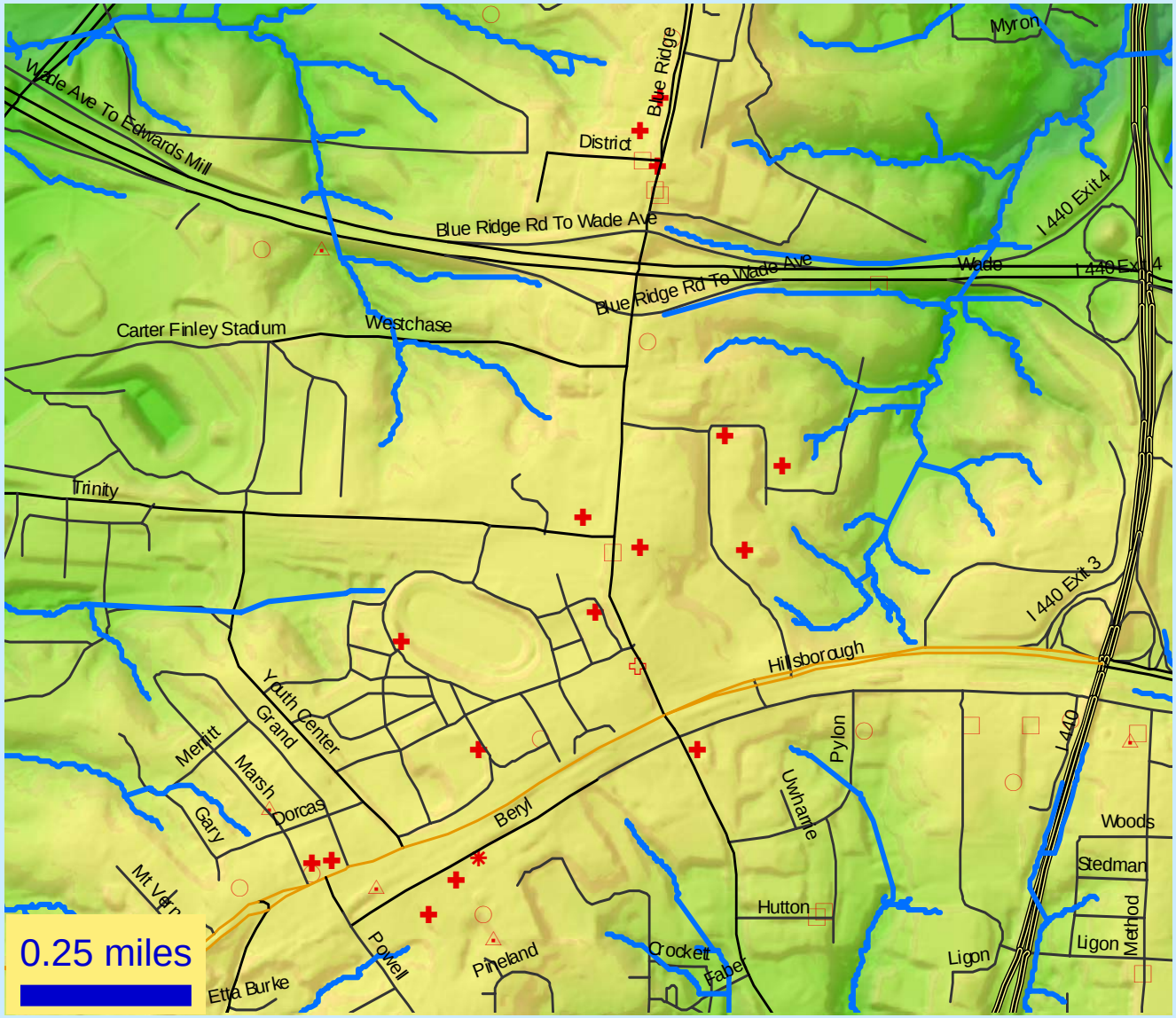
Stream or Road?



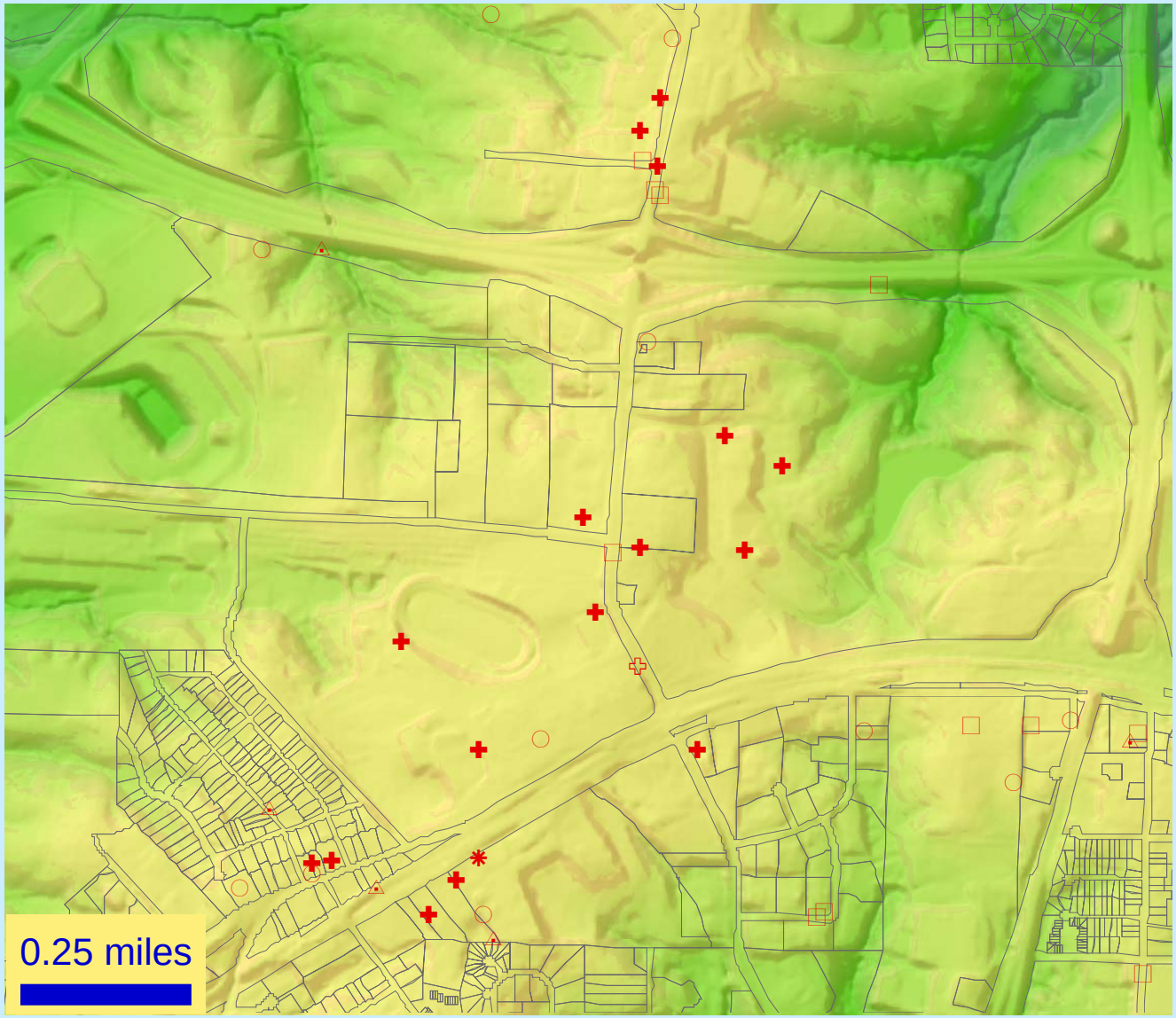
Contaminant sources and streams



Contaminant sources, streams and roads



Land ownership

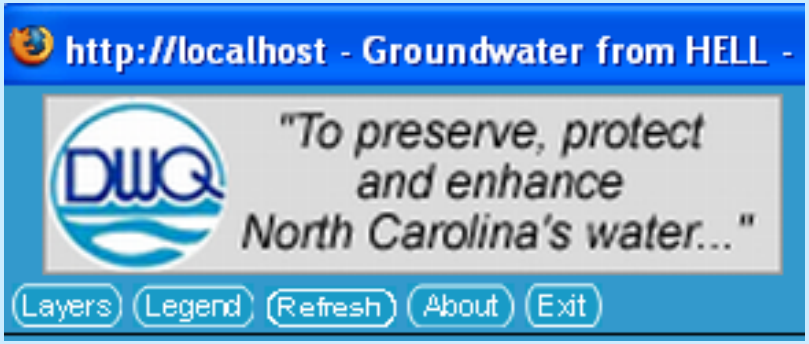


So what can we analyze with GIS?

- Location
- What is near that location?
- What is the land surface like?
- Where does the water flow?
- Are there nearby sources of potential contamination?
- Who owns the properties nearby?

So what can we analyze with GIS?

- Measure length and area
- Measure slope
- Select all permits within some distance from an impaired stream
- Select all the DWQ permits in a watershed
- Display data in 3D



Groundwater WebMap Viewer

Groundwater Web Map Viewer

http://h2o.enr.state.nc.us/gwp/GW_WebMap_Viewer.htm

Developer **Julia Harrell**, NC DENR GIS Coordinator

- EPA Section 319(h) Clean Water Act grants
- Open-source software
- Interface - Flexible Internet Spatial Template (FIST)
    - **Aaron Koning**, University of Northern British Columbia.
- Support - Minnesota MapServer
    - **Steve Lime** of the University of Minnesota
- MS4W
    - **DM Solutions** Group
- Large data layers stored in a Postgres/PostGIS spatial database
    - **Refractions Research**

Integrating Groundwater Quality Protection into Basinwide Planning at NCDENR, DWQ

http://h2o.enr.state.nc.us/gwp/images/Poster_IntegratingGW.jpg

Amy.keyworth@ncmail.net

http://localhost - Groundwater from HELL -

"To preserve, protect and enhance North Carolina's water..."

Layers | Legend | Refresh | About | Exit

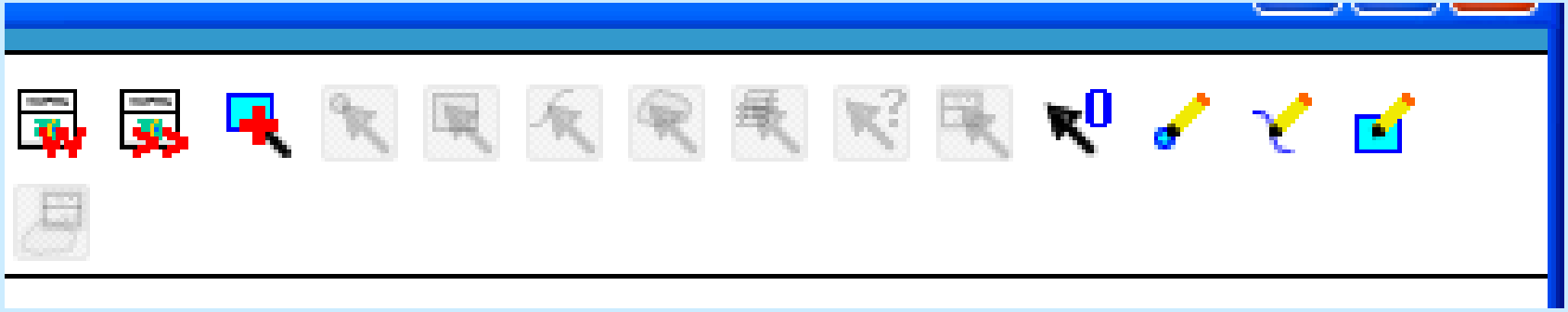
Active Tool:	Zoom In
Active Layer:	County Boundaries
Map Scale:	1 : 3,429,992 (Change scale)

Map Layers

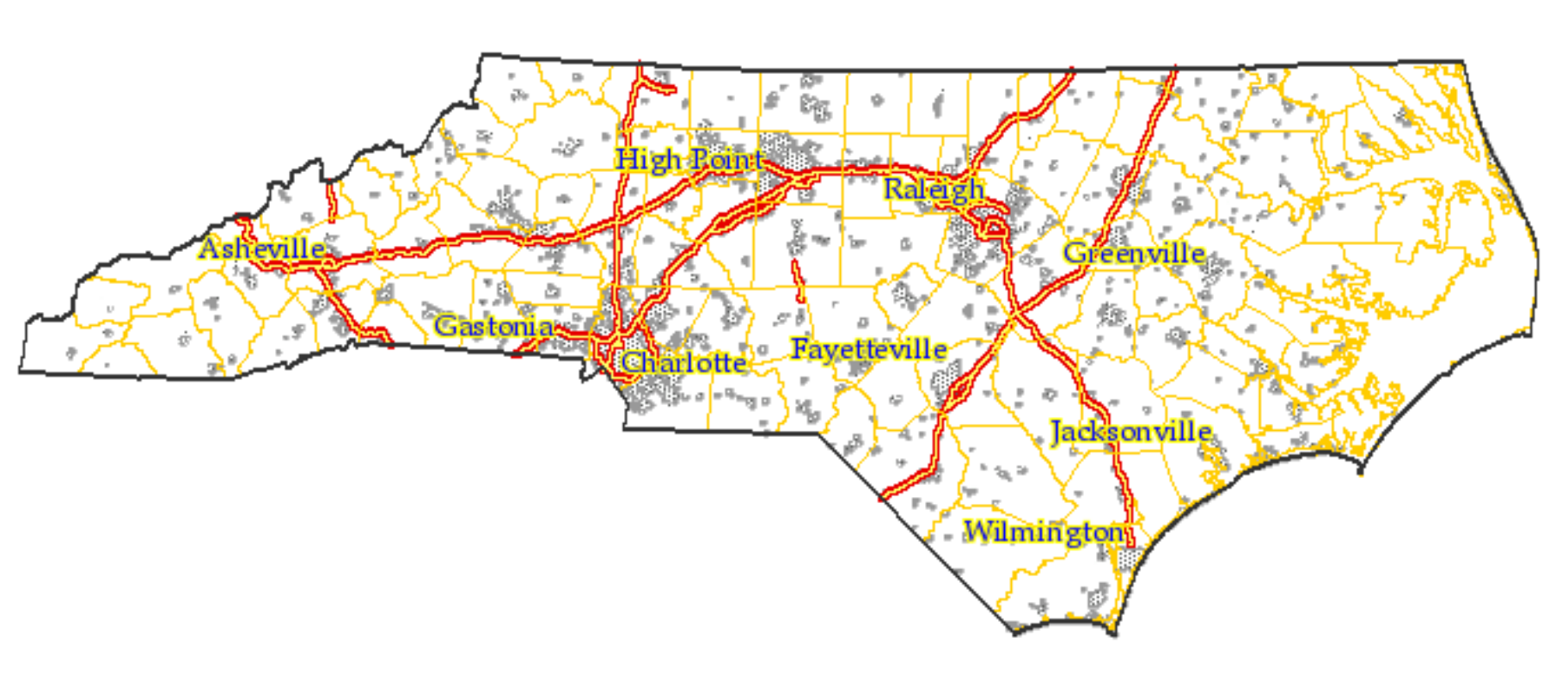
- Administrative Boundaries
- DWQ Monitoring
- DWQ Permited Facilities
- Public Water Supply and SWAP
- Highways
- USGS Quads
- Municipal Boundaries
  - [x] Cities
  - [x] All City Names
  - [x] Mid-sized City Names
  - [x] Major City Names
- Watershed Boundaries
- Geology and Hydrogeology

Refresh map

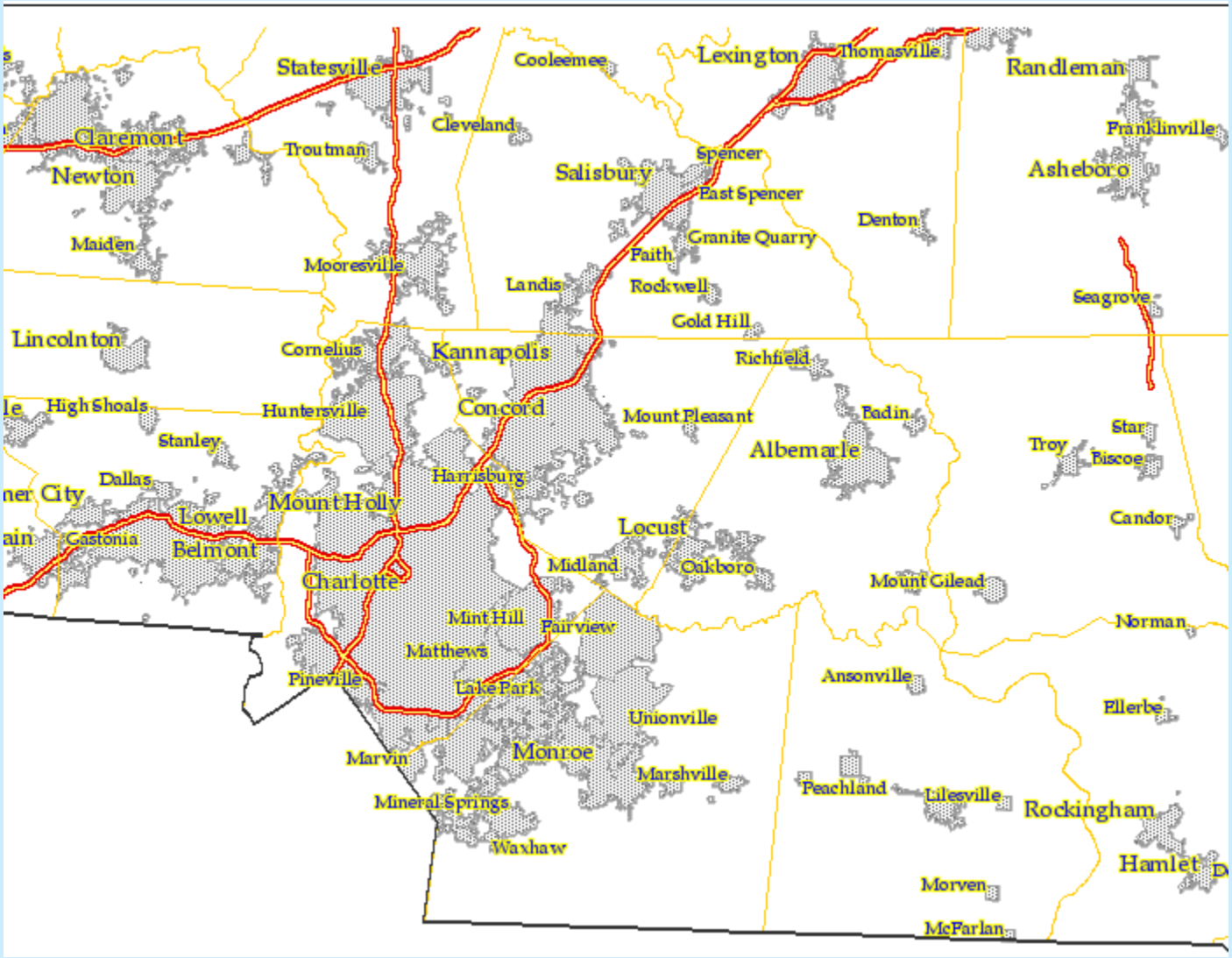
ABC



Municipal Boundaries



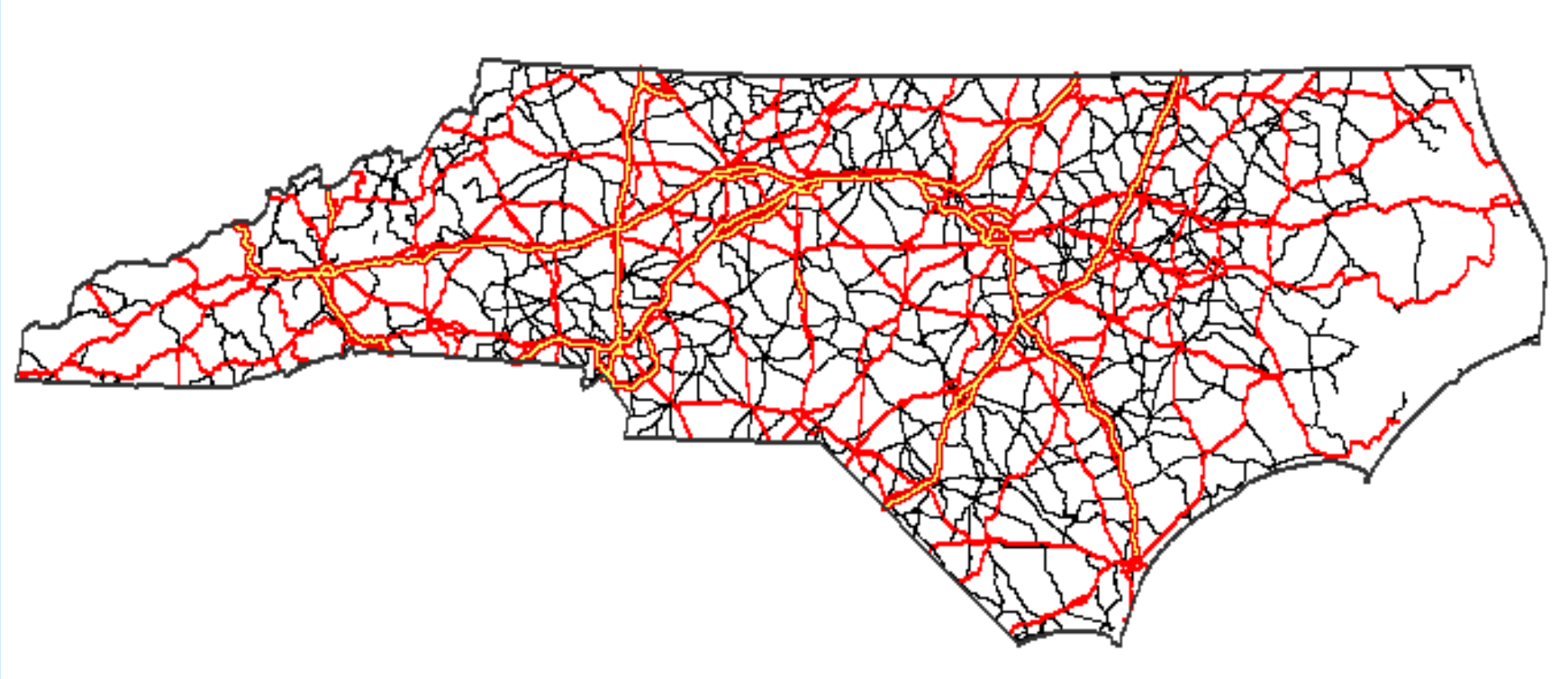
Municipal Boundaries



Map Layers

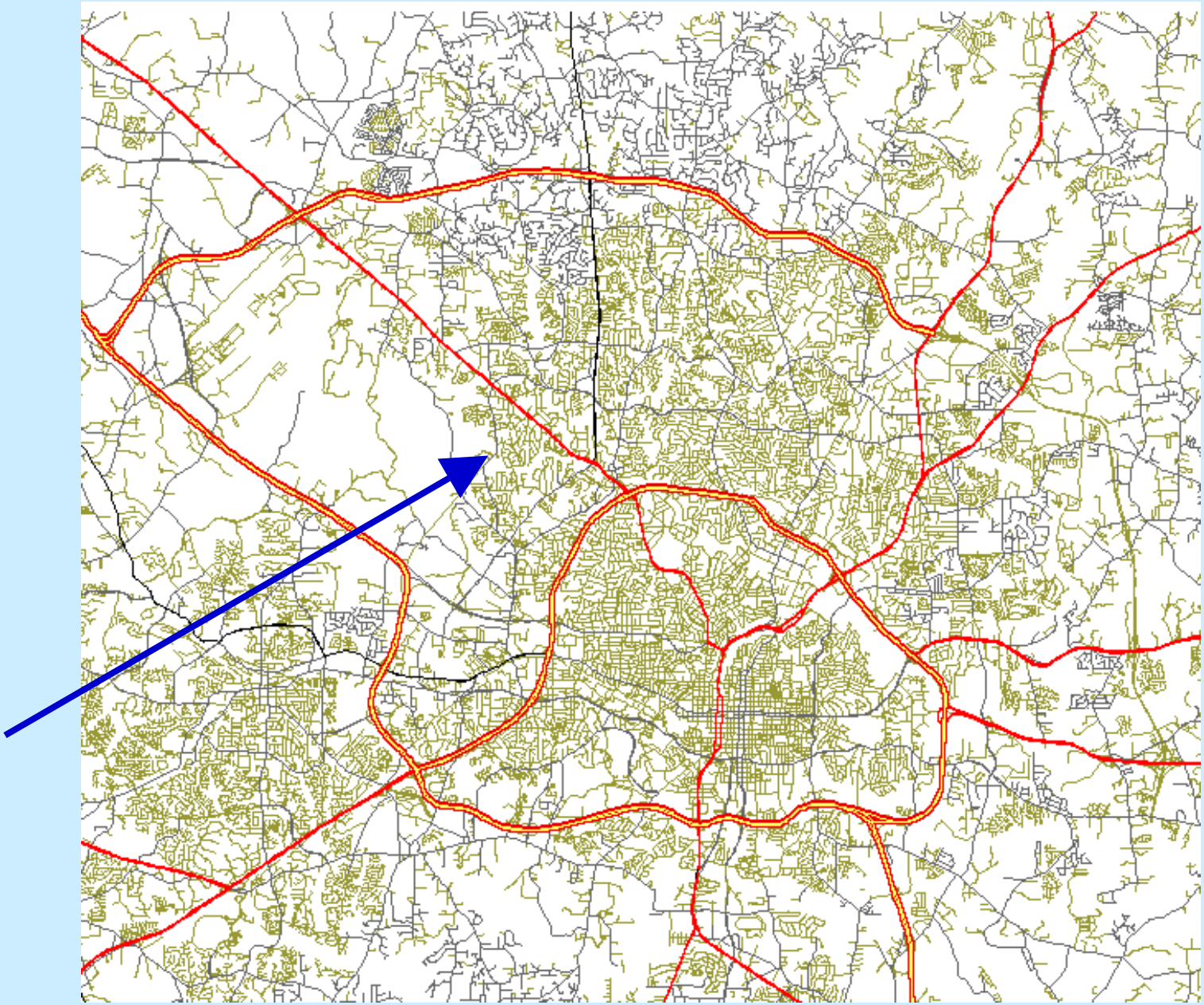
- Administrative Boundaries
- DWQ Monitoring
- DWQ Permited Facilities
- Public Water Supply and SWAP
- Highways
  - Local Roads
  - Secondary Roads
  - Primary Highways
  - Interstate Highways
- USGS Quads
- Municipal Boundaries
- Watershed Boundaries
- Geology and Hydrogeology

Highways



Highways

Highways



http://localhost - Drill Down Identify Results - Mozilla Firefox

Drill Down Identify Results

NC_OtherRoads
NC_SecondaryRoads
County_Boundaries
NC_State_Boundary

Layer: NC_OtherRoads
Displaying records: 1-1 of 1

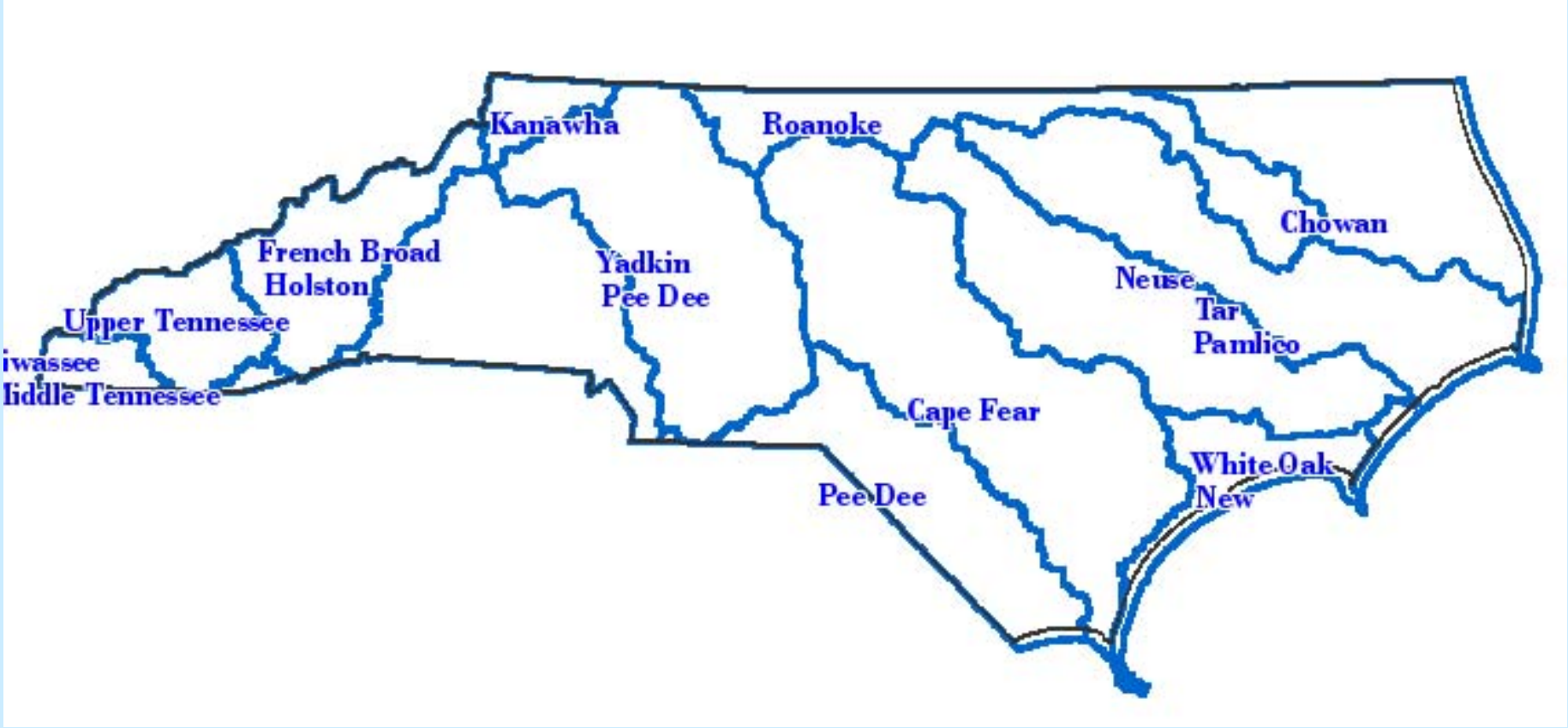
RTTYPTXT1	
RTSPETXT1	
RTNUMTXT1	0
RTTYPTXT2	
RTSPETXT2	
RTNUMTXT2	0
RTTYPTXT3	
RTSPETXT3	
RTNUMTXT3	0
COUNTY	91
IGDS_LEVEL	35
IGDS_COLOR	7
IGDS_STYLE	0
IGDS_WEIGH	0
FEDIRP	
FEDIRS	
FNAME	Umstead Forest Dr
FENAME	Umstead Forest
FETYPE	Dr
TMPFADDR	7800

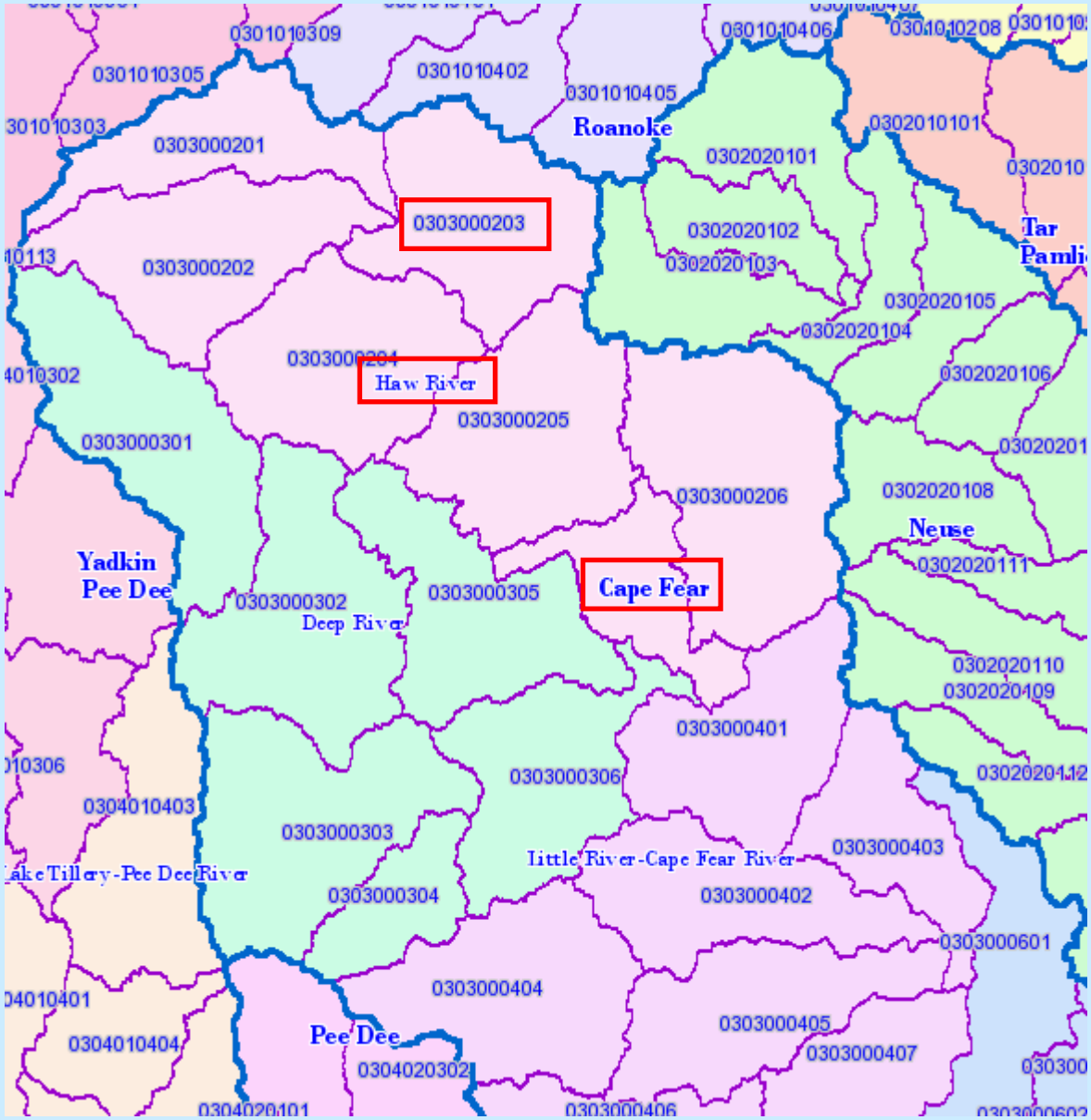
Done

Map Layers

- Administrative Boundaries
- DWQ Monitoring
- DWQ Permited Facilities
- Public Water Supply and SWAP
- Highways
- USGS Quads
- Municipal Boundaries
- Watershed Boundaries
  - River Basin Names
  - River Basins
  - 8-digit SubBasin Labels
  - 8-digit SubBasins
  - 10-digit Watershed Labels
  - 10-digit watersheds
  - 12-digit SubWatershed Labels
  - 12-digit SubWatersheds
- Geology and Hydrogeology

River Basins



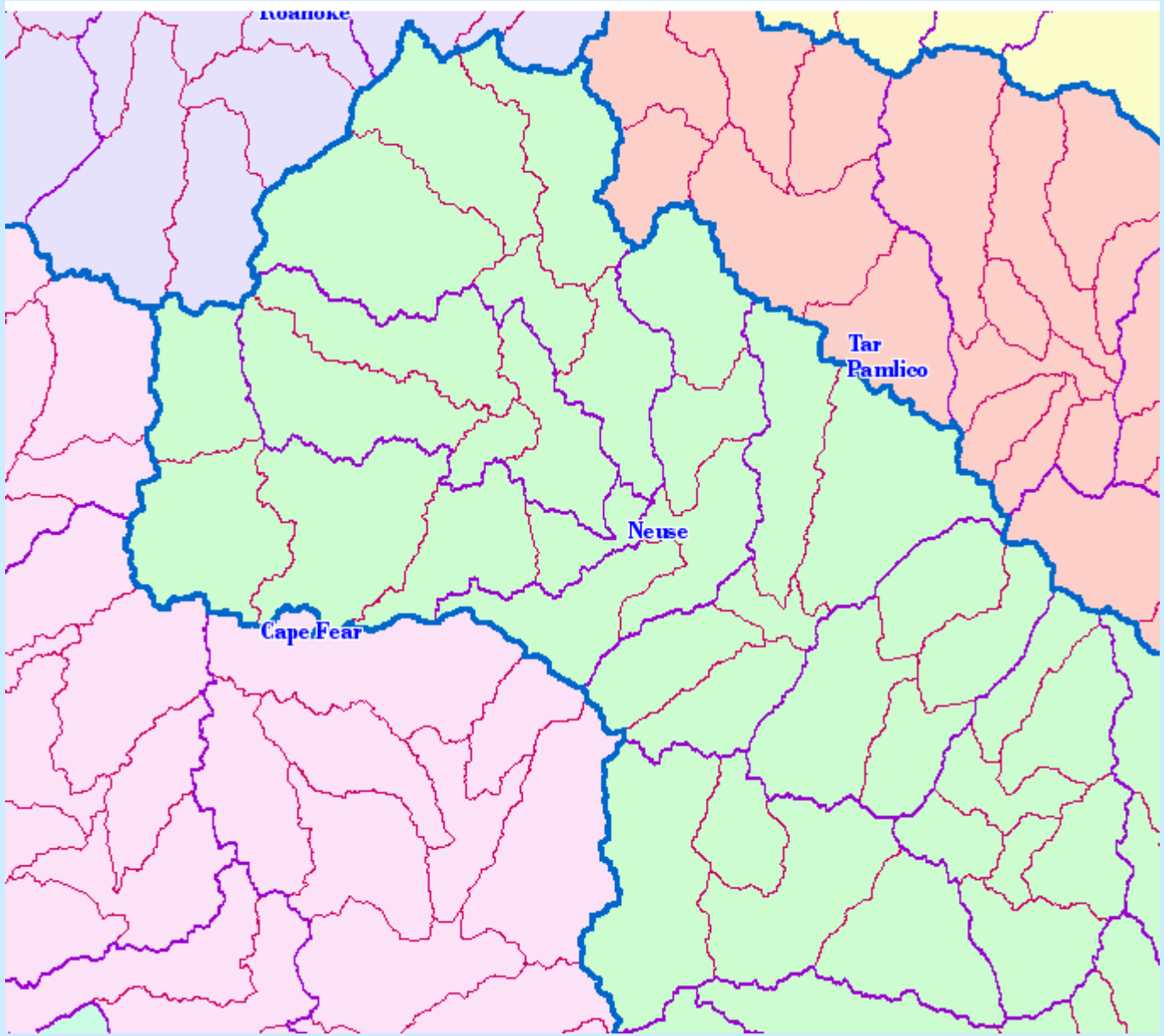


River Basins

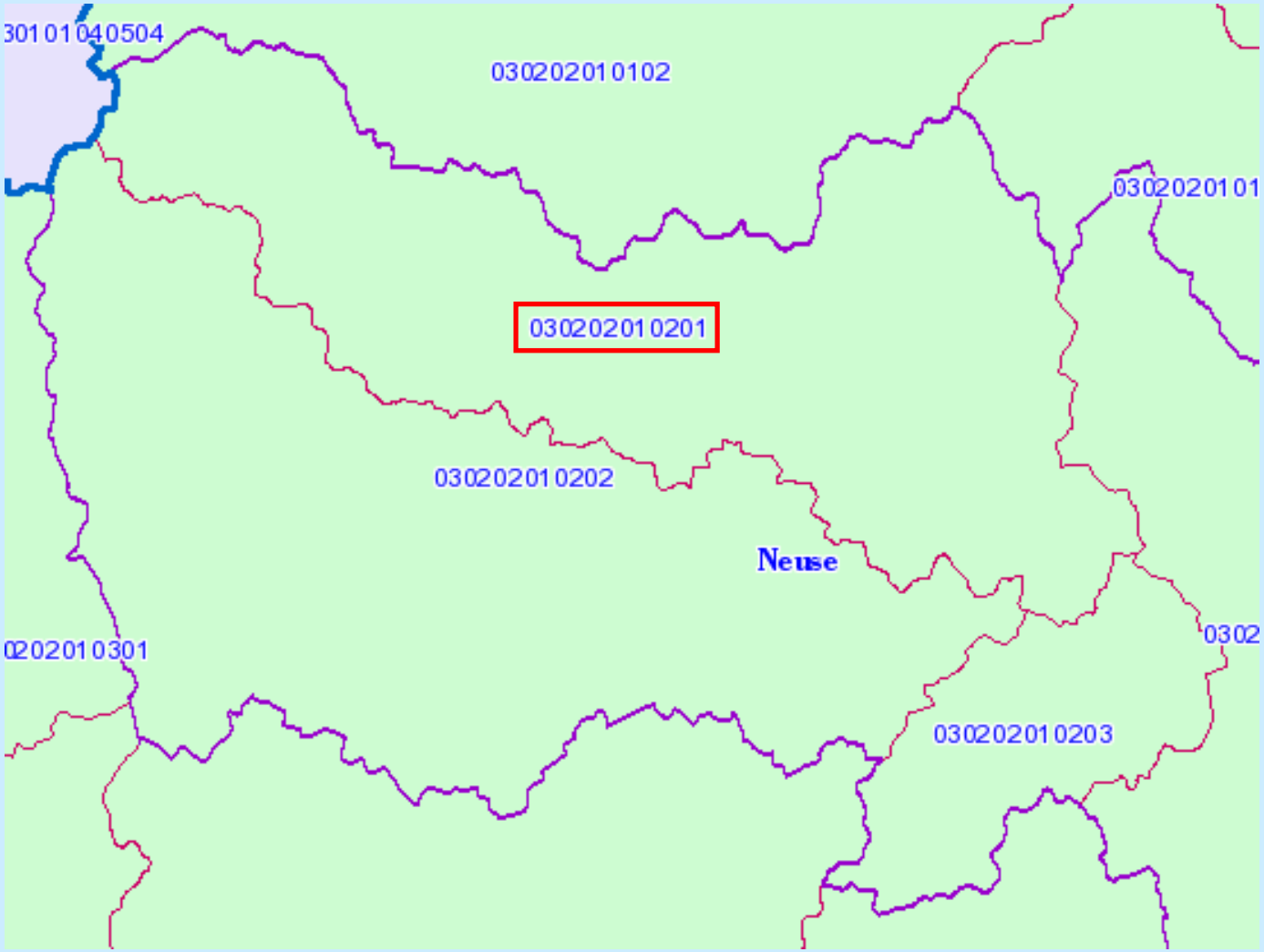
8-digit SubBasins

10-digit Watersheds

12-digit SubWatersheds



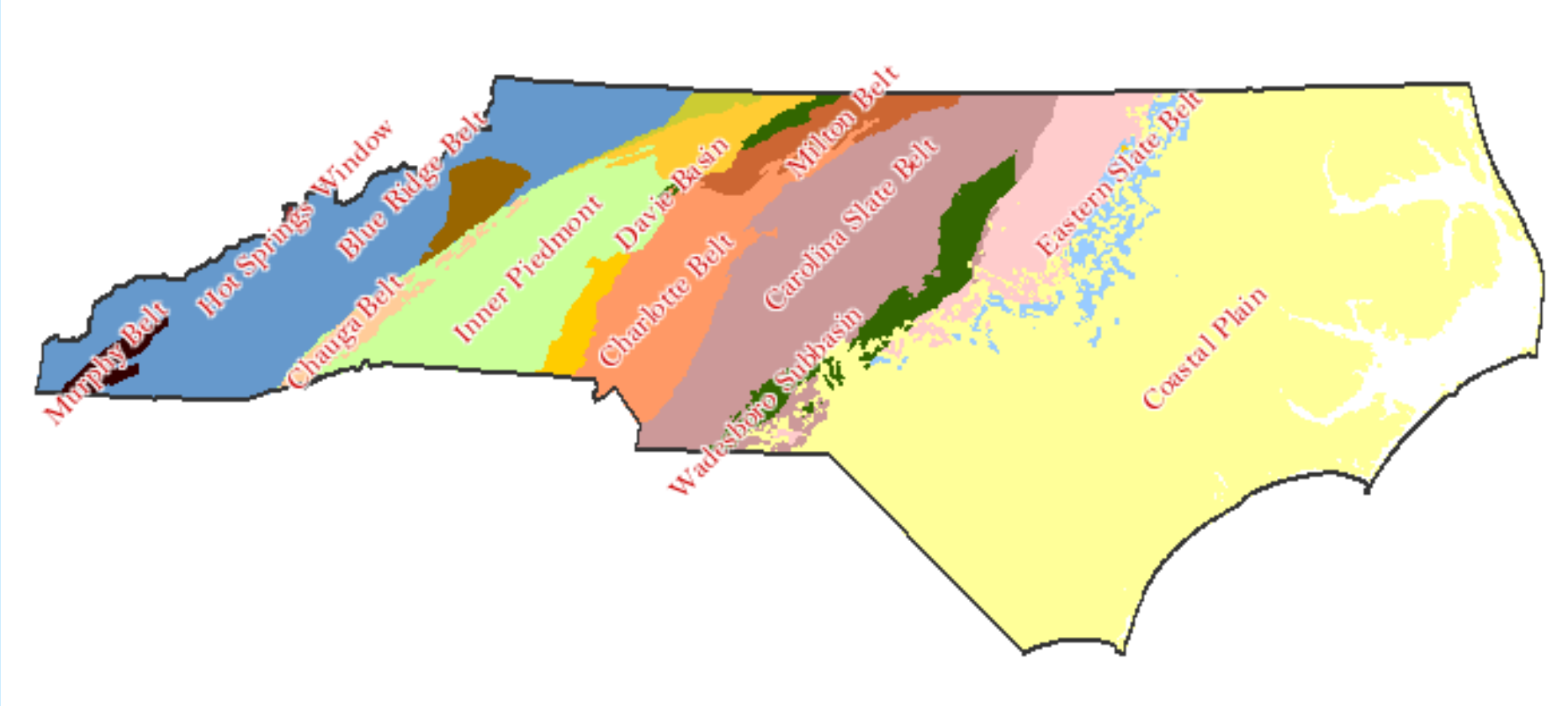
12-digit SubWatersheds



Geology and Hydrogeology

- [ ] Hydrogeology Labels - Zoom In
- [ ] Hydrogeology Labels - Zoom Out
- [ ] Hydrogeology
- [ ] Coastal Plain Scarps
- [ ] Geologic Dike Labels
- [ ] Geologic Dikes
- [ ] Geologic Structure Labels
- [ ] Geologic Structures
- [ ] Geologic Unit Labels - Zoom In
- [ ] Geologic Unit Labels - Zoom Out
- [ ] Geologic Units
- [x] Geologic Belt Labels
- [x] Geologic Belts

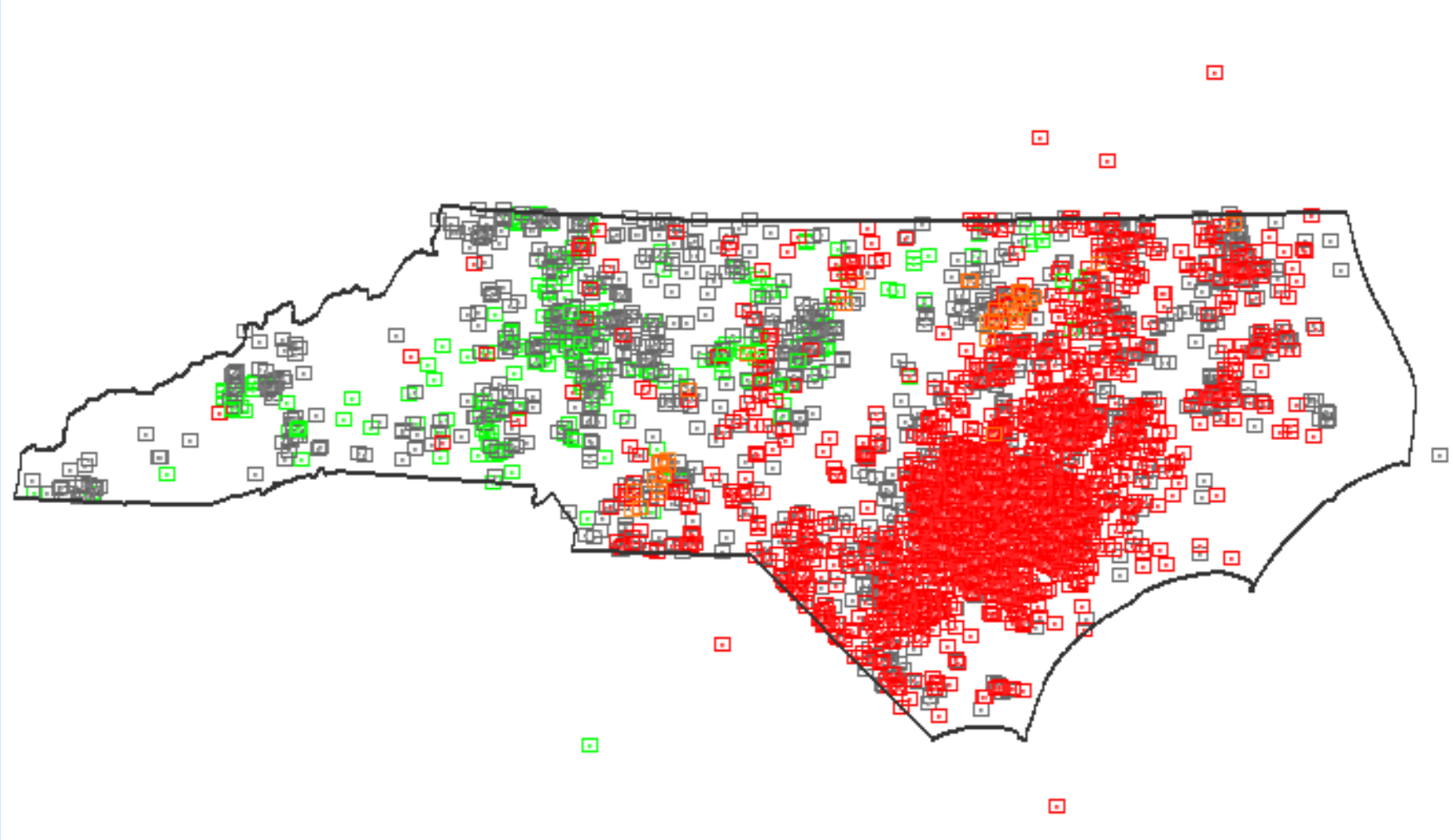
Geologic Belts



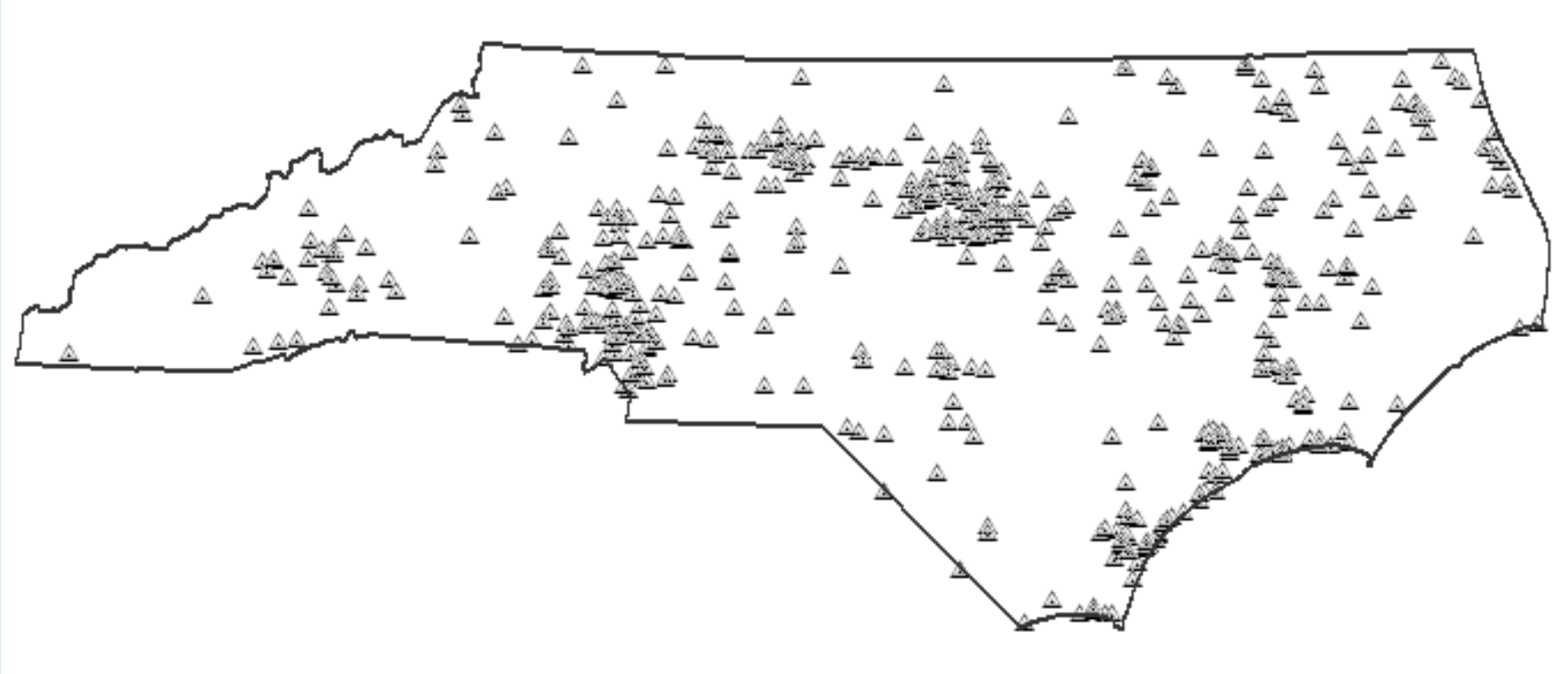
Map Layers

- Administrative Boundaries
- DWQ Monitoring
- DWQ Permited Facilities
  - [ ] Animal Operations
  - [x] Groundwater
  - [ ] Non-Discharge
  - [ ] NPDES Stormwater
  - [ ] NPDES Wastewater
  - [ ] State Stormwater
- Public Water Supply and SWAP
- Highways
- USGS Quads
- Municipal Boundaries
- Watershed Boundaries
- Geology and Hydrogeology

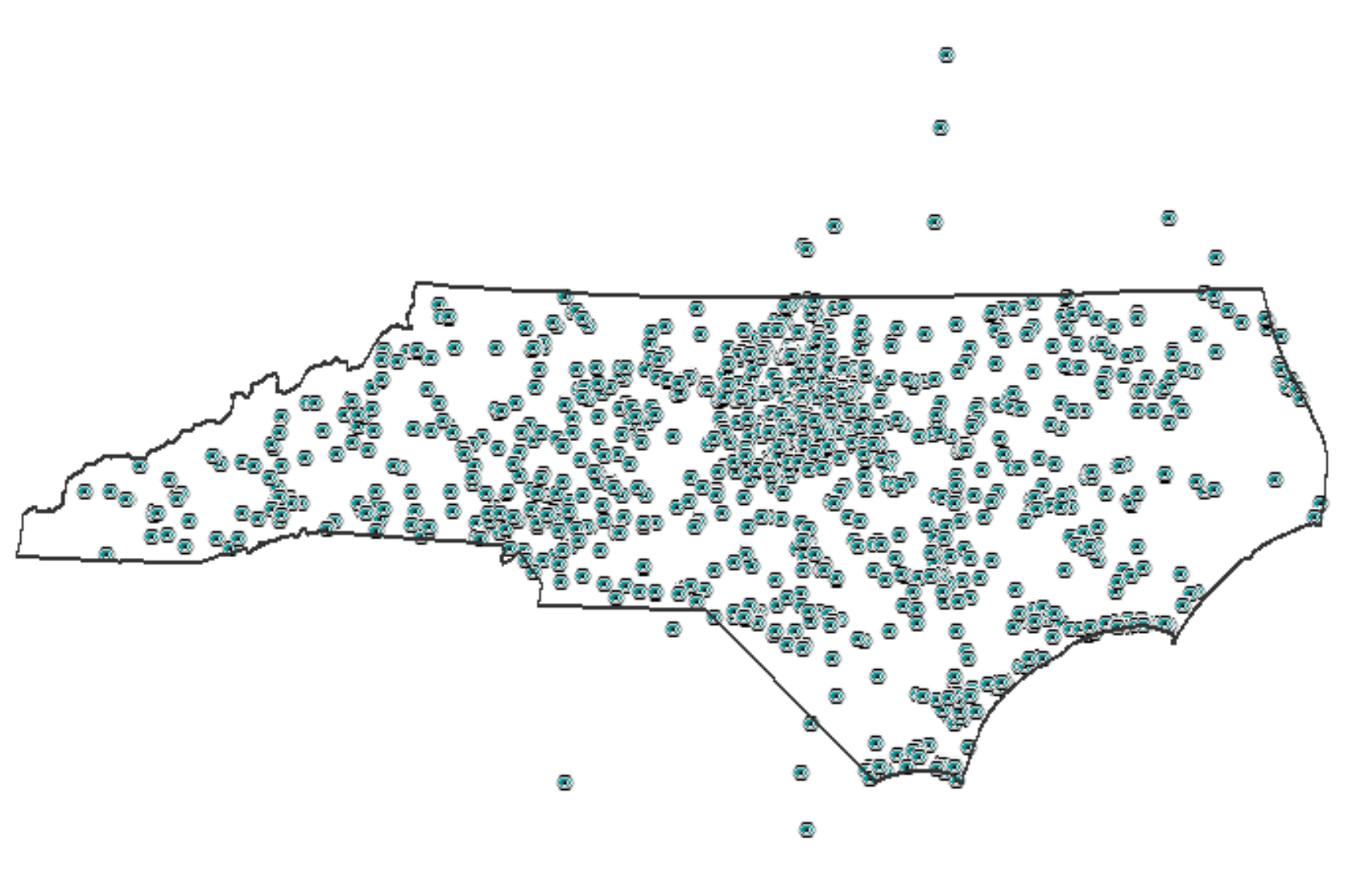
Animal Ops



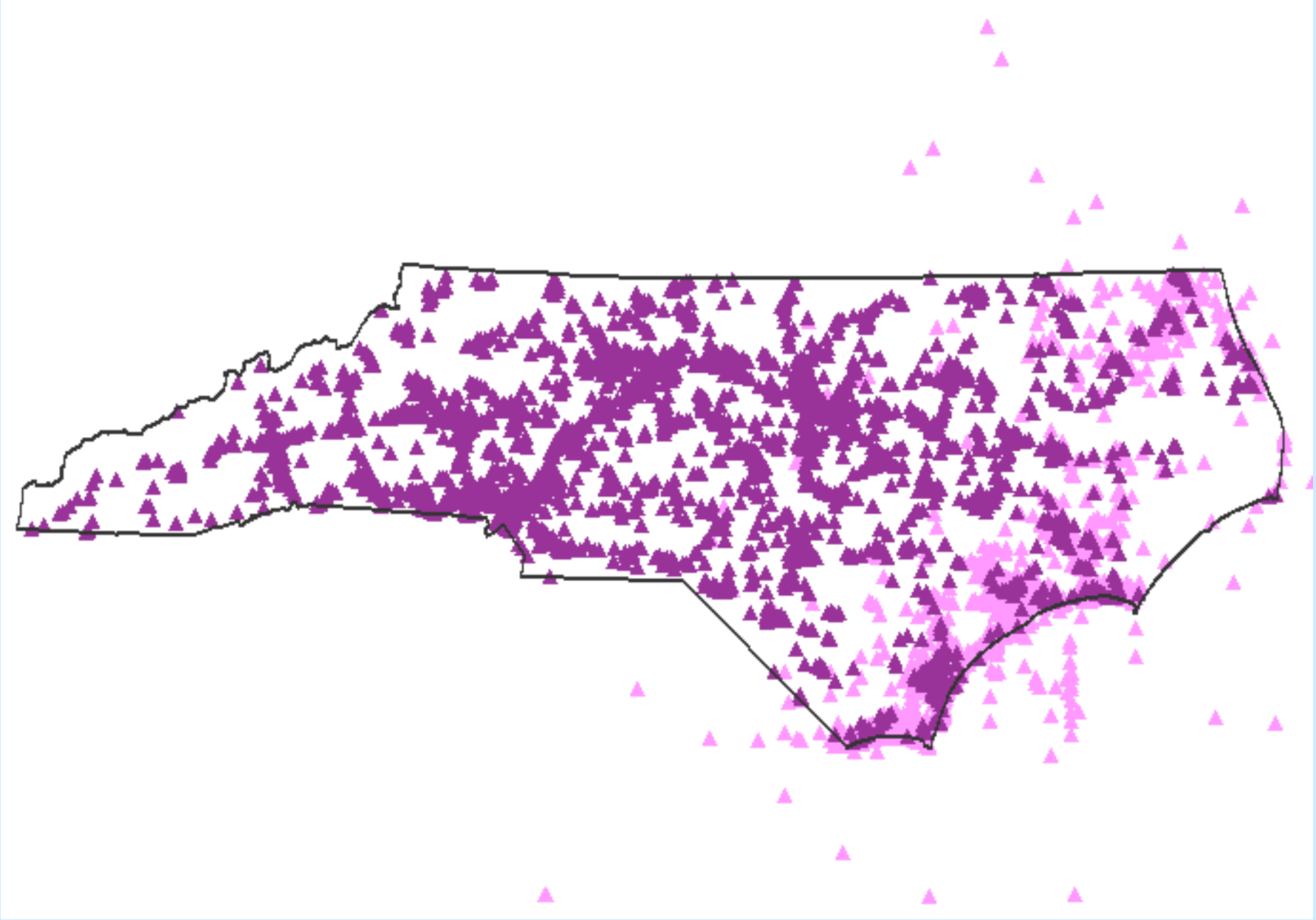
Groundwater Permits



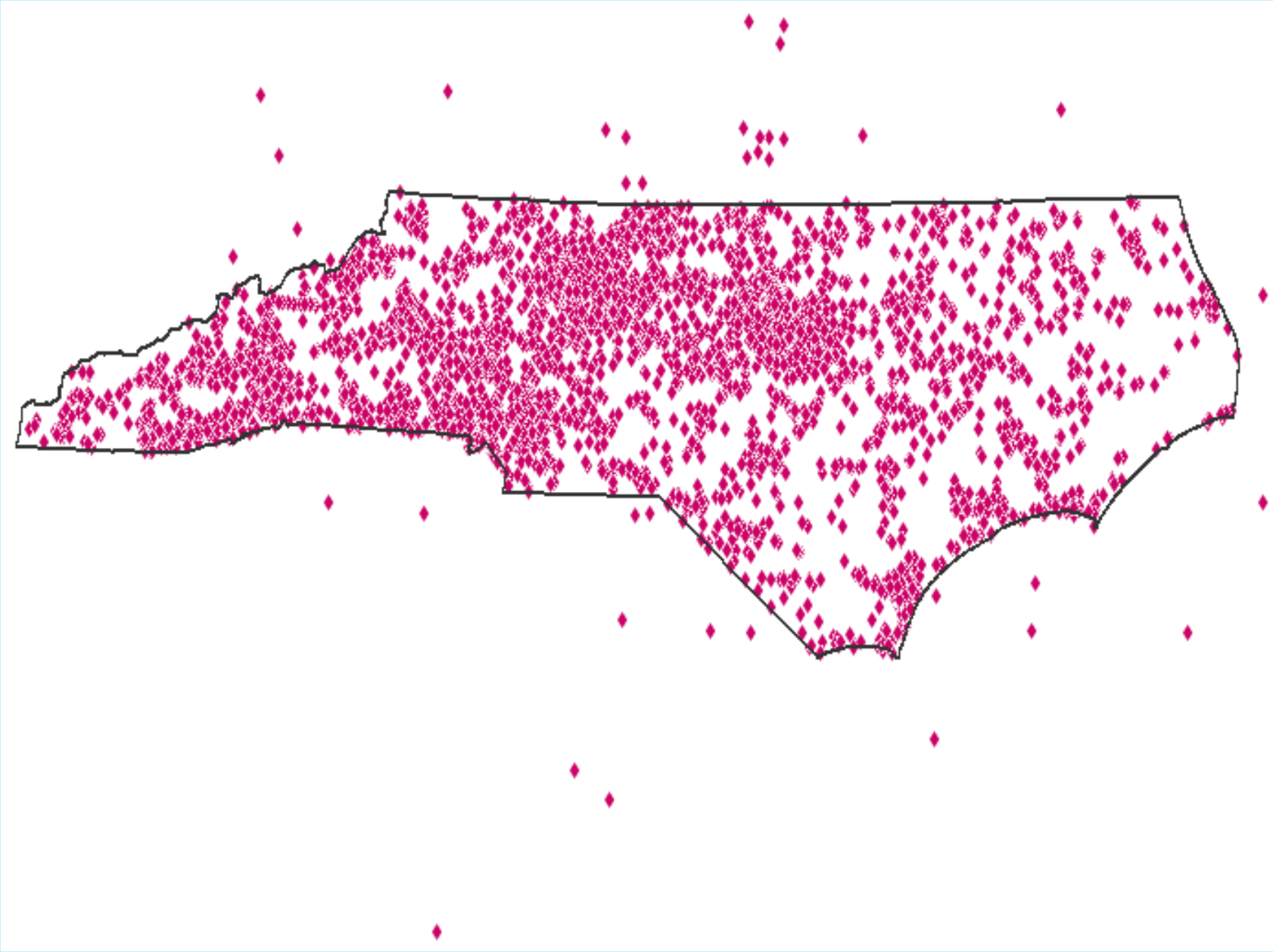
Non-Discharge



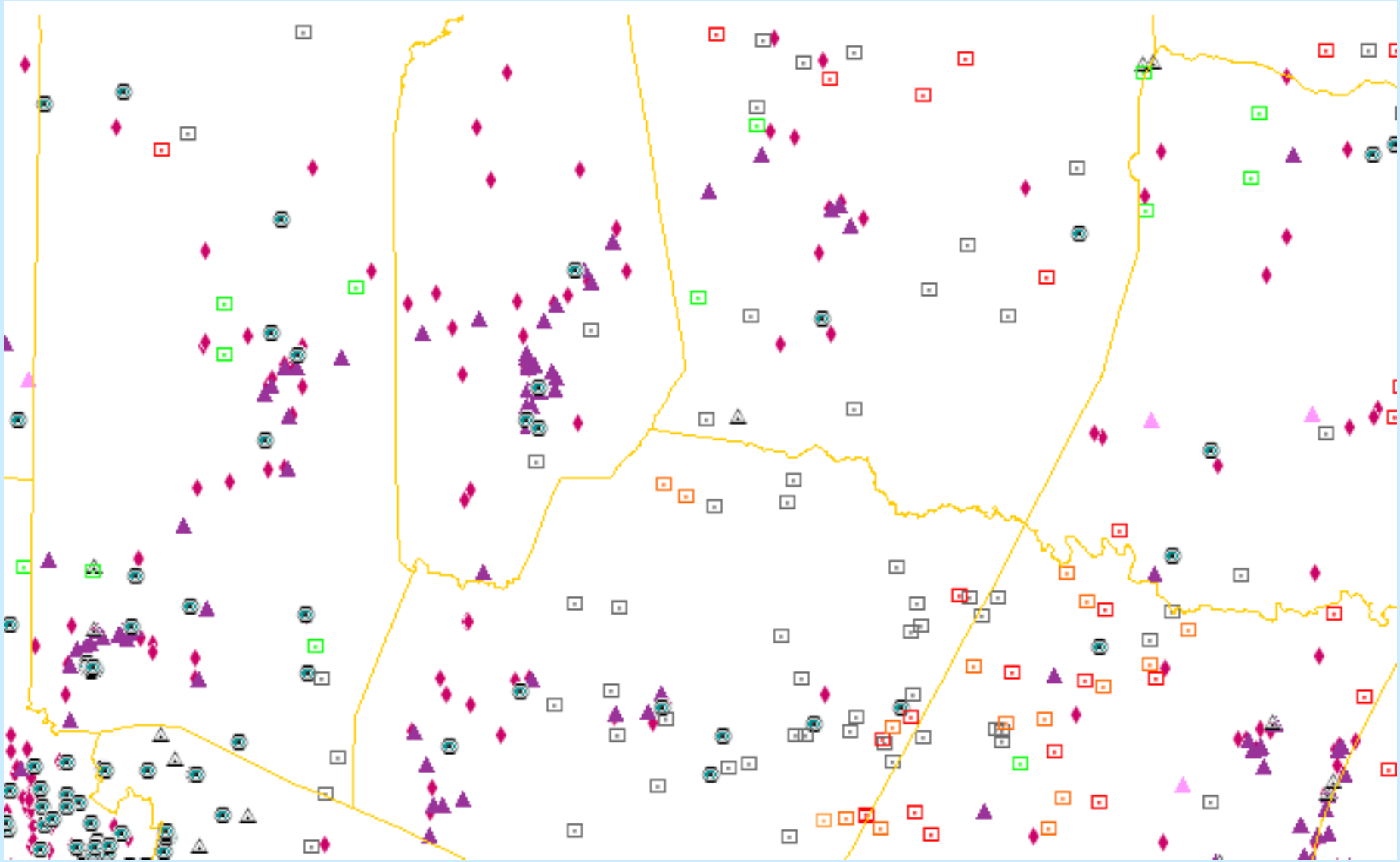
NPDES and State Stormwater



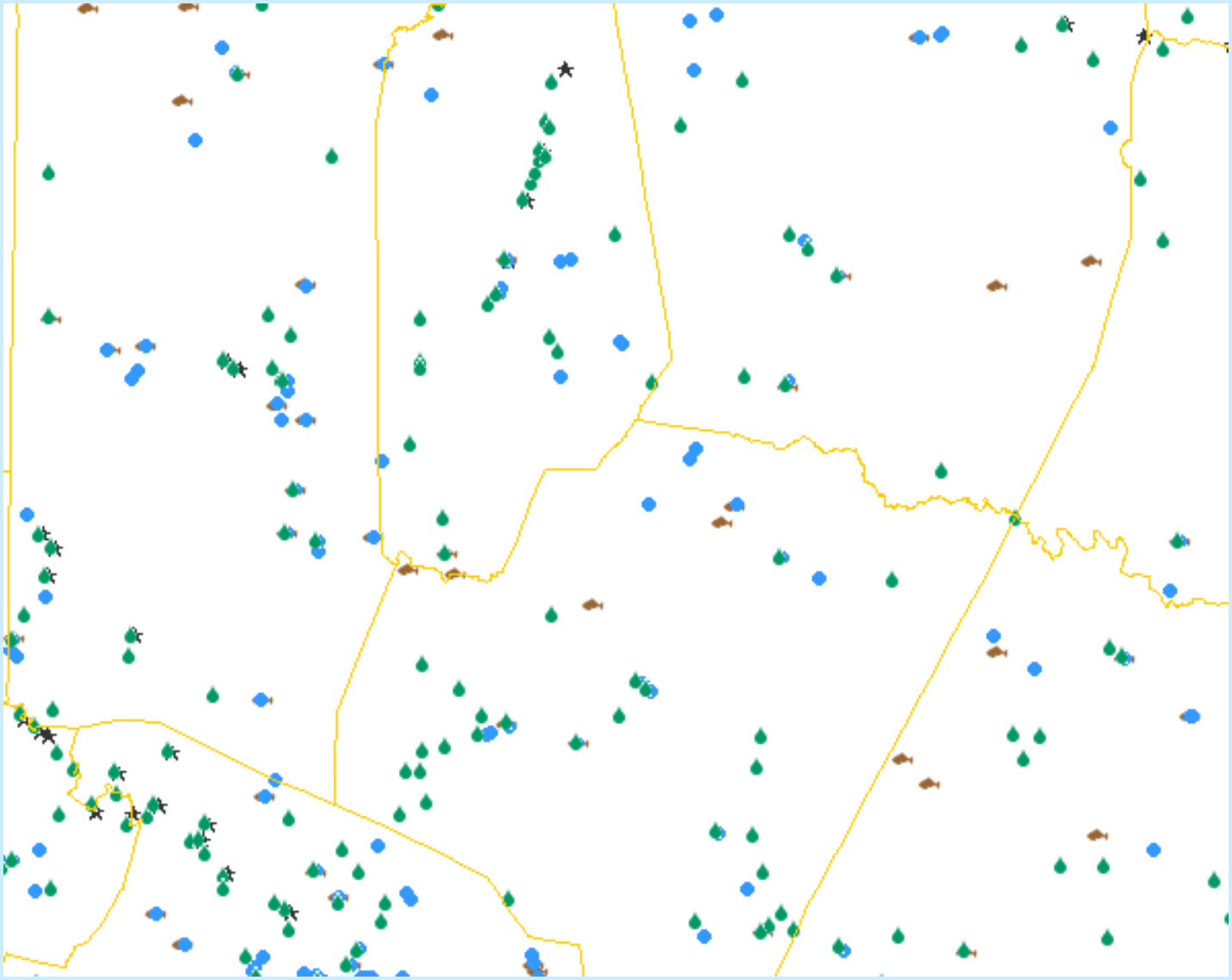
NPDES Wastewater



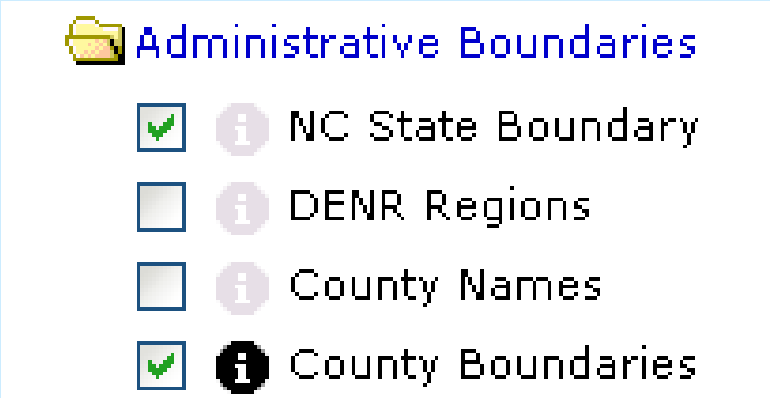
All DWQ Permitted Facilities

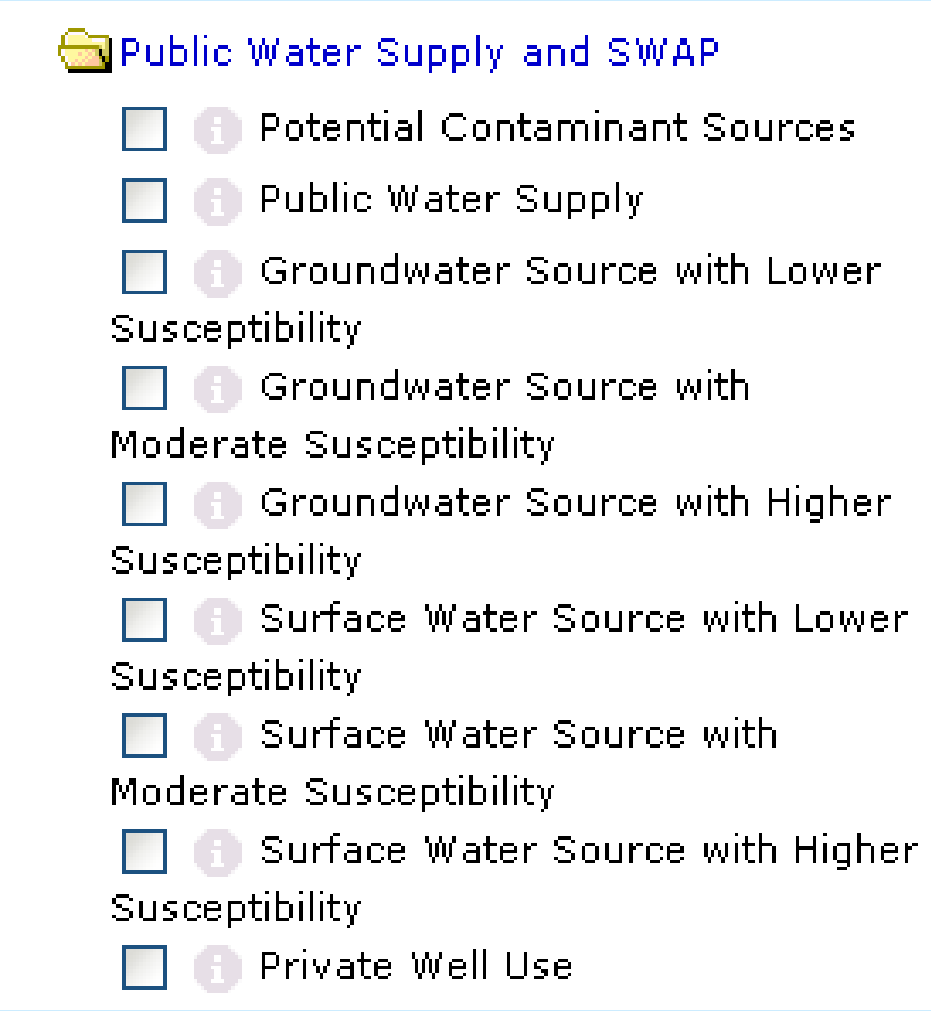


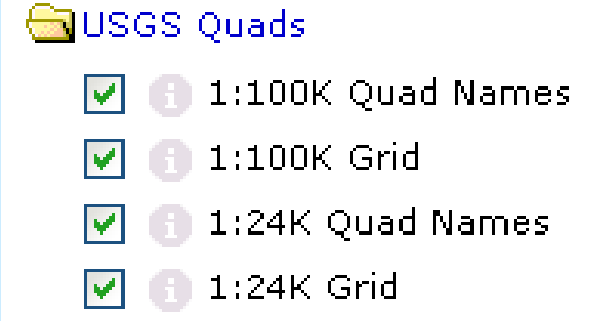
DWQ Monitoring Sites

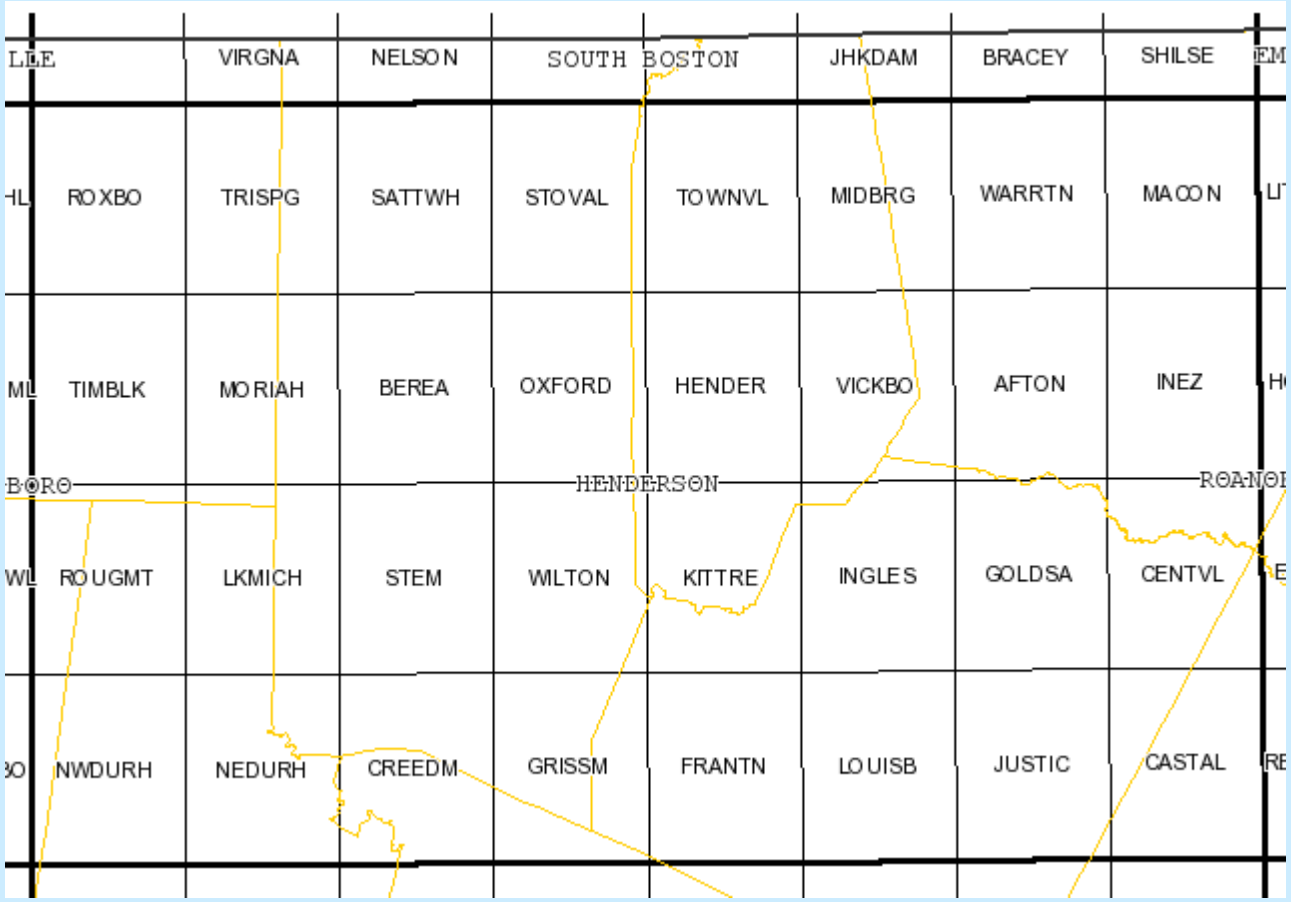


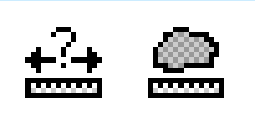
Other layers






USGS Quads
1:100K Quad Names
1:100K Grid
1:24K Quad Names
1:24K Grid


VIRGNA
NELSON
SOUTH BOSTON
JHKDAM
BRACEY
SHILSE
ROXBO
TRISPG
SATTWH
STOVAL
TOWNVL
MIDBRG
WARRTN
MACON
TIMBLK
MORIAH
BEREA
OXFORD
HENDER
VICKBO
AFTON
INEZ
HENDERSON
ROUGMT
LKMICH
STEM
WILTON
KITTRE
INGLES
GOLDSA
CENTVL
NWDURH
NEDURH
CREEDM
GRISSM
FRANTN
LOUISB
JUSTIC
CASTAL



Measure Area

Area (km^2)	1479.17
Area (hectares)	147917.38
Point 1	517491.07 E 310414.95 N
Point 2	564171.51 E 309827.91 N
Point 3	561529.22 E 276953.68 N
Point 4	516708.17 E 278714.80 N

Take home message

- Internet based
- Look At Data
- Will be some editing functionality
- For analysis, still need ArcMap
- More layers coming