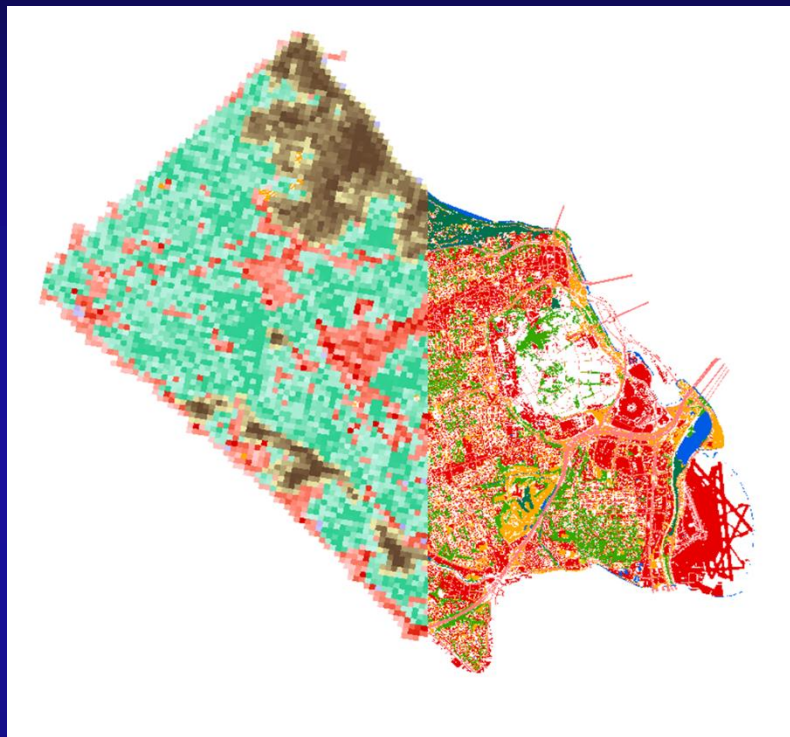


Phase 6.0 Local Land Cover Methodology

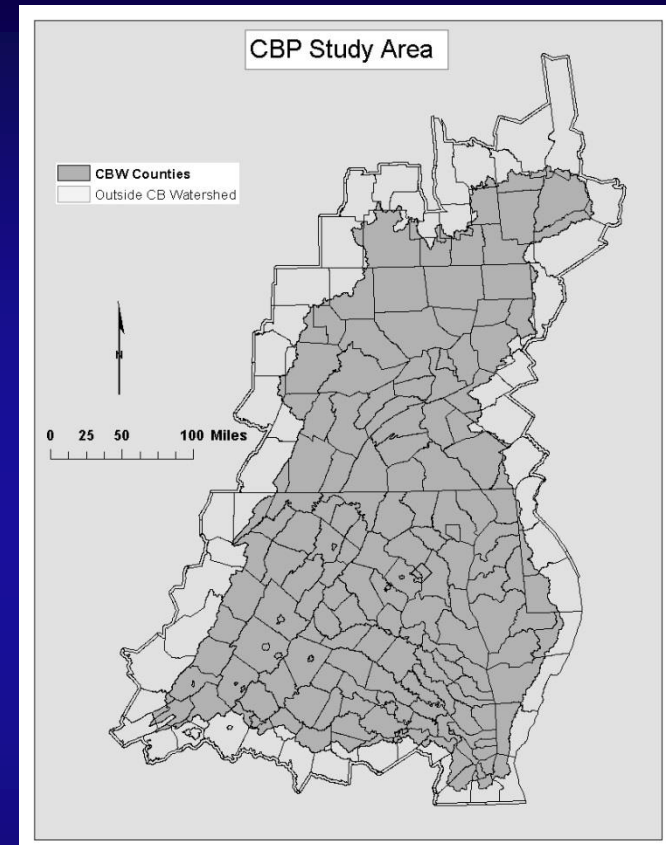


Peter Claggett, Frederick Irani, Quentin Stubbs, Renee Thompson
USGS Eastern Geographic Science Center



Phase 6 Local Data Method: Outline

- Data
- Classes
- Steps
- Other Factors



Phase 6 Local Data Method: Data

- **CBW States, Counties and Local Government agencies contributed digital land use, land cover, and other data to the CBPO for incorporation into the Phase 6.0 Land Cover database.**



Phase 6 Local Data Method: Data

- Data consisted of Vector or Raster data in a variety of cell resolutions, minimum mapping units dates, and map projections



Phase 6 Local Data Method: Data

- Each county provided a different set of data ranging from detailed land use to only parcel or zoning



Phase 6 Local Data Method: Data

- Land class categories and codes were not the same among all counties.
- Some local data was actually derived from regional land cover data such as NWI, etc.



Phase 6 Local Data Method: Data

- Land class categories and codes were not the same among all counties.
- Some local data was actually derived from regional land cover data such as NWI, etc.



Phase 6 Local Data Method: Data

- There are 216 FIPS codes identified across the CBW Study area
- Of these, 79 counties provided Parcel and Zoning, etc. but no Land Use data



Phase 6 Local Data Method: Data

- The remaining 137 Counties provided Land Use, Land Cover, Parcel or Zoning data
- Parcel information can be used to differentiate rural from urban areas
- Some zoning data included land characteristic information.



Phase 6 Local Data Method: Data

- Land class categories and codes were not the same among all counties
- Some local data was actually derived from regional land cover data such as NWI, etc.
- Each of the 6 States and DC Provided Statewide Land Cover or Land Use Data Except New York and Virginia

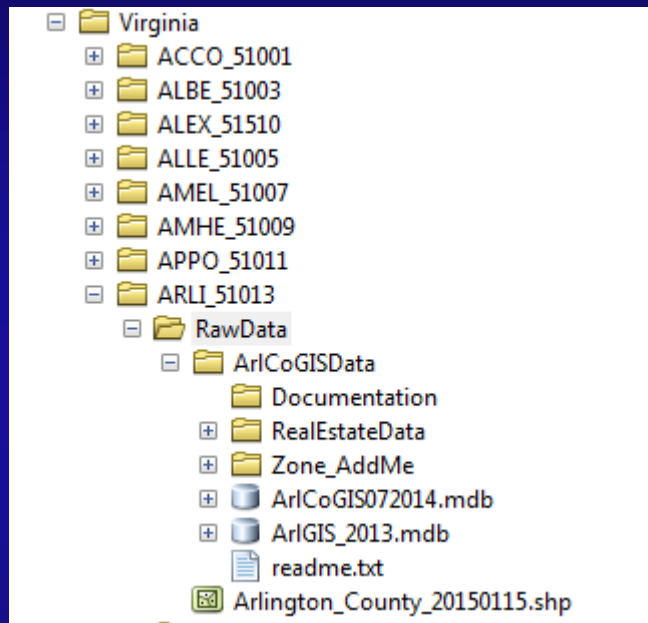


Phase 6 Local Data Method: Classes

- 1. Impervious Roads (IR)
 - Includes paved and unpaved Roads and Bridges
 - Excludes Driveways



Raw Local Data Inventory



Raw Local Data Inventory: Documentation

The screenshot displays a web application interface for a data inventory. On the left, a file browser shows a directory structure: Virginia > ARL1_S1013 > RawData > ARLCoGISData > Documentation. Below this, a table lists files with columns for Name, Date modified, Type, and Size.

Name	Date modified	Type	Size
copyrightackn.docx	5/29/2013 11:21 AM	Microsoft Word D...	15 KB
copyrightackn.pdf	5/29/2013 11:35 AM	Adobe Acrobat D...	13 KB
legaldisclaimer.docx	5/29/2013 11:22 AM	Microsoft Word D...	18 KB
legaldisclaimer.pdf	5/29/2013 11:35 AM	Adobe Acrobat D...	10 KB
metadata_CD2013.pdf	5/29/2013 12:09 PM	Adobe Acrobat D...	23,276 KB

On the right, a detailed metadata page for 'Airport poly' is shown. It includes the Arlington Virginia logo and contact information for the GIS Mapping Center. The page lists the dataset name, description, feature type, SDE name, and last major update. Below this is a table for attribute names, descriptions, data types, widths, and scales. The 'Ancillary Data' section provides geographic extents (North, South, West, East) and other metadata such as spatial reference, intended scale, positional accuracy, and source information.

Arlington Virginia
GIS Mapping Center
DES/E&CP Division
2100 Clarendon Blvd
Suite 913, Courthouse Plaza

Airport poly

Dataset: Pave

Description: RR Washington National Airport Runways, tarmac and associated paved areas

Feature Type: Polygon

SDE Name: arlgis.ARLGIS Airport_poly

Last Major Update: May 24, 2010

ATTRIBUTE NAME	DESCRIPTION	DATA TYPE	WIDTH	PRECISION	SCALE
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Ancillary Data

Geographic Extents:

North	South	West	East
38.952489	38.941765	-77.048121	-77.032157
7000422.520000	6992944.560000	11896431.520000	11900859.360000

Spatial Reference: NAD_1983_StatePlane_Virginia_North_FIPS_4501_Feet

Intended Scale: various

Positional Accuracy: Plus or Minus 2 feet

Positional Verification:

Source: All 2005 planimetric features were captured from 2005 Orthophotography.

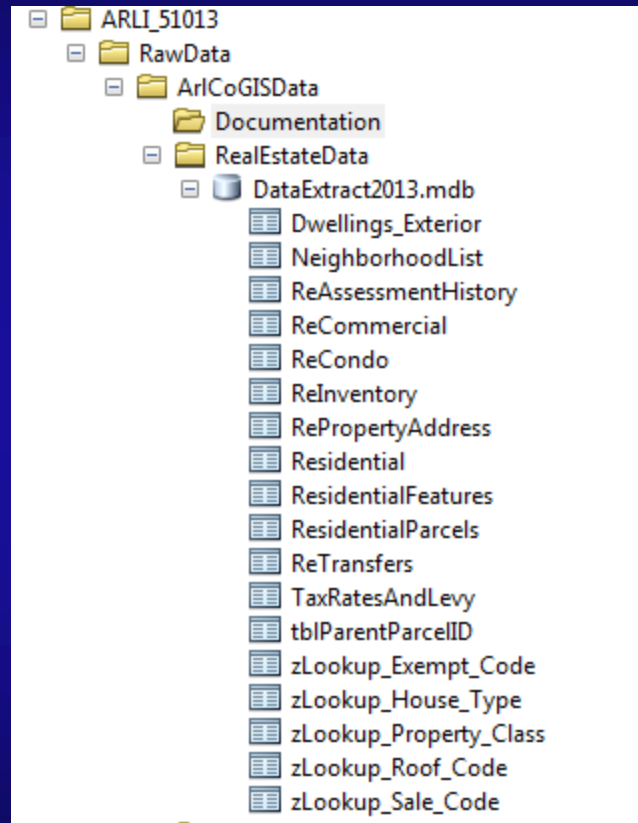
Source Medium:

Source Scale:

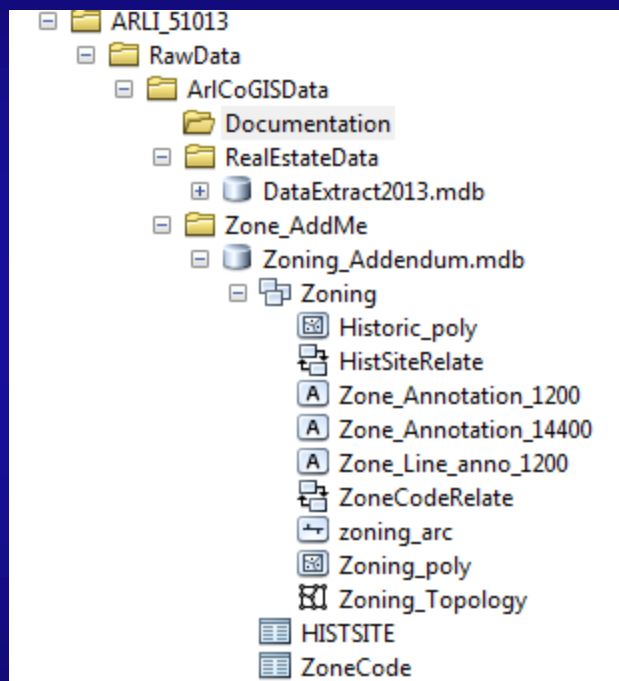
Maintenance Frequency: Once every two years

Comments: often used on 1:14400 scale maps

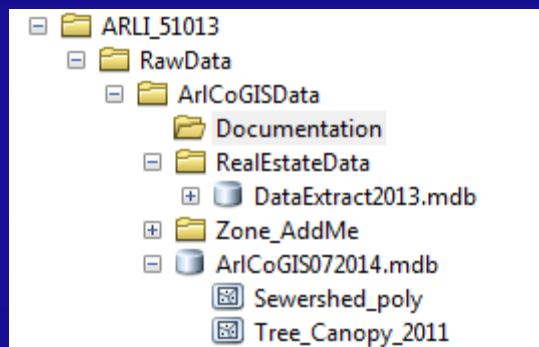
Raw Local Data Inventory



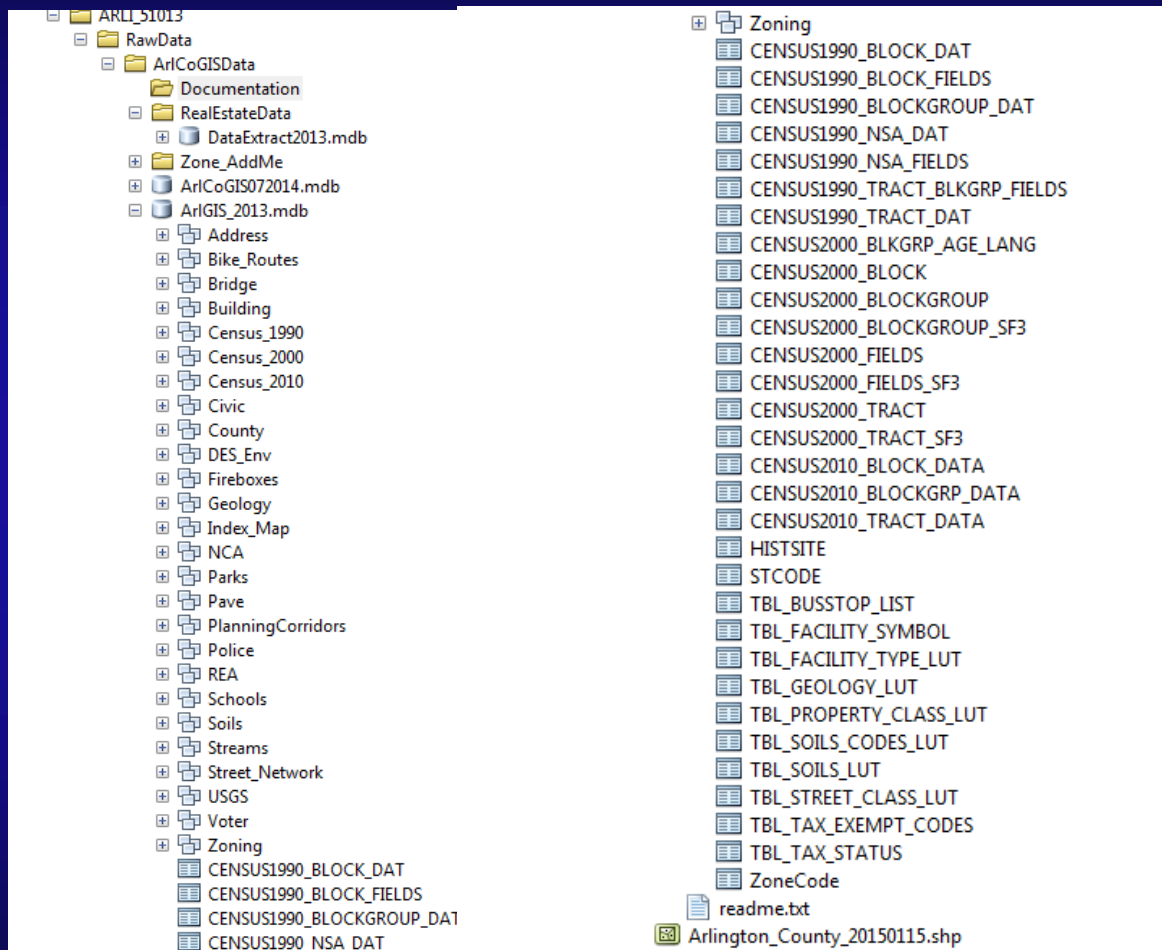
Raw Local Data Inventory



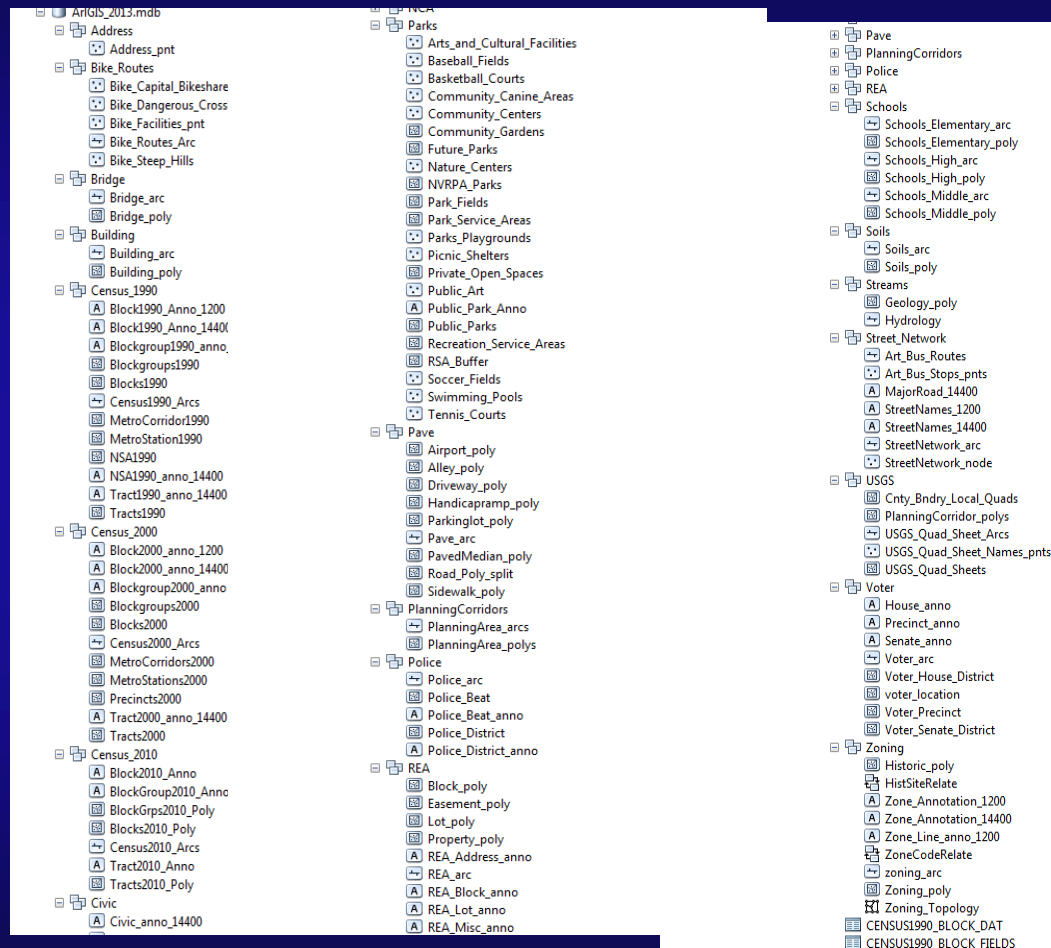
Raw Local Data Inventory



Raw Local Data Inventory



Raw Local Data Inventory



Phase 6 Local Data Method: Classes

- **Impervious Non-Roads (INR)**
 - Buildings
 - Driveways
 - Sidewalks
 - Parking lots
 - Garages
 - Tunnels
 - Runways
 - Some private roads



Phase 6 Local Data Method: Classes

- Forest (FOR)
 - Contiguous patches of trees and shrubs ≥ 1 acre
 - Assumed to have an unmanaged understory



Phase 6 Local Data Method: Classes

Tree Canopy (< 1 Acre)

- Overhanging Impervious Road surfaces
 - Impervious Road (TC_IR)
- Overhanging impervious road surfaces
 - Tree Canopy Impervious Non-Road (TC_INR)
- Overhanging Herbaceous Surfaces
 - Tree Canopy Impervious Herbaceous (TC_H)



Phase 6 Local Data Method: Classes

- Wetlands (WET)
 - Local or state mapped wetlands that are not NWI (already have as regional)



Phase 6 Local Data Method: Classes

- **Water (WAT)**
 - Streams
 - Ponds
 - Swimming pools
 - Canals
 - Ditches
 - Wet detention basins
 - Reservoirs
 - etc.



Phase 6 Local Data Method: Classes

- Open Space (OS)
 - Non-fertilized herbaceous
 - Non-forest scrub/shrub and barren cover that is justifiably not turf or extractive, e.g.
 - beaches, extractive, vacant lots,
 - abandoned/fallow agricultural fields
 - transmission line right-of-ways,
 - baseball mounds, junkyards, fairgrounds
 - gravel roads, railroads, etc.



Phase 6 Local Data Method: Classes

- Turf Grass (TG)
 - Within the Developed Mask
 - Fertilized herbaceous cover within 200m of roads
 - Golf courses
 - Athletic Fields
 - etc.



Phase 6 Local Data Method: Classes

- **Agriculture (AGR)**
 - Agriculture is a kind of “left over” class in that after all other classes are created outside of the Developed Mask (DM), only Agricultural Areas will remain as undefined.



Phase 6 Local Data Method: Steps

- Analysts have been allocated a number of counties each to perform the following steps:
 - Note that these steps are only guidelines
 - Judgment calls must be made along the way



Phase 6 Local Data Method: Steps

- **County and statewide data Inventory**
 - Which local data types will inform which final 10 meter classes?
 - Which data types can be used to partition developed areas from rural areas?
 - Development Mask (DM) e.g.:
 - Parcel data
 - Zoning Data



Phase 6 Local Data Method: Steps

- Project all data to Albers
- Rasterize all Vector Data to 1 meter
- Rasterize all Water to 1 meter
- Rasterize all Wetlands to 1 meter



Phase 6 Local Data Method: Steps

- Combine Shrub Scrub, Tree canopy, or Forest local data into one raster
- Separate out Forest from this raster
- Set any Forest cells that overlap local water or wetland cells to Null



Phase 6 Local Data Method: Steps

- Create an Open Space Class from the remaining Shrub/Scrub
- Create a Tree Canopy Class from the remaining non-forest, non-shrub/scrub



Phase 6 Local Data Method: Steps

- Rasterize all roads data to 1 meters:
Impervious Roads (IR)
- Rasterize all non-road impervious data to 1
meter (INR)



Phase 6 Local Data Method: Steps

- Create a raster of all Tree Canopy cells that overlap with Roads (TC_IR)
- Create a raster of all Tree Canopy Cells that overlap with INR (TC_INR)
- Remove TC_IR and TC_INR cell locations from Tree Canopy (TC_H)



Phase 6 Local Data Method: Steps

- Consolidate all local Open Space data types into one raster



Phase 6 Local Data Method: Steps

- Create a Developed Mask
 - Unclassified cells within the Developed Mask become Turf Grass (TG)
 - Unclassified cells Outside of the Developed Mask become Agriculture (AG)



Phase 6 Local Data Method: Steps

- Consolidate any local turf grass data types into one raster
- Turf and Agriculture are “Left Over” classes distinguished only by their location in or out of the Developed Mask



Phase 6 Local Data Method: Steps

- Aggregate all of the above 1 meter classes to 10 meter with values ranging from 1 – 100 percent coverage of each class.



Phase 6 Local Data Method: Steps

- Because GIS processing at 1 meter is very slow for large counties it can become necessary to work at 10 meter resolution as early in the process.



Phase 6 Local Data Method: Steps

- Add all 10 meter classes for a county.
- If any cell in the county exceeds 100, then isolate and correct the problem at 1 meter resolution and re-aggregate.



Phase 6 Local Data Method: Steps

- Because GIS processing at 1 meter is very slow for large counties it becomes necessary to work at 10 meter resolution as early in the process.



Phase 6 Local Data Method: Steps

- All data is projected to Albers and aggregated to 10 meters as soon as possible



Phase 6 Local Data Method: Steps

- Rather than identifying overlapping TC_IR, TC_INR, Forest over Water, etc. All 10 meter datasets are combined in such a way as to create a table showing the individual layer cells at each location



Phase 6 Local Data Method: Steps

- The sum of these components may add up to more than 100.
- In this case cell values must be adjusted according to a hierarchy that makes sense for each particular combination.

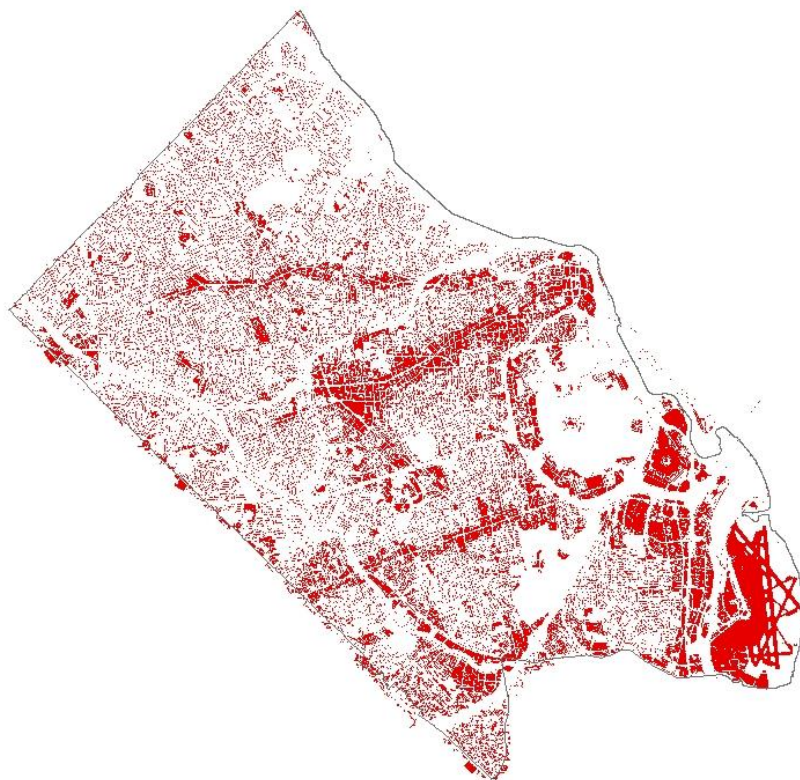


Phase 6 Local Data Method:Optional

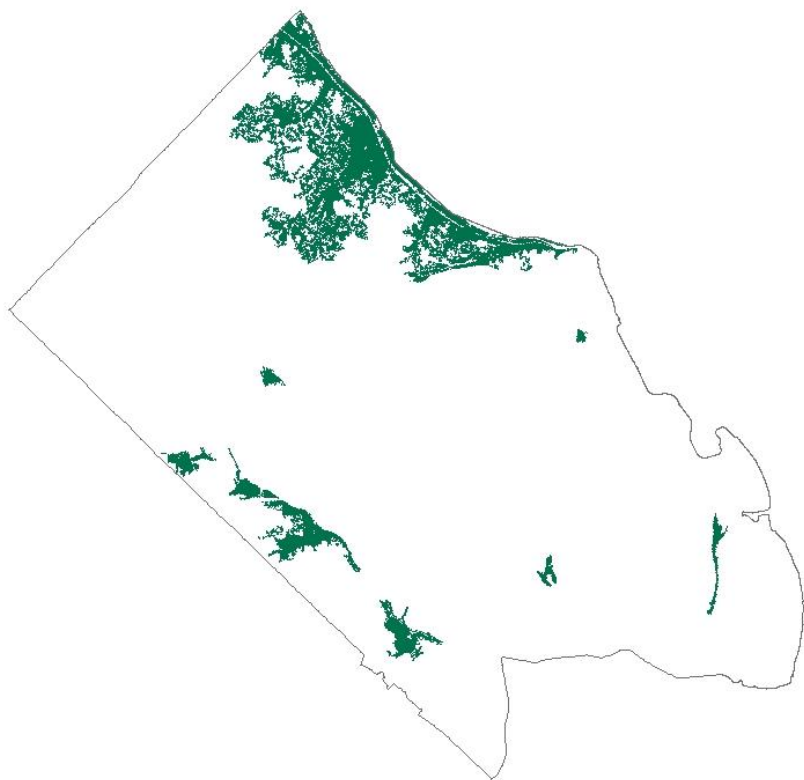
- Aggregated classes are 32-bit Integer
- Folding Local and Regional Data Together

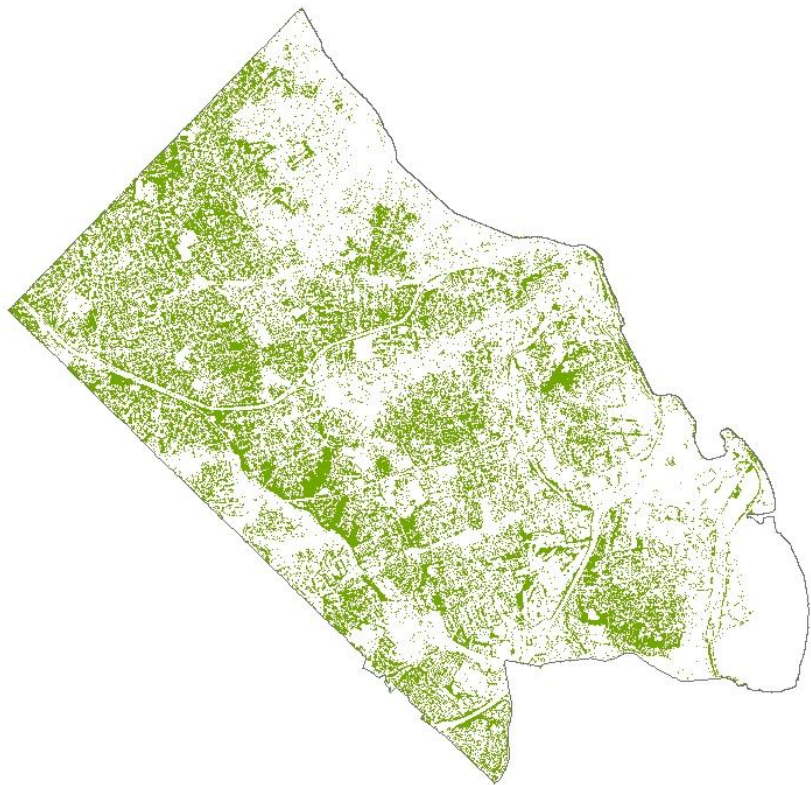


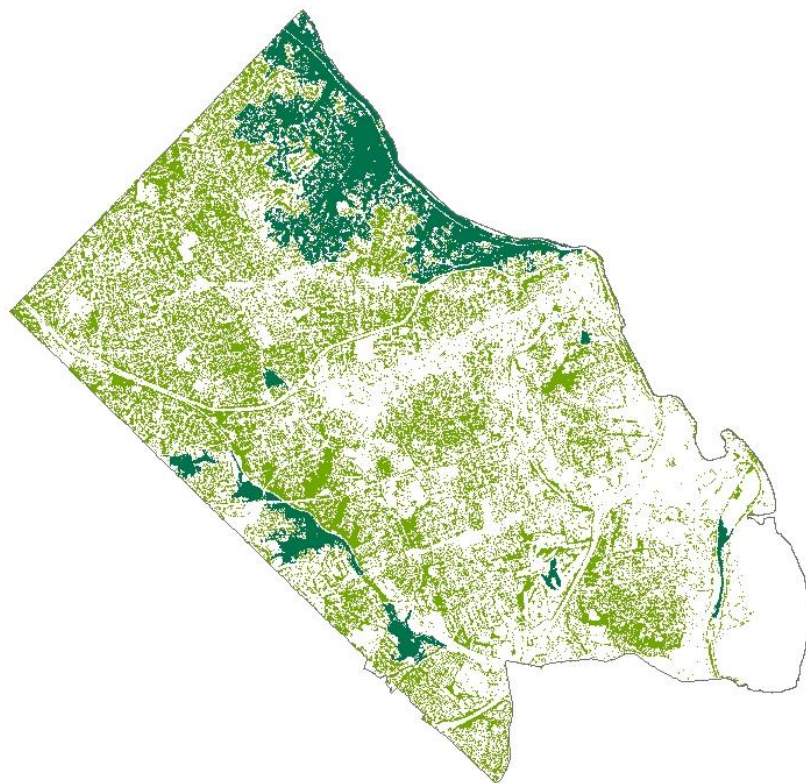


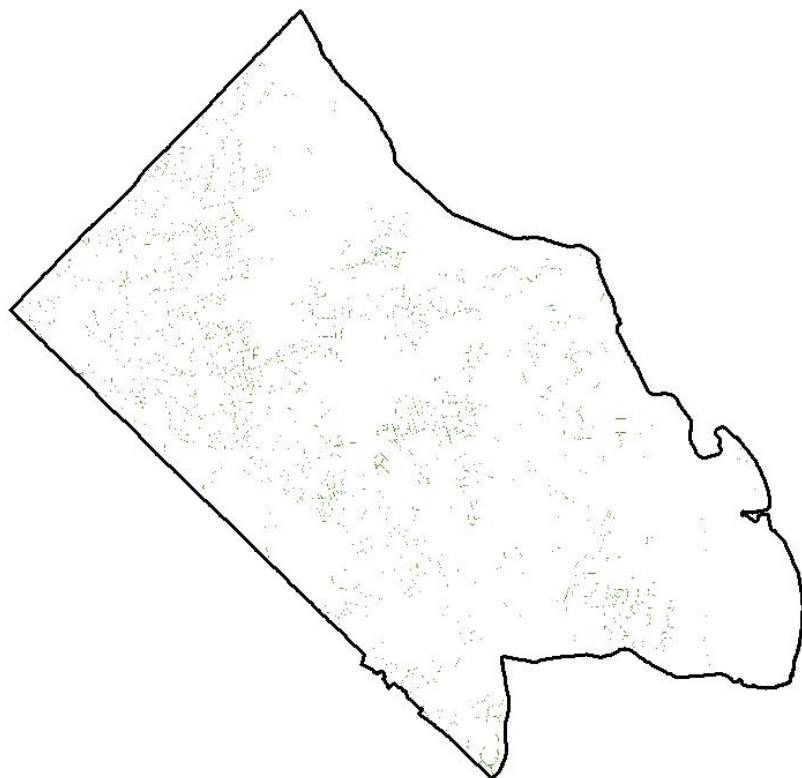


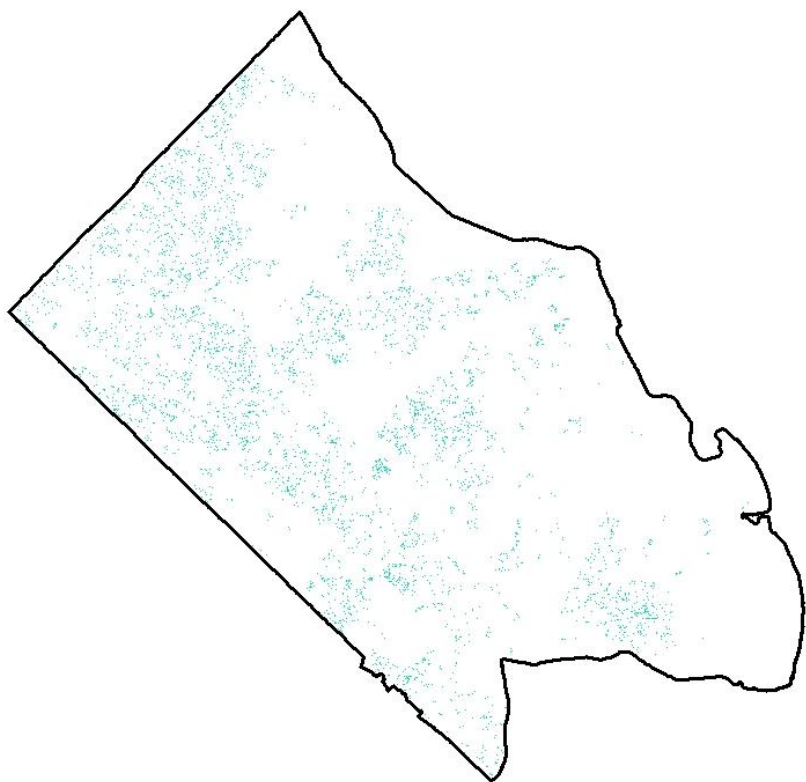


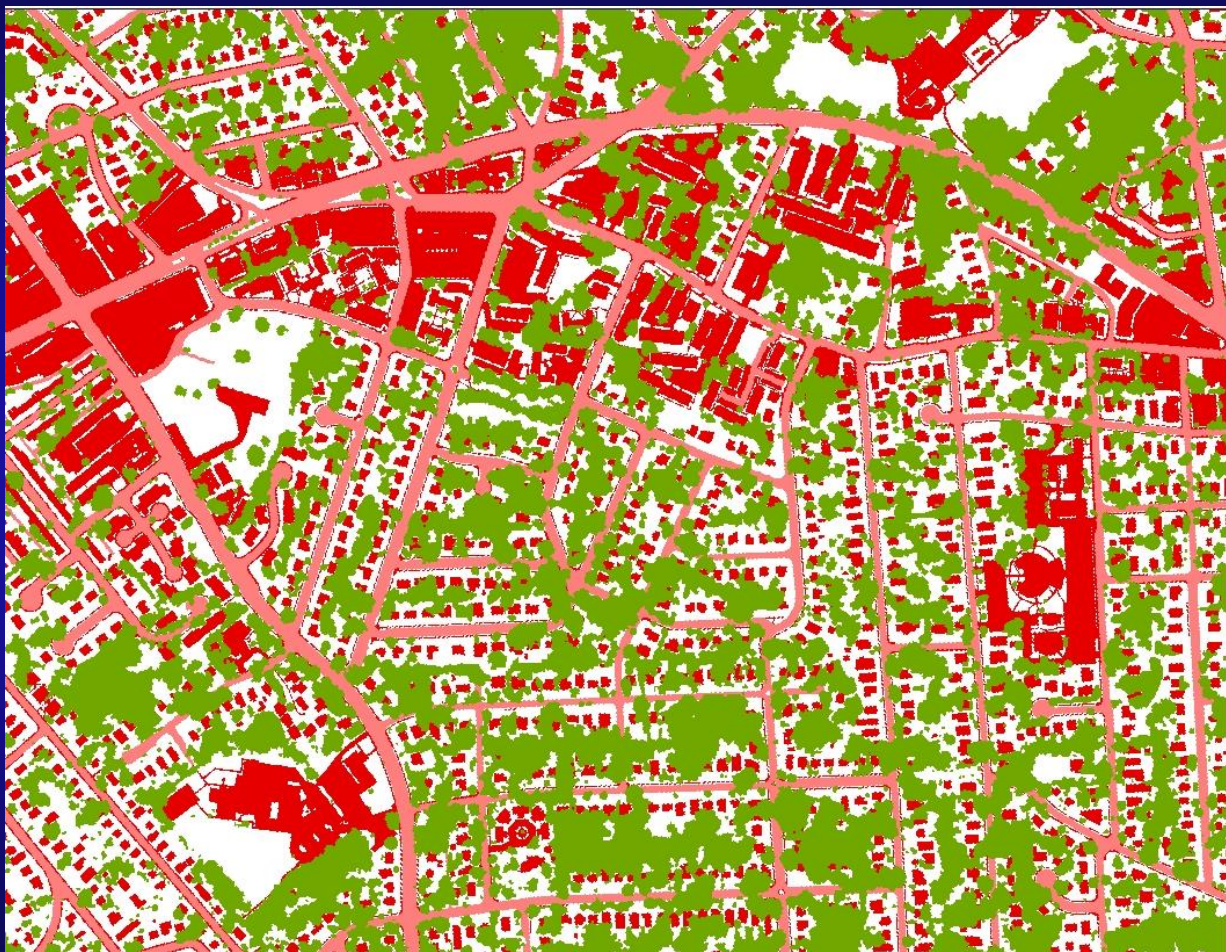


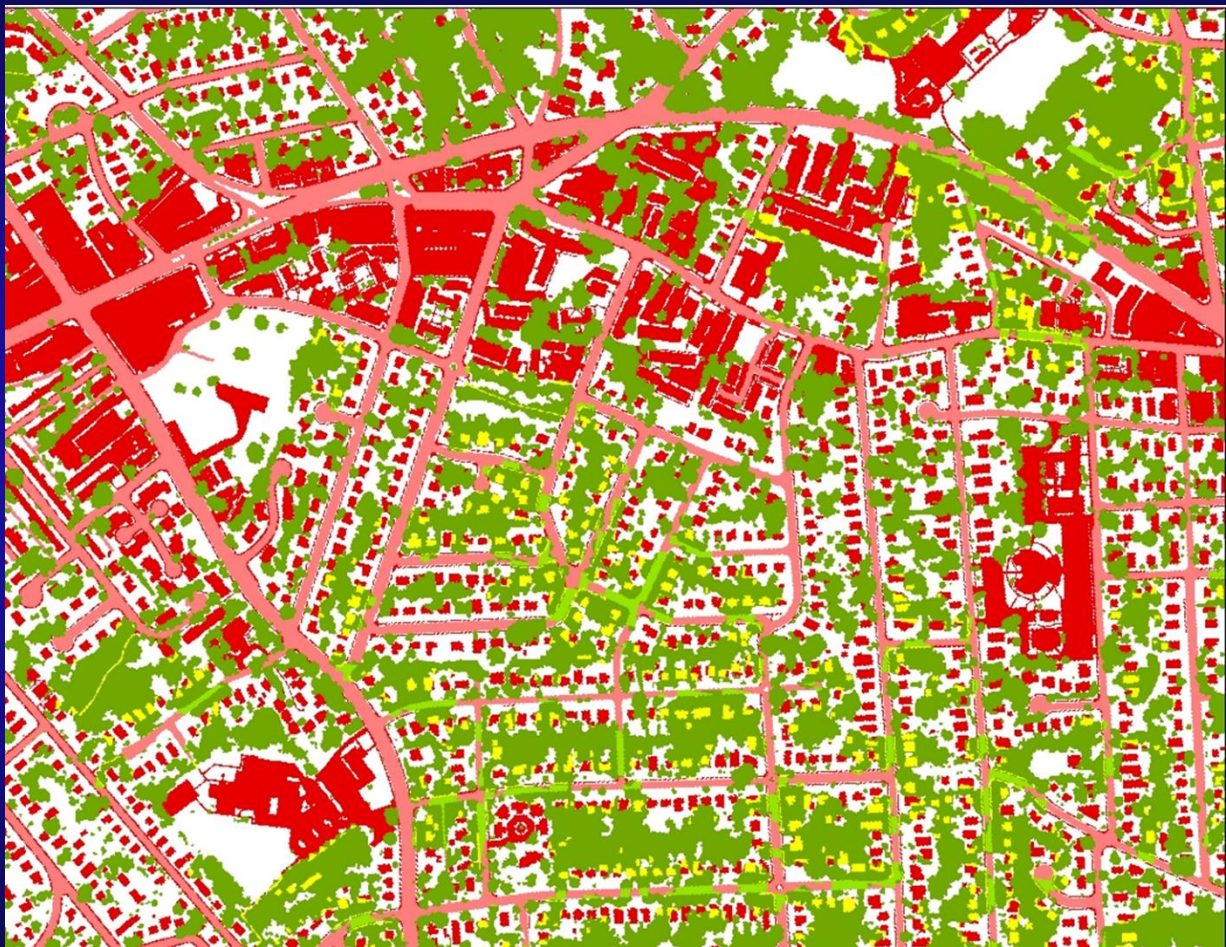


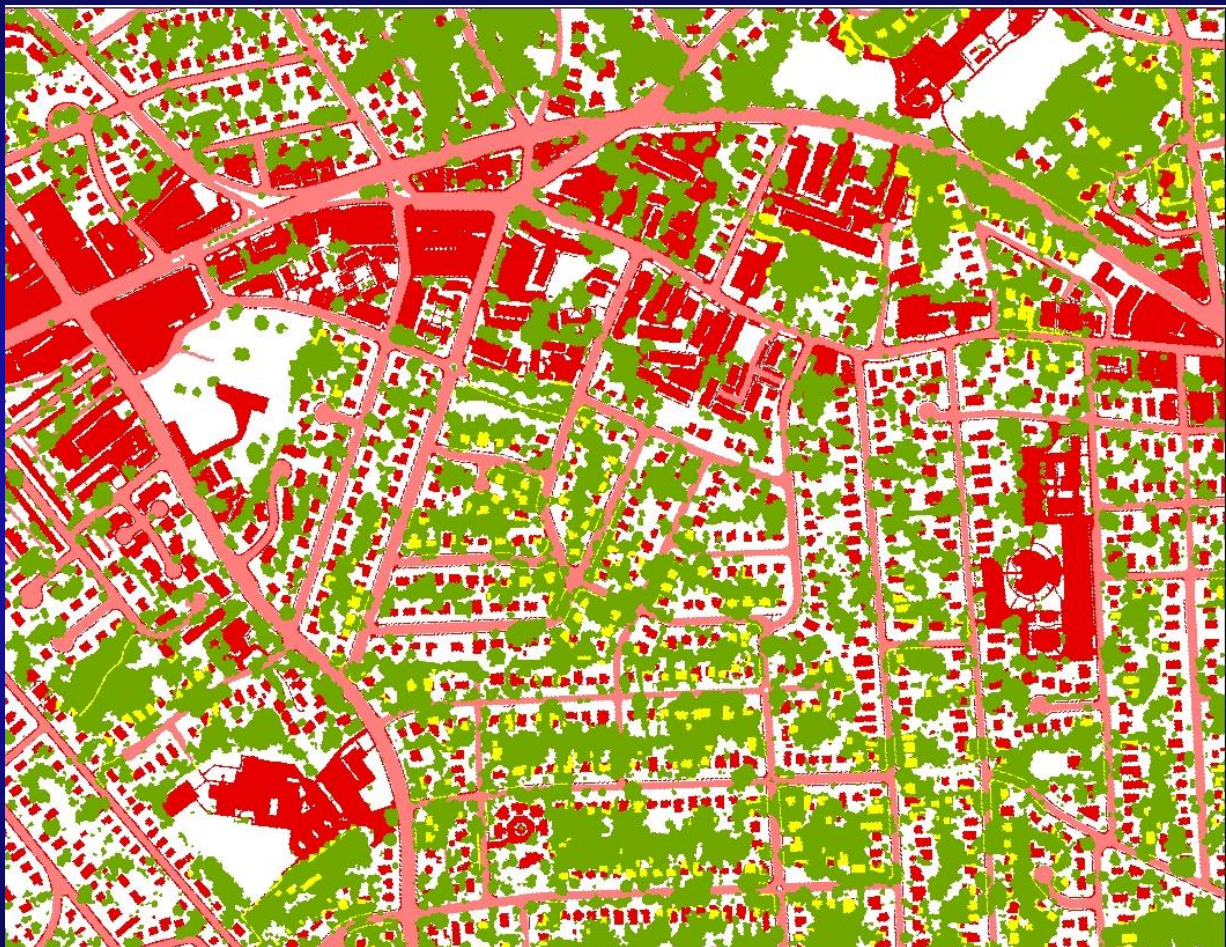










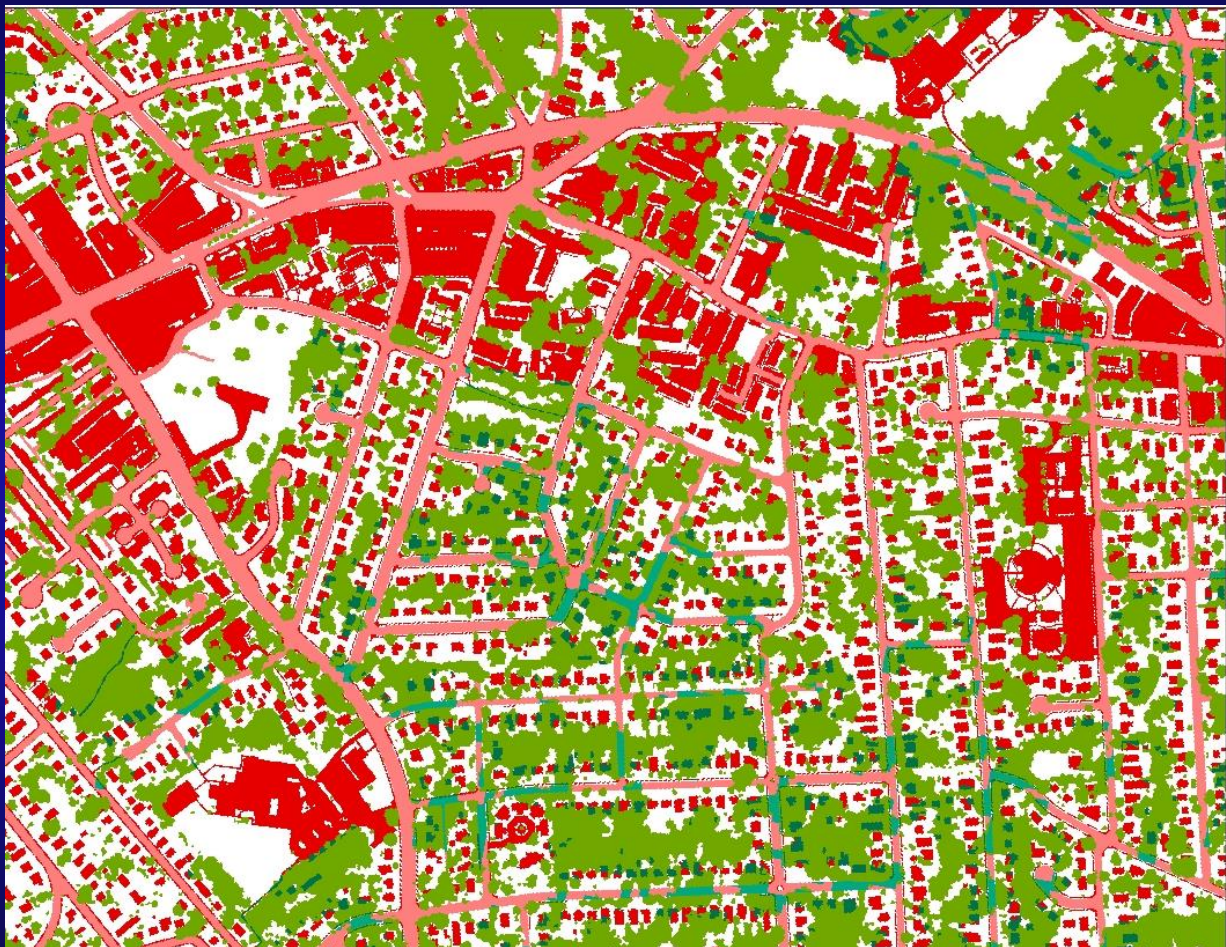


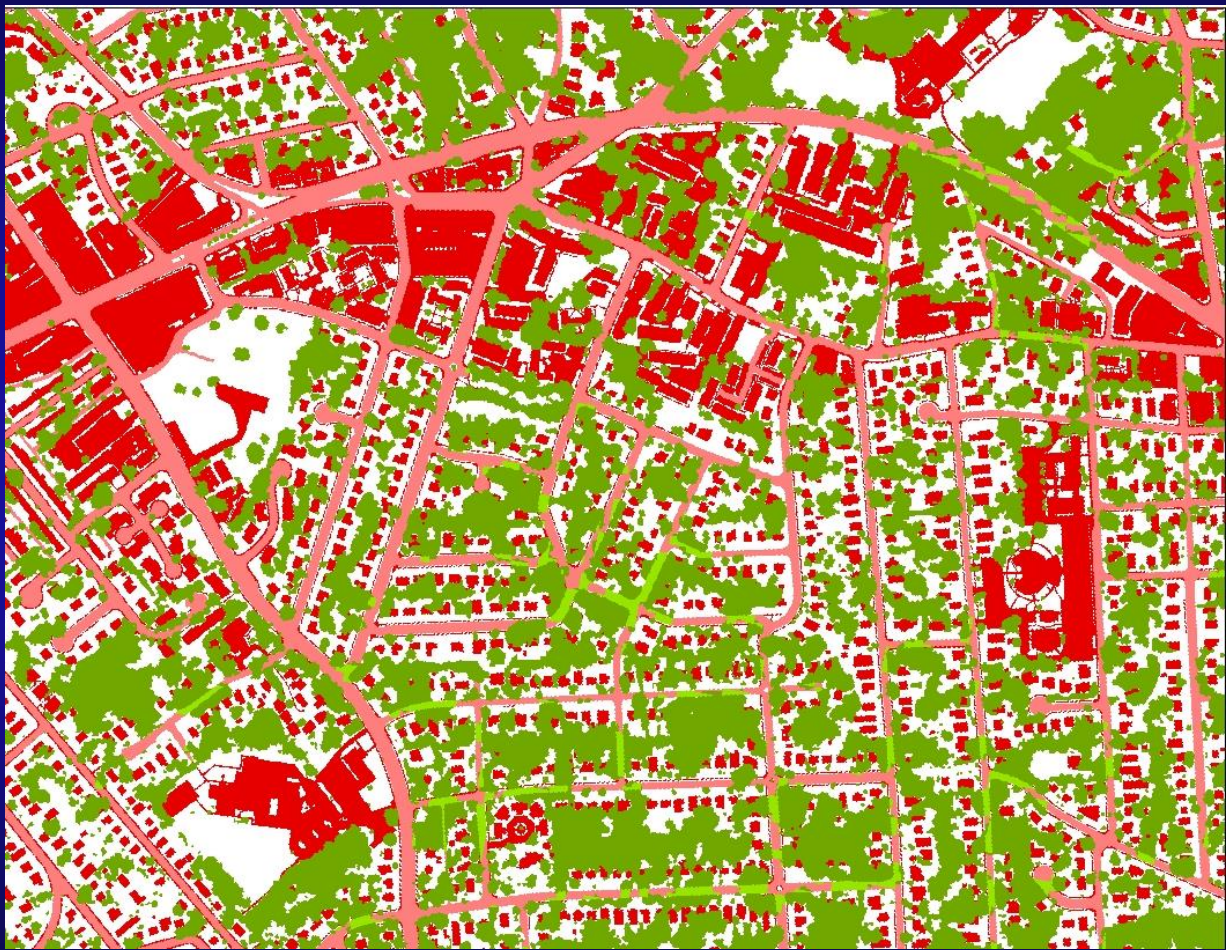






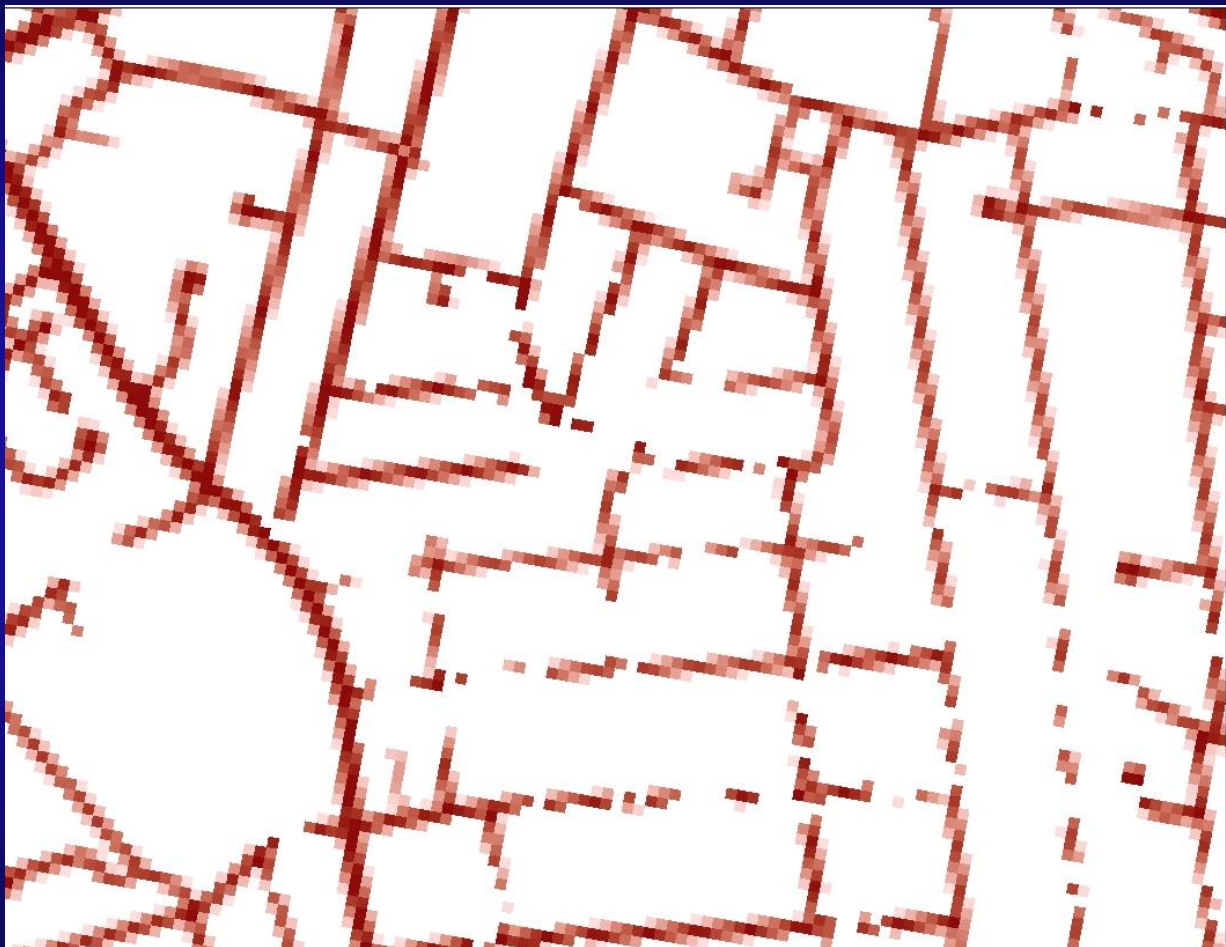






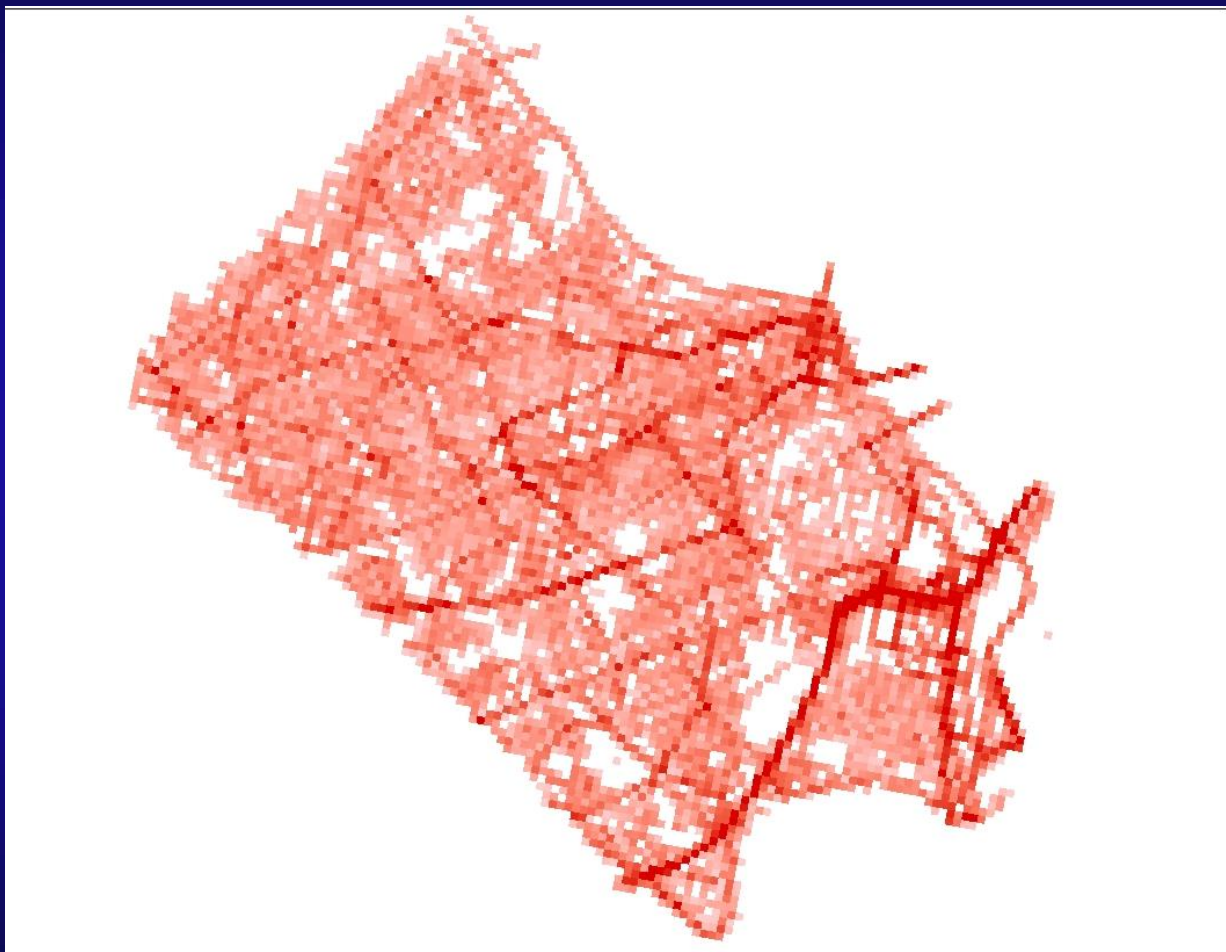




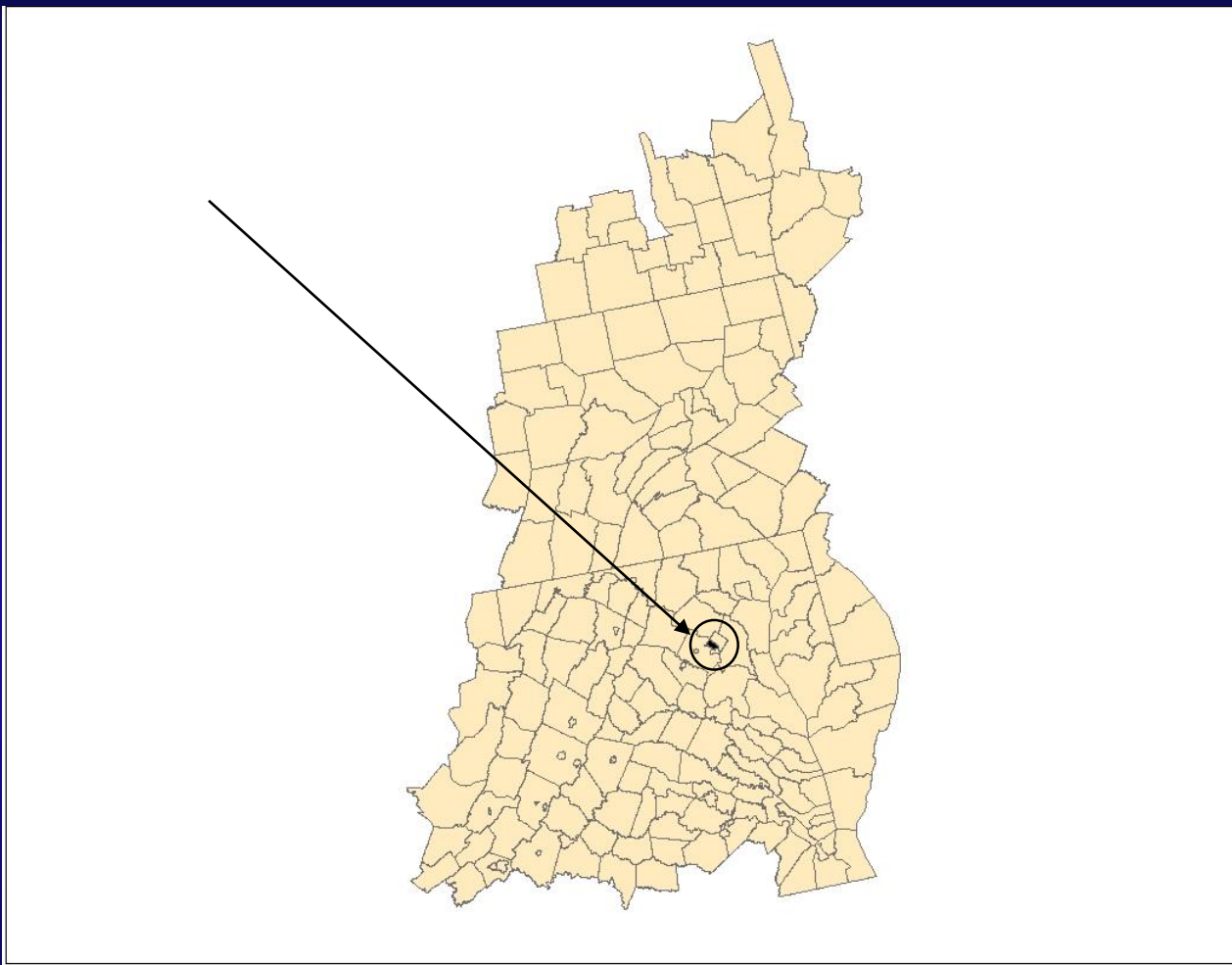








Progress: Arlington, VA



Questions?

