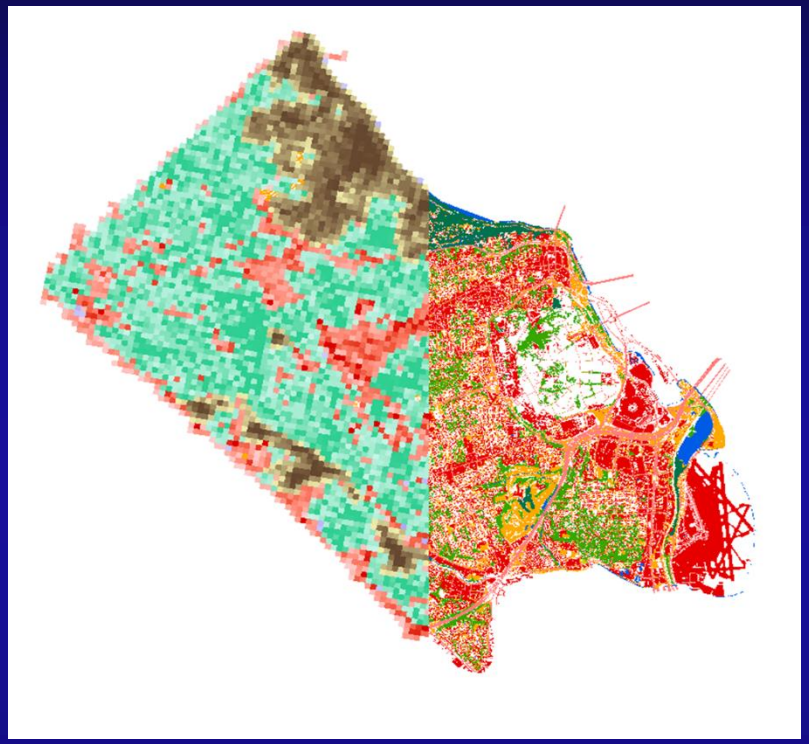
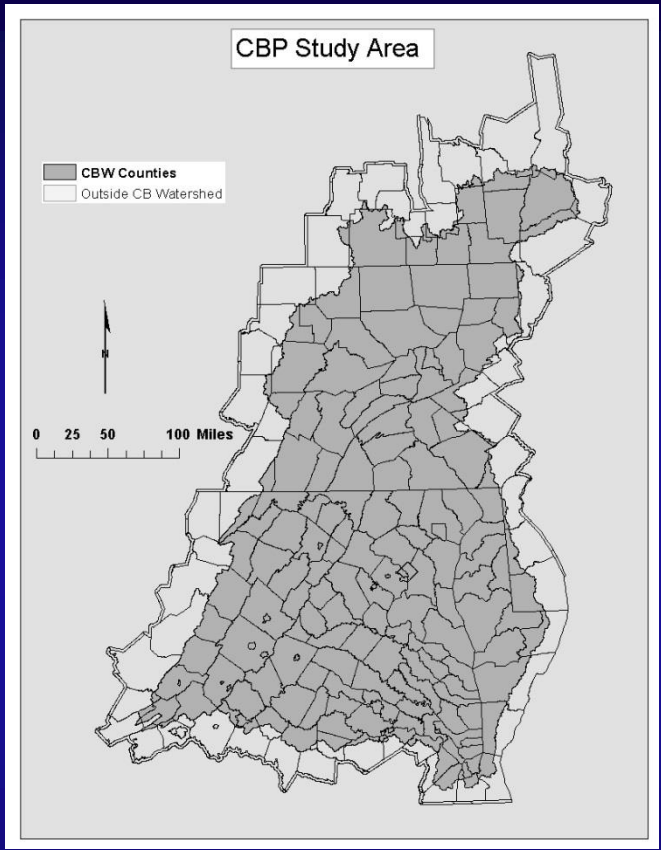
Phase 6.0 Local Land Cover Methodology



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

Phase 6 Local Data Method: Outline

- Data
- Classes
- Steps
- Other Factors

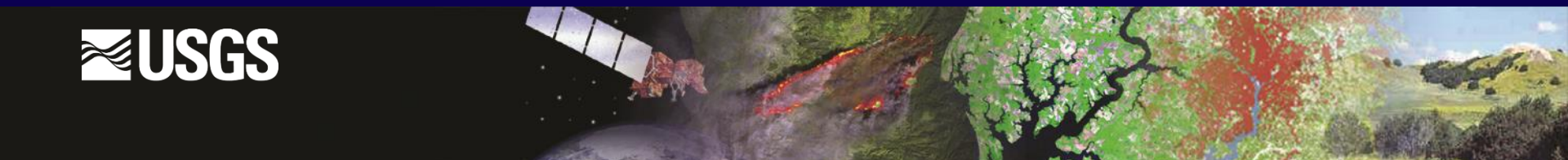


Phase 6 Local Data Method: Data

- 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

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Phase 6 Local Data Method: Data

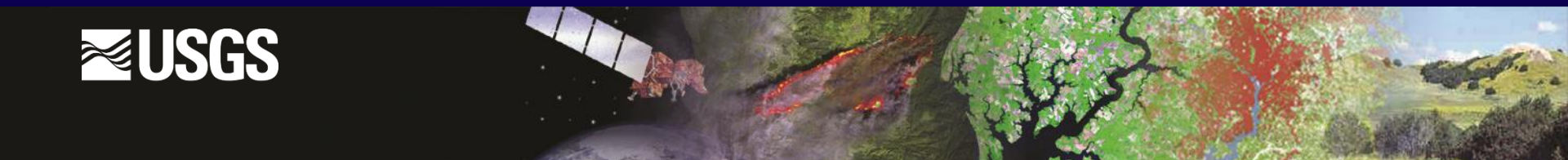
- There are 216 FIPS codes identified across the CBW Study area
- Of these, 79 counties provided Parcel and Zoning, etc. but no Land Use data

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

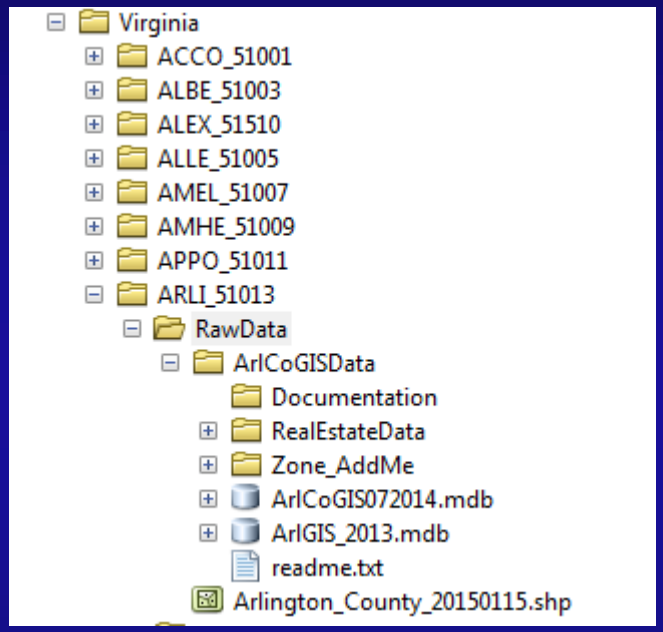
- Land class categories and codes were not the same among all counties
- Some local data was actually derived from regional land cover data such as NWI, etc.
- Each of the 6 States and DC Provided Statewide Land Cover or Land Use Data Except New York and Virginia



Phase 6 Local Data Method: Classes

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

Raw Local Data Inventory



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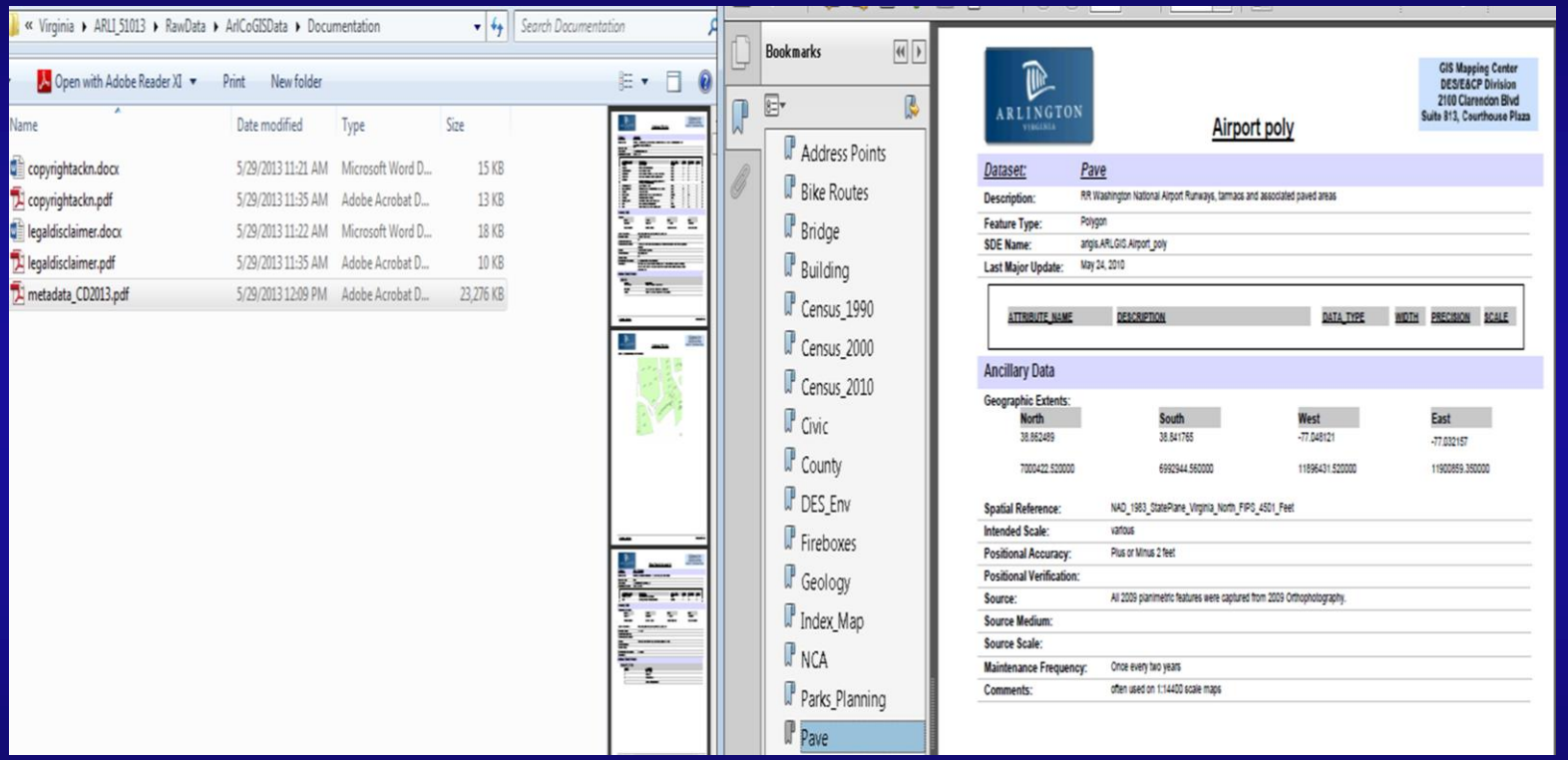
Raw Local Data Inventory: Documentation



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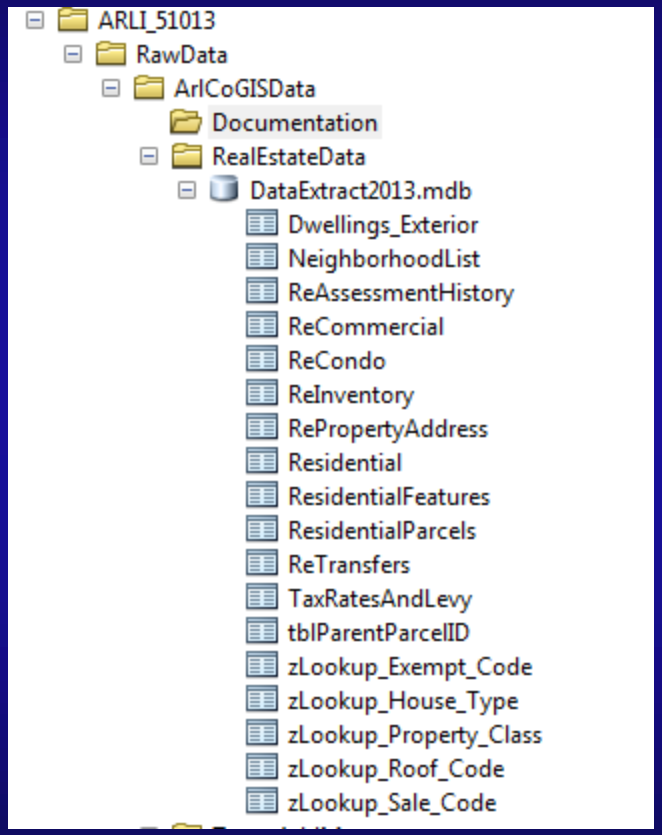

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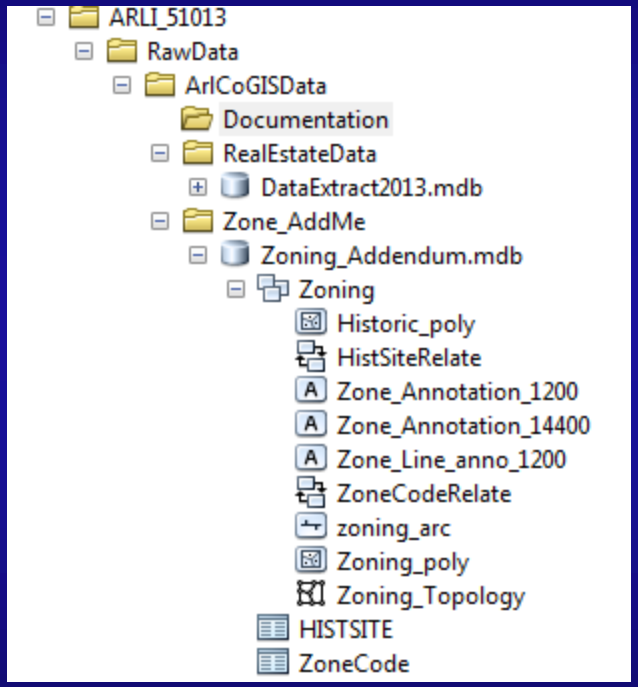

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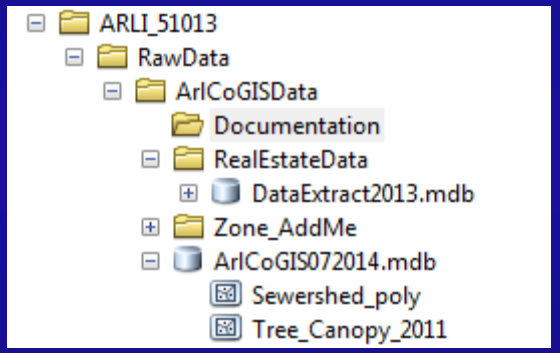

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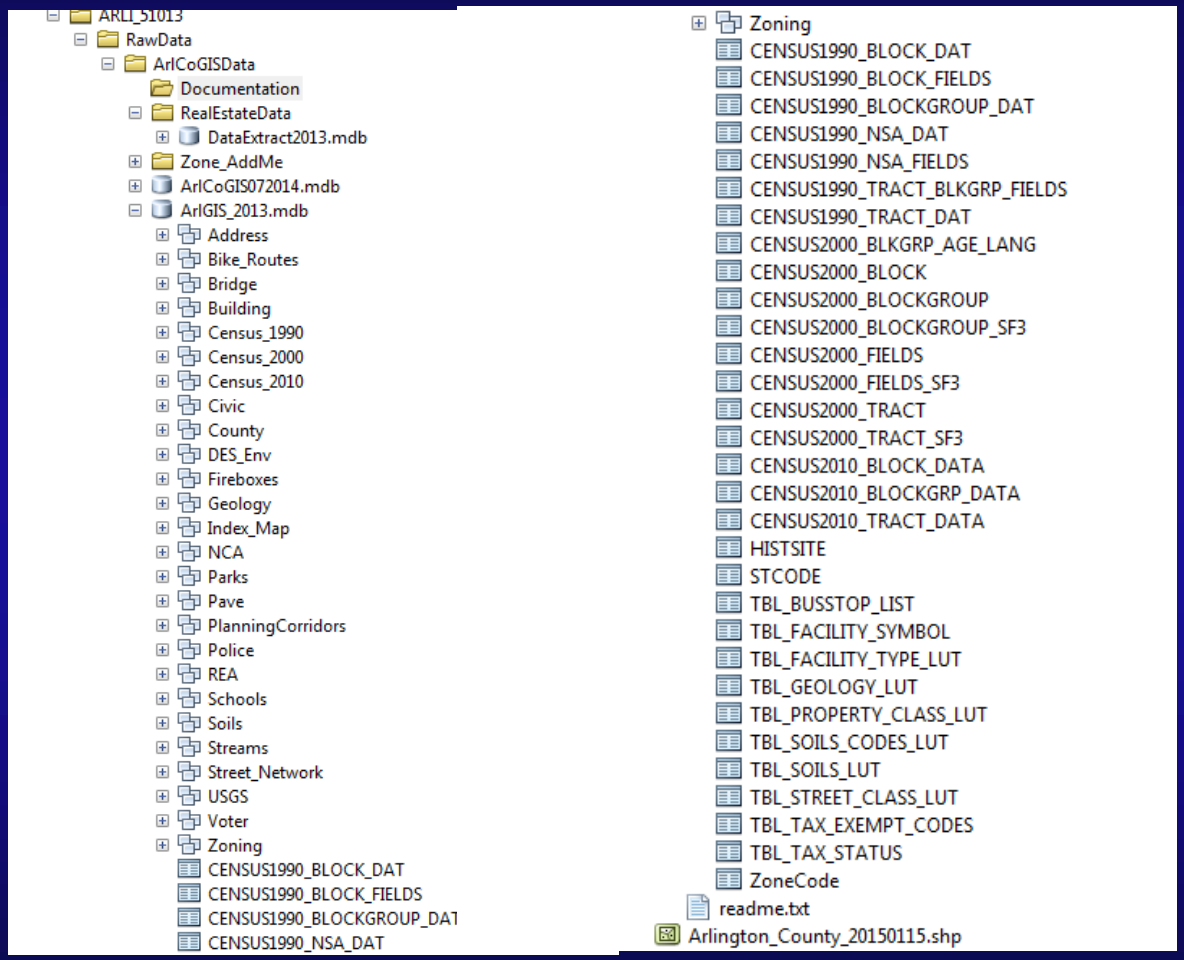

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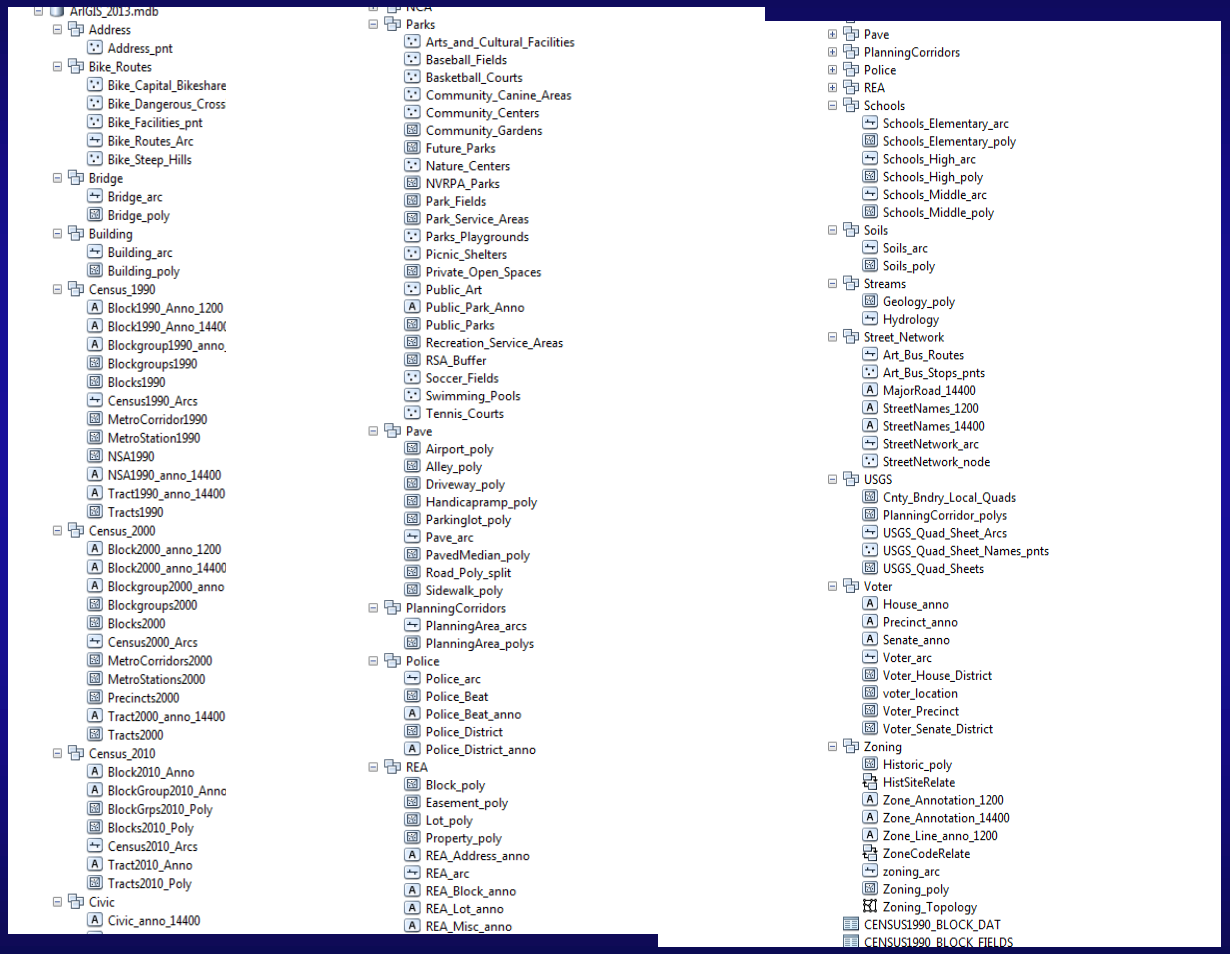

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Phase 6 Local Data Method: Classes

- 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

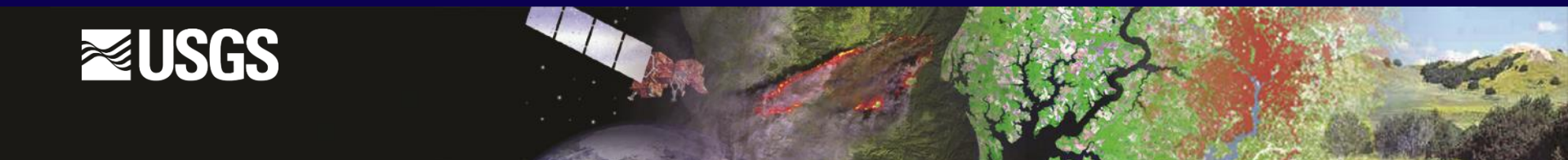
- Open Space (OS)
  - Non-fertilized herbaceous
  - Non-forest scrub/shrub and barren cover that is justifiably not turf or extractive, e.g.
    - beaches, extractive, vacant lots,
    - abandoned/fallow agricultural fields
    - transmission line right-of-ways,
    - baseball mounds, junkyards, fairgrounds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

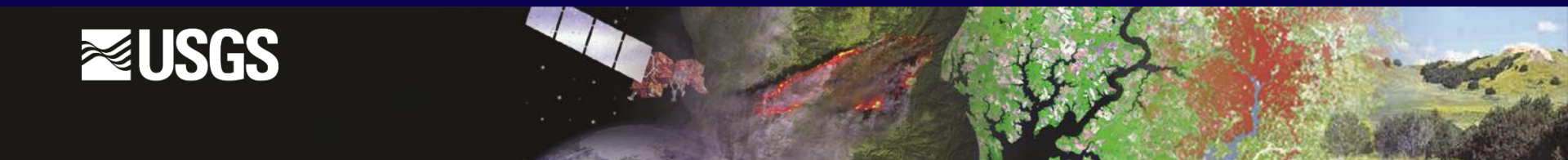
- **Because GIS processing at 1 meter is very slow for large counties it becomes necessary to work at 10 meter resolution as early in the process.**

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

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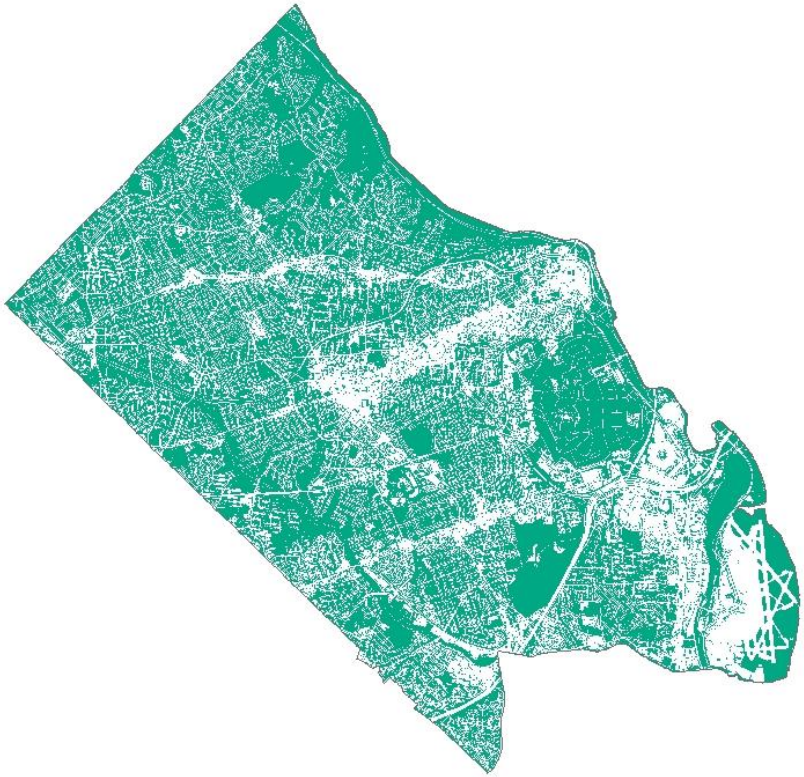

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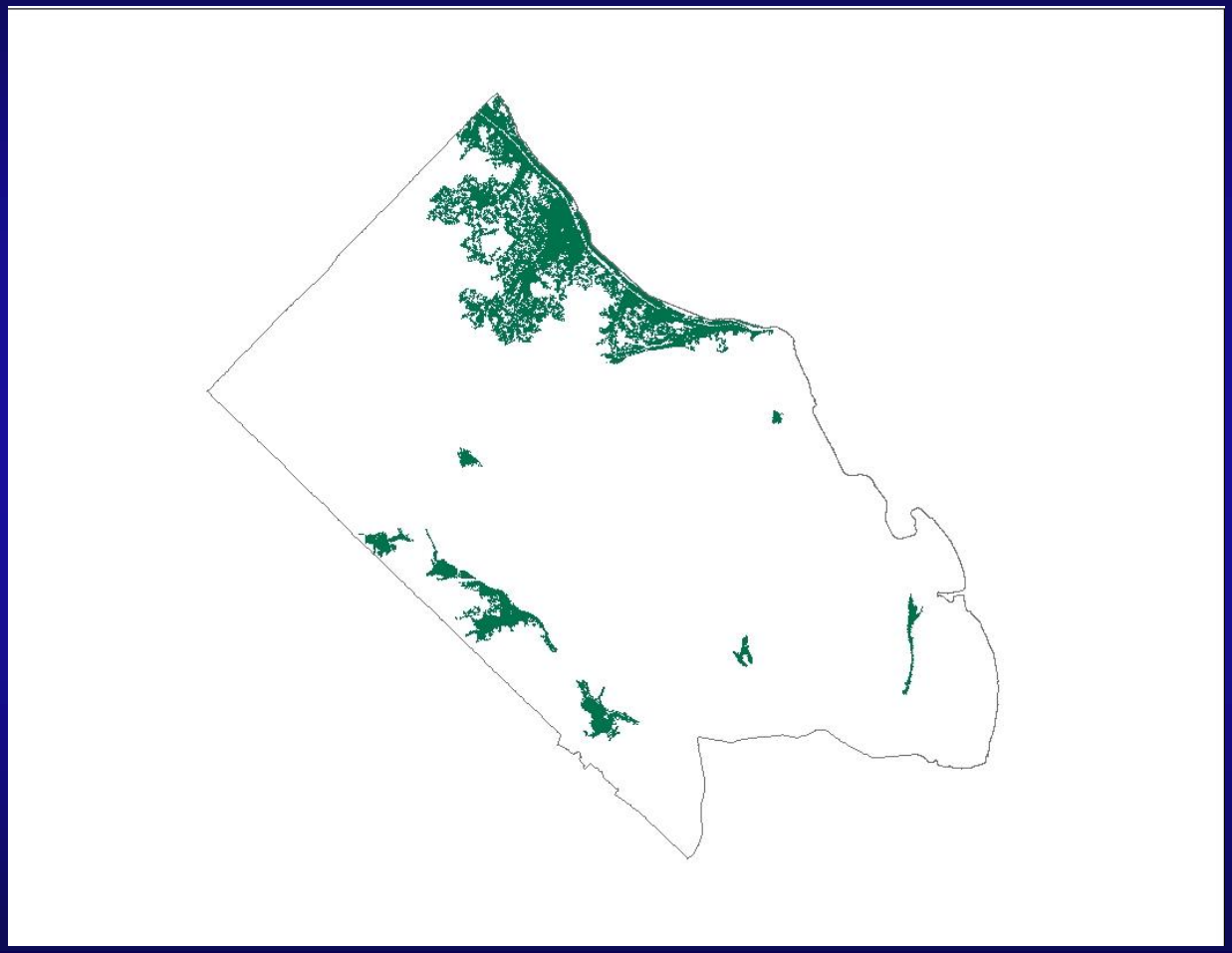

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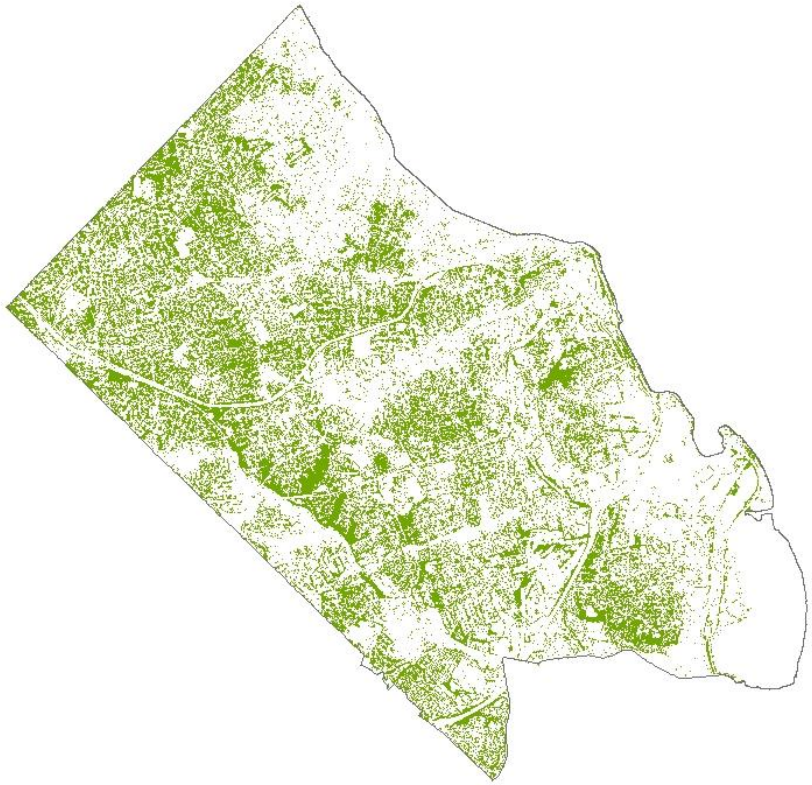

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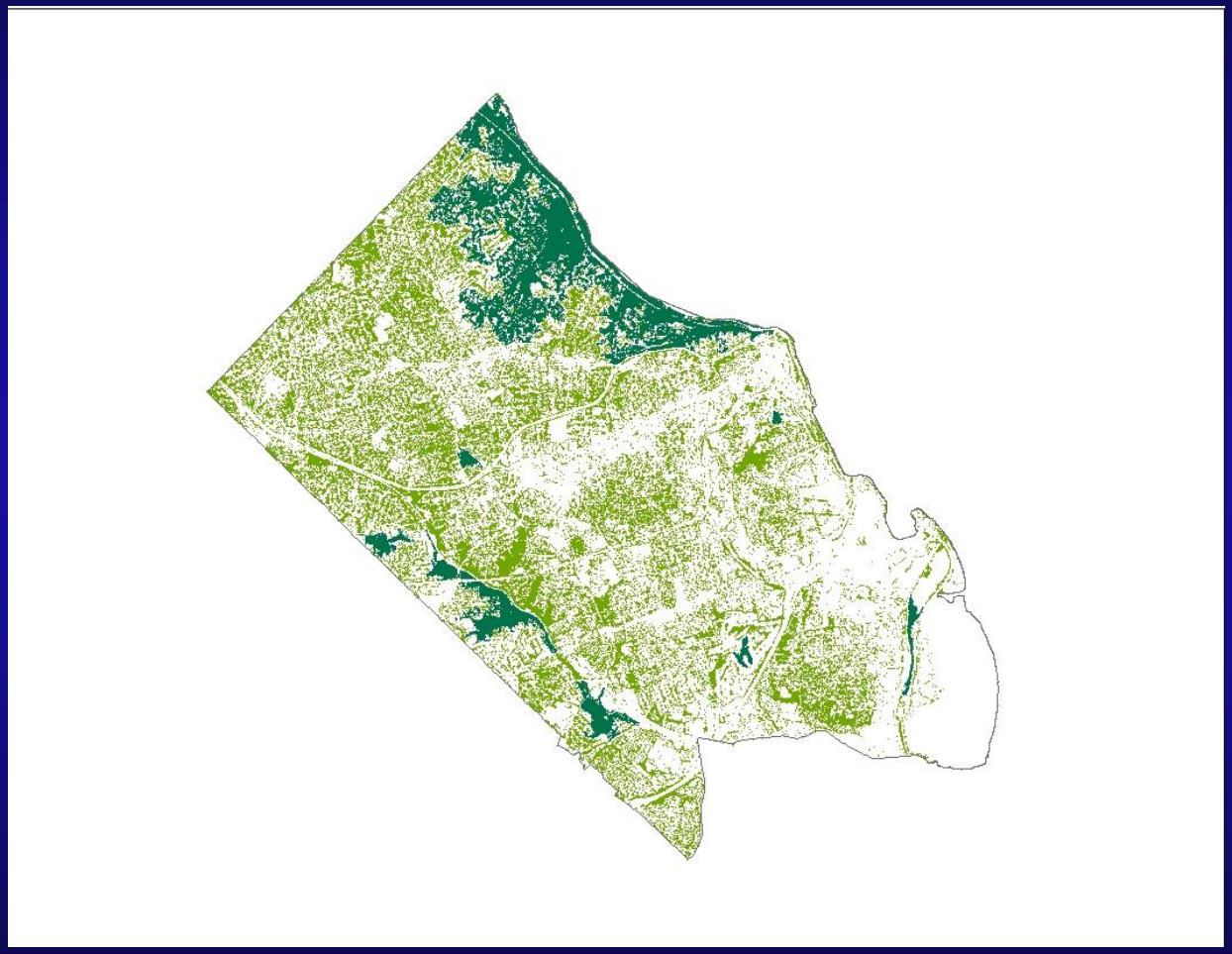

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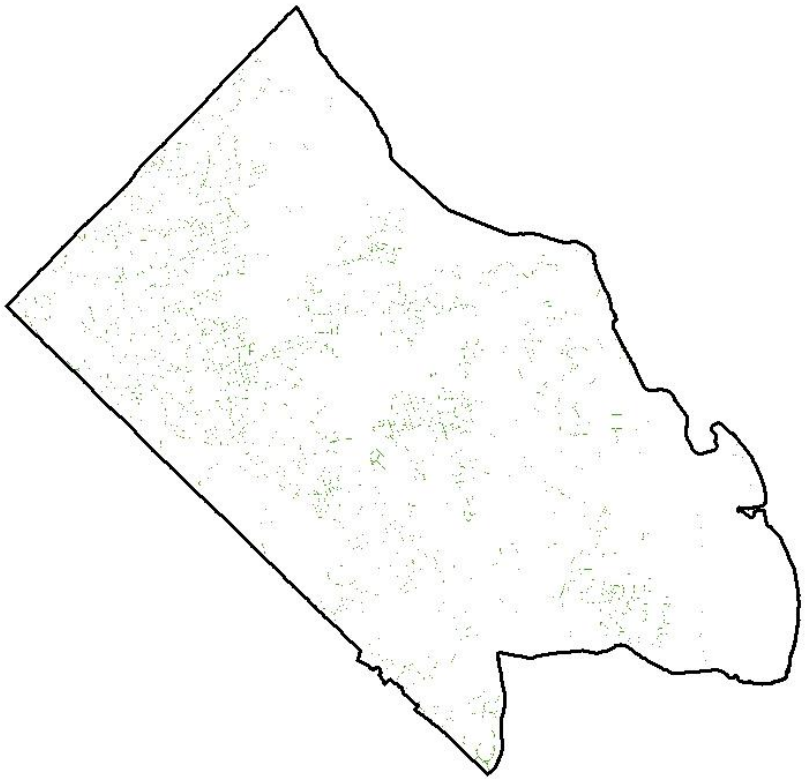

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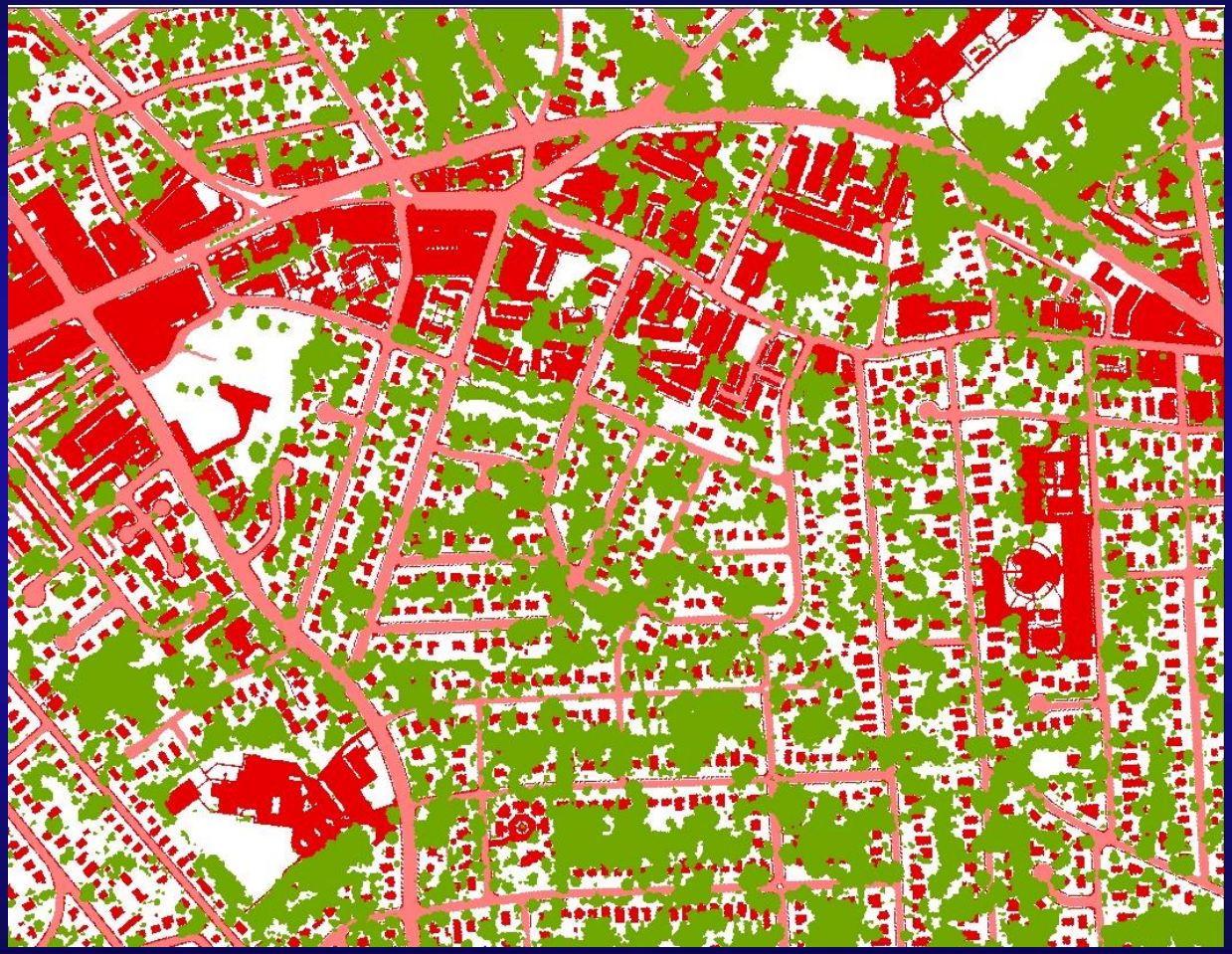

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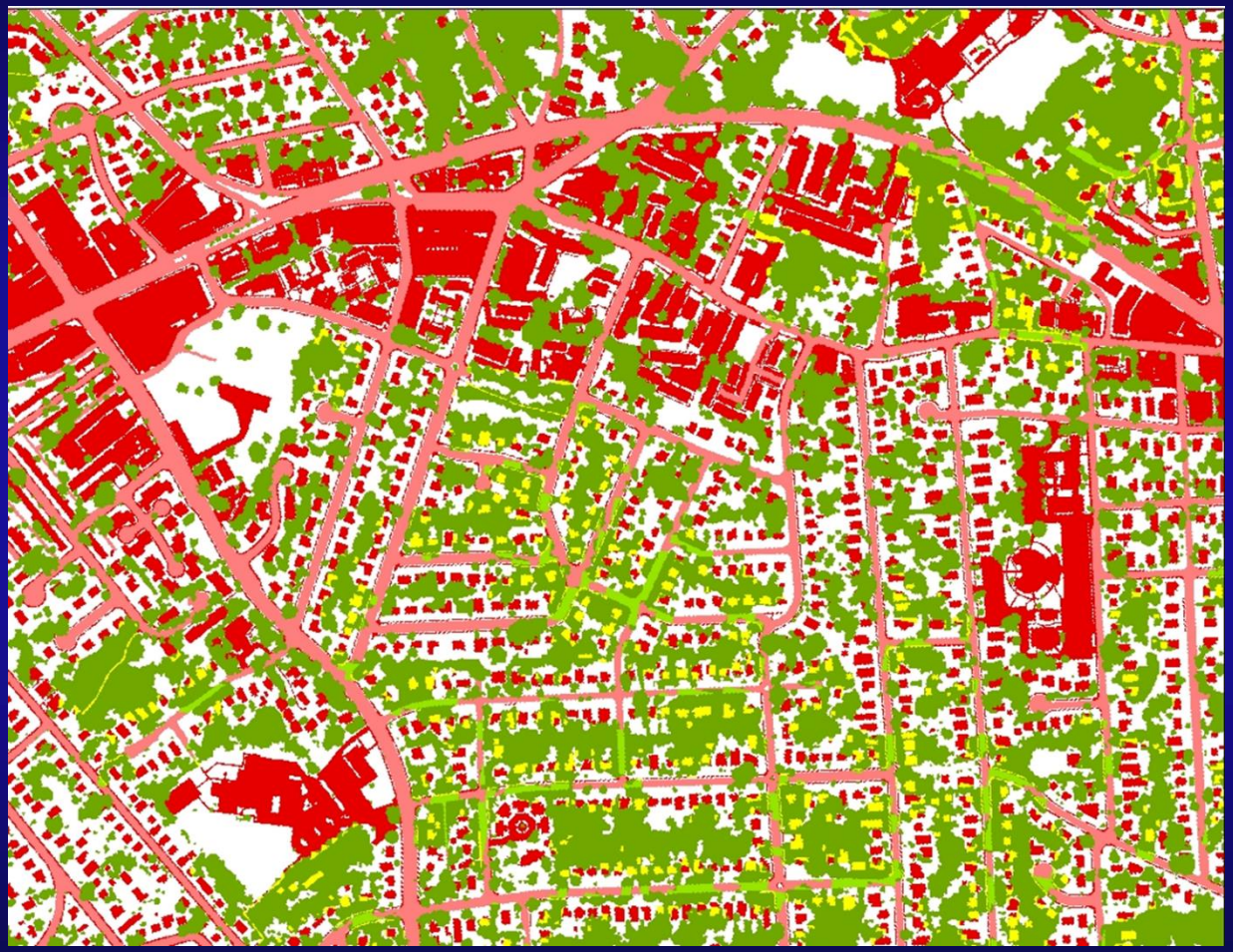

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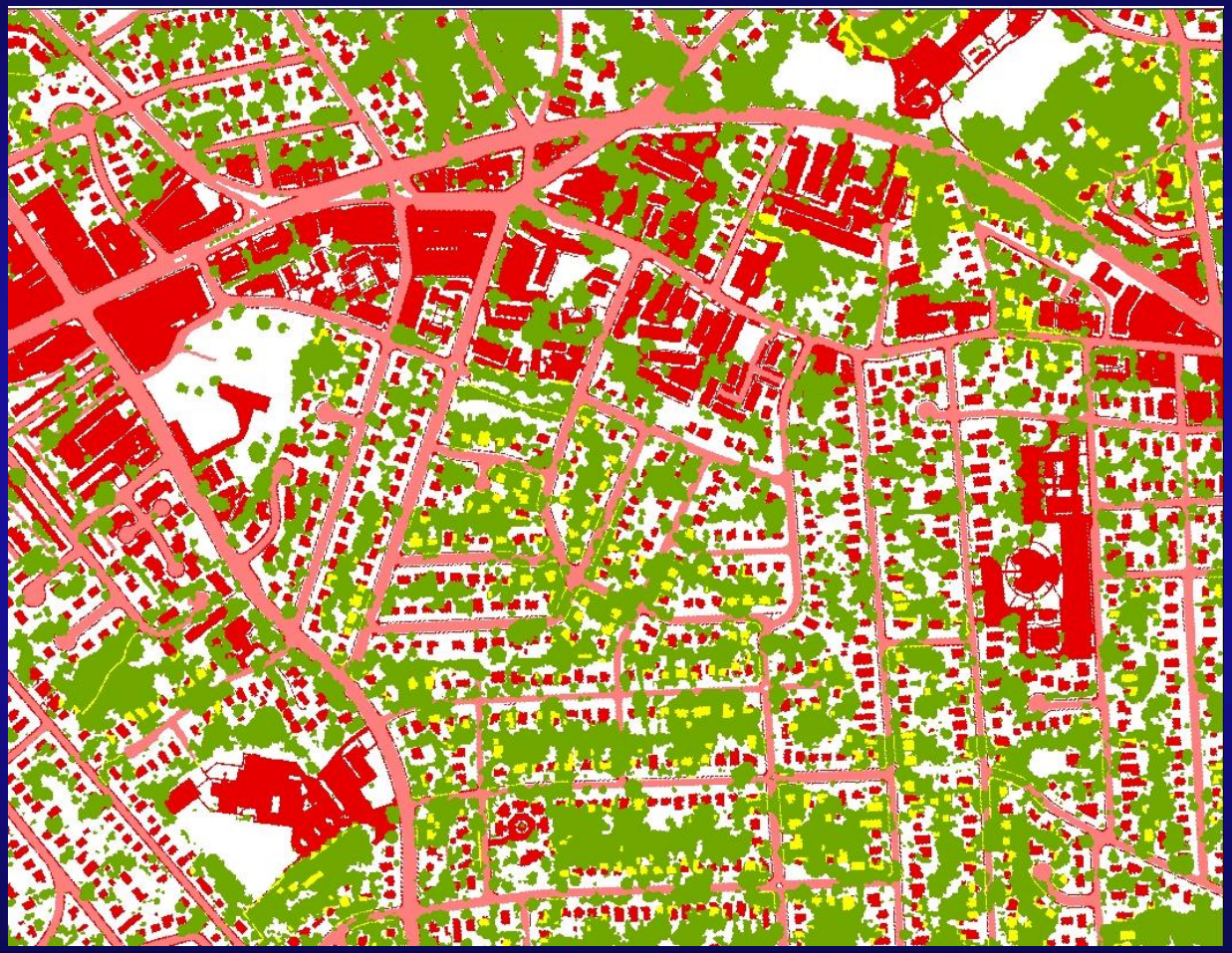

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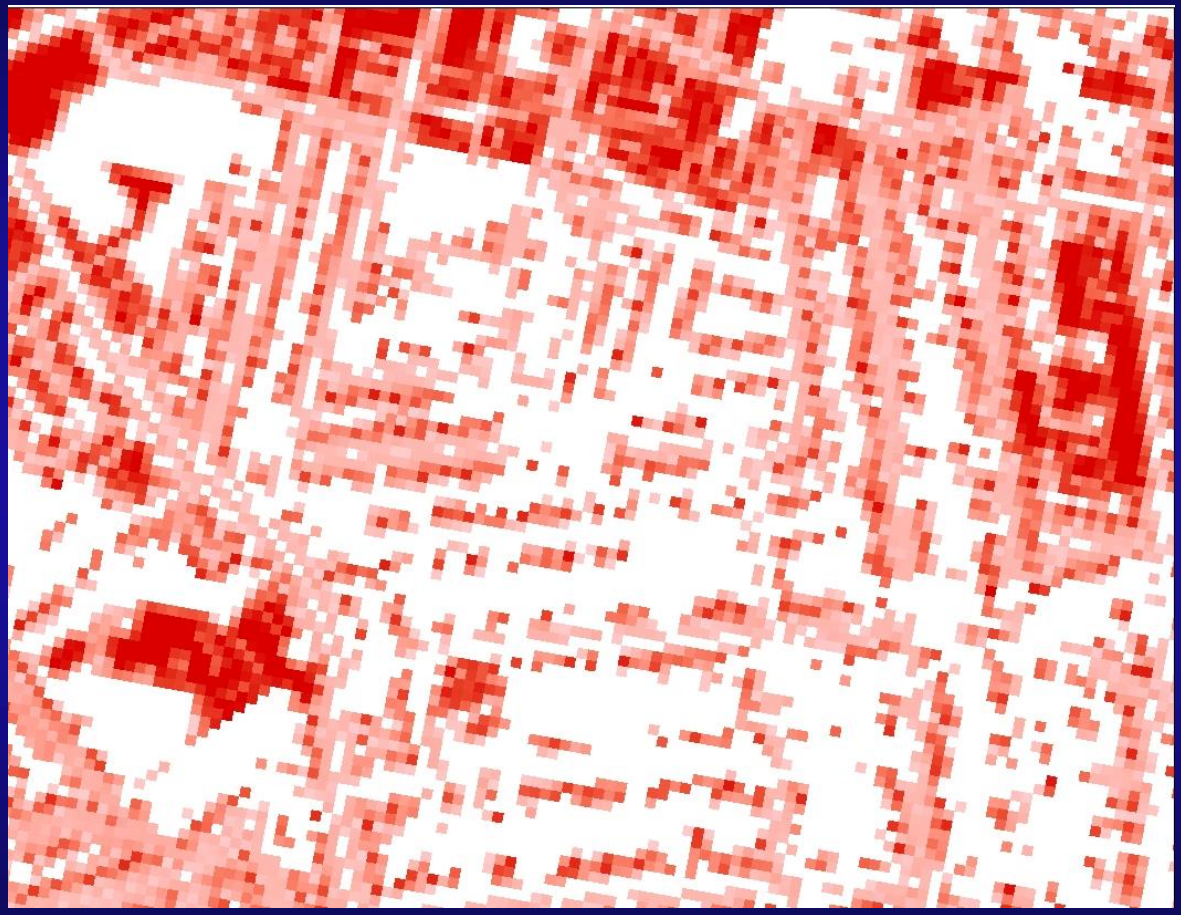

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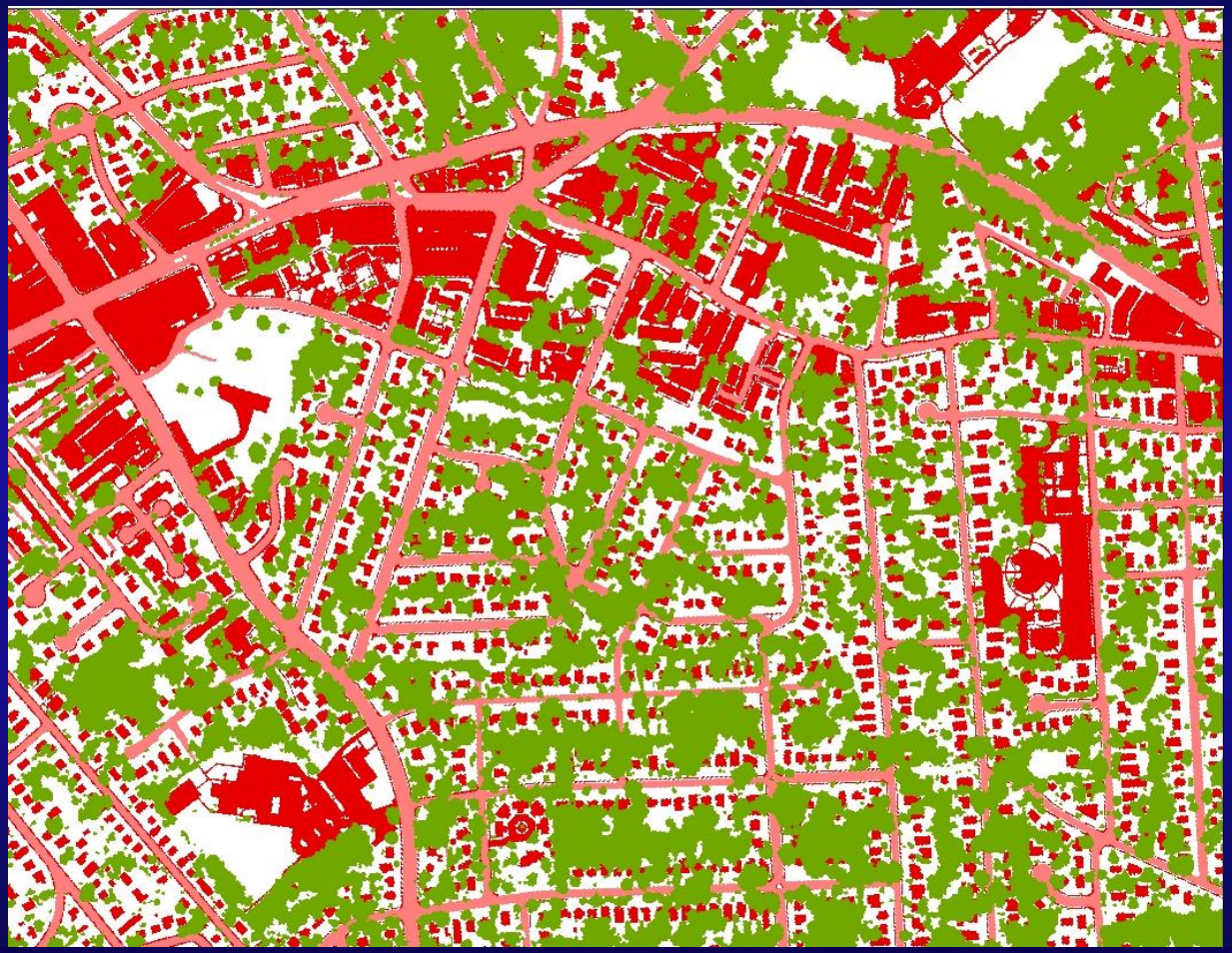

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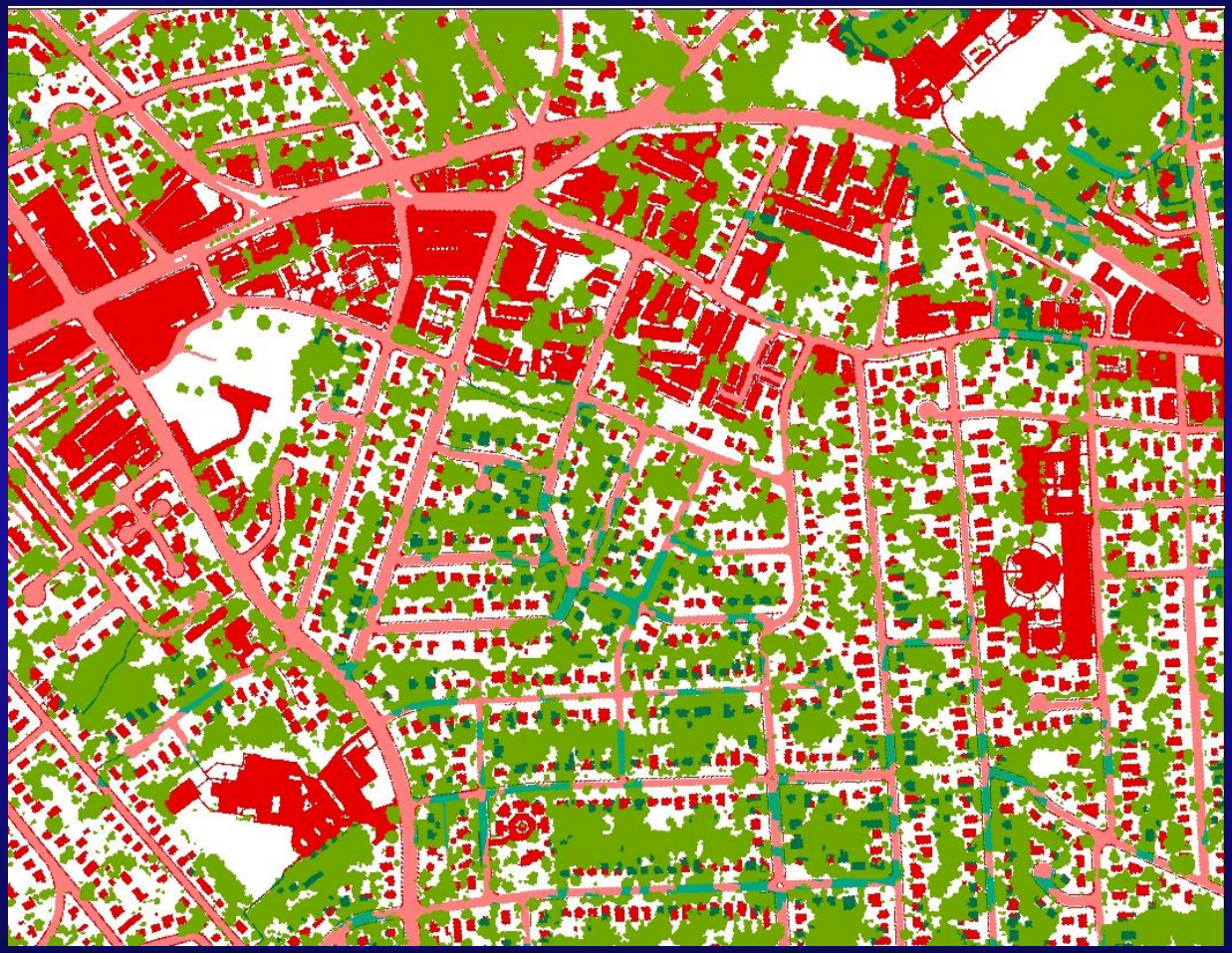

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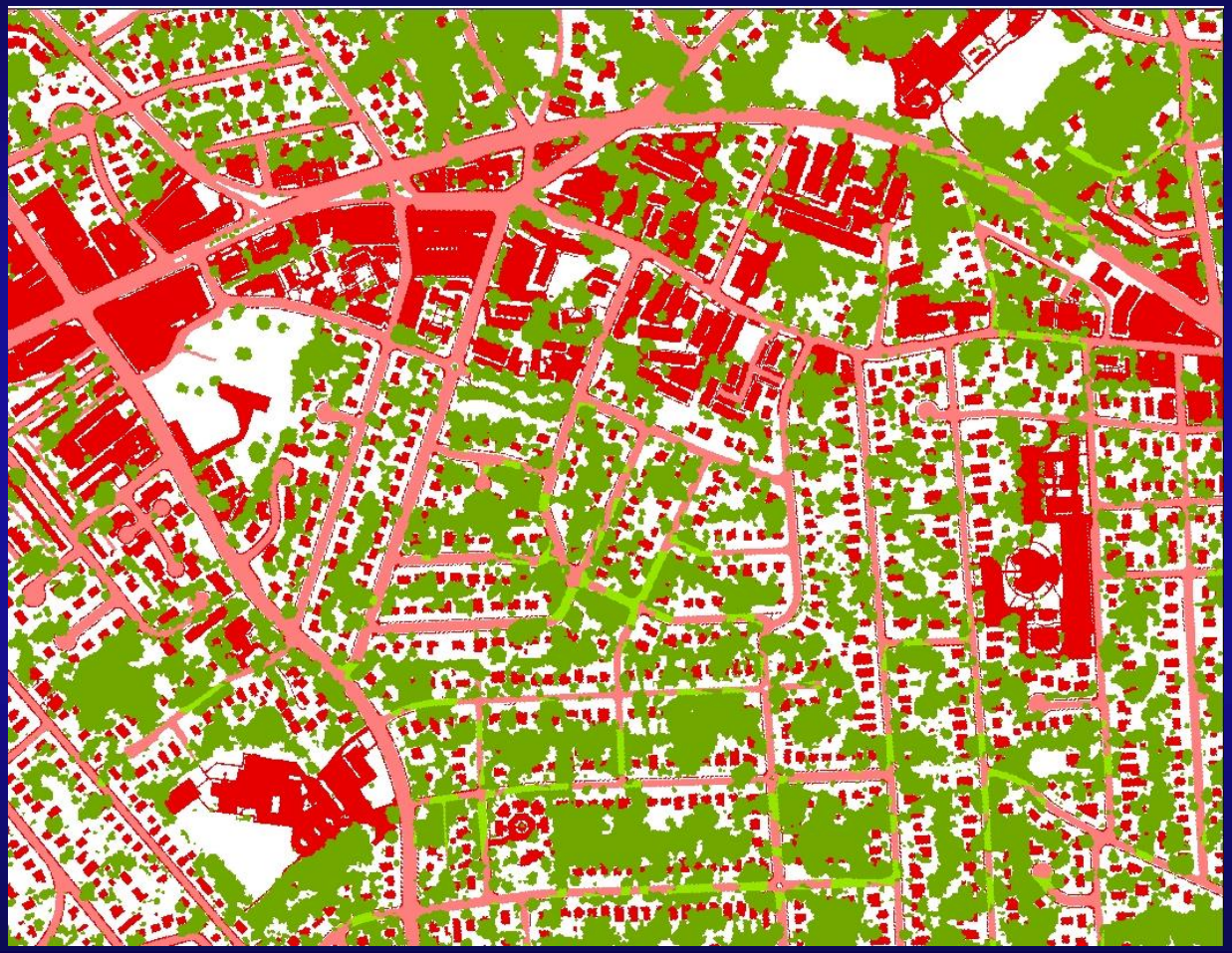

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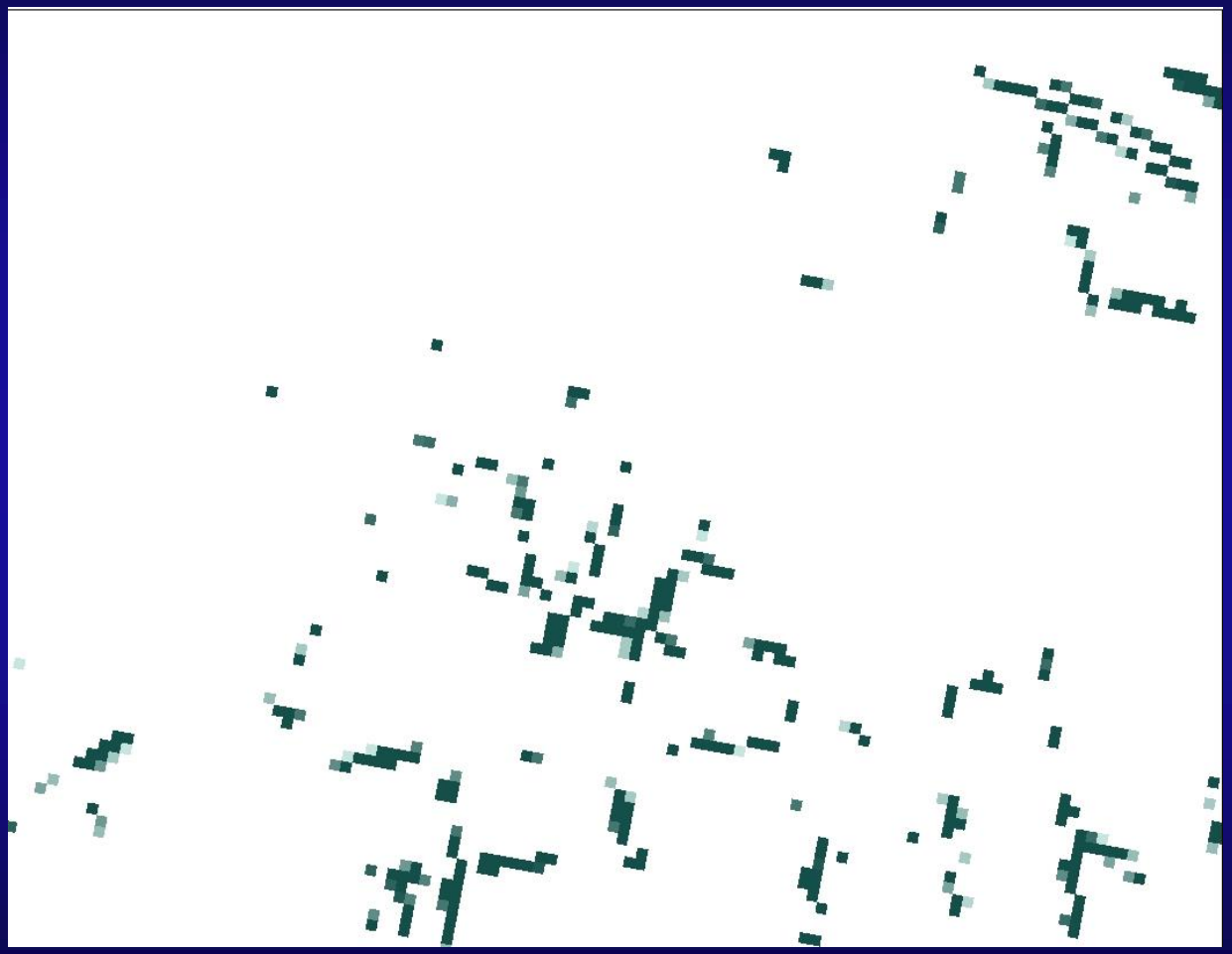

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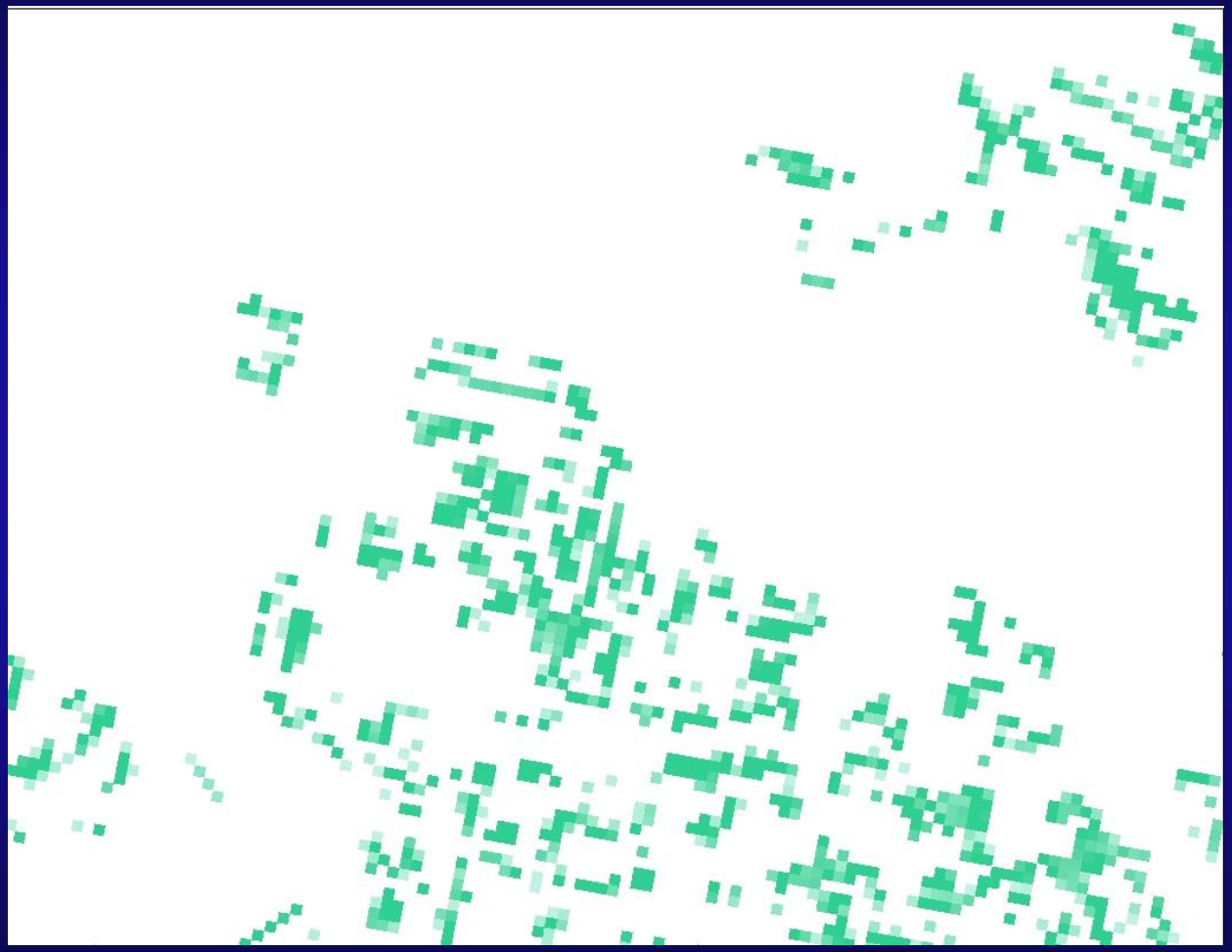

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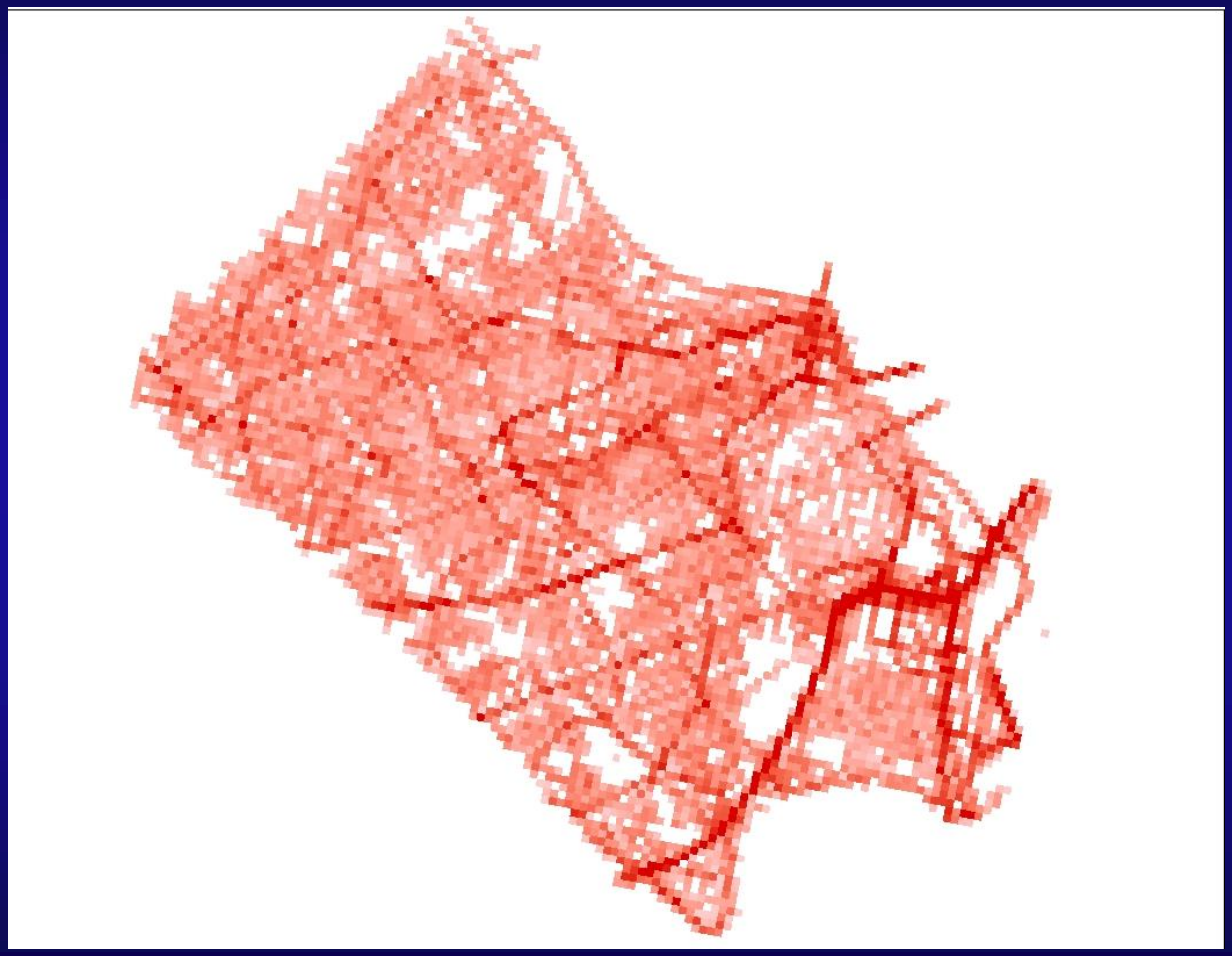

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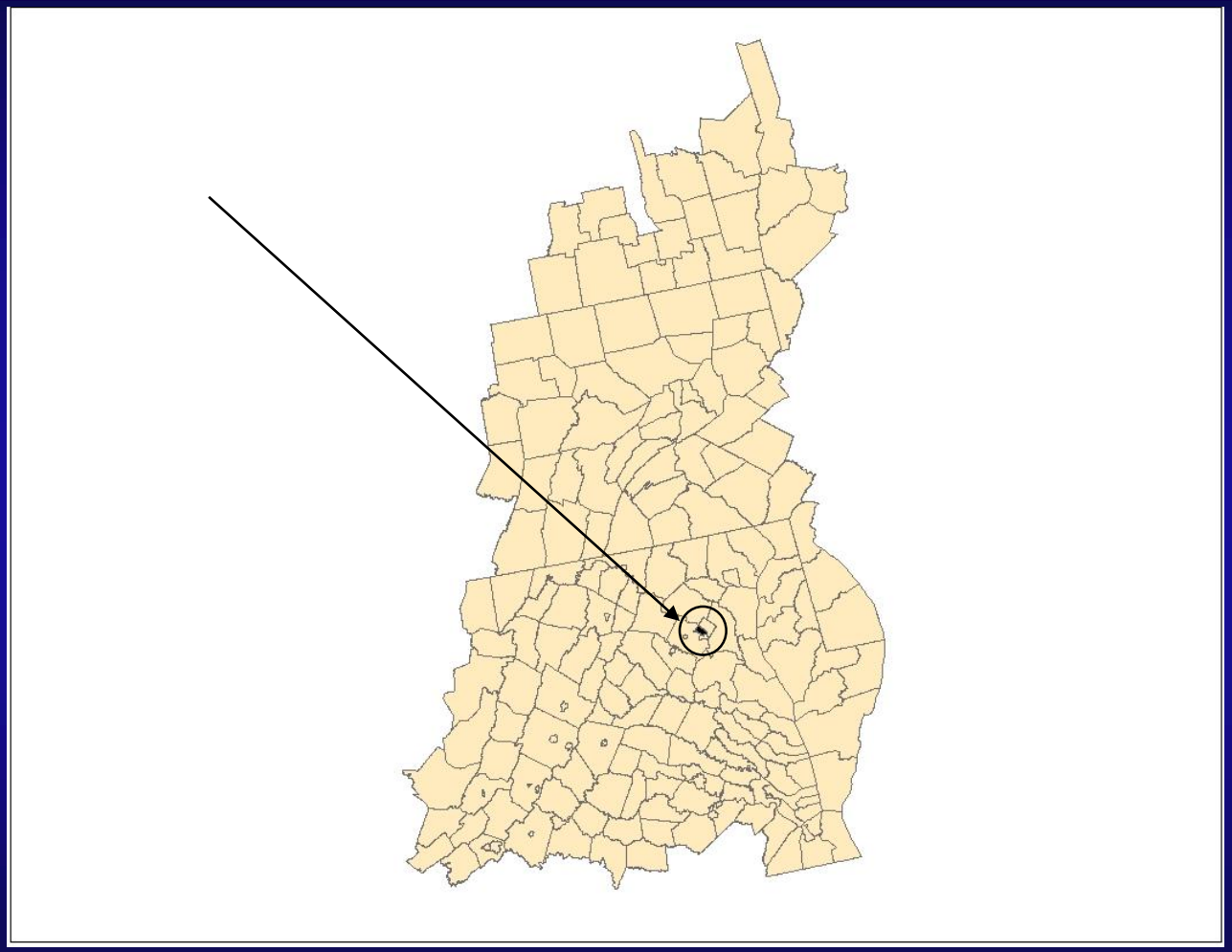
Progress: Arlington, VA



Questions?