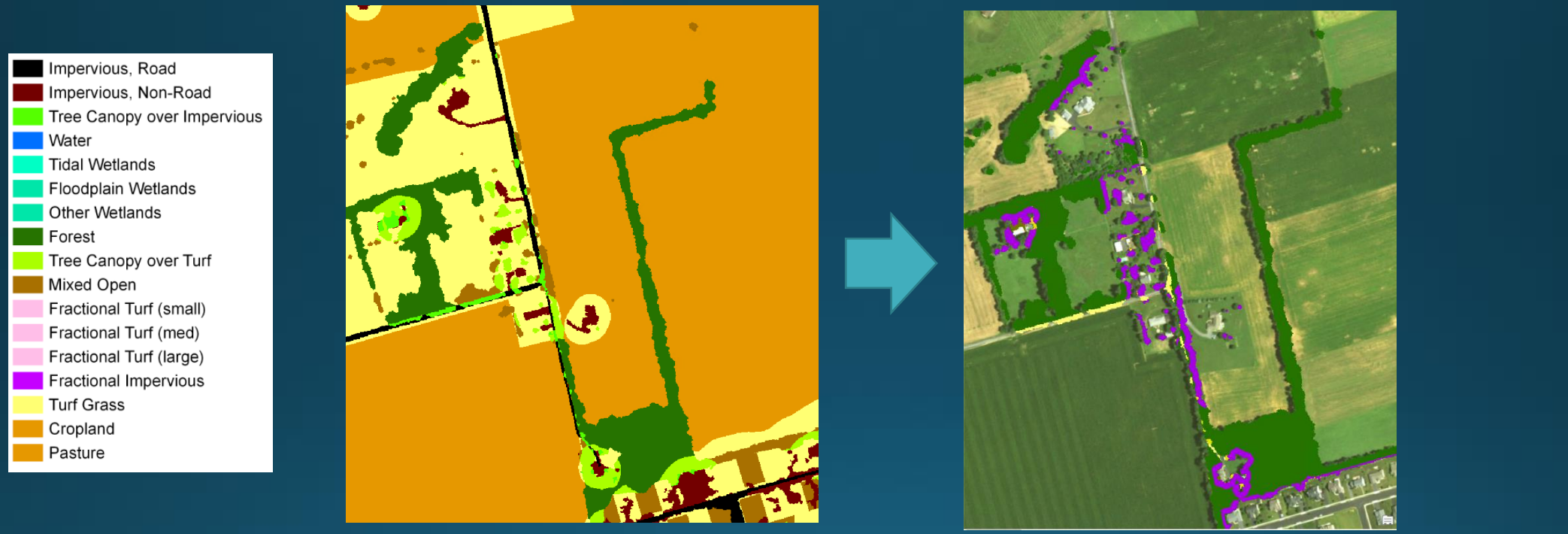
Forest and Tree Canopy Modeling



December 2, 2020: Joint Forestry and LUWG

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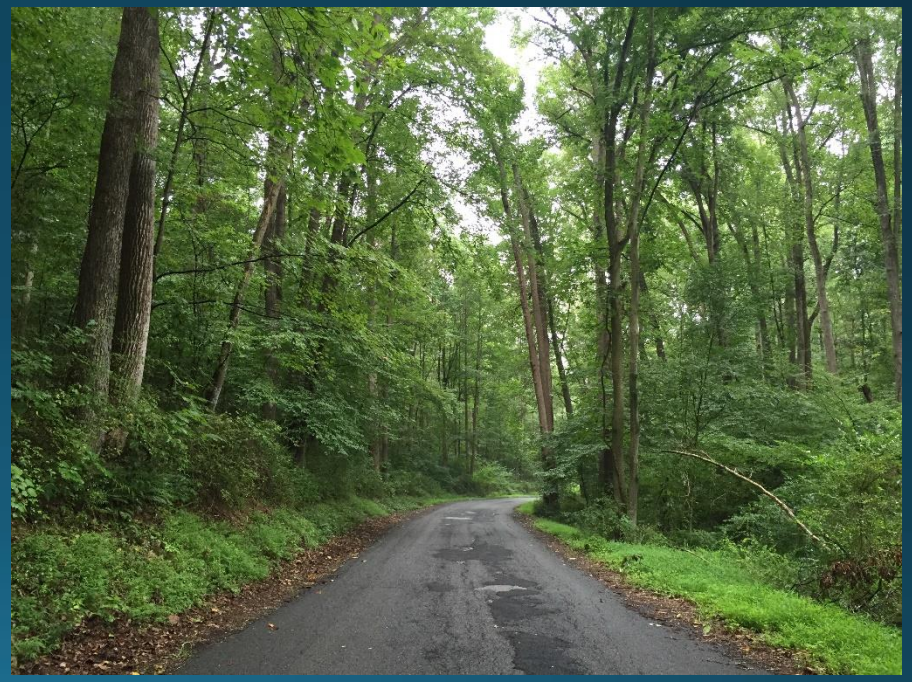
Forest and Tree Canopy Modeling

- Tree Canopy over Turf
- Forest
- Implications of various methods
- End uses
  - CBPO modeling
  - CIC modeling
  - Ecosystem functions
  - Carbon sequestration
- Decisions and feedback

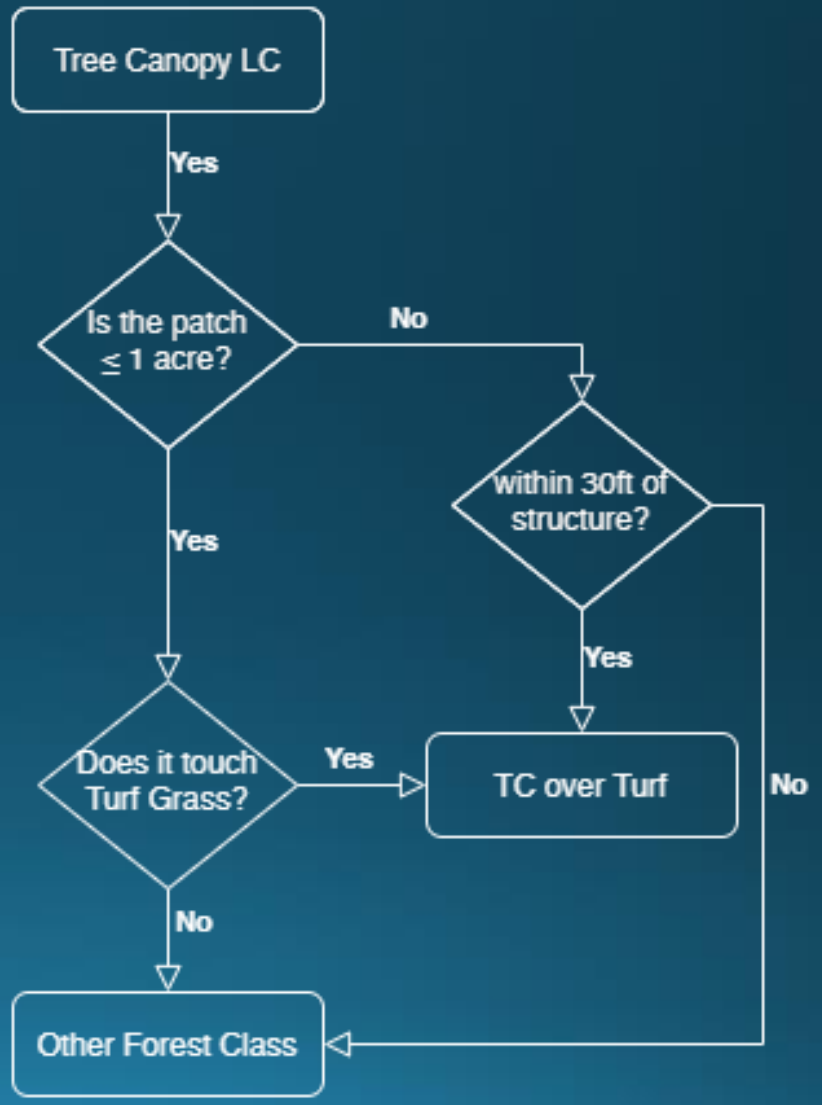
Tree Canopy over…

- Tree canopy over land cover classes
  - Tree Canopy over Impervious Other (*Adding railroads*)
  - Tree Canopy over Structures
  - Tree Canopy over Roads
- Adding Tree Canopy over Turf Grass

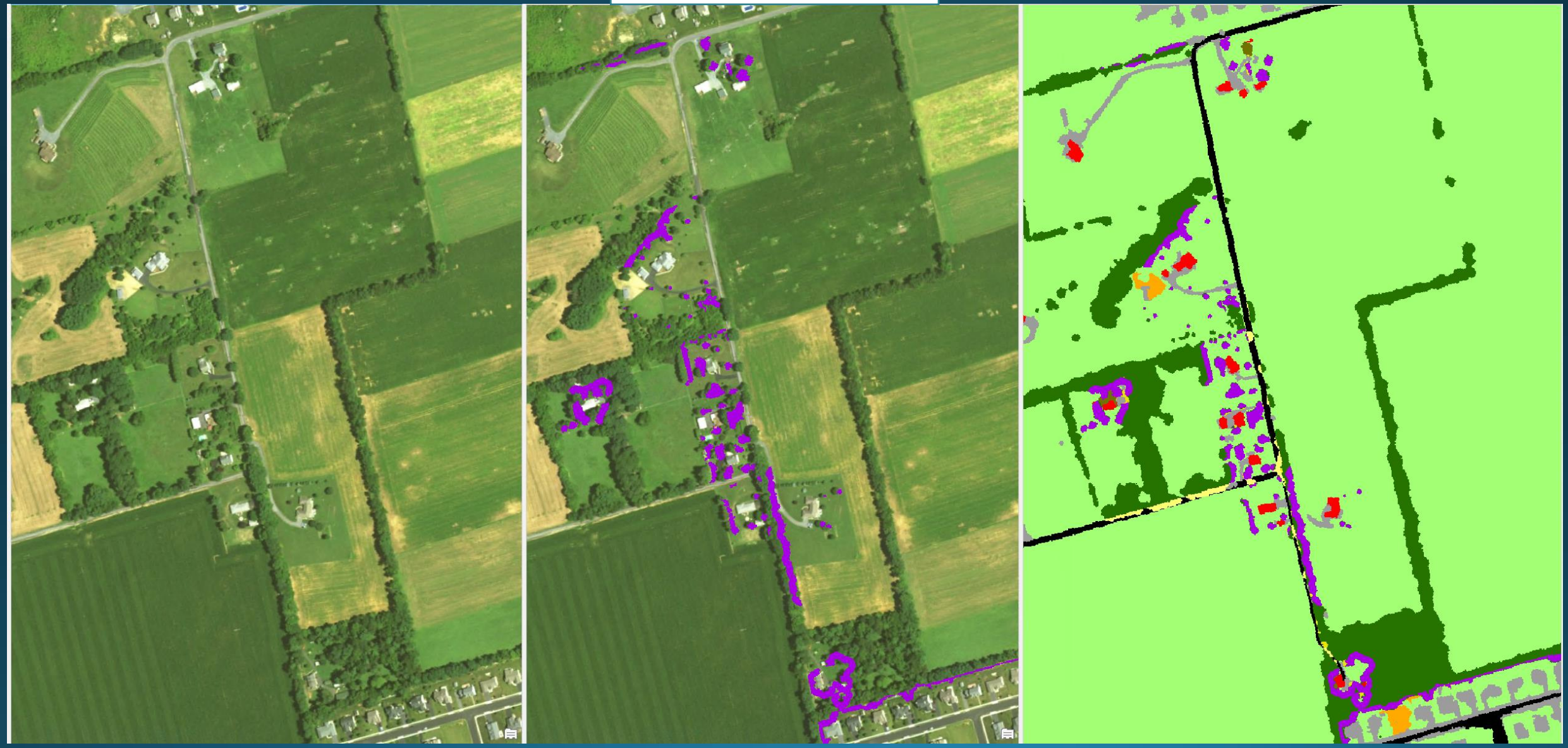


Tree Canopy over Turf Grass (TC over TG)

- Buffer Structures: 30 feet
  - TC within 30 feet of structures is converted into TC over TG
    - Possible to include variable buffer distances instead of 30 feet
    - Note: Buffer does not extend beyond parcel boundaries, water, or roads and wetlands take precedence.
- Tree Canopy patch/region size thresholds
  - Tree canopy patches ≤ 1 acre
  - Reclassify as TC over TG if ≤ 1 acre and touching Low Vegetation
- Exclude TC adjacent to Agriculture fields



Tree Canopy over Turf Grass



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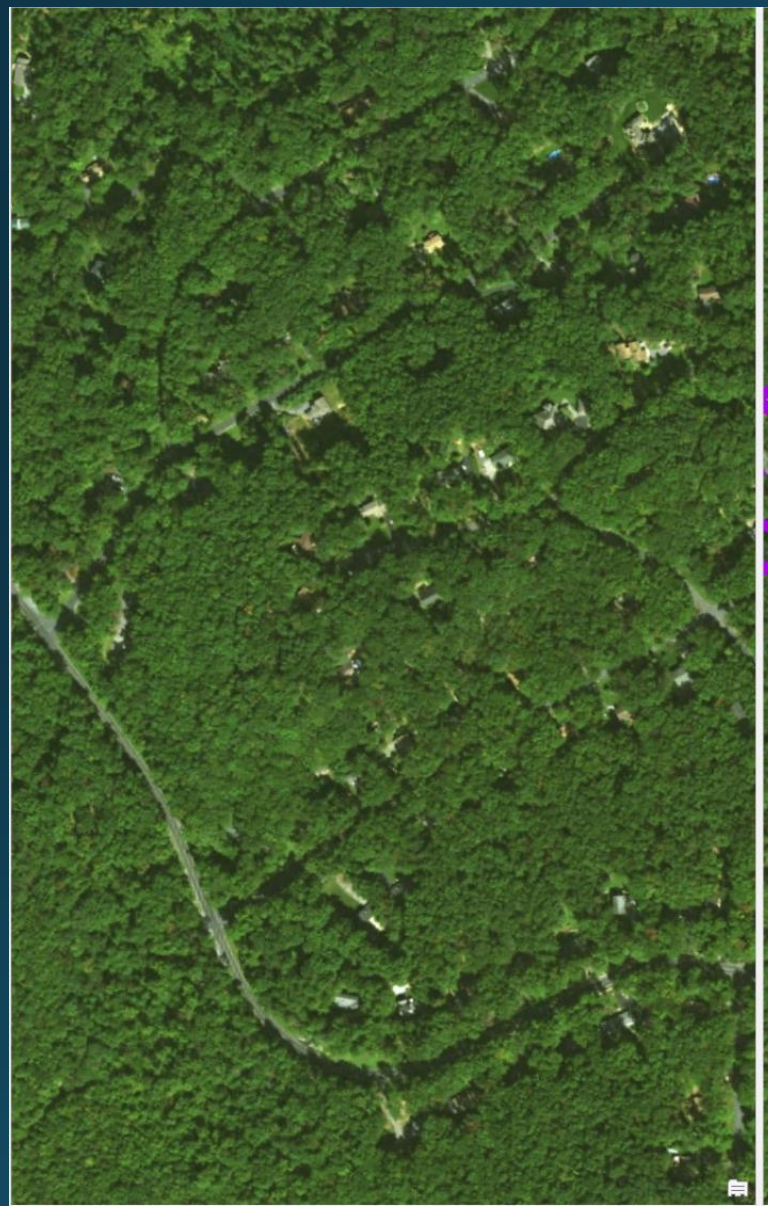
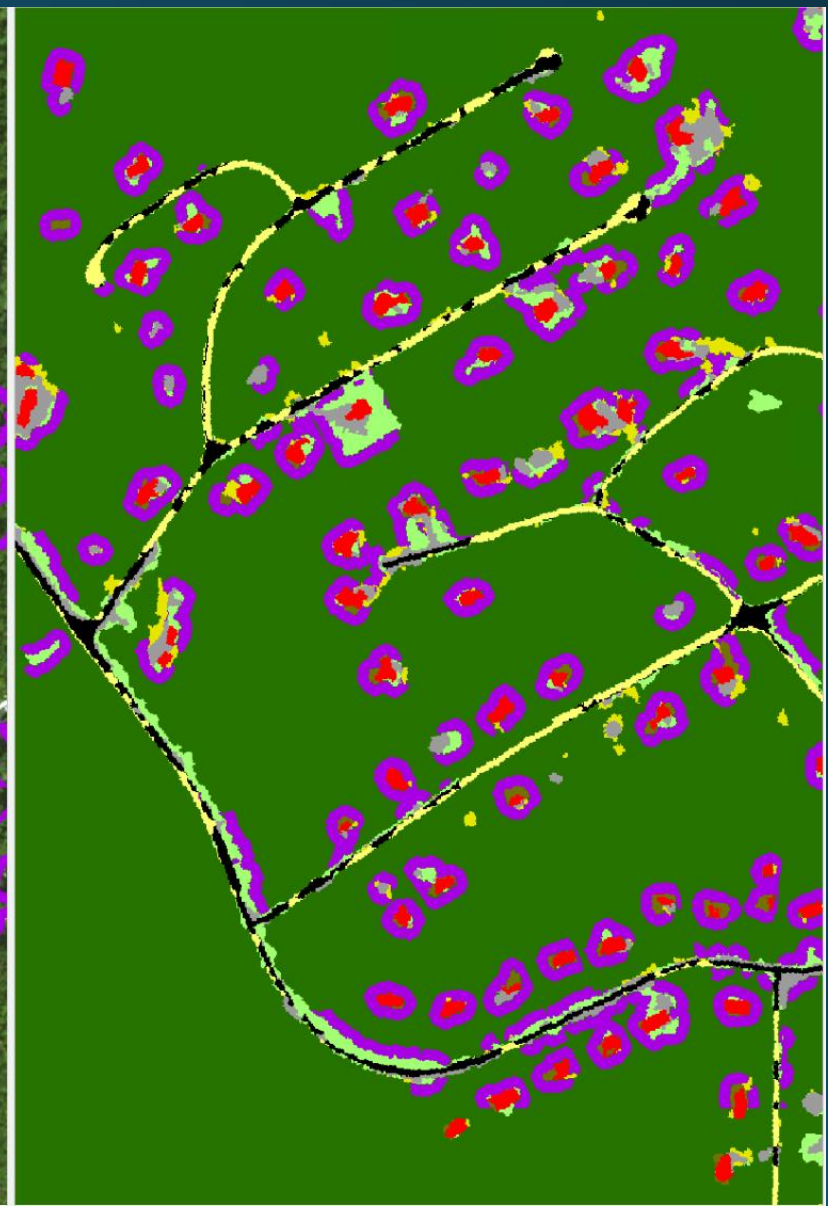
Tree Canopy over Turf Grass

Tree Canopy over Turf Grass



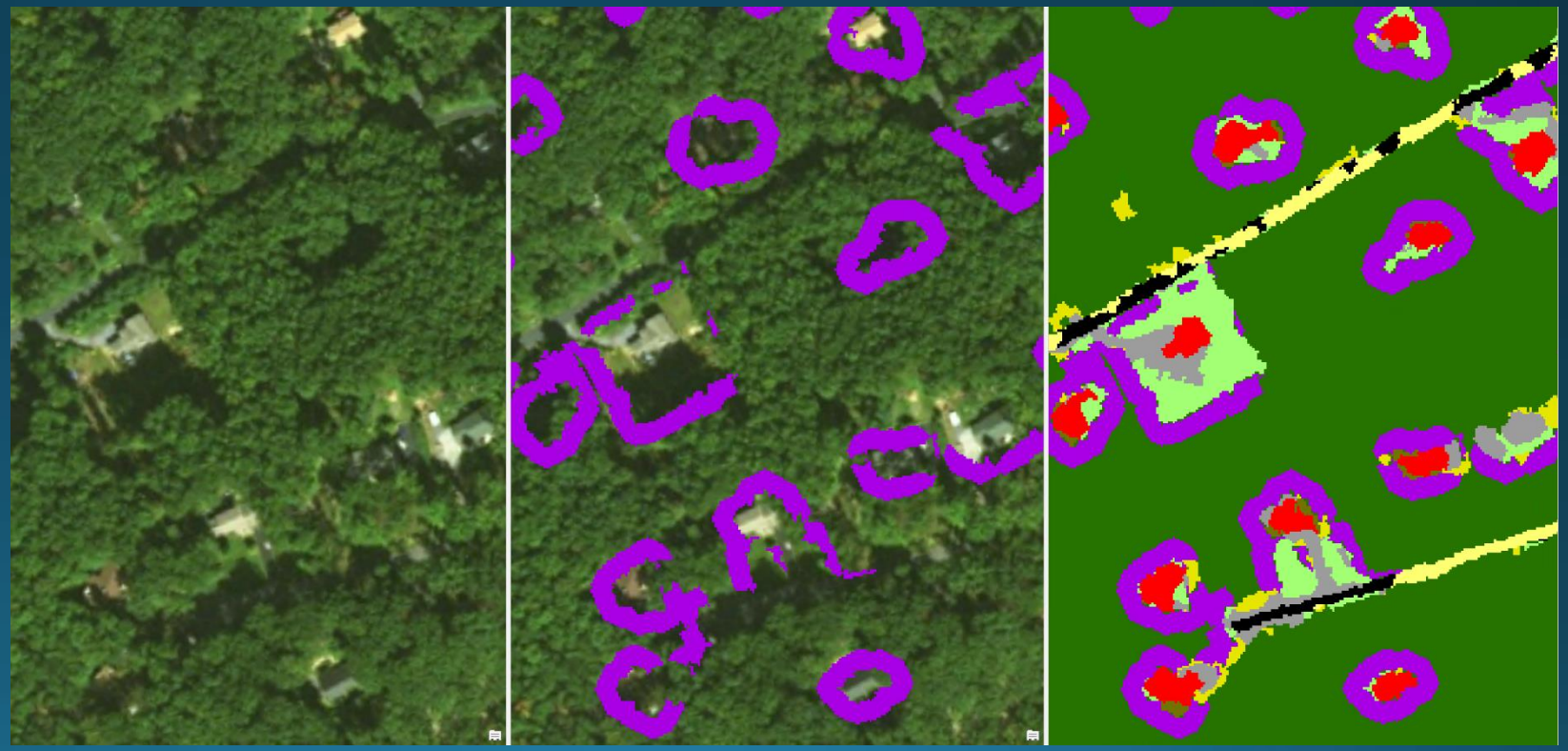


Decision 1 – TC over Turf Methods

Does this mapping approach for Trees over Turf Grass make sense?

What patch size thresholds and buffer width thresholds should be used to map Trees over Turf Grass.

- Suggestion: 1 acre max patch size
- Suggestion: 30 foot buffer



Decision

- What should TC over TG buffer be in developed forested landscapes?
  - Suggestion: 30 feet
- What should size threshold be to differentiate between forest and TC over TG?
  - Suggestion: 1 acre

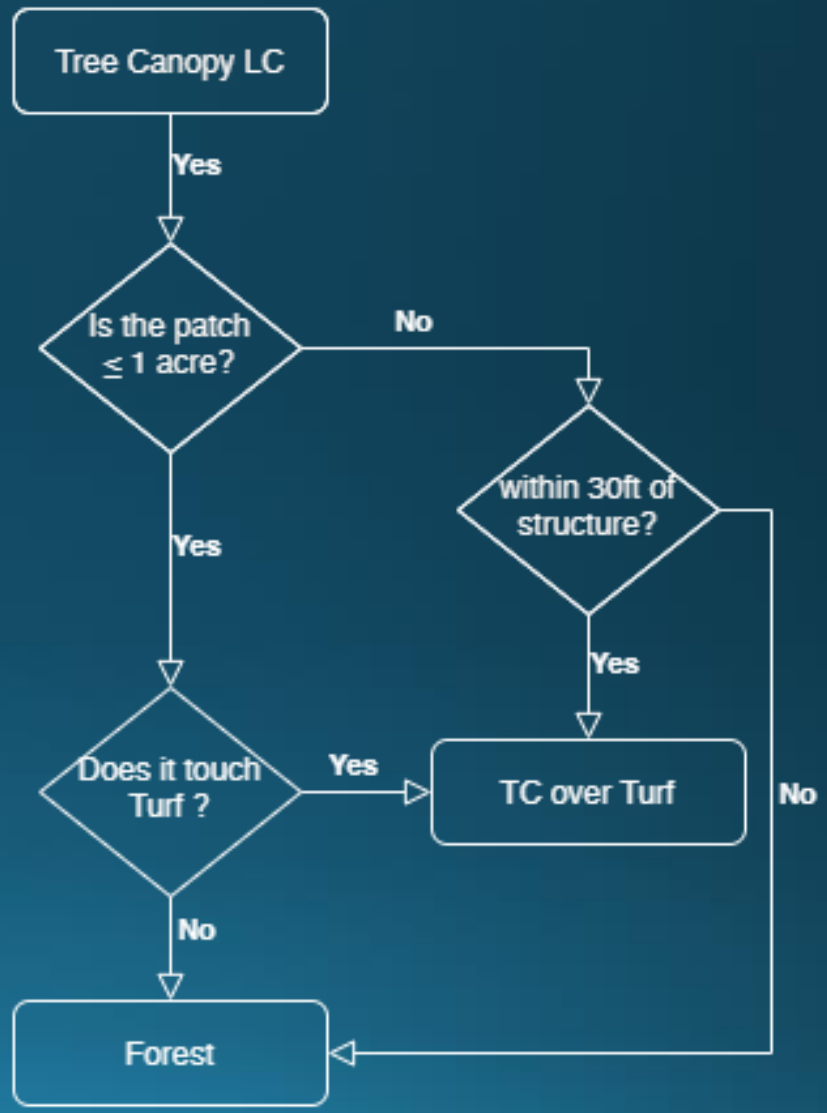
Options for Forest Methods:

1. Single-class forest (consistent with LC)
2. Contiguous vs. Fragmented
3. Interior vs Exterior

Note: all options include a Natural Succession, Timber Harvest, and TC over… classes

Single-class “Forest” (default)

1) Identify TC over TG (same methods)
2) Everything else that is Tree Canopy in the Land Cover stays the same.



Forest

Tree Canopy over Turf Grass

Tree Canopy over Structures

Tree Canopy over Impervious Surfaces

Tree Canopy over Impervious Roads

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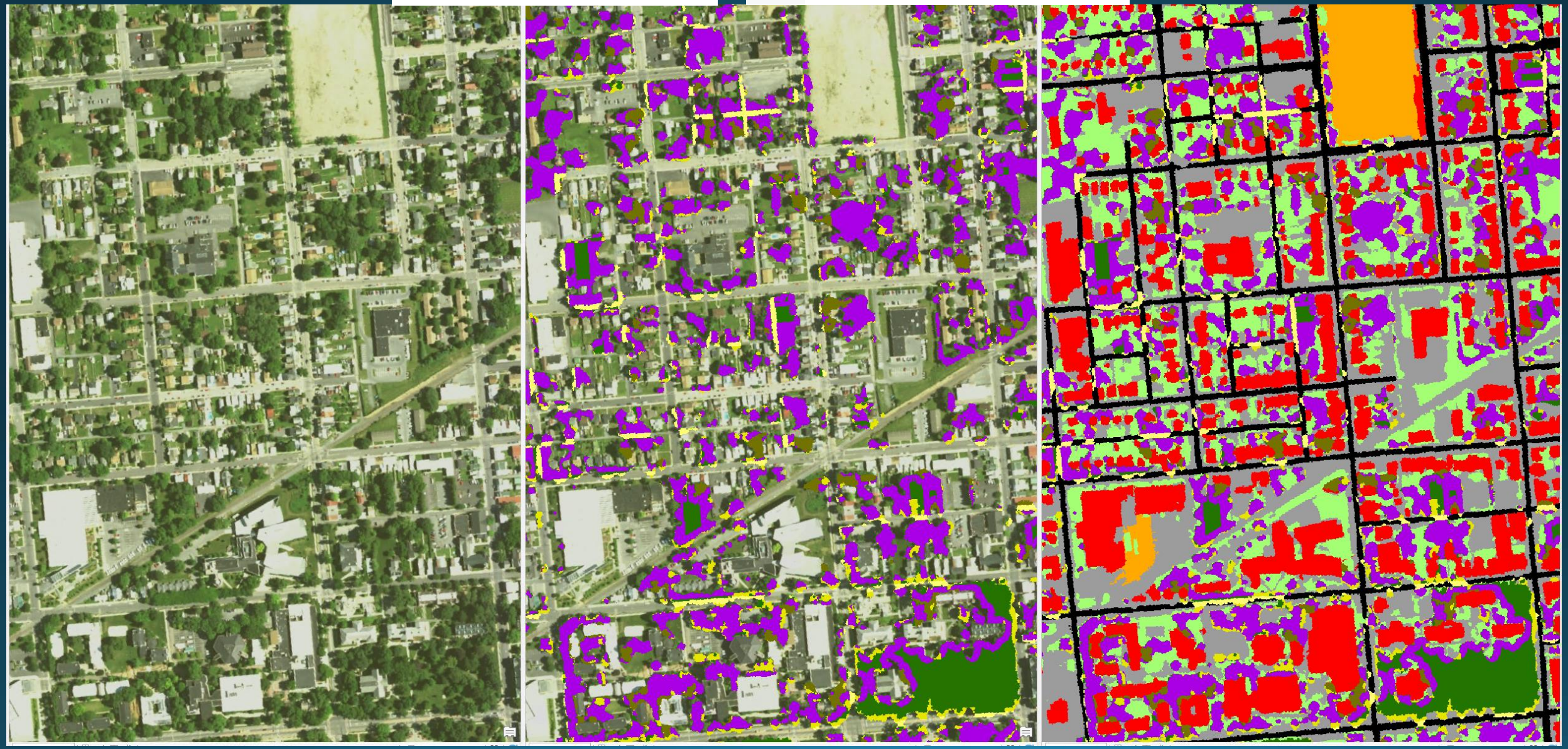
Forest
Tree Canopy over Turf Grass
Tree Canopy over Structures
Tree Canopy over Impervious Surfaces
Tree Canopy over Impervious Roads

Forest

Tree Canopy over Turf Grass

Tree Canopy over Structures

Tree Canopy over Impervious Surfaces

Tree Canopy over Impervious Roads

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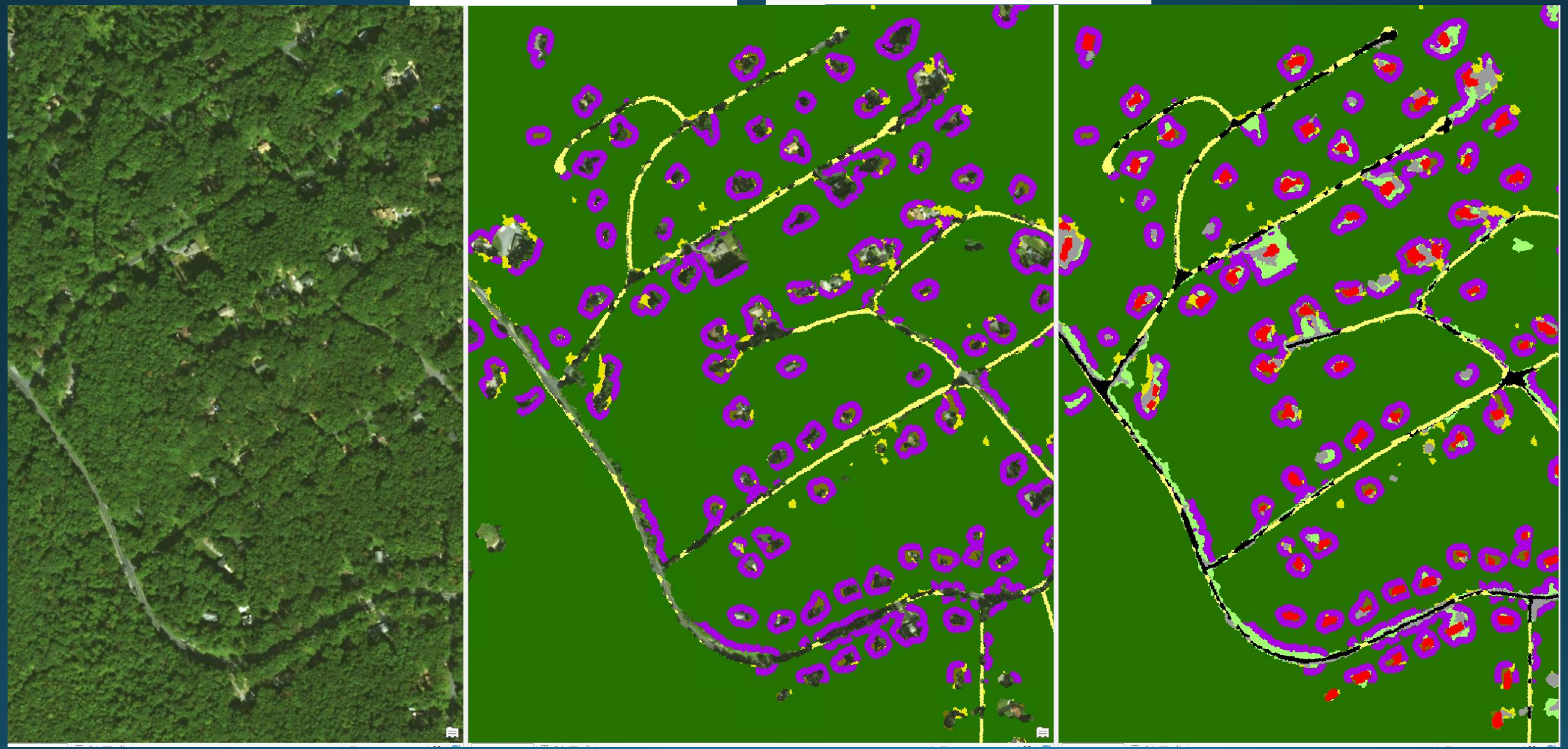
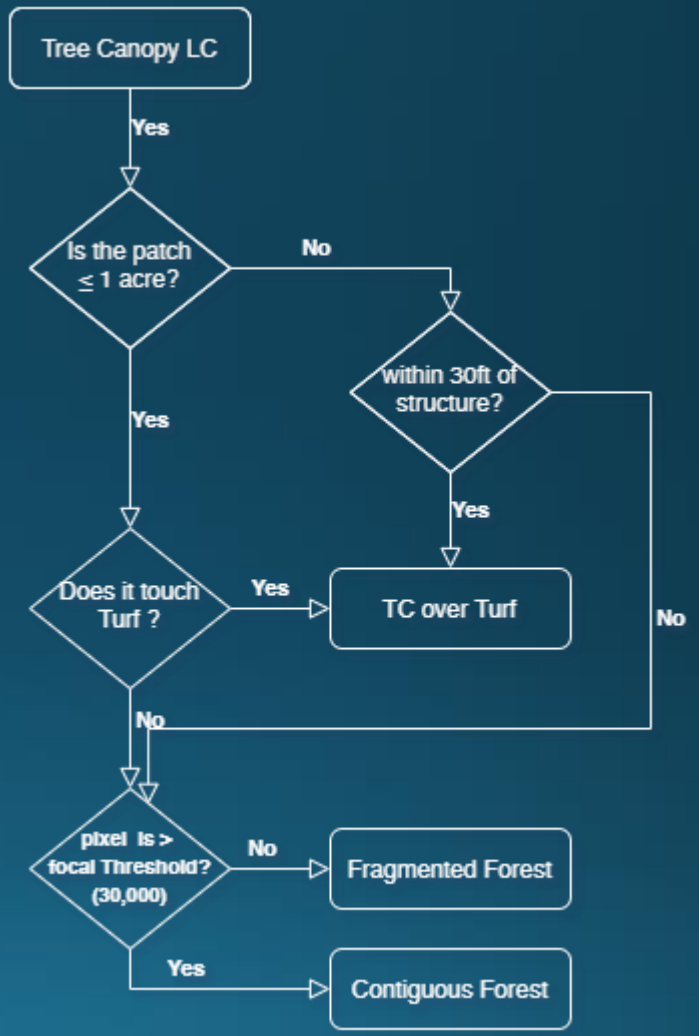


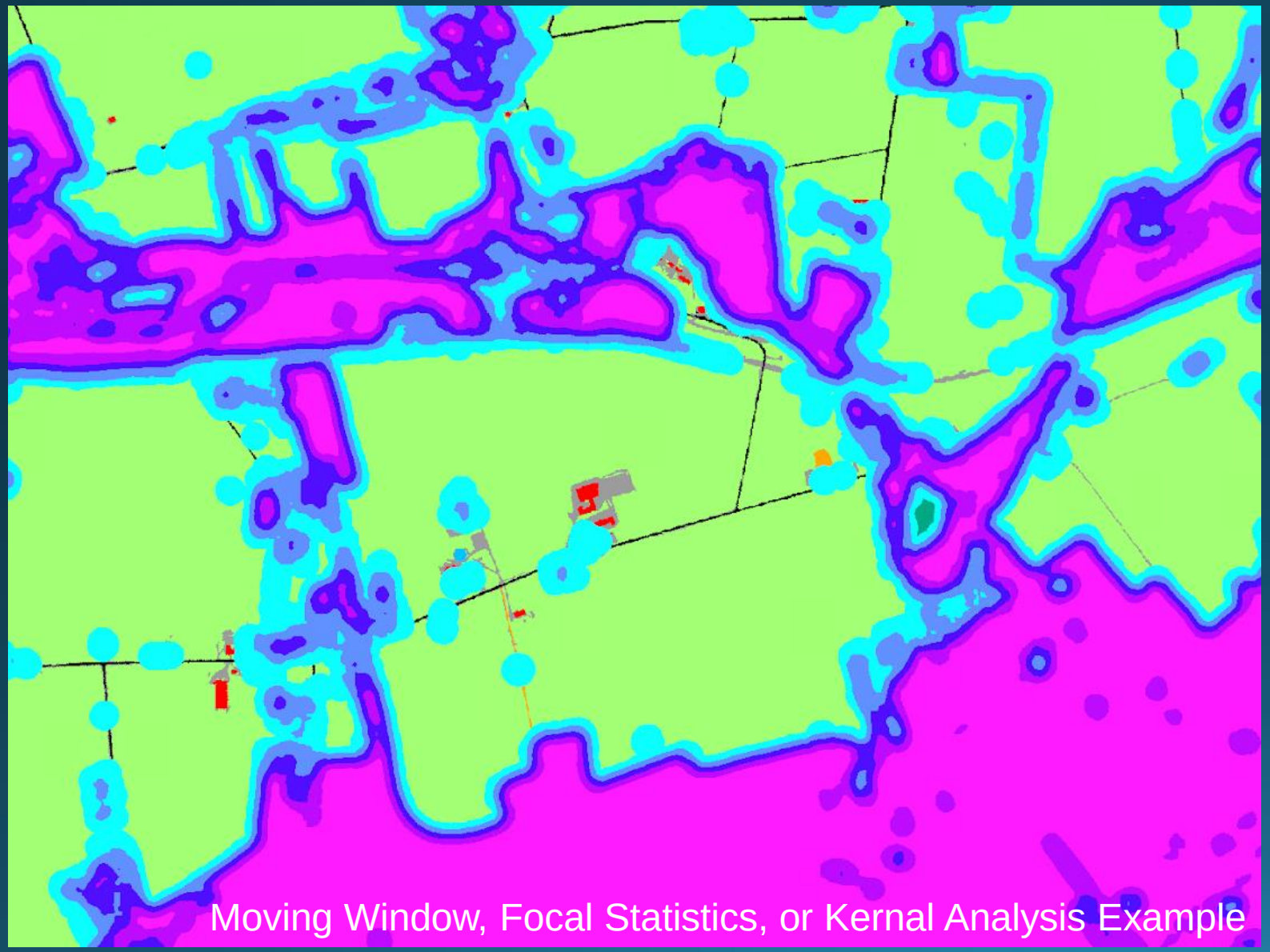
Contiguous vs. Fragmented

1. Identify TC over TG (same methods)
2. Weighted LC Focal Analysis
3. Sum all pixels within 1 acre circular window across a weighted land cover surface

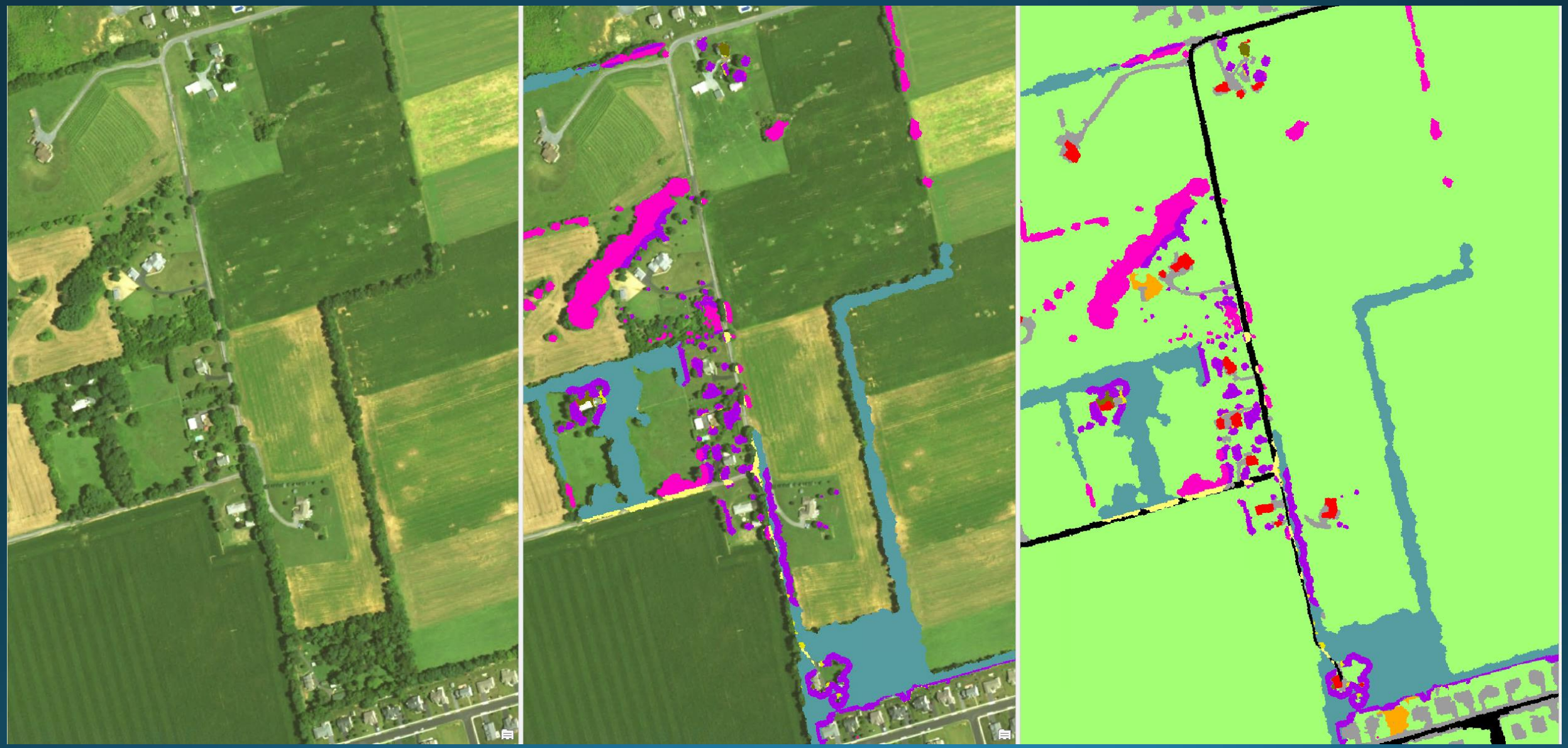
   Note: The current weighting scheme is based on the assumed impact of each LC class on forest contiguity. Ex.- Tree Canopy has a positive impact on contiguity while a Structure or Road will have a negative impact.
4. Utilize patch size threshold and focal analysis results threshold



Contiguous vs. Fragmented



Moving Window, Focal Statistics, or Kernal Analysis Example



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Tree Canopy over Turf Grass

Contiguous

Fragmented

Tree Canopy over Structures

Tree Canopy over Impervious Surfaces

Tree Canopy over Impervious Roads

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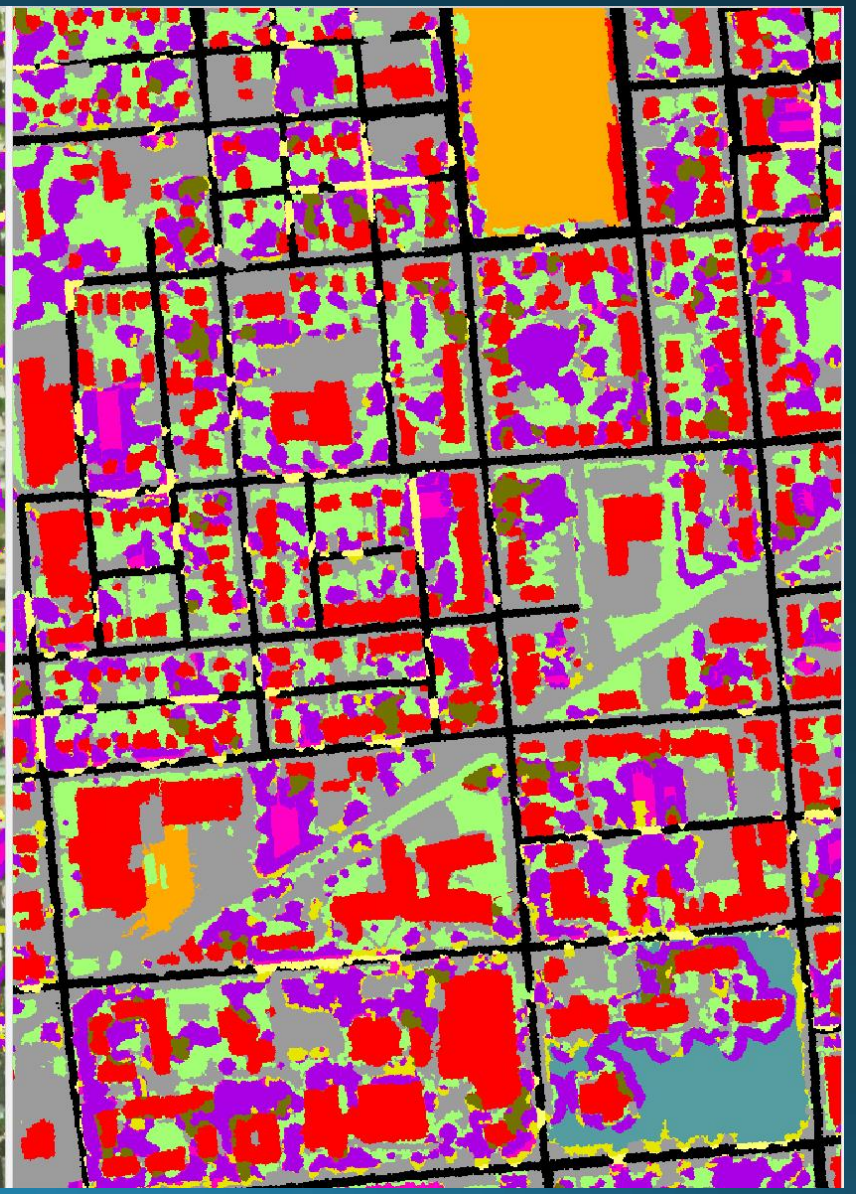
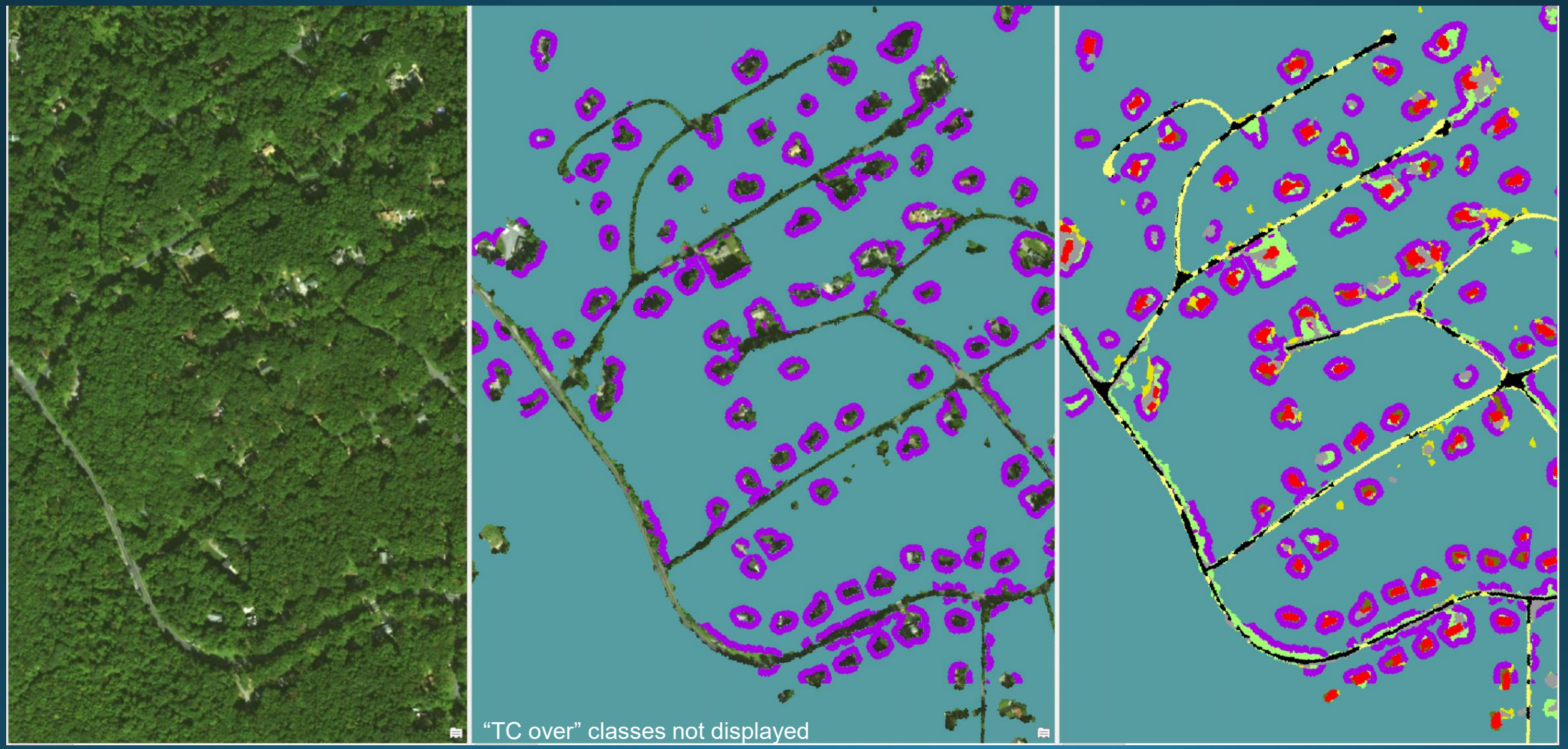
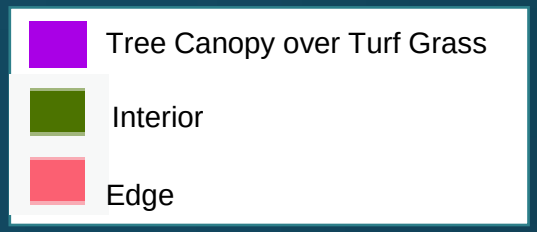



Tree Canopy over Turf Grass
Contiguous
Fragmented
Tree Canopy over Structures
Tree Canopy over Impervious Surfaces
Tree Canopy over Impervious Roads
“TC over” classes not displayed

Interior vs. Edge

- Shrink Tree Canopy 200 feet



Interior vs. Edge

- Shrink Tree Canopy 200 feet

Tree Canopy over Turf Grass

Interior

Edge

Tree Canopy over Turf Grass

Interior

Edge

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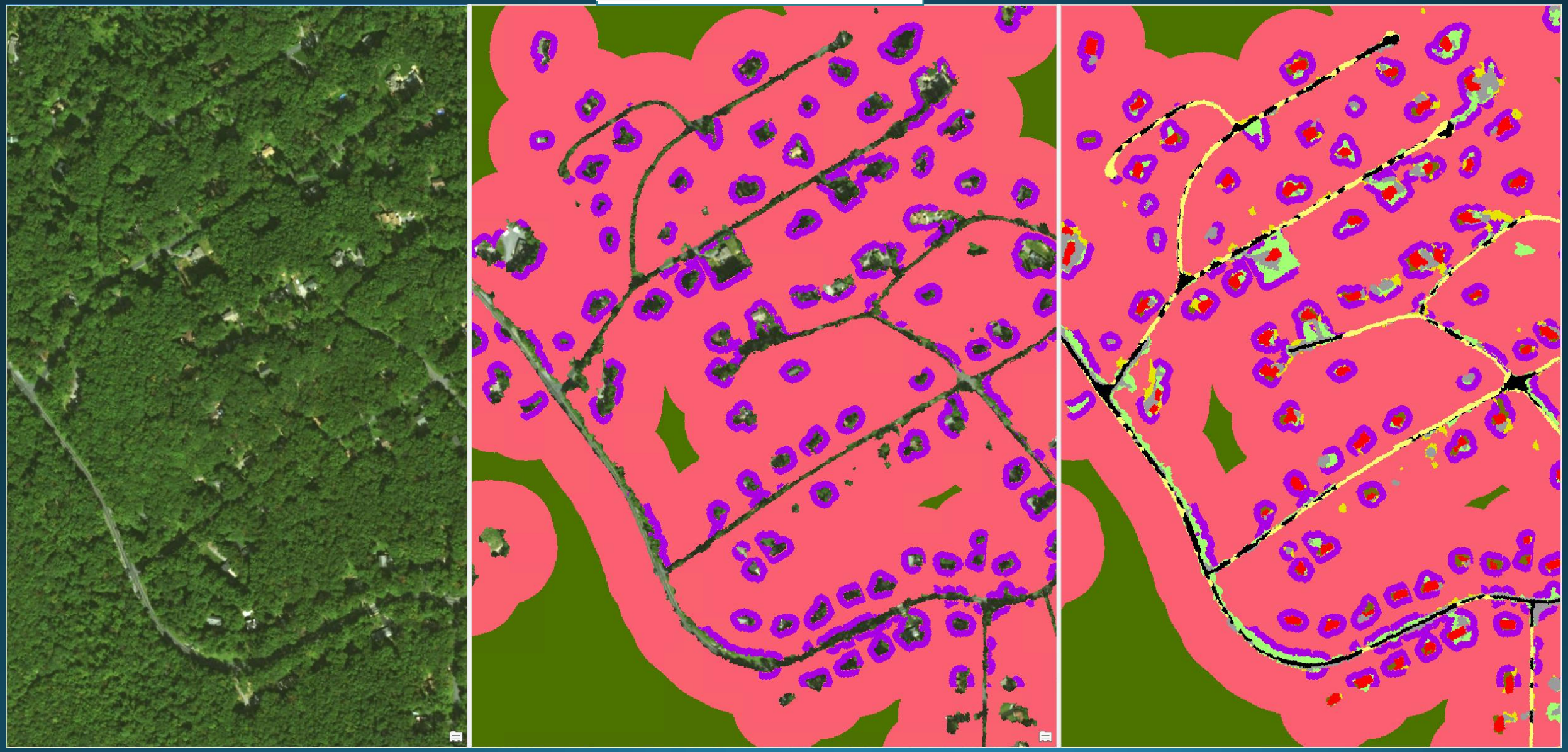
Tree Canopy over Turf Grass
Interior
Edge

Comparing Methods

Single “Forest” or “Tree Canopy” Class

- Pros:
  - Faster runtime
  - Simple
- Cons:
  - Small rural fragments called single class “Forest” or “Tree Canopy”

Contiguous vs. Fragmented

- Pros:
  - Easy to track changes in fragmentation
- Cons:
  - Varying definitions of fragmentation
  - More complicated
  - Slower runtime
  - Some causes of fragmentation are natural

Interior vs. Edge

- Pros:
  - Ecological meaning- altered microclimate and understory conditions; increased predation and invasive species along the edge
- Cons:
  - Definition of fragmentation varies depending on purpose of analysis
  - Causes of fragmentation are both natural and anthropogenic complicating interpretation of trends for management purposes

Decision 2 – Selecting Forest Methods

Should we differentiate between multiple types of forest in the latest land use dataset?

If yes, how and why?

If no, additional analysis will be done to understand and track forest fragmentation trends.

Questions?

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