Chesapeake Bay Program
A Watershed Partnership

Alternative approaches for developing the Phase 6 land use dataset

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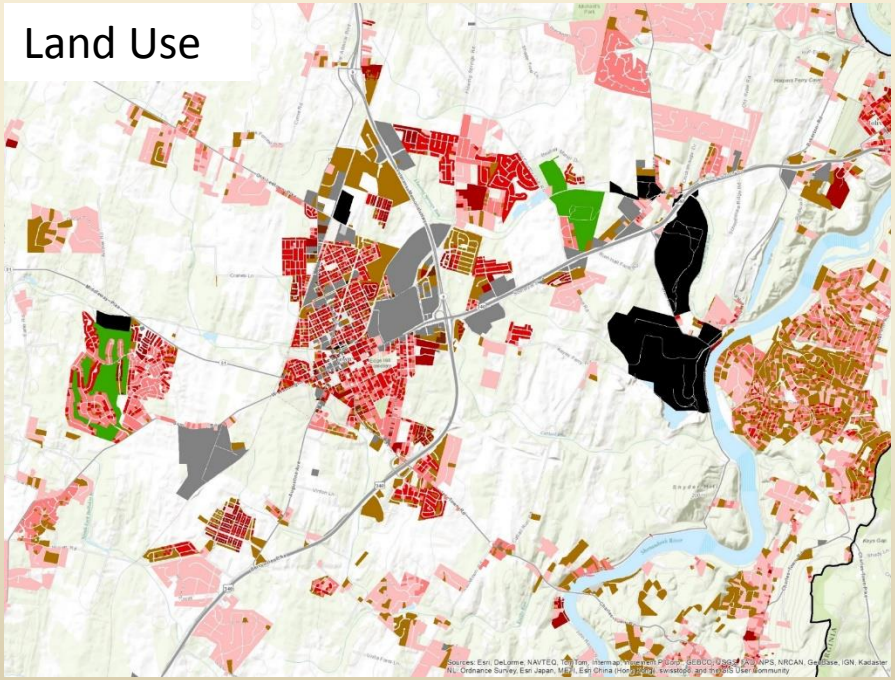
Outline of Presentation

1. Review of list of proposed land uses
2. Overview of source data sets
3. Comparison and contrasting of two primary approaches
4. Case Scenarios: Prince George's County
    1. Developed
    2. Agriculture
5. Key Questions
6. Next Steps

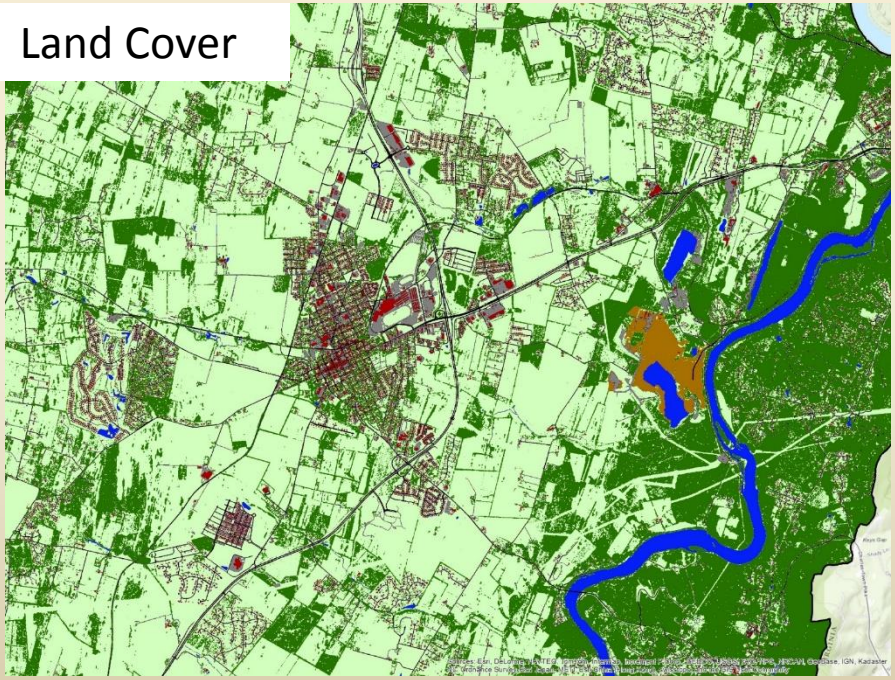
Building a 2012 Phase 6 Land Use Raster Database

1. Phase 6 Land Uses
2. Regulated Areas (MS4s/CSOs)
3. Federal Lands
4. Riparian Zone with effectiveness weights
5. Stream corridors with (Stream Source Ratio proportions)

Land Use



Land Cover



Phase 6 Proposed Land Uses*

- Phase 6 proposed land uses = 27
  - Urban 7
  - Agricultural 13
  - Natural 7
- Phase 5 land uses = 25
  - Urban 4
  - Agricultural 17
  - Natural 4

It may be that the loading rate data do not support differentiation among some land uses or that other issues may preclude incorporation into the model

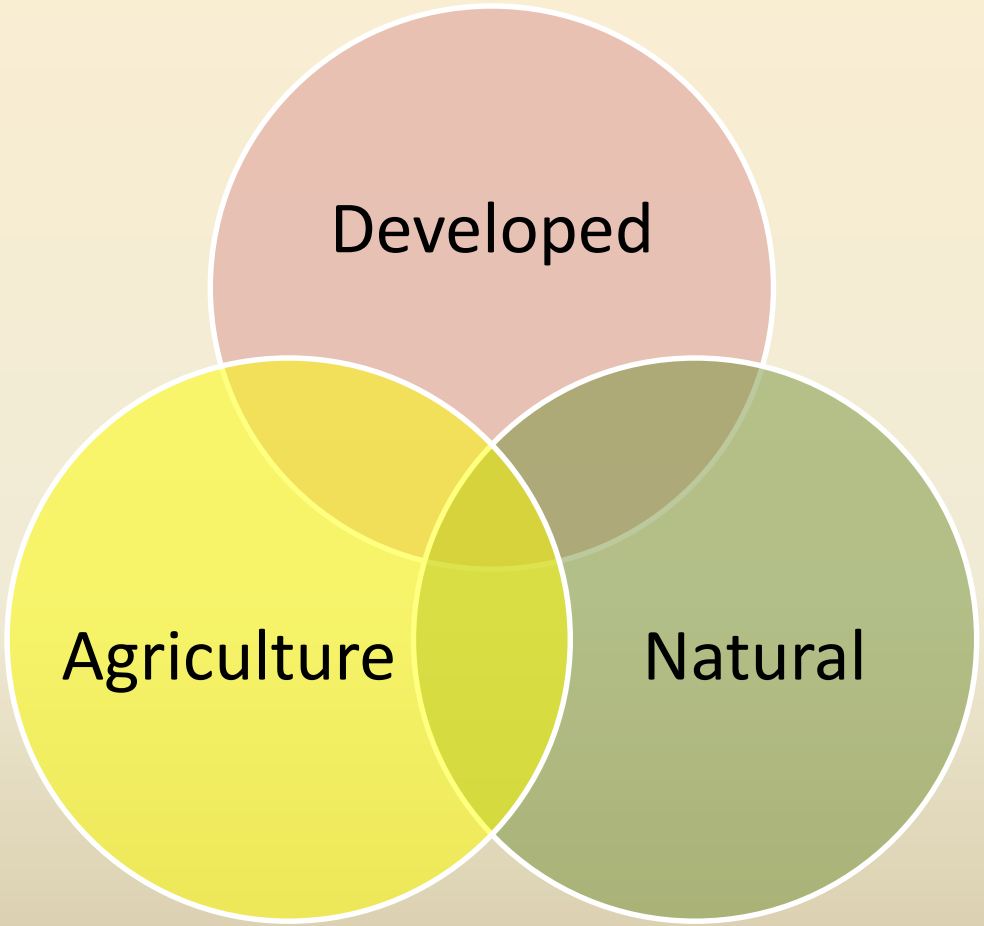
***Land uses are also attributed using overlays of federal properties, MS4s, CSOs, and riparian zones.**

Reasons to differentiate land uses

- Distinct land use loading rates from literature, models, other data sources
- BMPs are exclusive to one type of land use (e.g.: stream corridor buffers or fencing)
- Helps jurisdictions for planning and reporting purposes. In this case, there would not be a different loading rate.

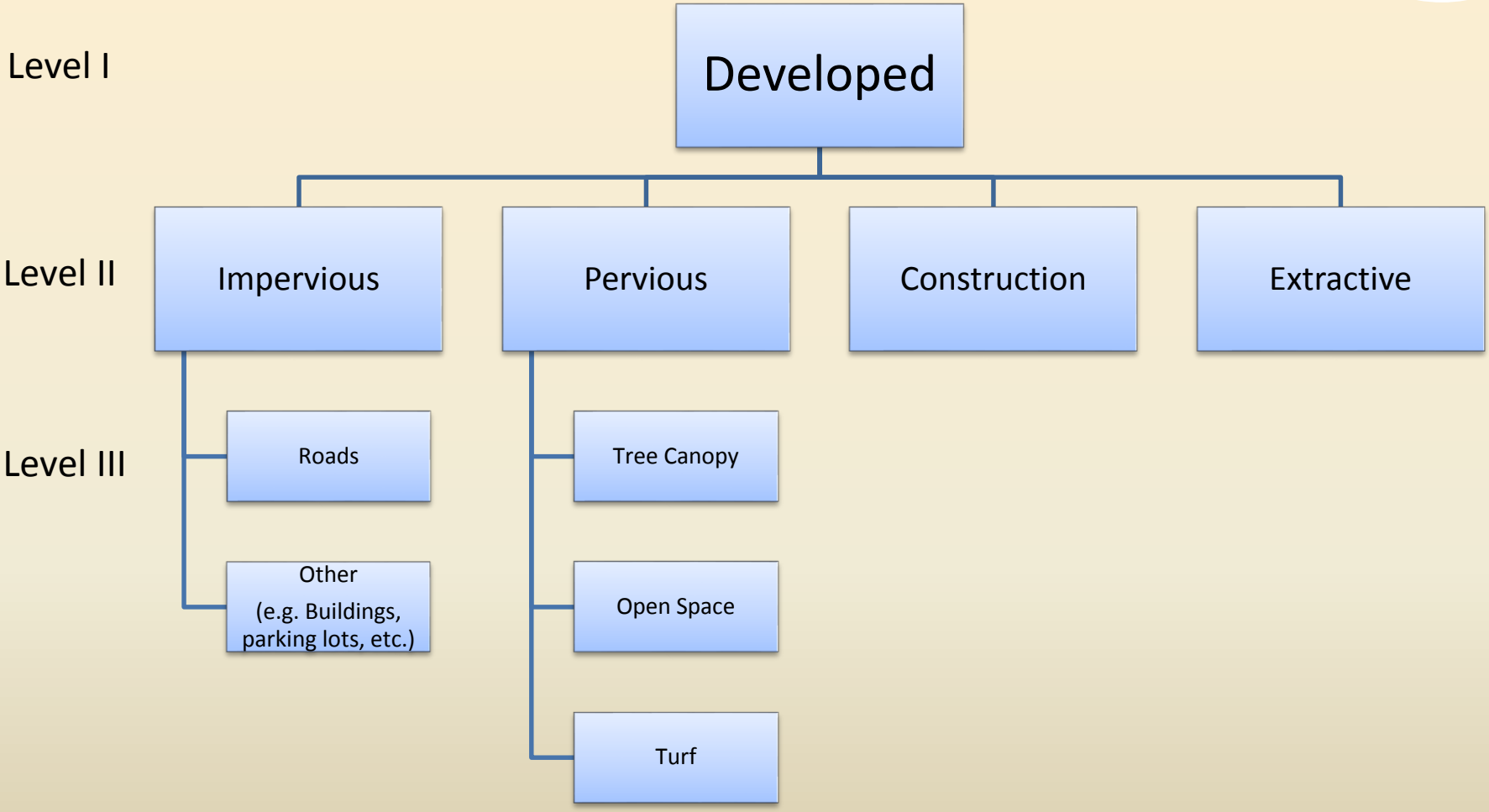
Proposed Developed Phase 6 Land Uses

Level I



Proposed Developed Phase 6 Land Uses

Developed



Proposed Developed Phase 6 Land Uses

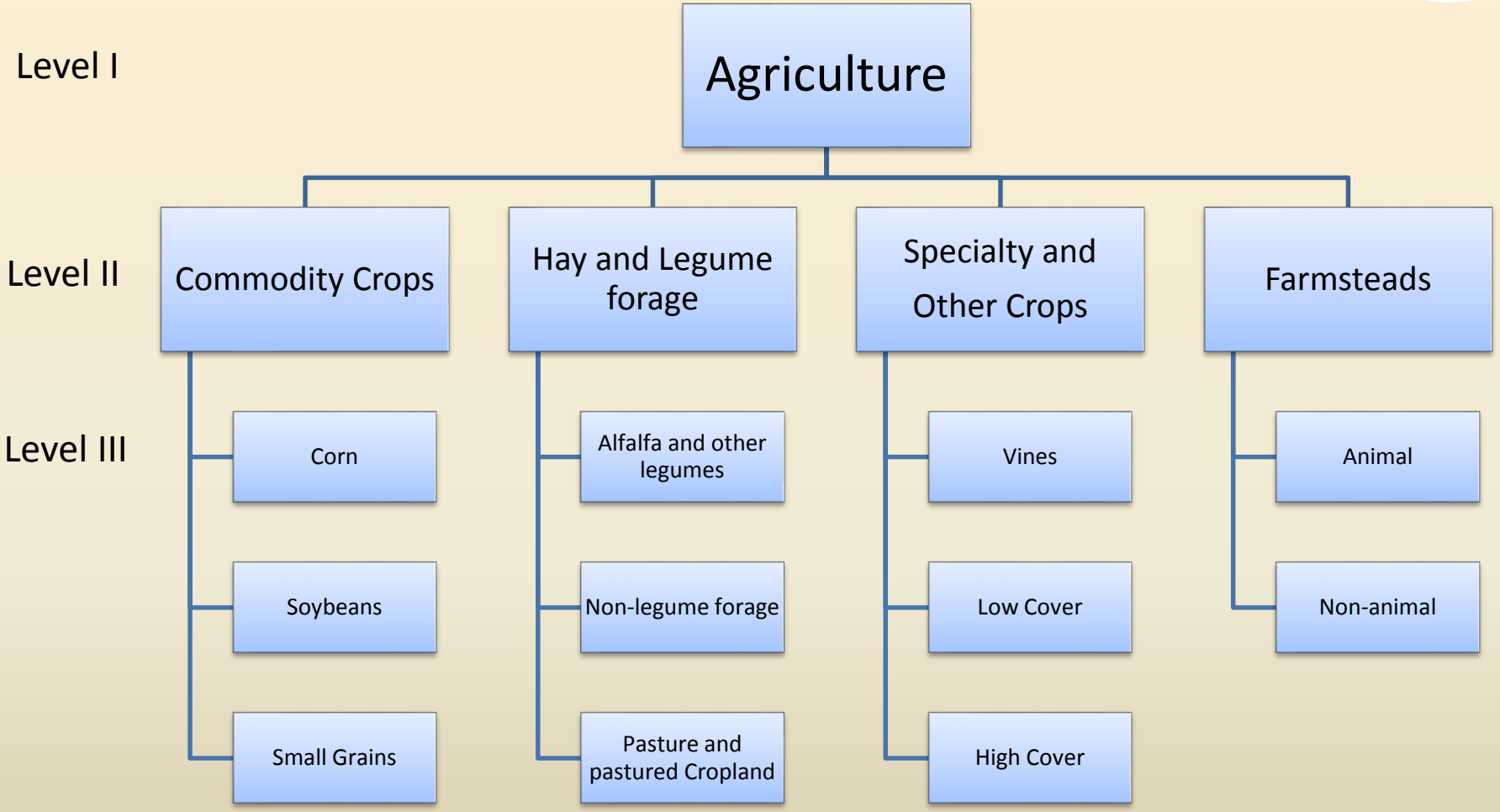
Developed

Phase 6	Phase 5.3.2
Roads Buildings, parking lots, etc.	Impervious surfaces
Turf grass Tree canopy* “Open space”	Turf grass (pervious)
Construction Extractive	Construction Extractive

* provisional, pending further work on loading differences and model fitness

Proposed Developed Phase 6 Land Uses

Agriculture



Proposed Agricultural Phase 6 Land Uses (from Ag Workgroup and Ag Modeling Subcommittee)

Agriculture

Phase 6

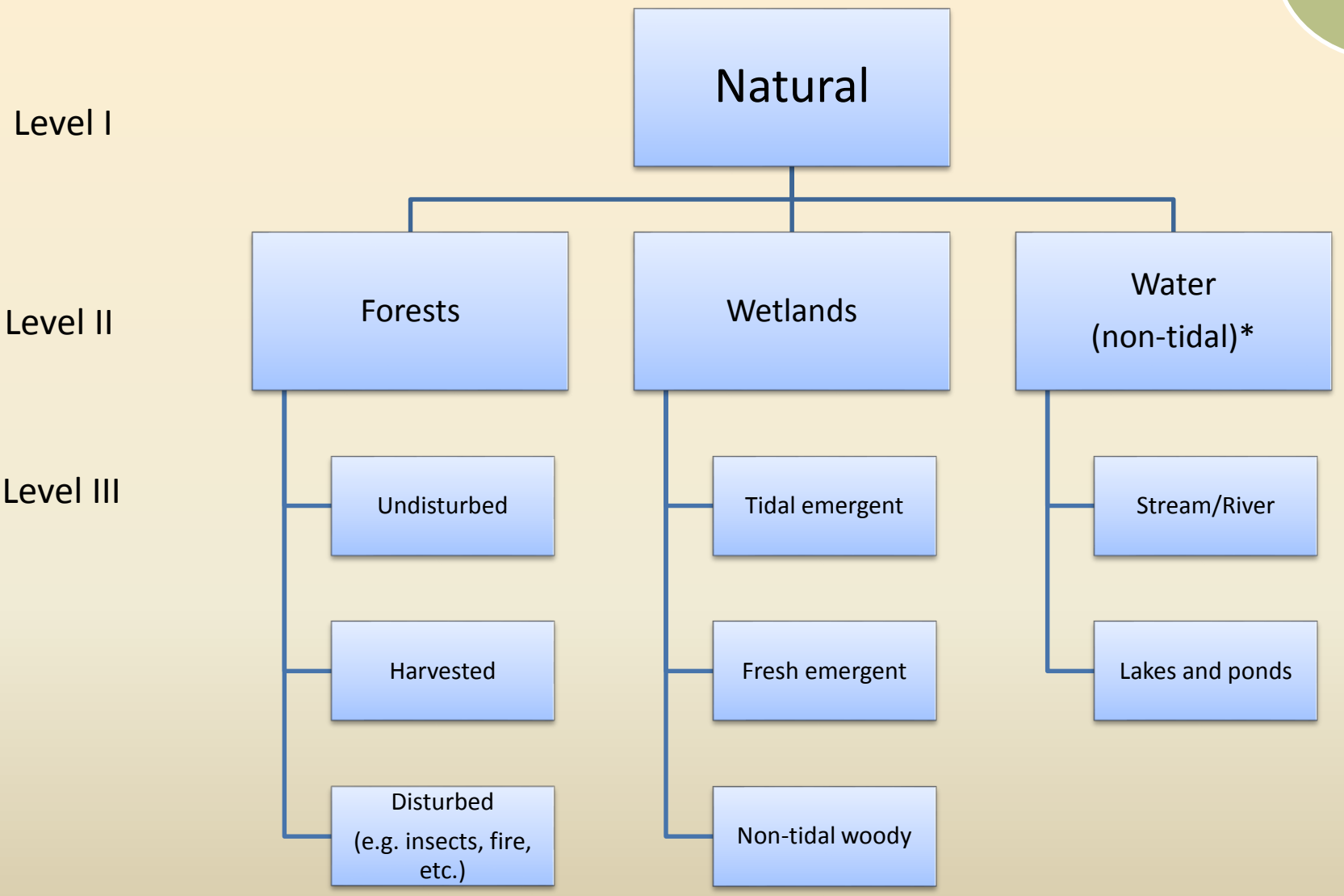
Corn
Soybeans
Small grains
Alfalfa
Non-legume forage
Pasture
Vines
Low cover specialty
High cover specialty
Impervious CAFO & AFO farmsteads
Impervious non-animal farmsteads
Pervious CAFO & AFO farmsteads
Pervious non-animal farmsteads

Phase 5.3.2

Hightill w/ & w/o manure
Lowtill with manure
Nutrient management hightill w/ & w/o manure
Nutrient management lowtill
Alfalfa
Hay w/ & w/o nutrients
Nutrient management alfalfa
Nutrient management hay
Pasture
Nutrient management pasture
Nursery
AFOs
CAFOs
Degraded riparian pasture

Proposed Developed Phase 6 Land Uses

Natural



Proposed Natural Phase 6 Land Uses

Natural

Phase 6	Phase 5.3.2
Forests	Woody/open
Harvested forest	Harvested forest
Disturbed forest	
Tidal emergent wetlands	
Fresh emergent wetlands	
Non-tidal woody wetlands	
Water*	Water

* Will expand water coverage to include 1:24K National Hydrography Dataset waterbodies and possibly Landsat derived “persistent” water features.

Two Primary Approaches
Towards constructing the Phase 6 Land Use dataset

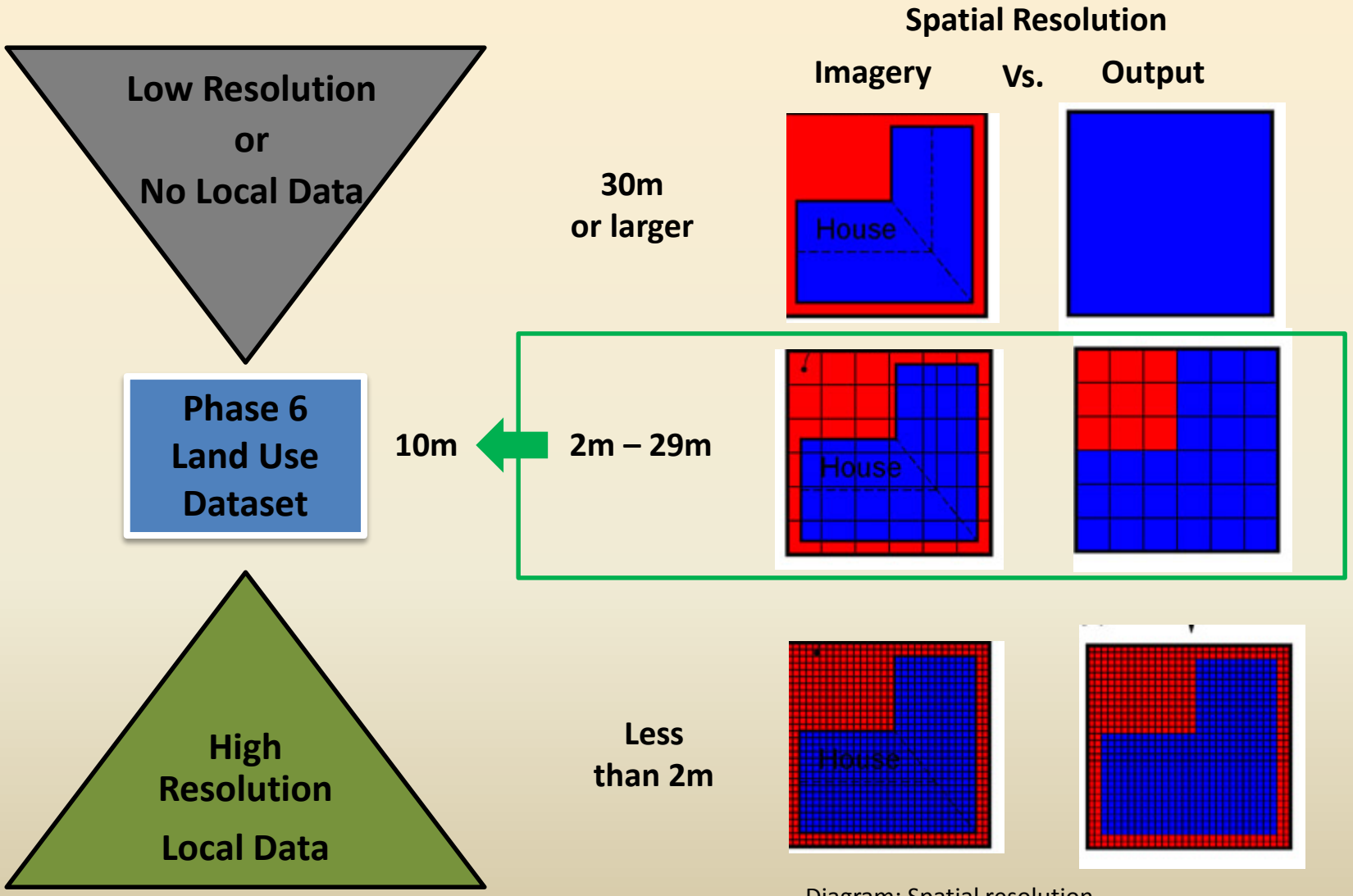
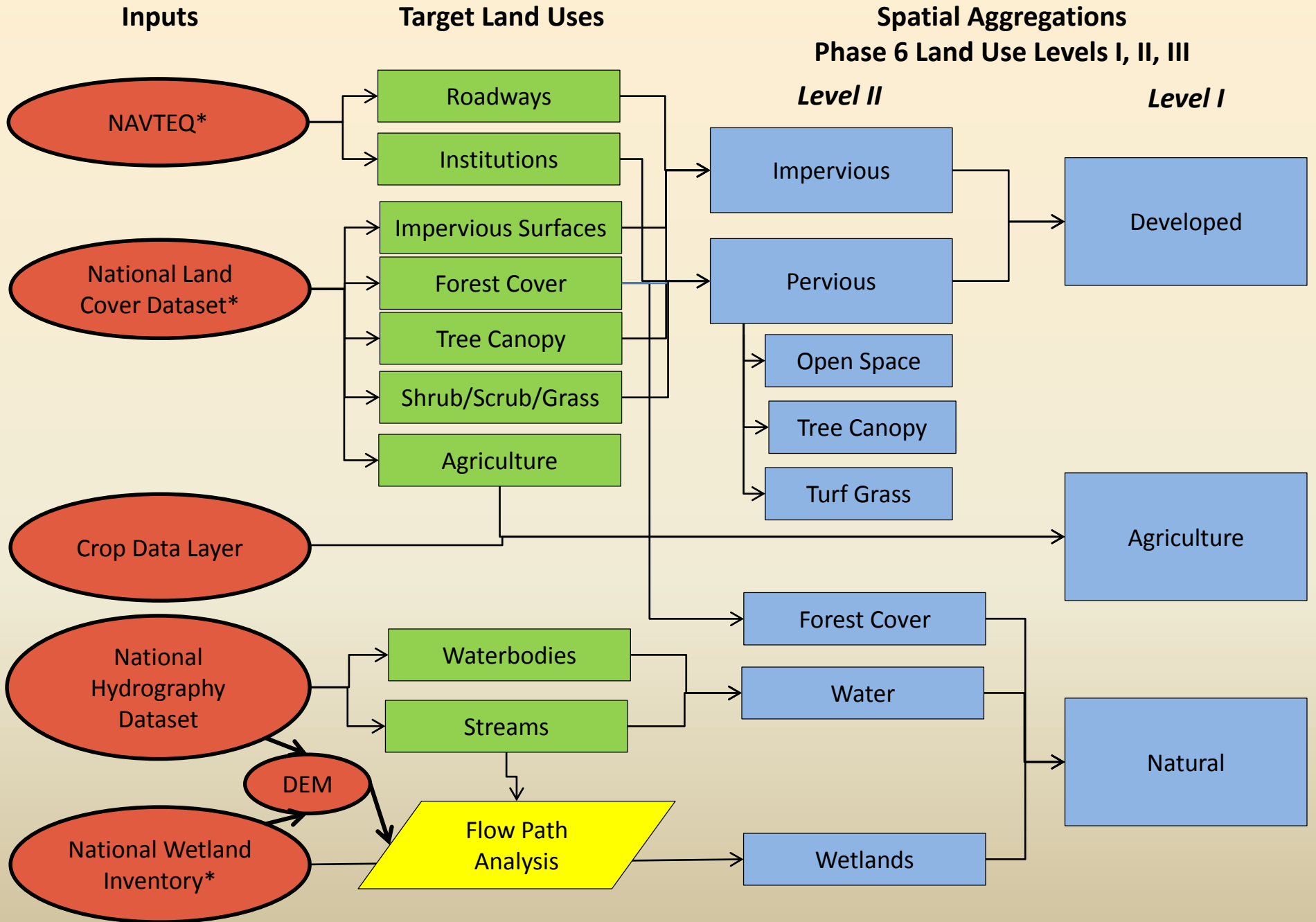
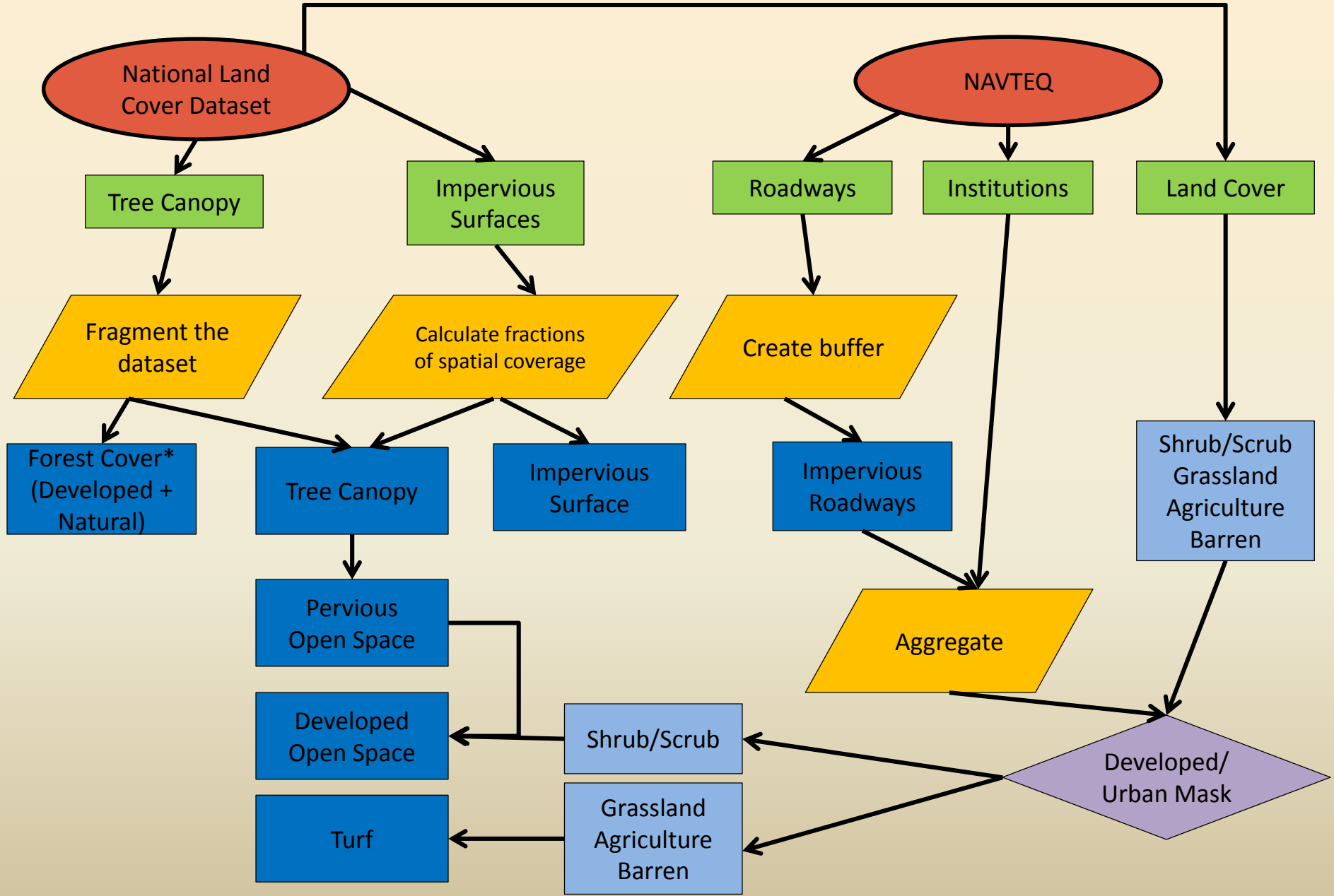


Diagram: Spatial resolution.
Source: Satellite Imaging Corporation

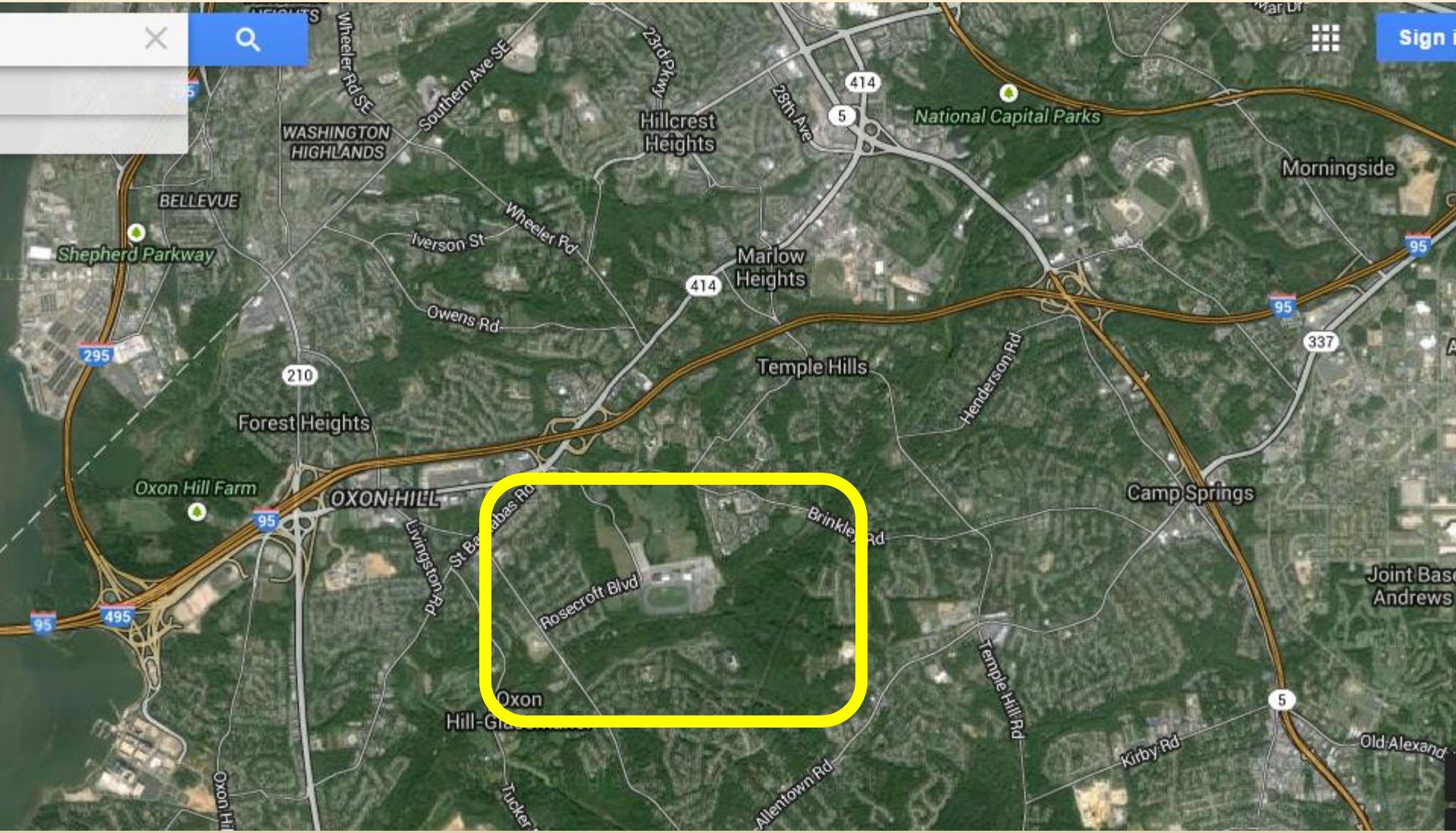
Flow Chart


Inputs
Target Land Uses
Spatial Aggregations
Phase 6 Land Use Levels I, II, III
Level II
Level I
NAVTEQ*
National Land Cover Dataset*
Crop Data Layer
National Hydrography Dataset
DEM
National Wetland Inventory*
Roadways
Institutions
Impervious Surfaces
Forest Cover
Tree Canopy
Shrub/Scrub/Grass
Agriculture
Waterbodies
Streams
Flow Path Analysis
Impervious
Pervious
Open Space
Tree Canopy
Turf Grass
Forest Cover
Water
Wetlands
Developed
Agriculture
Natural

Proposed Developed Phase 6 Land Use Methods



Fort Washington in Prince George's County, MD



Rosecroft Raceway with Henson Creek to the South

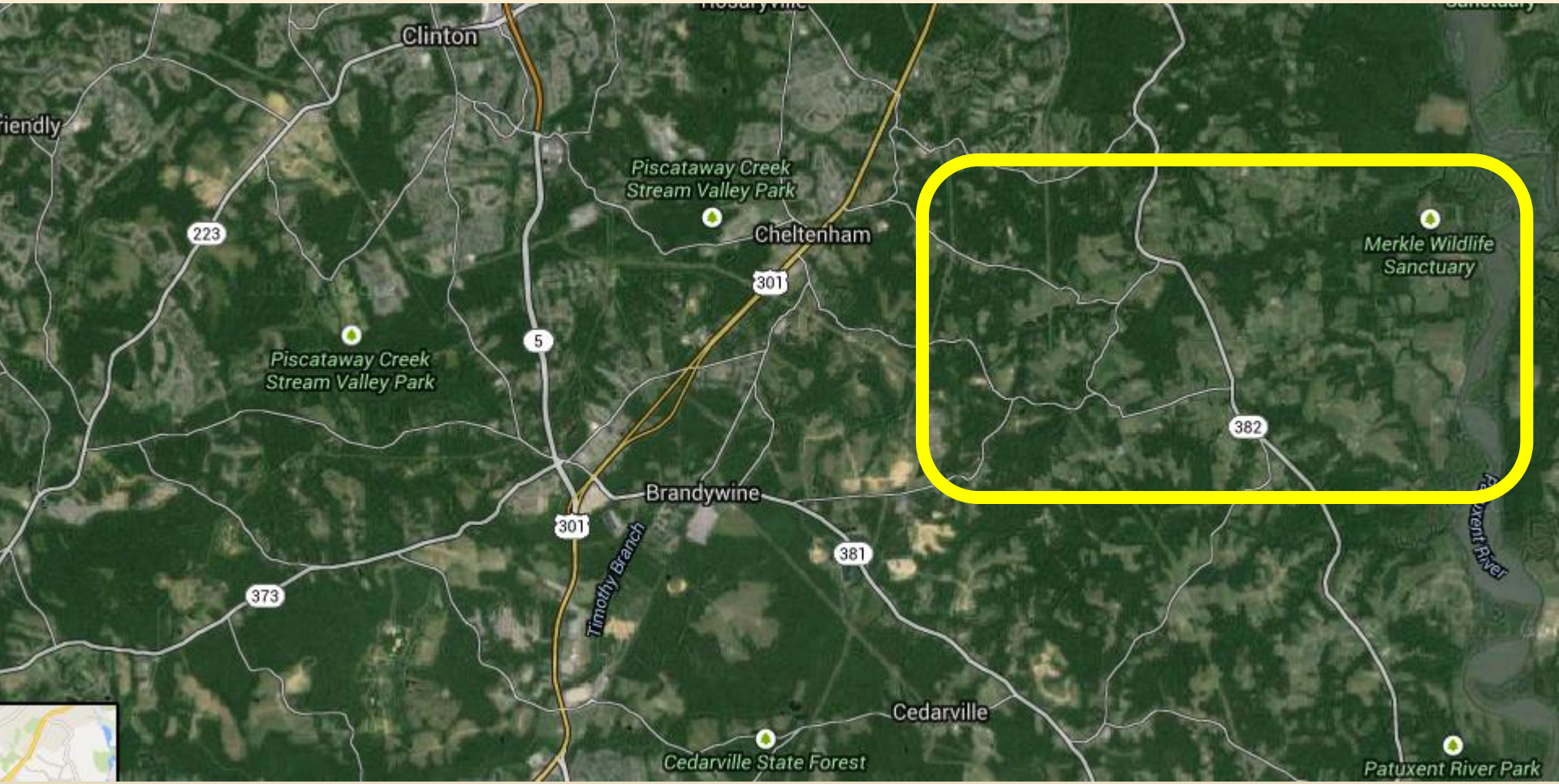
PG County, MD 2009 LUD with NAVTEQ at 10m resolution

PG County, MD 2009 LUD with NAVTEQ at 30m resolution

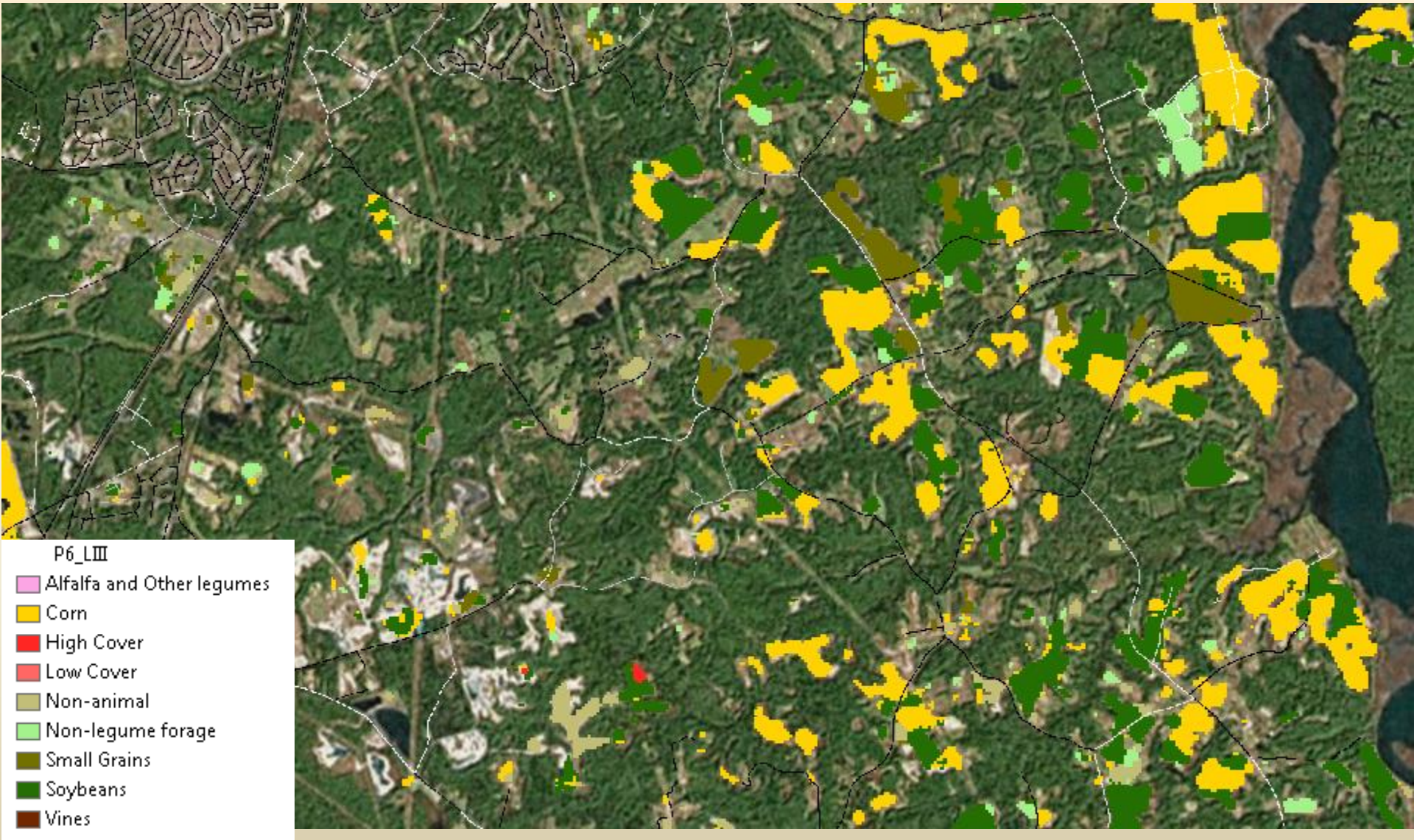
NLCD 2011 with NAVTEQ at 10m resolution

NLCD 2011 with NAVTEQ at 30m resolution

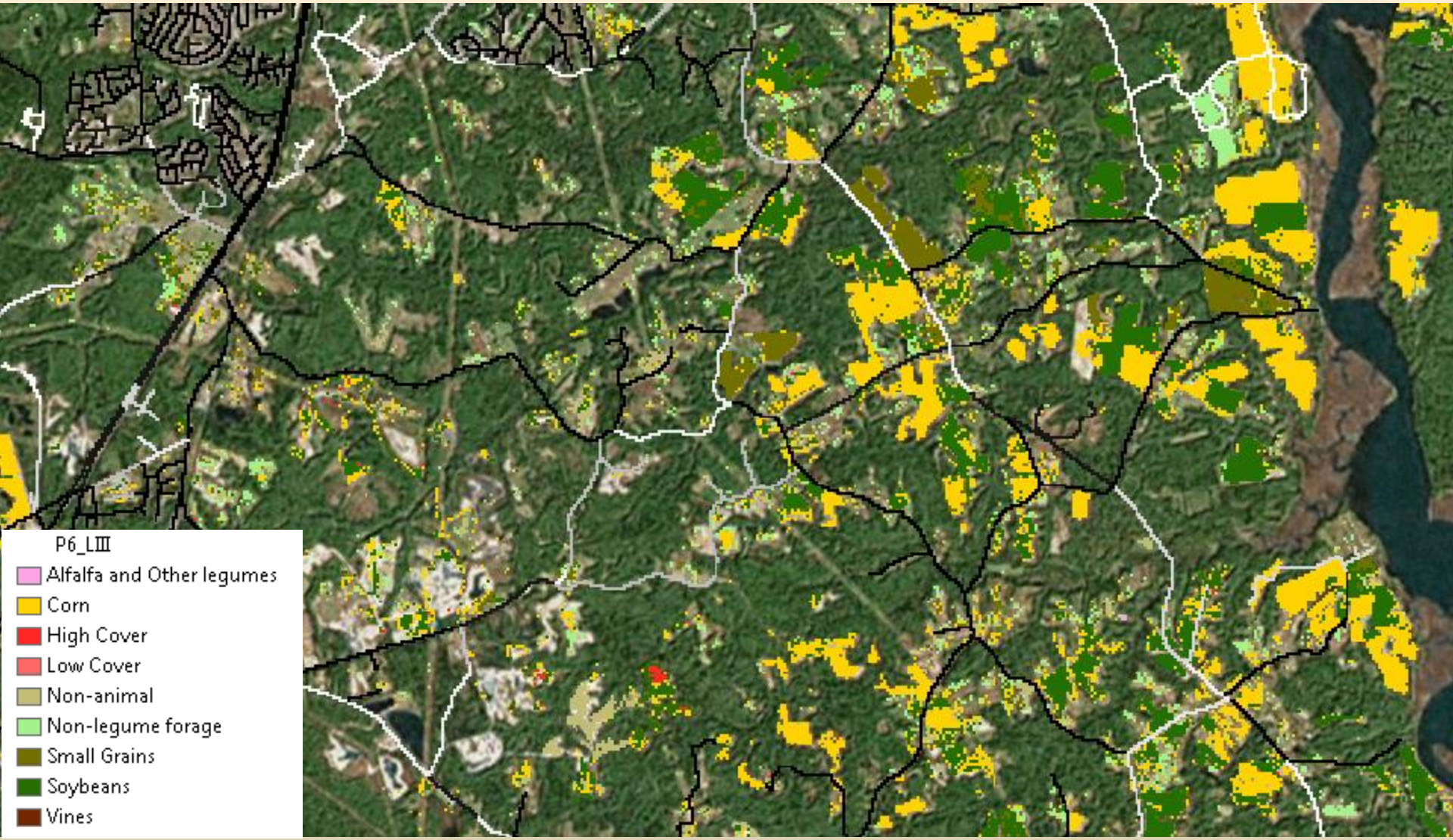
East of Cheltenham, MD and West of the Patuxent River



CDL 2013 with NAVTEQ at 10m resolution



CDL 2013 with NAVTEQ at 30m resolution



PG County, MD 2009 LUD with NAVTEQ at 10m resolution

NLCD 2011 with NAVTEQ at 10m resolution

Key Questions

- **Feasibility of proposed land uses** → Is it feasible to differentiate the HGM conditions and subsequent loading rates for each Phase 6 land use at each level?

- **Spatial scale** → What will be the most accurate and applicable spatial scale to use?
  - Buffers versus resolution
  - Size of raster files

- **Fractional coverage versus spatial distribution** → Where in the pixel is the 50% impervious, 30% forest, 10% water, and 10% wetland coverage?

- **Accuracy** → How does classification accuracy change between Phase 6 land use Levels II and III?
  - Crop Types

- **Edge effect** → What is the best method to account for shrub/scrub land cover adjacent to roadways and infrastructure?

- **Cartographic hierarchy of land uses** → What are the important variables to consider when stacking the land use layers to create the final, comprehensive map

Next Steps

- Receive updates on land use classes from the Wetland Expert Panel
- Expand the beta testing of local land use land cover data sets at multiple spatial scales.
- Apply an algorithm/function to decipher forest from tree canopies by identifying patches of pixels with 100% forest cover.
- Create a rule book for prioritizing and fractioning urban and rural land uses.
- Begin “burning-in” impervious surface layers into the working comprehensive dataset, and calculating pixel level ratios between developed and impervious versus pervious land uses
- Begin incorporating demographic data to weight low, medium, and high intensity developed land uses.