Using Local Land Use/Cover Data to inform the Chesapeake Bay TMDL

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USGS Chesapeake Bay Program Office

U.S. Department of the Interior
U.S. Geological Survey

Land Use vs. Land Cover

- Low-density Residential
- Transportation
- Agriculture
- Rural conservation

- Impervious surfaces
- Tree canopy
- Herbaceous
- Barren

Phase 6 Land Uses

- Impervious-Roads
- Forests
- Turf Grass
- Open Space

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P6 Developed Land Uses

Impervious Roads (IR): paved and unpaved roads and bridges.

Impervious Non-Roads (INR): buildings, driveways, sidewalks, parking lots, runways and some private roads.

Construction (CON): reported acreage of land with Erosion & Sediment Control permits.

Extractive (XTR): estimated acreage of disturbed/active, abandoned and reclaimed mines. Separate???

Turf Grass (TG): all herbaceous lands within 200m of roads in developed areas that have an average lot size <=5 acres.

P6 Natural Land Uses

Forest (FOR): contiguous patches of trees and shrubs, with minimum radius >= 1 acre circle, assumed to have an unmanaged understory

Harvested Forest (HAR): state reported annual acres harvested at the county level.

Disturbed Forest (DIS): monitored average annual extent of disturbed forest (via insect, fire damage).

Tree Canopy (TCH, TCIR, TCINR): small fragments of trees or shrubs overhanging herbaceous and impervious surfaces. Only TCH will have a unique loading rate in P6LU_v1. The other classes will load like their parents- IR and INR.

P6 Natural Land Uses (continued)

Wetlands (TWET, FWET, HWET): National Wetlands Inventory (NWI) non-pond, non-lake wetlands divided into tidal, floodplain, and headwater subclasses based on NWI attributes and landscape position. Will load like forest but provide an added reduction efficiency.

Water (WAT): All waterbodies mapped by the National Hydrography Dataset, NWI ponds & lakes, and the National Land Cover Dataset (Open Water). Assumes all single-line streams are 15' wide.

Open Space (OS): non-fertilized herbaceous and non-forest scrub/shrub that is justifiably not turf or extractive (e.g., beaches, vacant lots, transmission line right-of-ways, junkyards, fairgrounds, gravel roads, railroads).

P6 Agricultural Land Uses

Cropland (CRP): leftover areas of rural herbaceous lands with majority crops according to the Cropland Data Layer 2008 – 2013.

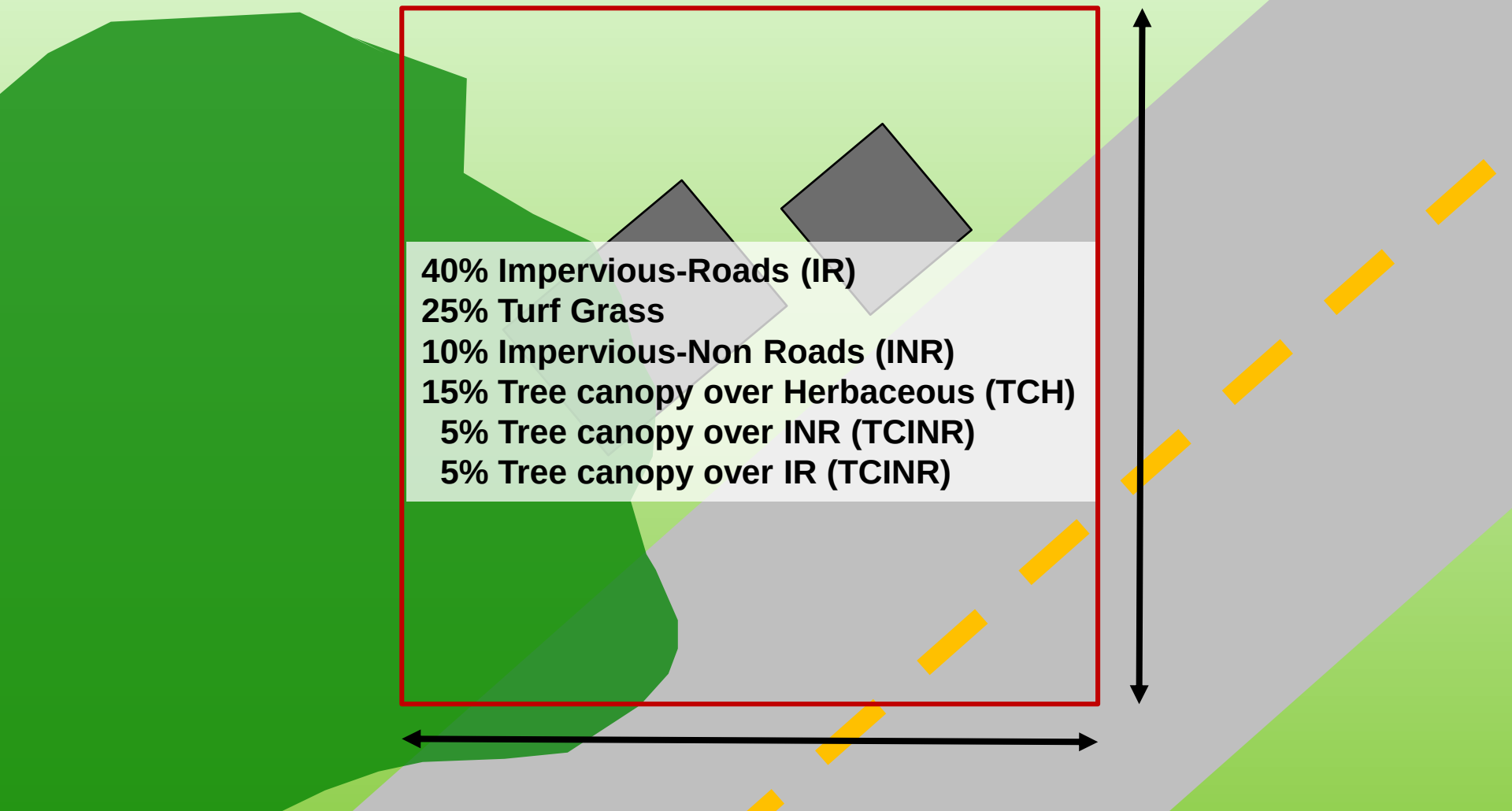
Pasture/Hay (PAS): leftover areas of rural herbaceous lands with majority pasture/hay according to the Cropland Data Layer 2008 – 2013.

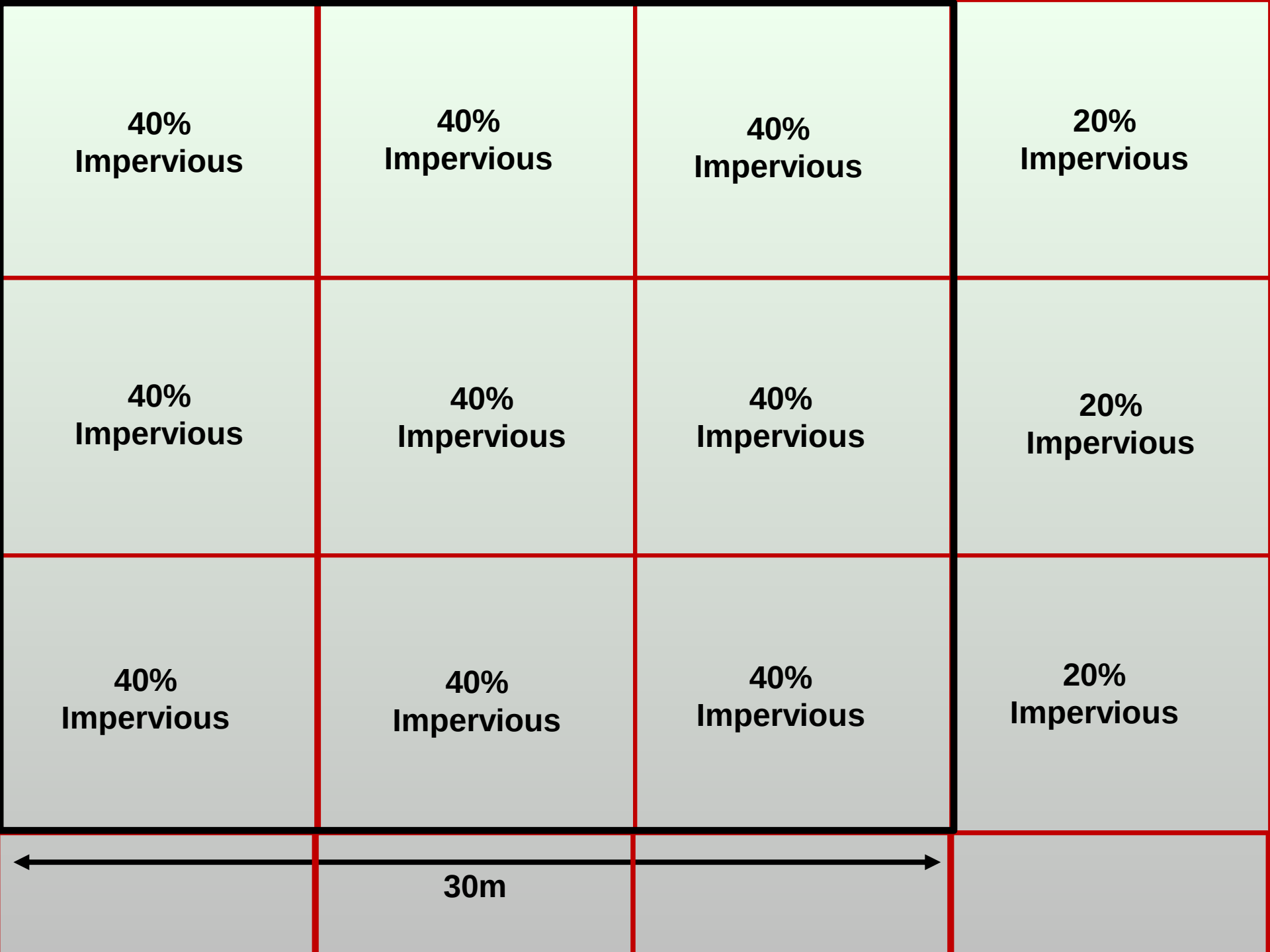
Specialty Crops (SPC): leftover areas of rural herbaceous lands with majority specialty crops according to the Cropland Data Layer 2008 – 2013.

Farmsteads (FST): “All other lands” reported in Ag Census including house, barns, sheds, paddocks, animal operation structures, grass, driveways, etc.

Phase 6 Land Use Map Characteristics

- 10m resolution
- Fractional and continuous pixel values




40% Impervious
40% Impervious
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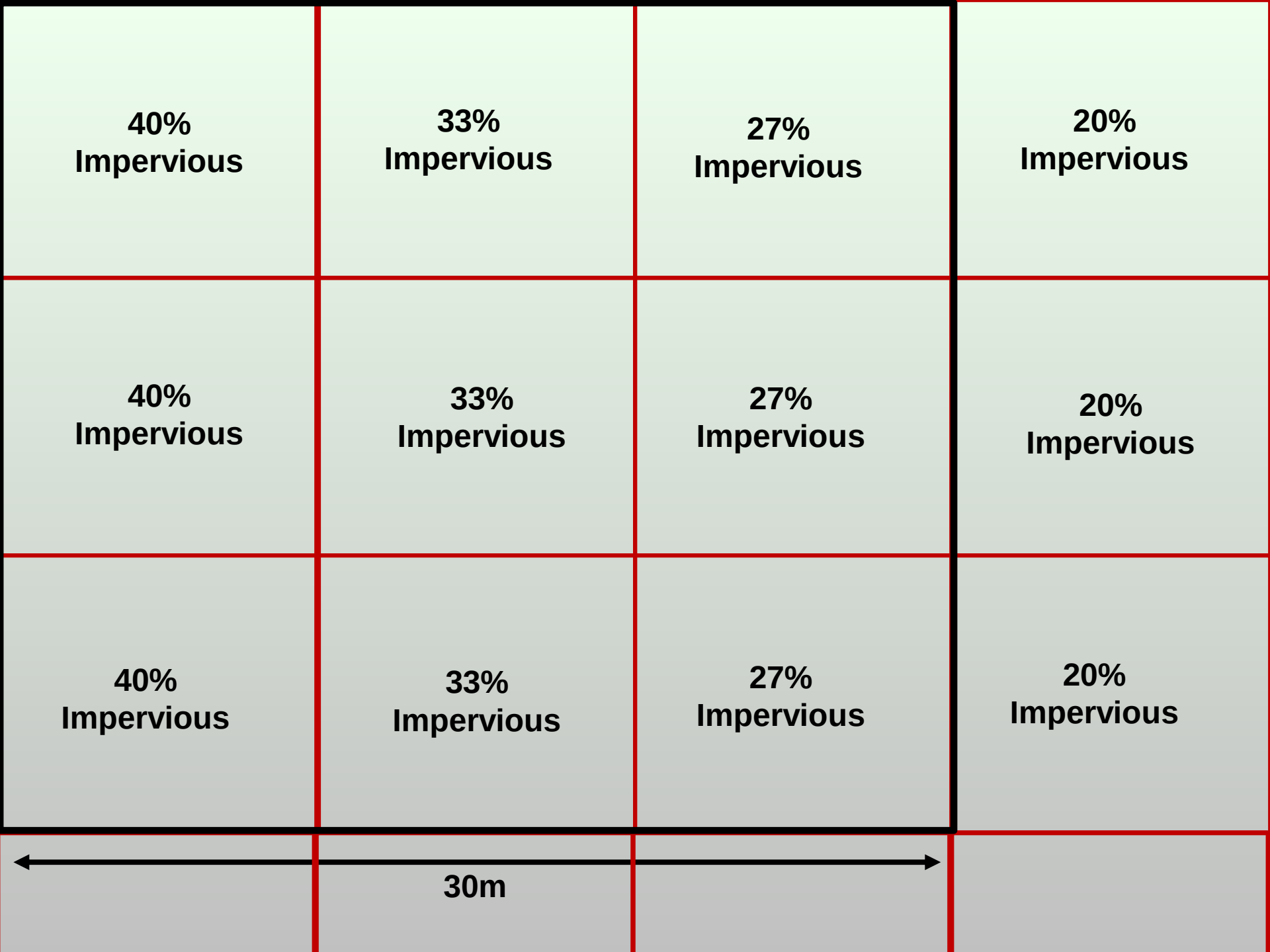
40% Impervious
40% Impervious
20% Impervious
30m


40% Impervious
33% Impervious
27% Impervious
20% Impervious
40% Impervious
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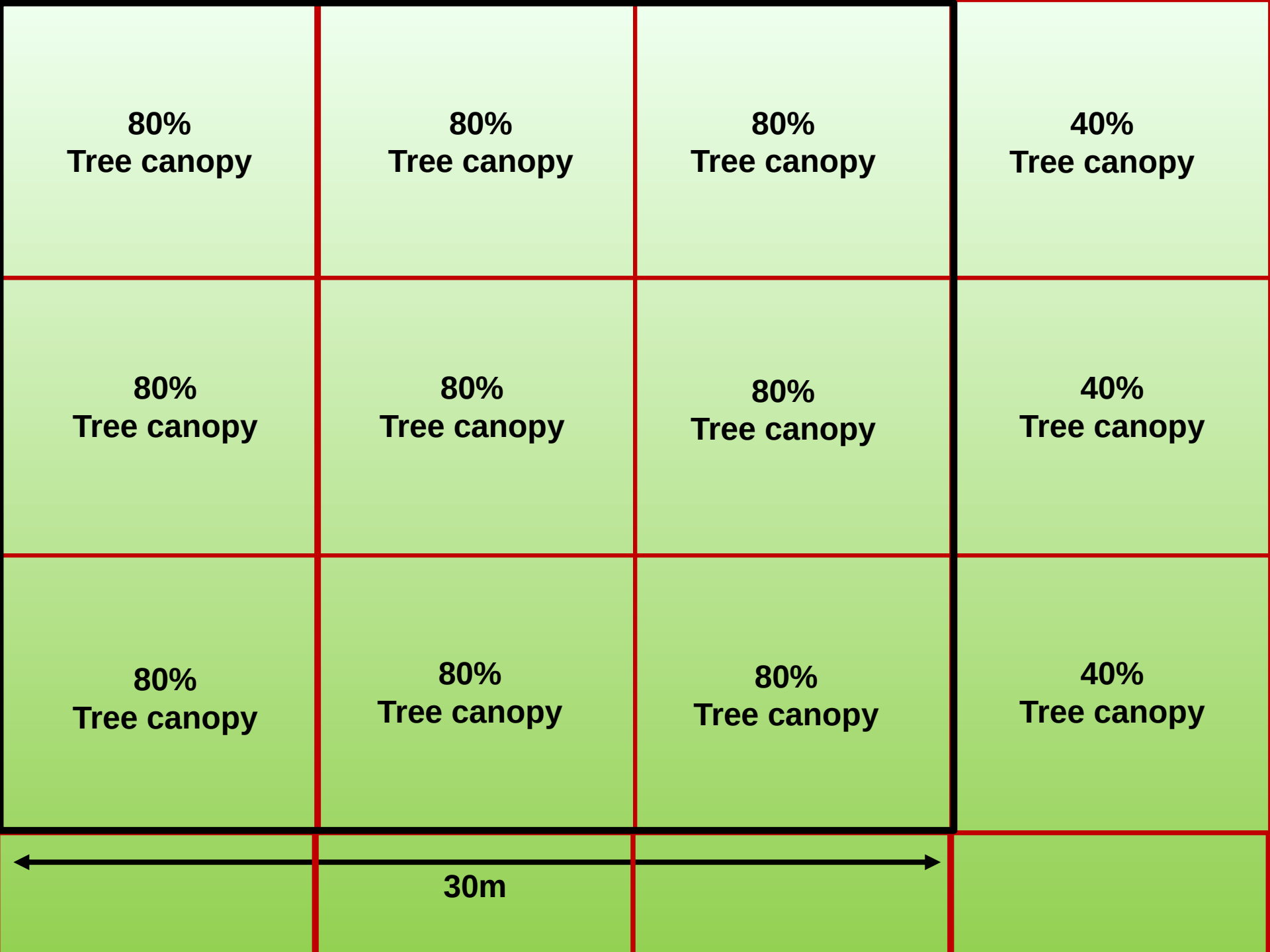
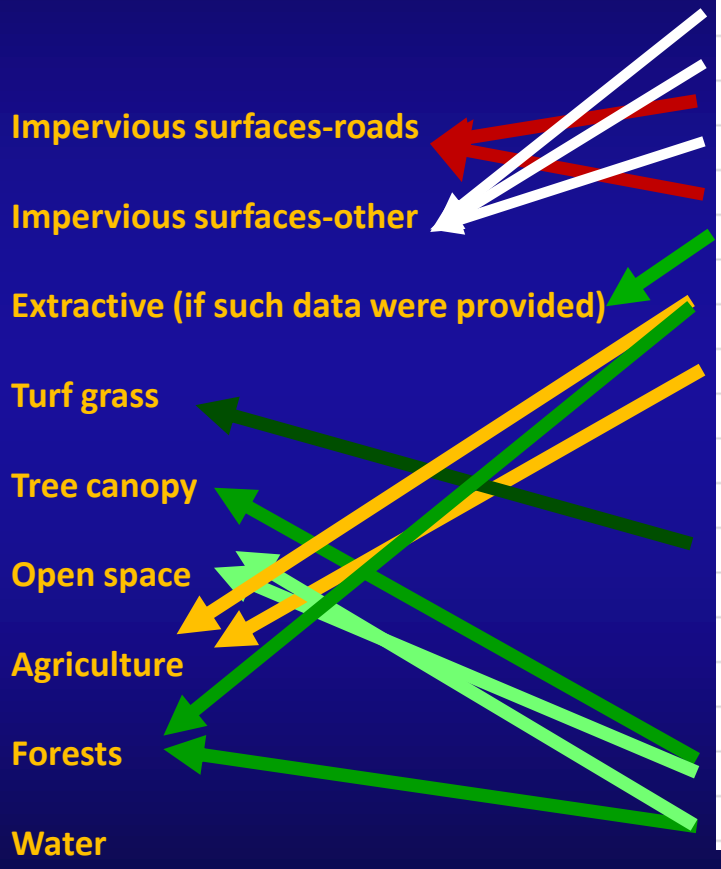
40% Impervious
33% Impervious
27% Impervious
20% Impervious
30m


80%
Tree canopy
80%
Tree canopy
80%
Tree canopy
40%
Tree canopy
80%
Tree canopy
80%
Tree canopy
80%
Tree canopy
40%
Tree canopy
80%
Tree canopy
80%
Tree canopy
80%
Tree canopy
40%
Tree canopy
30m

Local Data and Phase 6 crosswalk



Shapefile Name	Type	Potential P6 application
LanCo_TrainStations	Point File	1.1.2 Buildings, parking lots, etc.
DEMPts	Points	
Railroad	Line	1.1.1 Roads
Buildings2005	Polygon	1.1.2 Buildings, parking lots, etc.
Drives2008	Polygon	1.1.2 Buildings, parking lots, etc.
ParkingLots2008	Polygon	1.1.2 Buildings, parking lots, etc.
RoadEdge2008	Polygon	1.1.1 Roads
Quarries	Polygon	1.4 Extractive
Act319Parcels	Polygon	3.1 Forest OR Ag depending on attribute table
LanCo_Easements	Polygon	
LanCo_AgSecurityZones	Polygon	
LanCo_FloodZones	Polygon	
LanCo_LandCover2008	Polygon	
LanCo_Muni	Polygon	
LanCo_ParksAnd_Rec	Polygon	
LanCo_UGS_VGA	Polygon	
LanCo_Zoning	Polygon	
lanpa2008	30m grid	
LanCoZoning	Polygon	
Lancover_2010Lancaster	1m grid	Direct use along with other data, aggregate to 10m
LancasterCountyLulc201403	Polygon	Develop Urban Footprint

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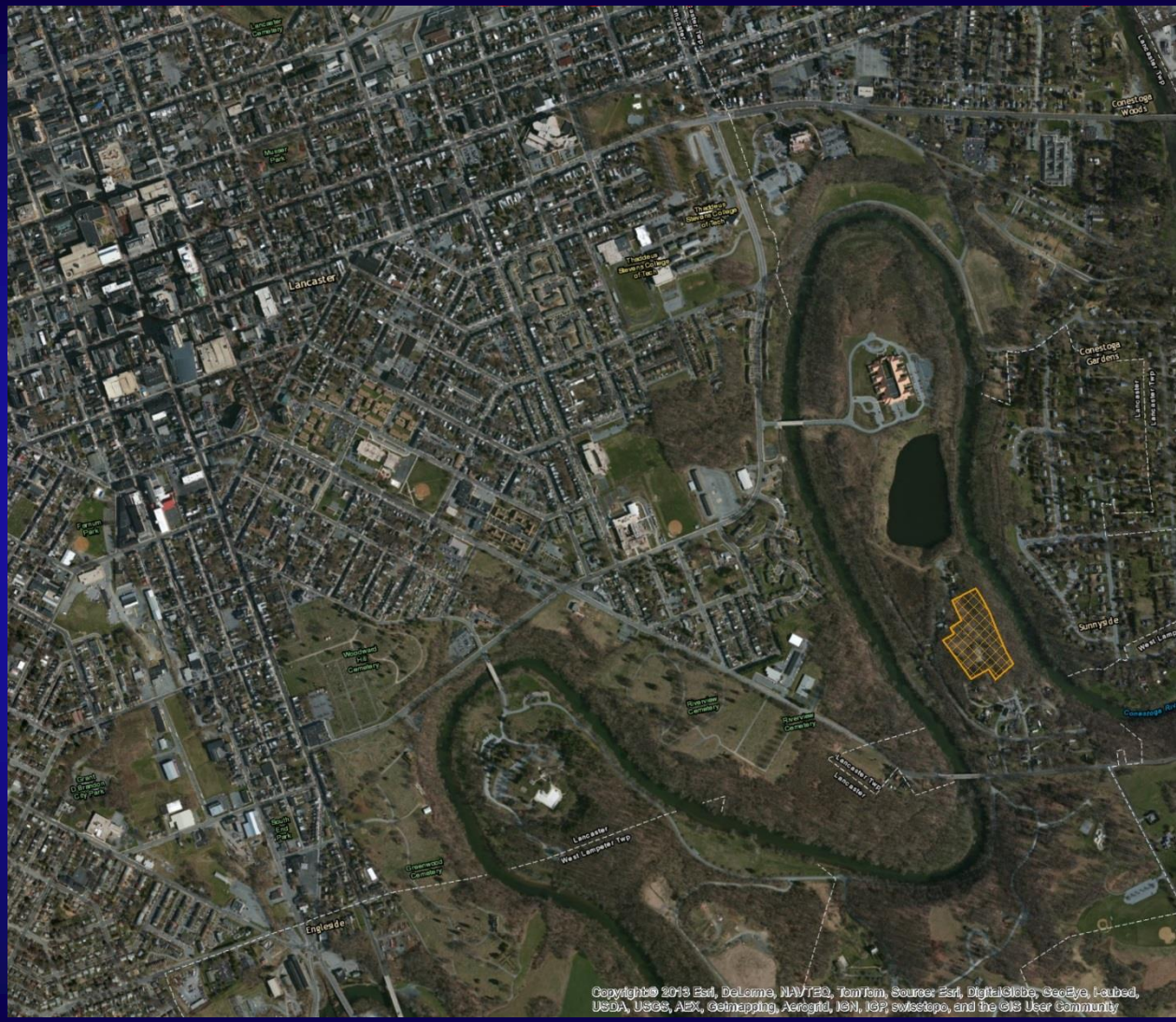
Lancaster City (SE)

Local Data

- 1 m Land Cover 2010
- Polygon buildings 2005 (converted to 1m)
- Polygon road edge 2008 (converted to 1m)
- Drives (private drives and driveways) 2008 (converted to 1m)
- Quarries



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Impervious Roads

Local Data

- Polygon road edge 2008 (converted to 1m)
- Aggregated to 10m

= Impervious Roads (IR) Land Use Layer

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Impervious Non-Roads

Local Data

- Drives (private drives and driveways) 2008
- Polygon buildings 2005
- Polygon parking lots
- Land cover “buildings” and “other paved”
- Merged together
- Aggregated to 10m

= Impervious Non-Roads (INR) Land Use Layer

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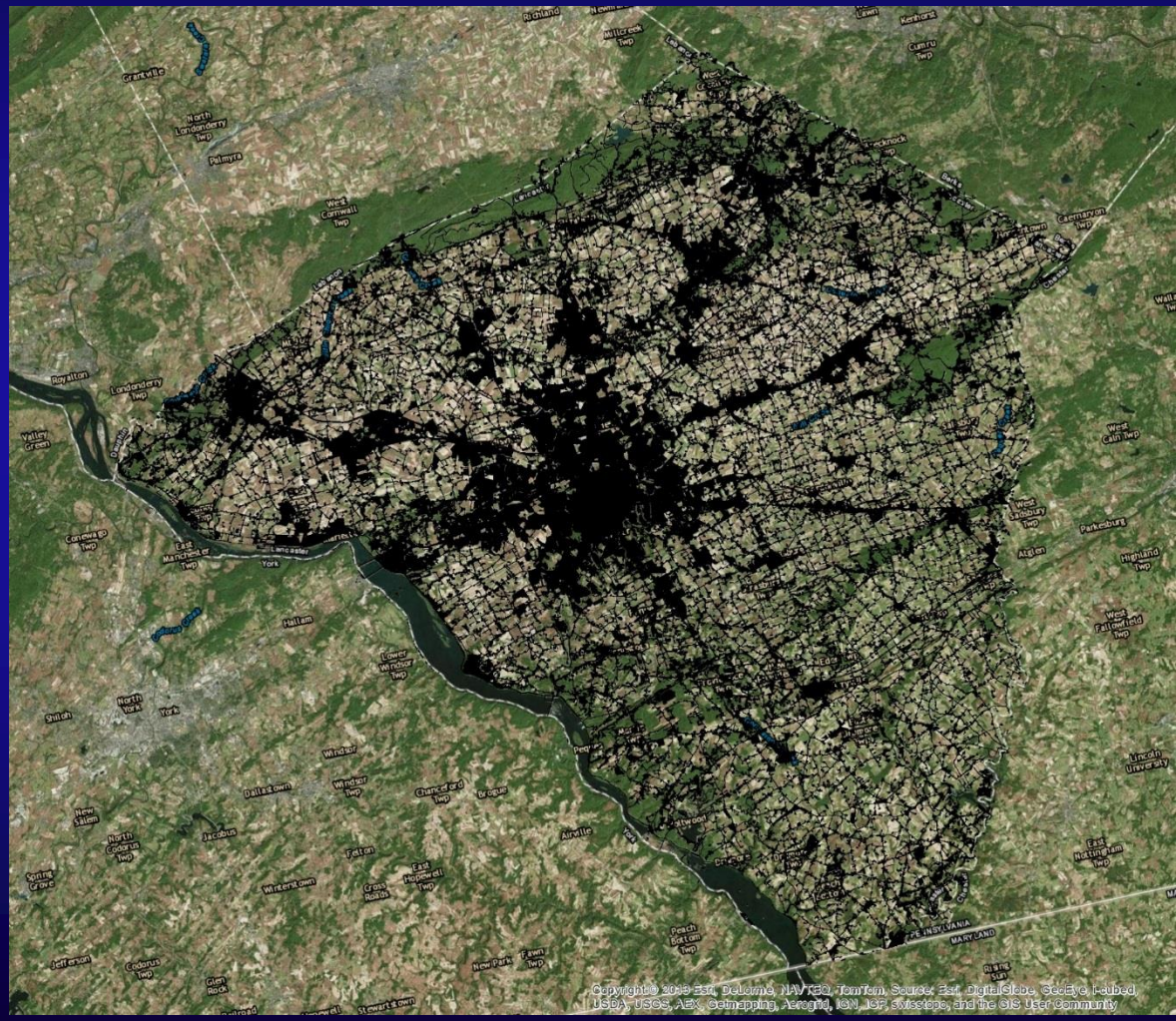
Developed “Mask” or Turf Mask

10 m IR and INR layers were combined to create a “impervious_mask”

local land use data and information related to whether the parcel is *residential (including very low density residential), commercial, industrial, institutional, recreational, and urban open space land uses*

= Developed Mask



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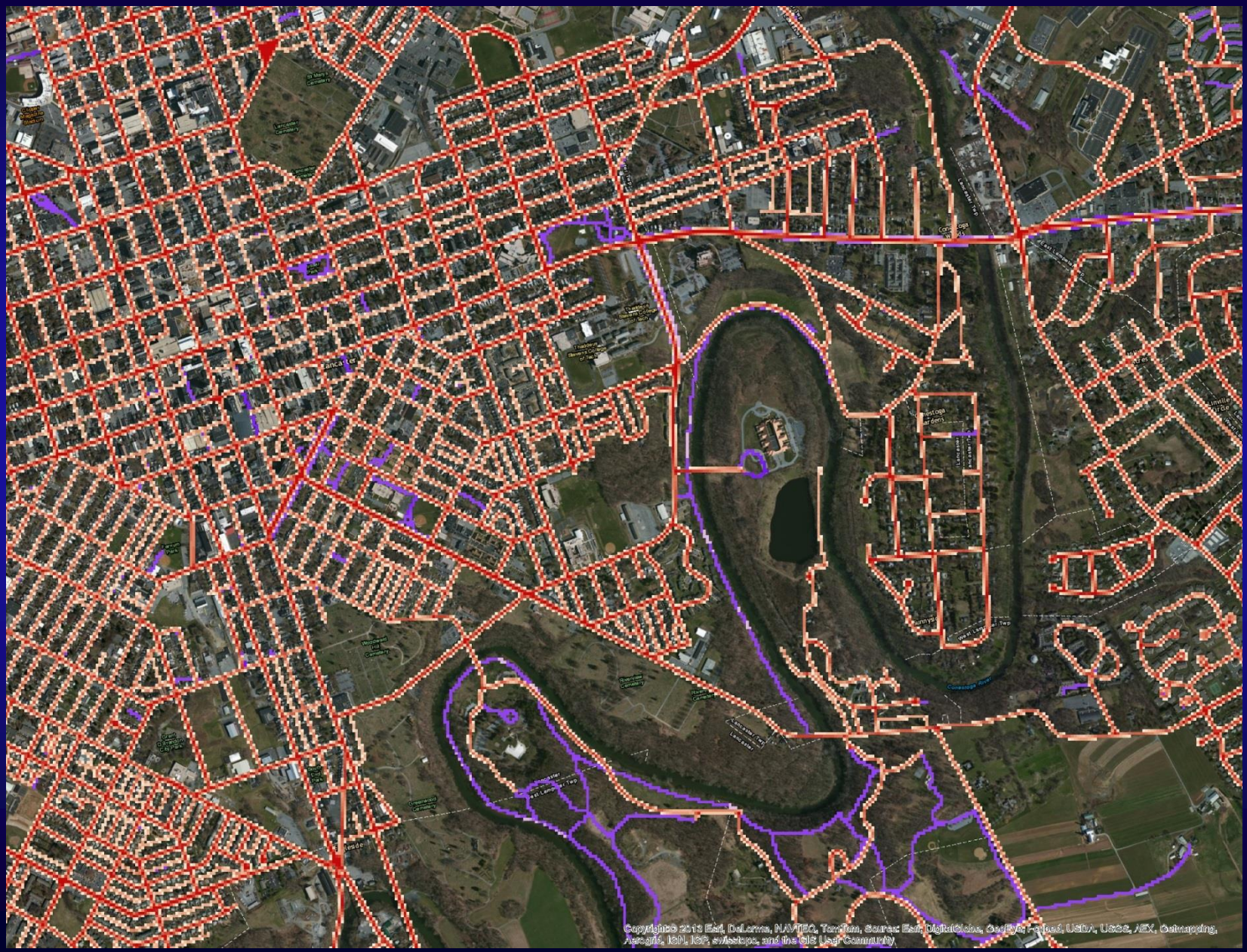
Local vs. Regional Data: Roads



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Local vs. Regional Data: Impervious Non-Roads

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Local vs. Regional Data: Forest and Tree Canopy

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Comparison of P6 Local v Regional Land Use Lancaster County, PA

Class	Local	Regional
Impervious Roads:	13,511	15,993
Impervious Non-Roads:	40,167	< 25,000
Tree Canopy Herbaceous:	61,016	34,541

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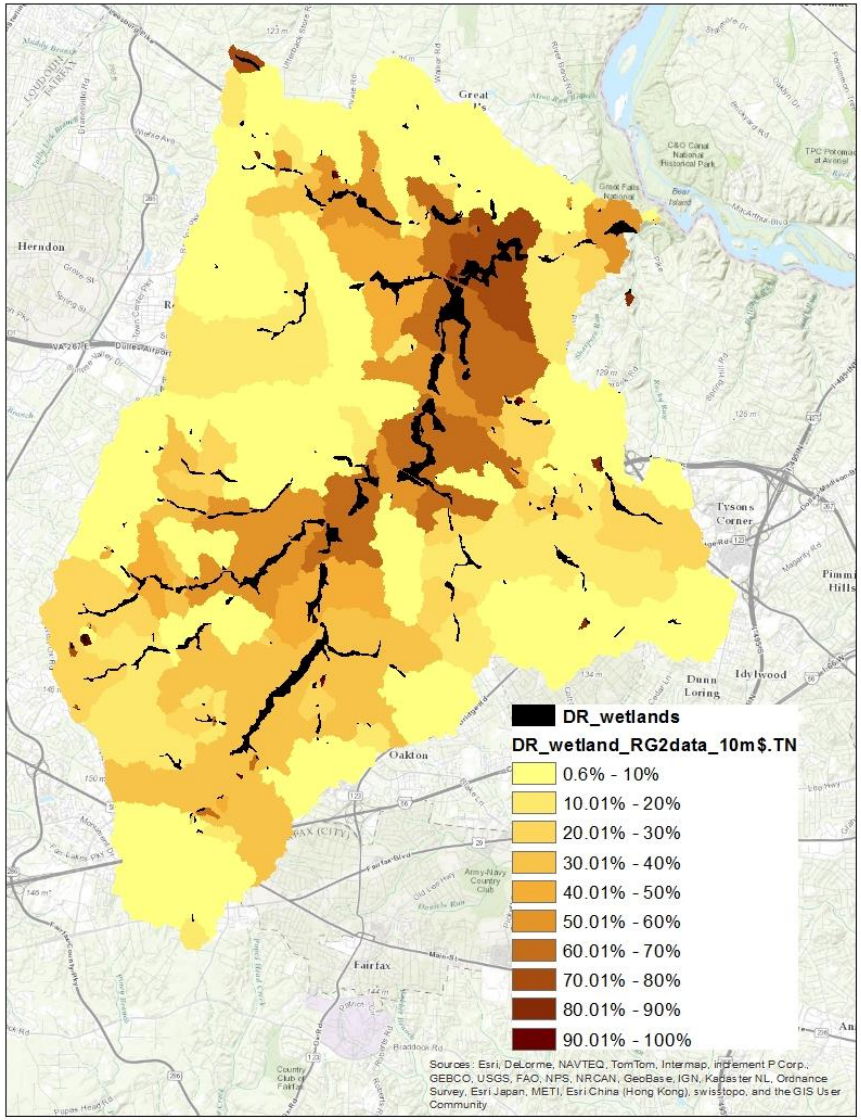
Wetland Efficiencies



STAC, 2008. Quantifying the Role of Wetlands in Achieving Nutrient and Sediment Reductions in Chesapeake Bay. STAC Publication 08-006

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Coming Soon: 2013 High-res Land Cover Data

Derived from existing 1m leaf-on aerial imagery, leaf-off aerial imagery (where available), and LiDAR-derived digital surface models.

Produced by the Chesapeake Conservancy and University of Vermont

Paid for by the Chesapeake Bay Program Partners

Classification:

- **Water**
- **Tree canopy**
- **Scrub/shrub**
- **Herbaceous/grass**
- **Barren**
- **Impervious Roads**
- **Impervious Structures etc.**
- **Impervious Obscured by Tree Canopy**

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P6 Land Use Development Schedule

Apr 2015:	Complete regional land use dataset using nationally available data (P6 Land Use Database v1)
Jun 15, 2015:	Complete integration of local land use data (P6LU_v2)
Jun-Jul 2015	State and local jurisdictions review land use data (six weeks)
Aug 2015	CBPO responds to comments on P6LU_v2 data
Sep 1, 2015	Submit P6LU_v2 to CBP Modeling Team
Sep'15 - Jun'16:	Incorporate additional local data and high-res land cover into P6 Land Use Database v3.
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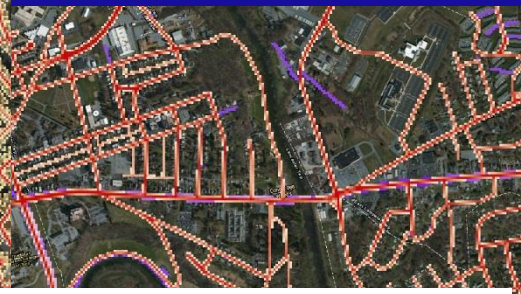
Phase 6 Land Use WebViewer (for jurisdictional review)



Features:

Turn layers on/off
Adjust transparency of layers
Re-order layers
Zoom and navigate
View underlying aerial imagery
View metadata
Download data in by county or viewer extent.
Comment (email sent to CBPO)

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