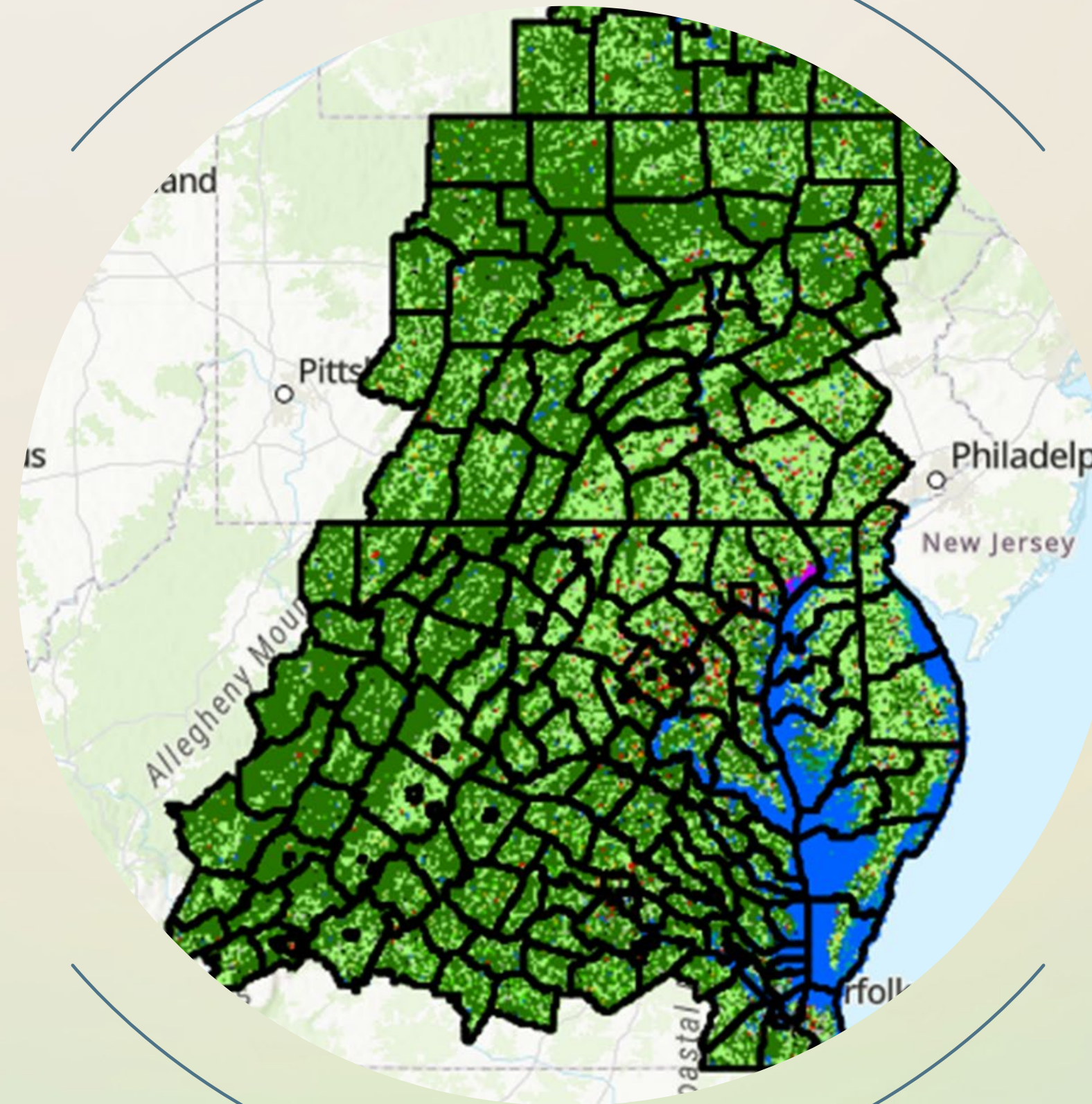


LAND USE AND WATER QUALITY IN THE CHESAPEAKE BAY WATERSHED

KC Filippino, Senior Water Resources Planner,
Hampton Roads Planning District Commission



SETTING THE STAGE

Water Quality and Planning

Chesapeake Bay TMDL

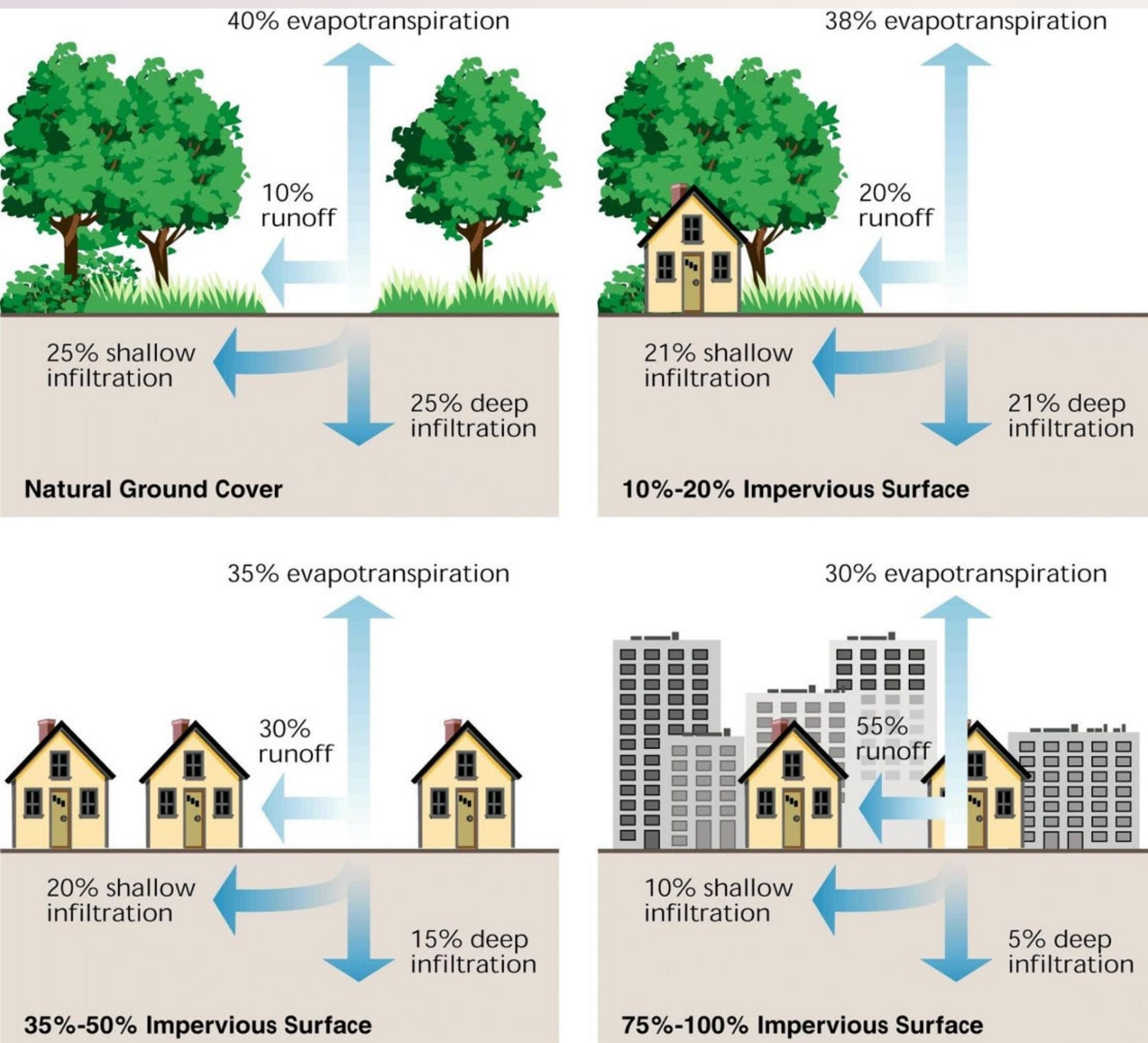
Land Uses and Loadings

Data uses

What happens on the land impacts our waters

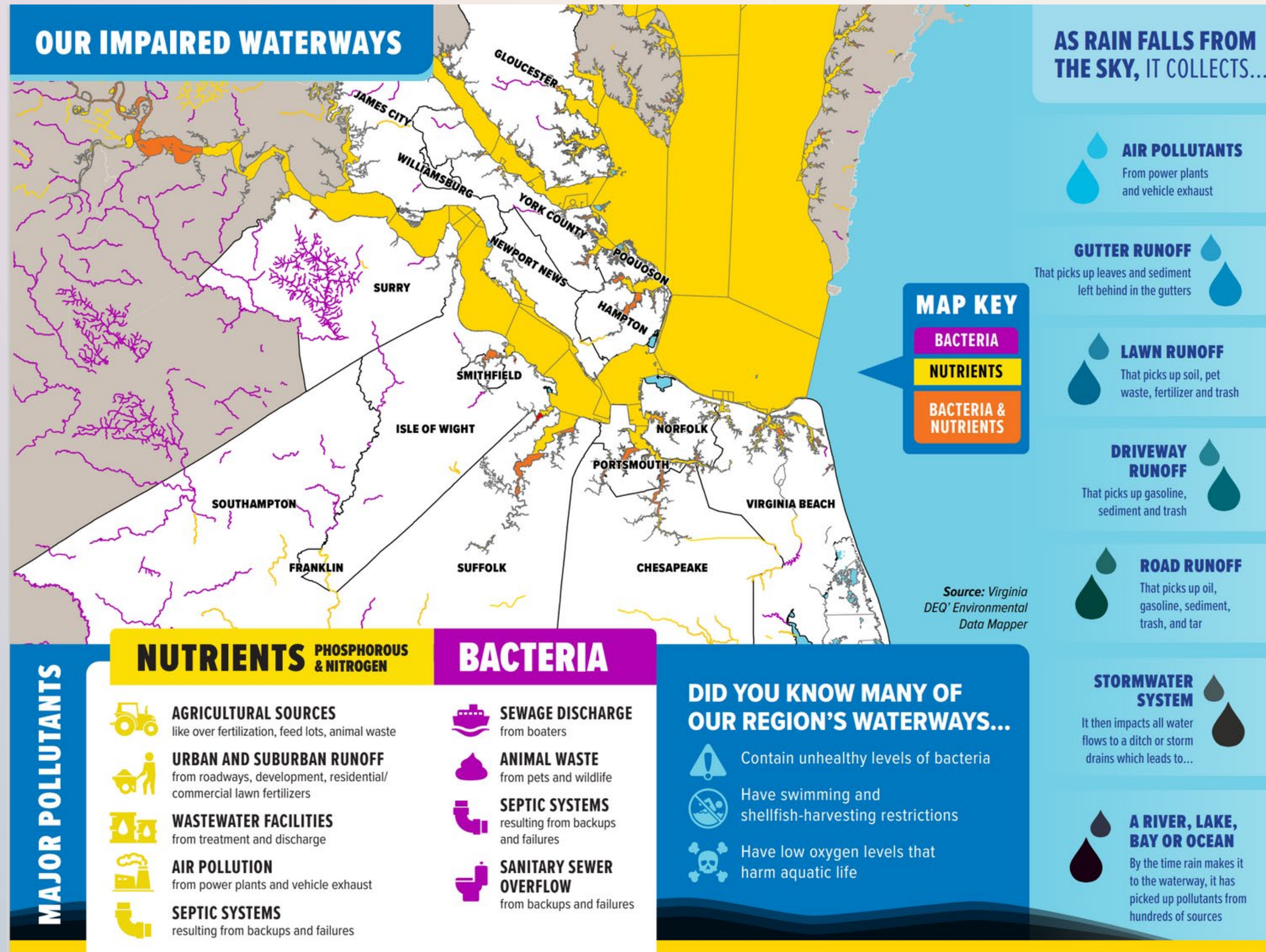


Impervious surfaces generate more runoff



- Causes erosion
- Less infiltration
- Introduces pollution

Water Quality



- Runoff increases nutrients or other pollutants and leads to impaired waters
- Increased algae blooms
- Decreased dissolved oxygen
- Impairments lead to Total Maximum Daily Loads (TMDLs)

Chesapeake Bay TMDL: Pollution diet to decrease source loads from land



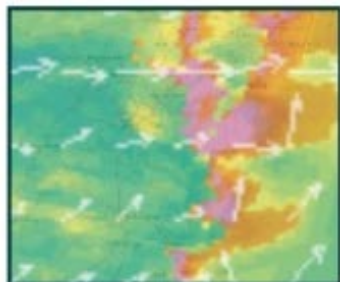
LAND USE AND THE BAY MODEL

Data and Model Inputs

Pollution Control Data
Land Use Data
Point Sources Data
Septic Data
U.S. Census Data
Agricultural Data



Land Use
Change
Model



Airshed
Model

Precipitation Data
Meteorological Data
Elevation Data
Soil Data

Phase 6 Watershed Model



Estuary Model



- Connecting modeled loads to measured water quality end points

- Modeled loads = Point and non-point sources and atmospheric deposition

- Non-point sources are based on land use

HISTORY

2014 - 2018

- High-resolution land cover & use mapping completed using 2013 imagery for Bay watershed
- Best available data at the time
- Data prior to 2013 in model at coarser scales

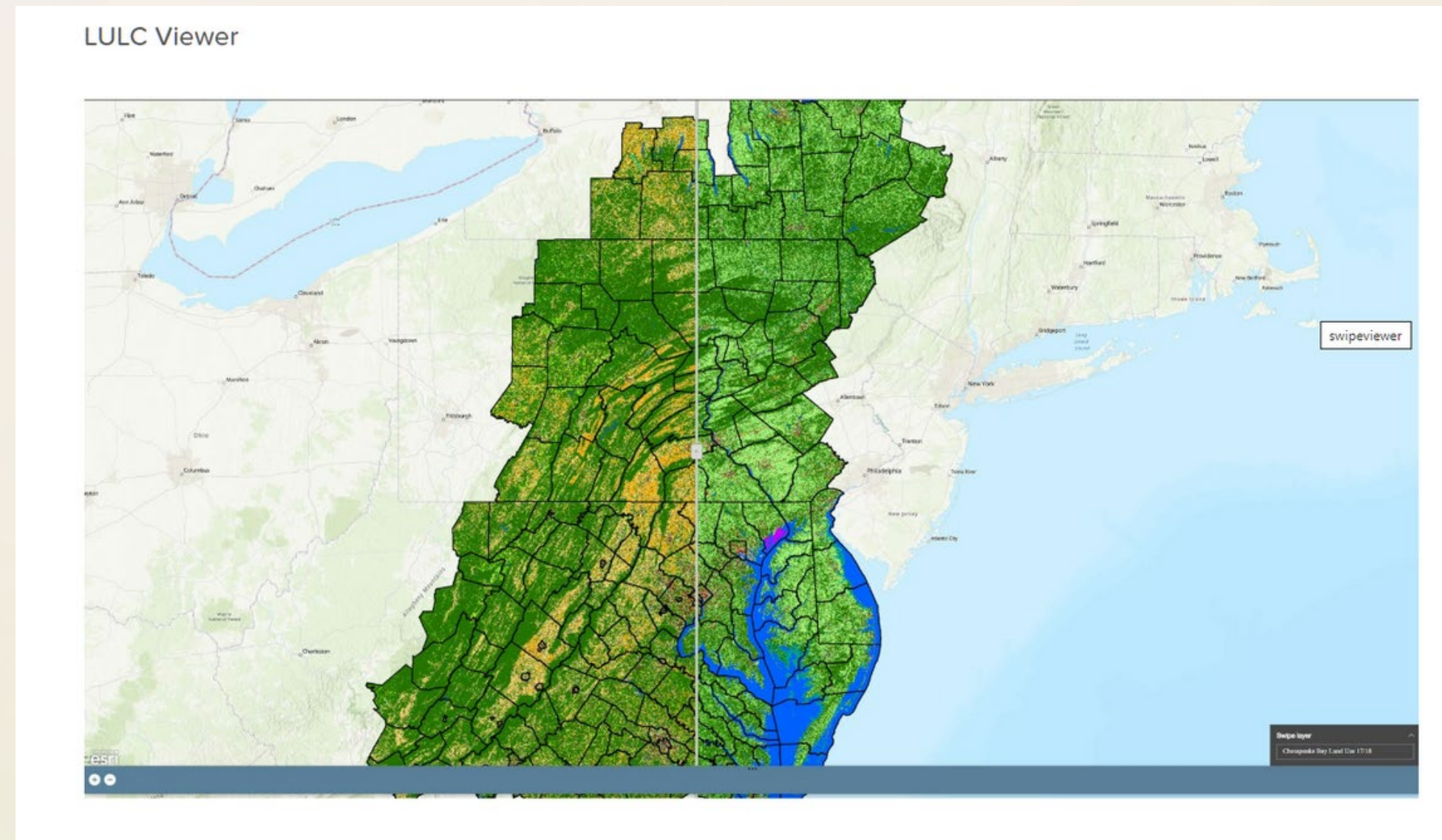
STATUS

2018 - 2022

- Cooperative Agreement with Chesapeake Conservancy covering 4 objectives
- Developed land cover, land use, & change products for all counties based on 2017/18 imagery
- Re-mapped 2013/14 product

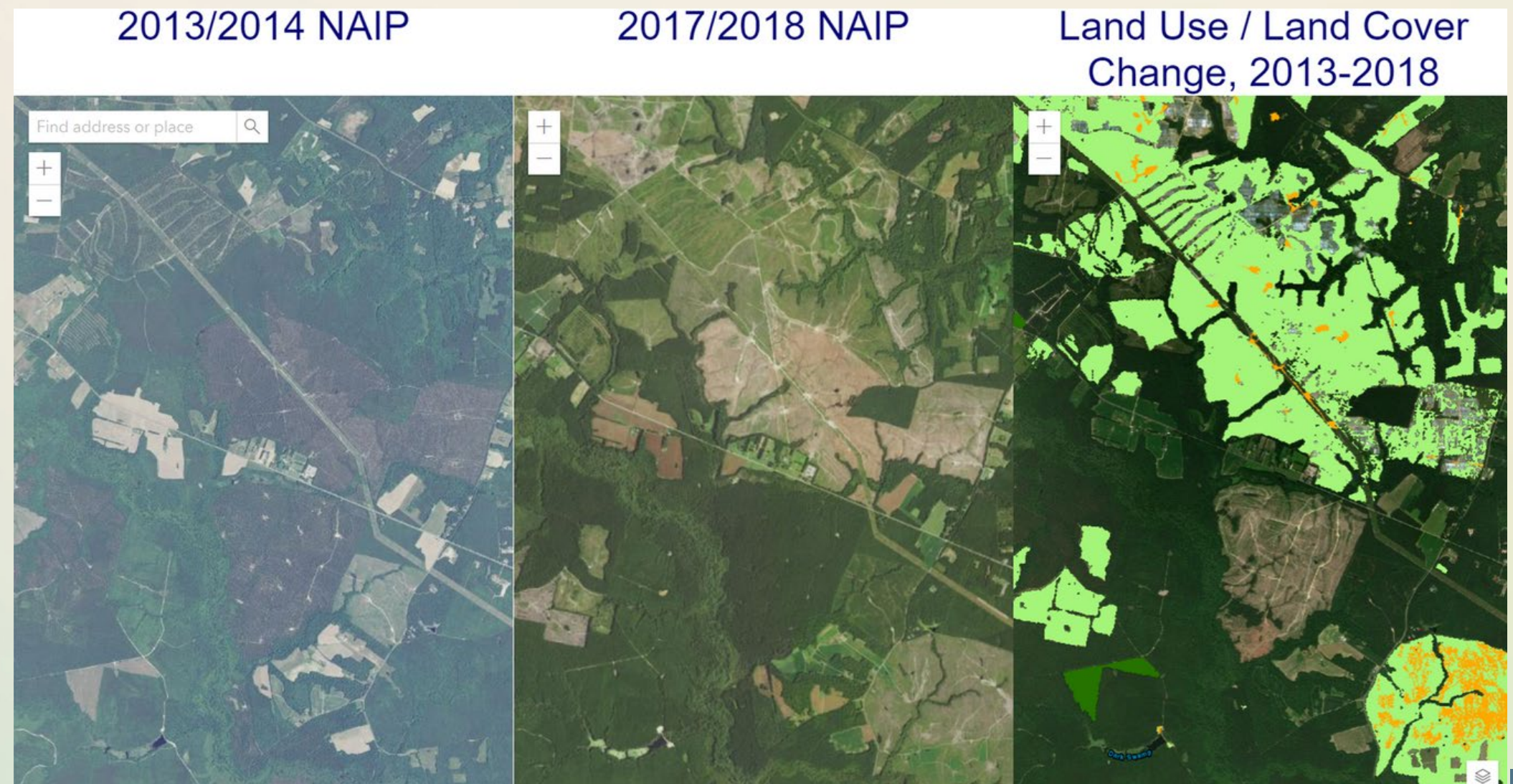
Land cover & land use now available

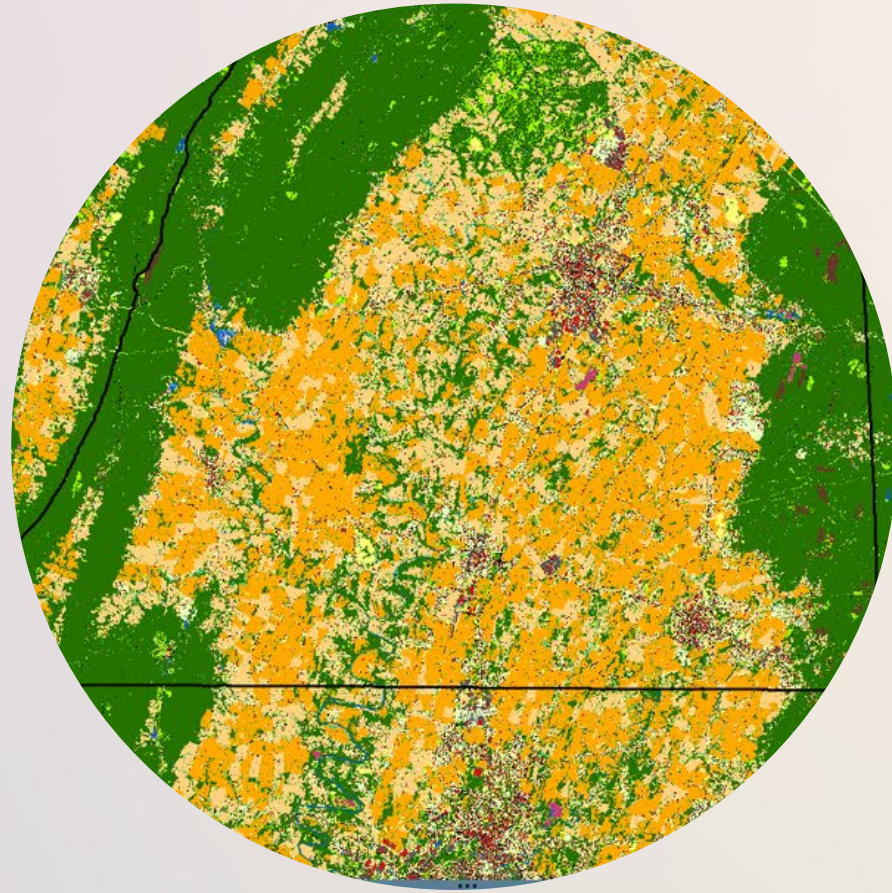
- [Website and materials](#)
- Data [viewer](#) for 2017/ 18 LC and LU
- [Land Cover](#) and [Land Use](#) Descriptions
- [Methodology](#) for land use classifications
- County-specific downloads with GIS files for LC & LU for 2013/ 14 & 2017/ 18



Land Cover & Land Use Change - First of its kind

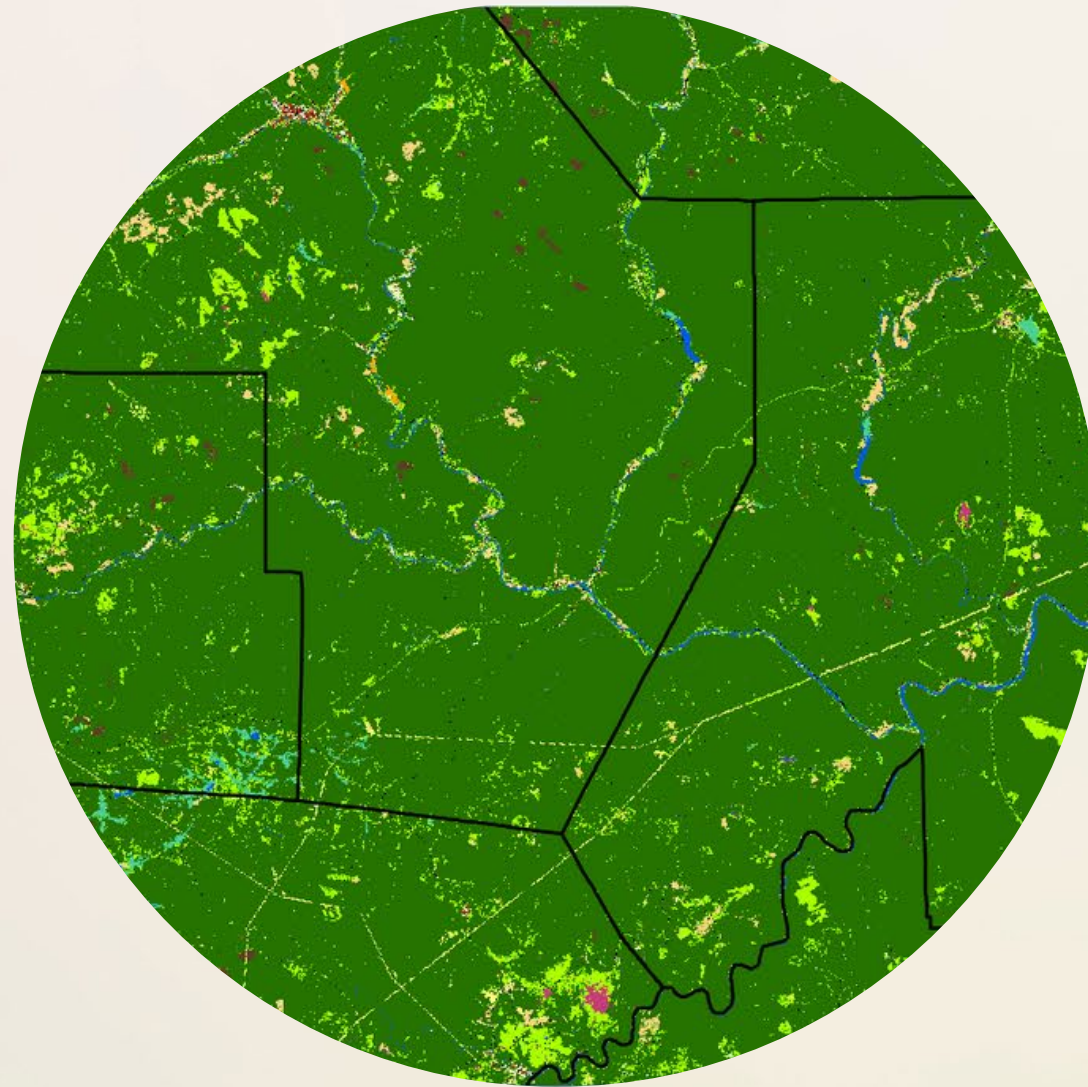
- Observed change between 2013/14 and 2017/18 for land cover and land use
- Matrix of change for 18 or 54 classes





%21

Agriculture acres in the
watershed



%66

Natural acres in the
watershed



%14

Developed acres in the
watershed



MODELED LOADING RATES

11.8 lbs Total
Nitrogen/ acre/ year

23.9 lbs Total
Nitrogen/ acre/ year

1.6 lbs Total
Nitrogen/ acre/ year

303,292

Forest Acres Lost



22,903

Agriculture Acres
Gained



151,952

Mixed Open Acres Gained

89,746

Impervious and Turf Grass
Acres Gained

Land use
planning can be
decoupled from
water quality
management



WHAT CAN WE LEARN FROM THIS DATA?

Conservation needs

Have we lost crucial
conserved land?

Buffer Protections

Where can they
be maximized?

Tree canopy

Losing or
gaining?

Development patterns

What about infill and
redevelopment?

Integration

Resilience, hazard
mitigation, water
quality

Smart Growth

Planning ahead to
maximize
development w/
conservation



THANKS!



KC Filipino, HRPDC

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