Draft Land Use Methods and Metrics (LUMM) Indicators

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Land Use Work Group Meeting
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Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

https://blog.nature.org/science/2016/09/08/energy-sprawl-is-the-largest-driver-of-land-use-change-in-the-u-s/

Goal: Conserve landscapes treasured by citizens in order to maintain water quality and habitat; sustain working forests, farms and maritime communities; and conserve lands of cultural, indigenous and community value.

Outcome*:* Assess and understand the impacts of land use change on watersheds, habitats, and communities at a scale relevant to county-level decision-makers.

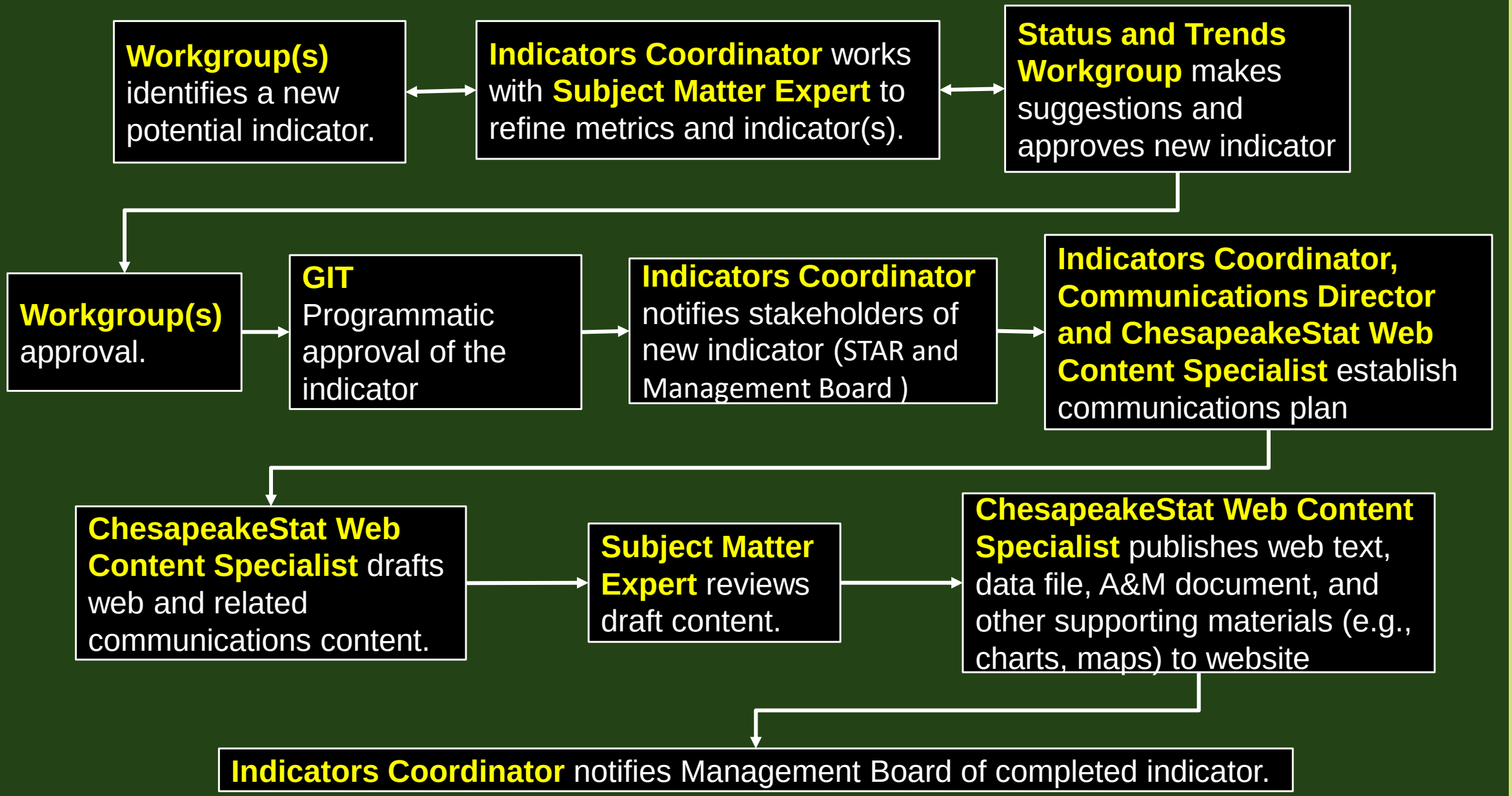
Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

1. *Measure rate of farmland, forest and wetland conversion, and the extent and rate of change in impervious surface coverage.*

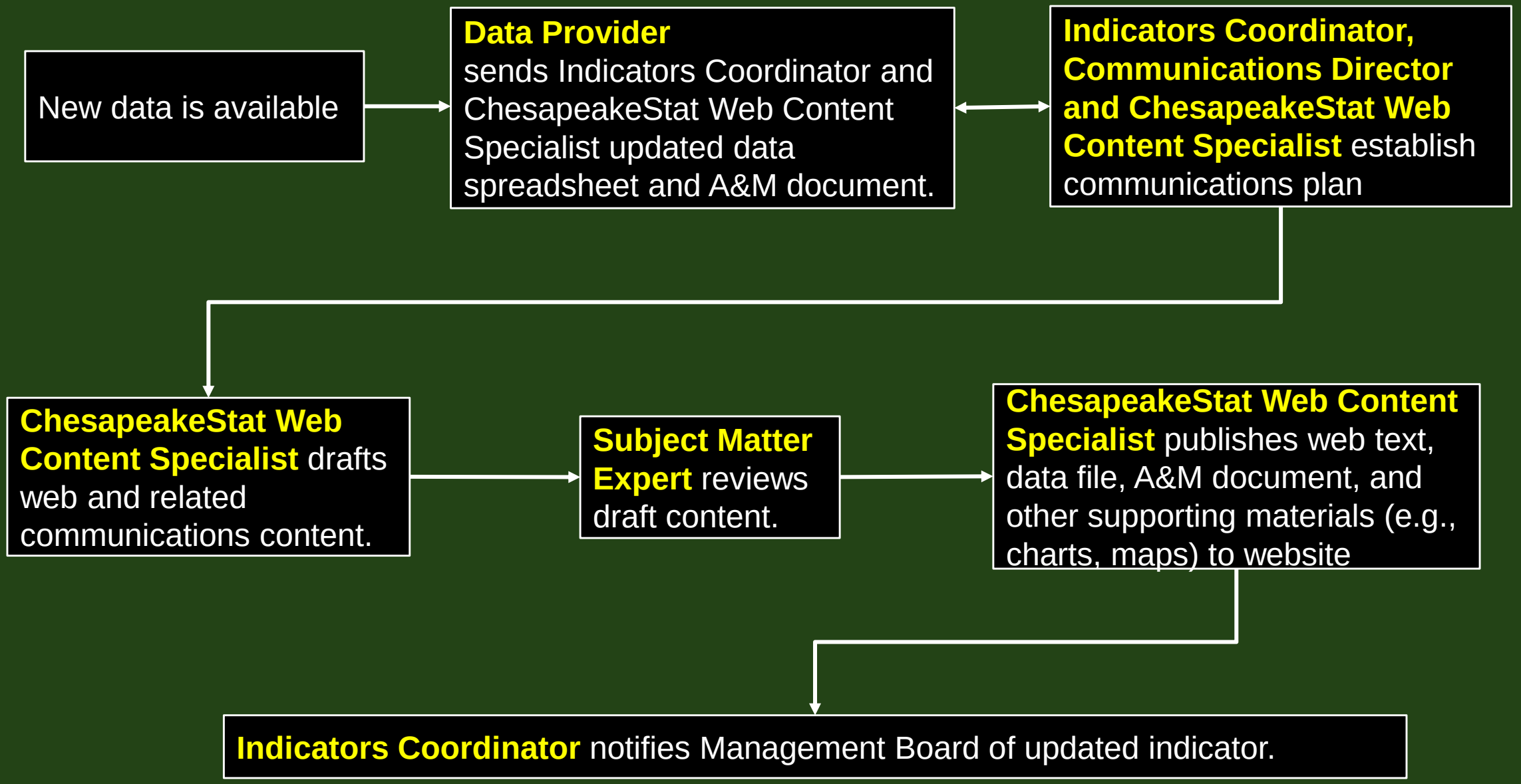
2. *Quantify the potential impacts of land conversion to water quality, healthy watersheds and communities.*

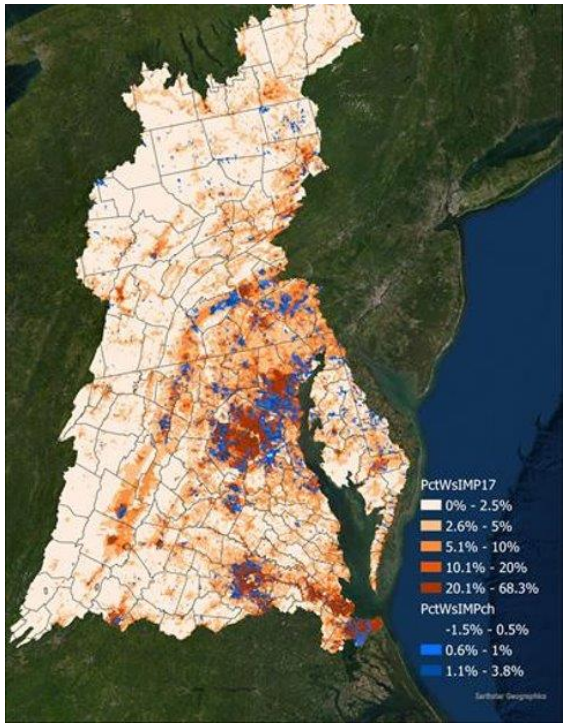
3. *Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.*

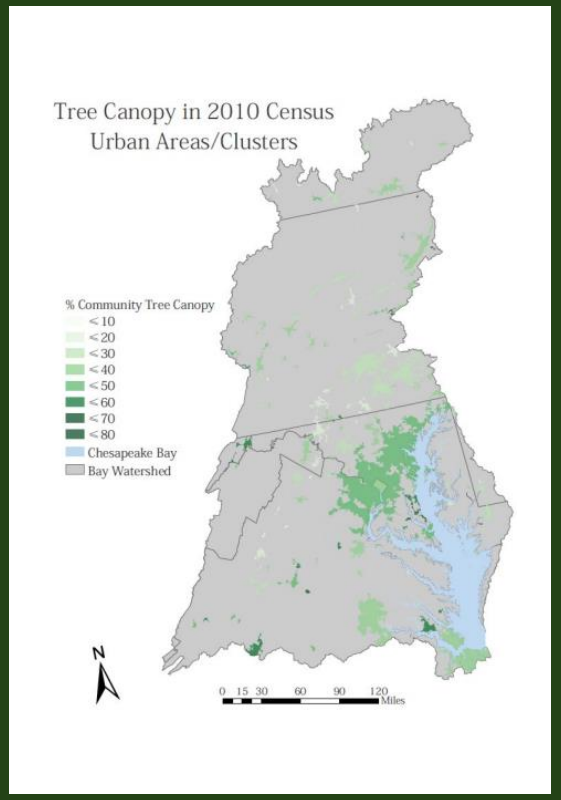
Establish New Indicators Process



Update Existing Indicators Process







Completed Metrics

- Impervious (2017/18) and Impervious Change (2013/14-2017/18)
  - Indicator of development and associated with the permanent conversion of pervious surfaces (e.g., farm fields, forests, and open space).
  - https://www.chesapeakeprogress.com/conserved-lands/land-use-methods-and-metrics-development
- Community Tree Cover (2017/18) and Community Tree Cover Change (2013/14-2017/18)
  - Indicator of urban tree canopy capacity that provides air quality, water quality and habitat benefits throughout the watershed.
  - https://www.chesapeakeprogress.com/abundant-life/tree-canopy

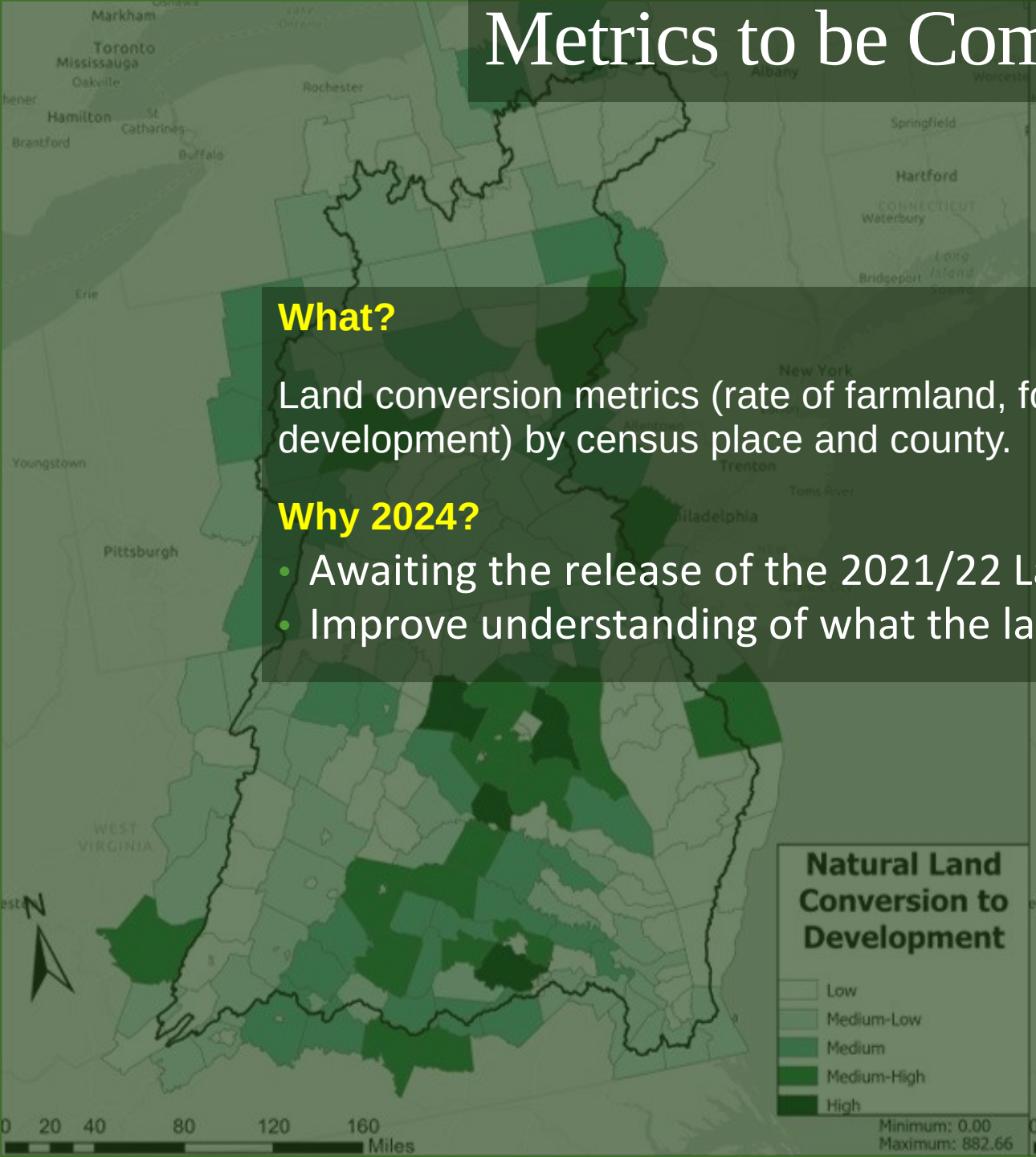
Metrics to be Completed in 2024

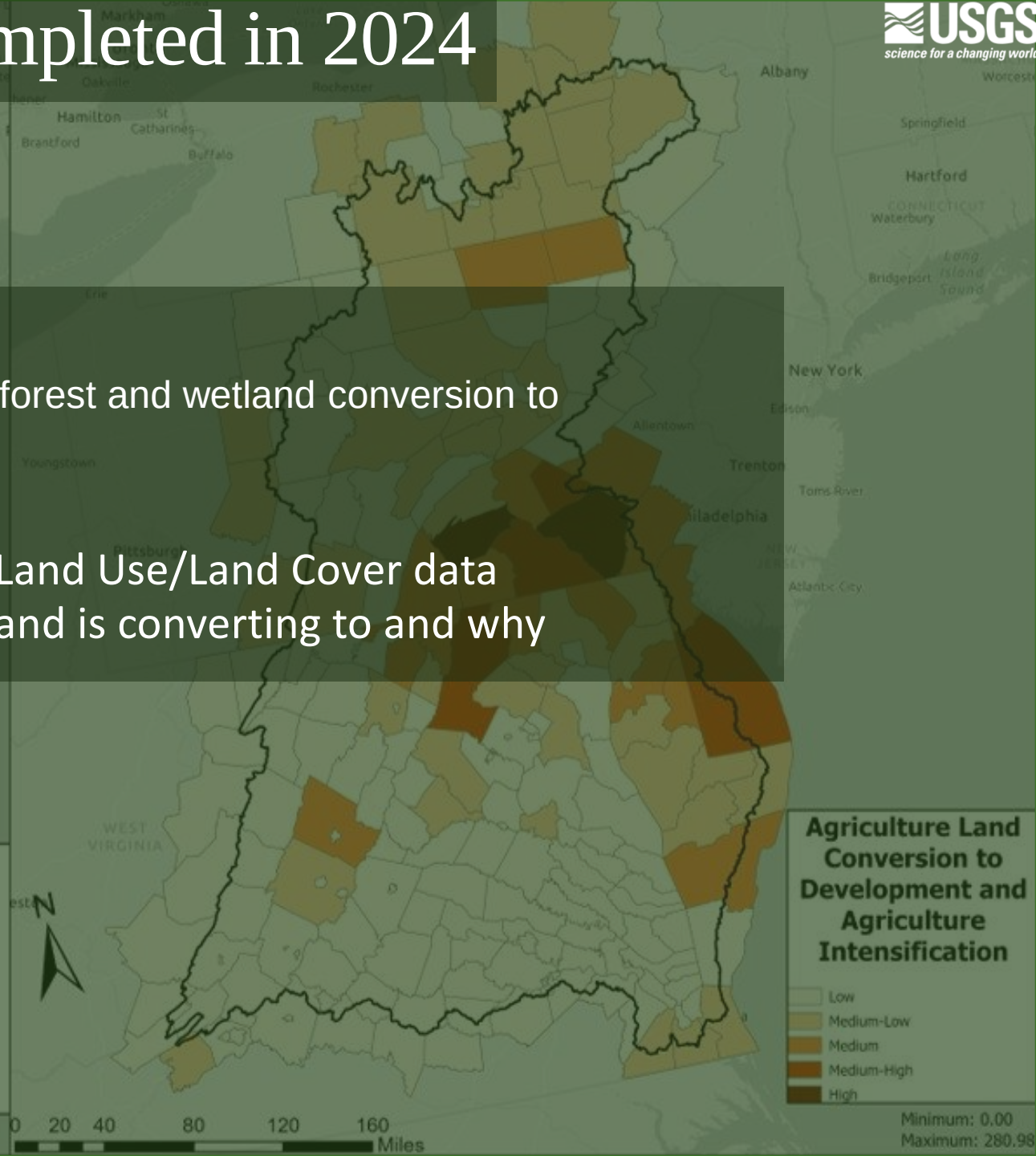
What?

Land conversion metrics (rate of farmland, forest and wetland conversion to development) by census place and county.

Why 2024?

- Awaiting the release of the 2021/22 Land Use/Land Cover data
- Improve understanding of what the land is converting to and why





Metrics to be Completed in 2024

What?

New metric: **Effective Impervious Cover** (Impervious cover weighted by its proximity to streams relative to ridges) by catchment and watershed.

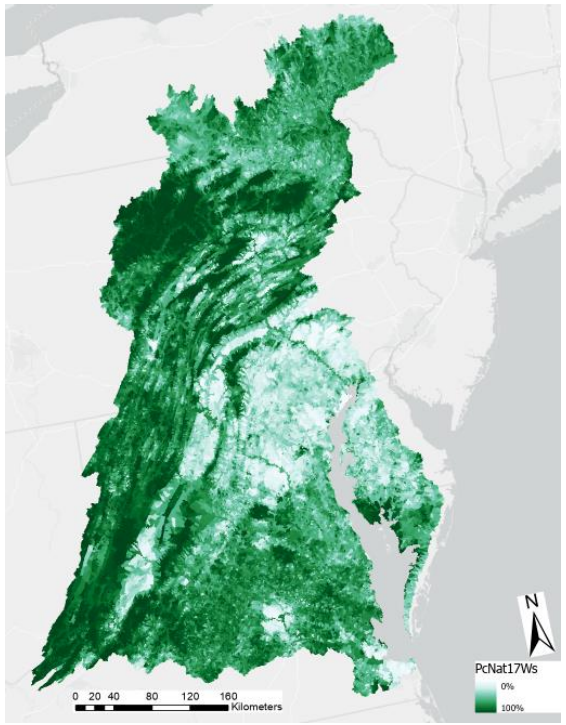
Why 2024?

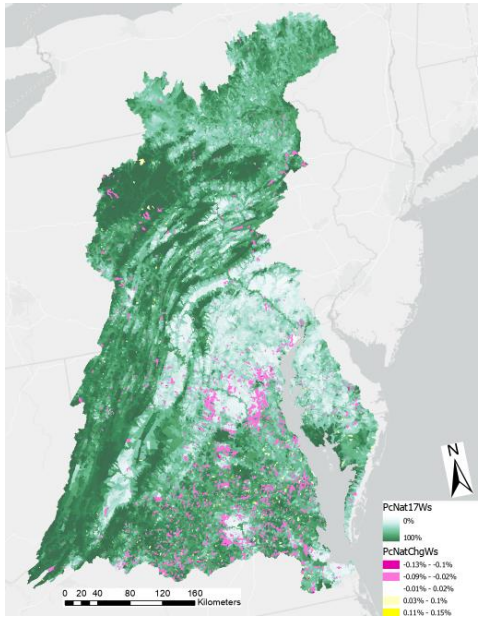
- Need time to develop and test methodology
- Time to statistically test the significance of effective impervious on water quality (calCAST) and benthics (Chesapeake Healthy Watersheds 2.0)
- Awaiting new 1-meter DEM for the Chesapeake Bay Watershed

Road Stream Crossing

Structures uphill of stream
(long distance and gentle slope)

Structures uphill of stream
(short distance and steep slope)





Proposed New Metrics for 2023: Natural Land and Natural Land Change

What?

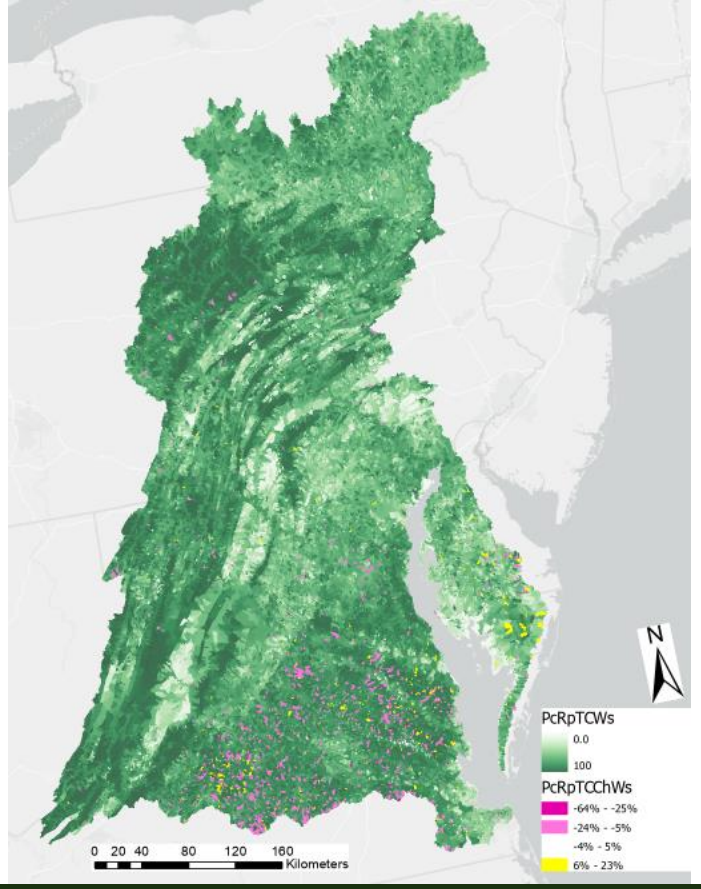
Indicator of natural land and natural land change associated with land conversion to a non-natural state (development, agriculture, and water) by catchment and watershed.

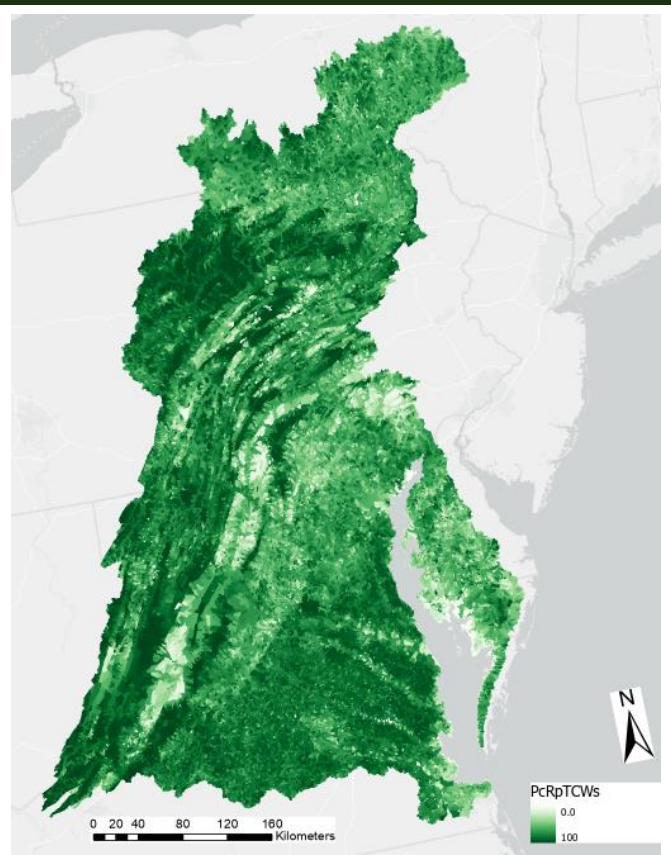
Why?

Natural lands provide climate and water quality benefits by sequestering carbon and retaining and transforming nutrients that can pollute waterways. Natural lands provide habitat and food sources to many species in the watershed.

Natural land change includes conversion to developed lands, agriculture, and water. Changes within natural, including forest dynamics and harvests, are not captured in this indicator. The focus of natural land change is to assess loss and gains to natural land to agriculture, residential and commercial lands, solar fields, and other types of development, and water.

Natural land = Forests, Harvested forests, regenerating forests (natural succession), Tidal, riverine, and terrene wetlands = FORE + TCOT + NATS + HARF + TDLW + RIVW + TERW





Proposed New Metrics for 2023: Riparian Tree Cover and Riparian Tree Cover Change

What?

Indicator of Tree Cover and Tree Cover change in 30-meter (100-foot) riparian zone by catchment and watershed.

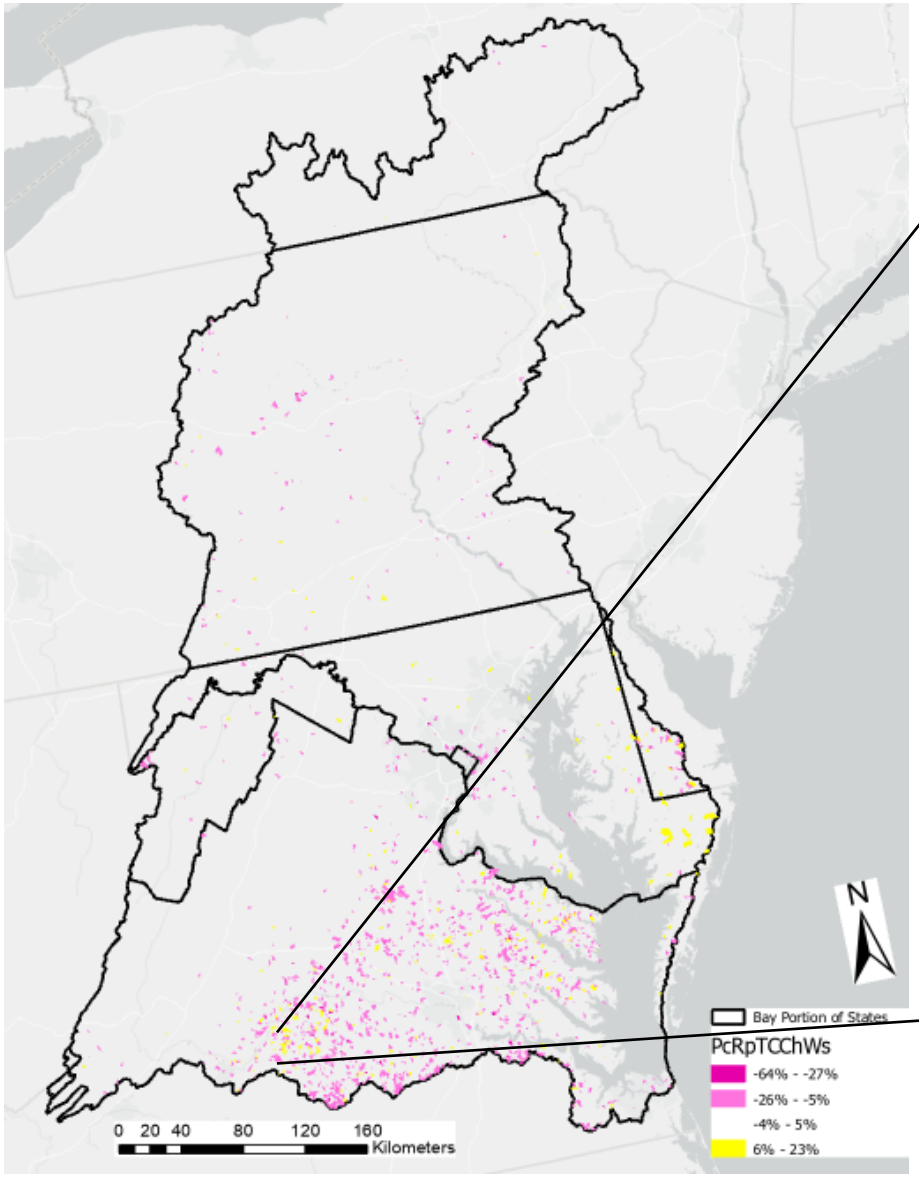
Why?

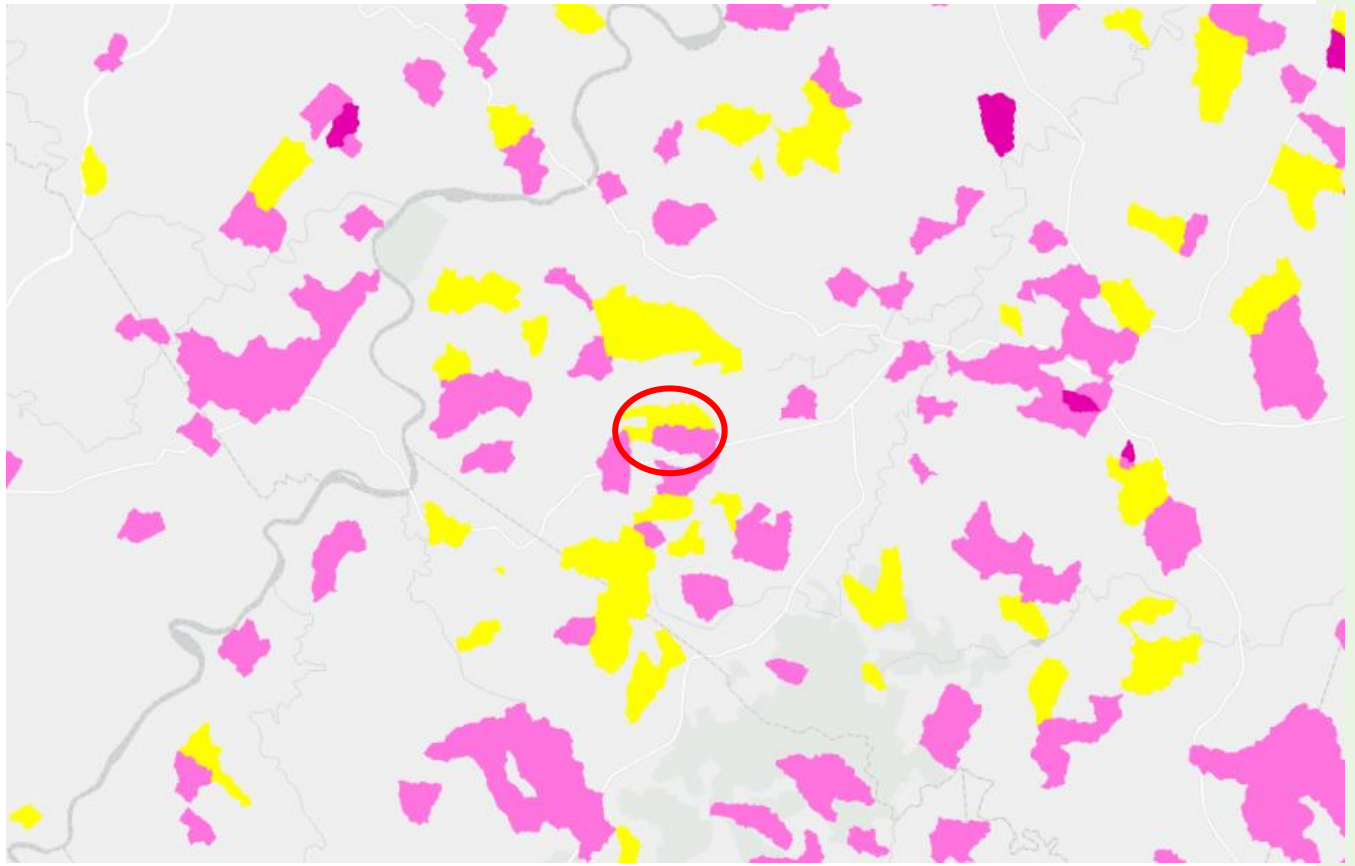
Tree Cover in riparian zones provides water quality benefits by consuming nutrients before they flow into streams and by stabilizing stream banks to reduce sediment. Tree Cover in riparian zones provides shade to streams that lowers stream temperatures which is required to provide habitat for keystone species, like Brook Trout. Tree Cover in riparian areas is also an essential component for watershed health.

Riparian tree cover change complements the reporting of planting efforts to understand overall trends.

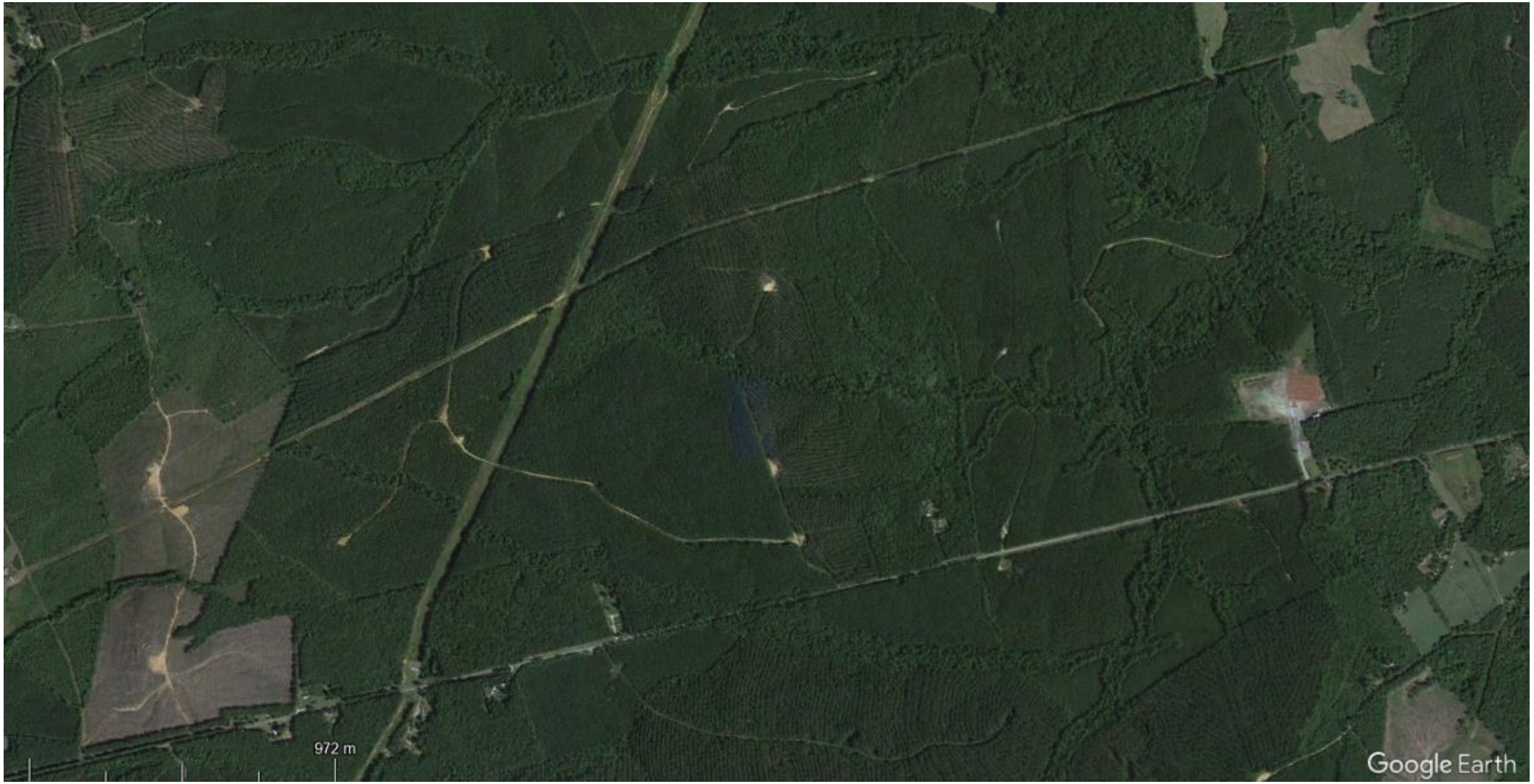
Tree Cover = FORE + TCOT + TCTG + TCIS

Riparian Tree Cover Change Example: Buckingham, Virginia



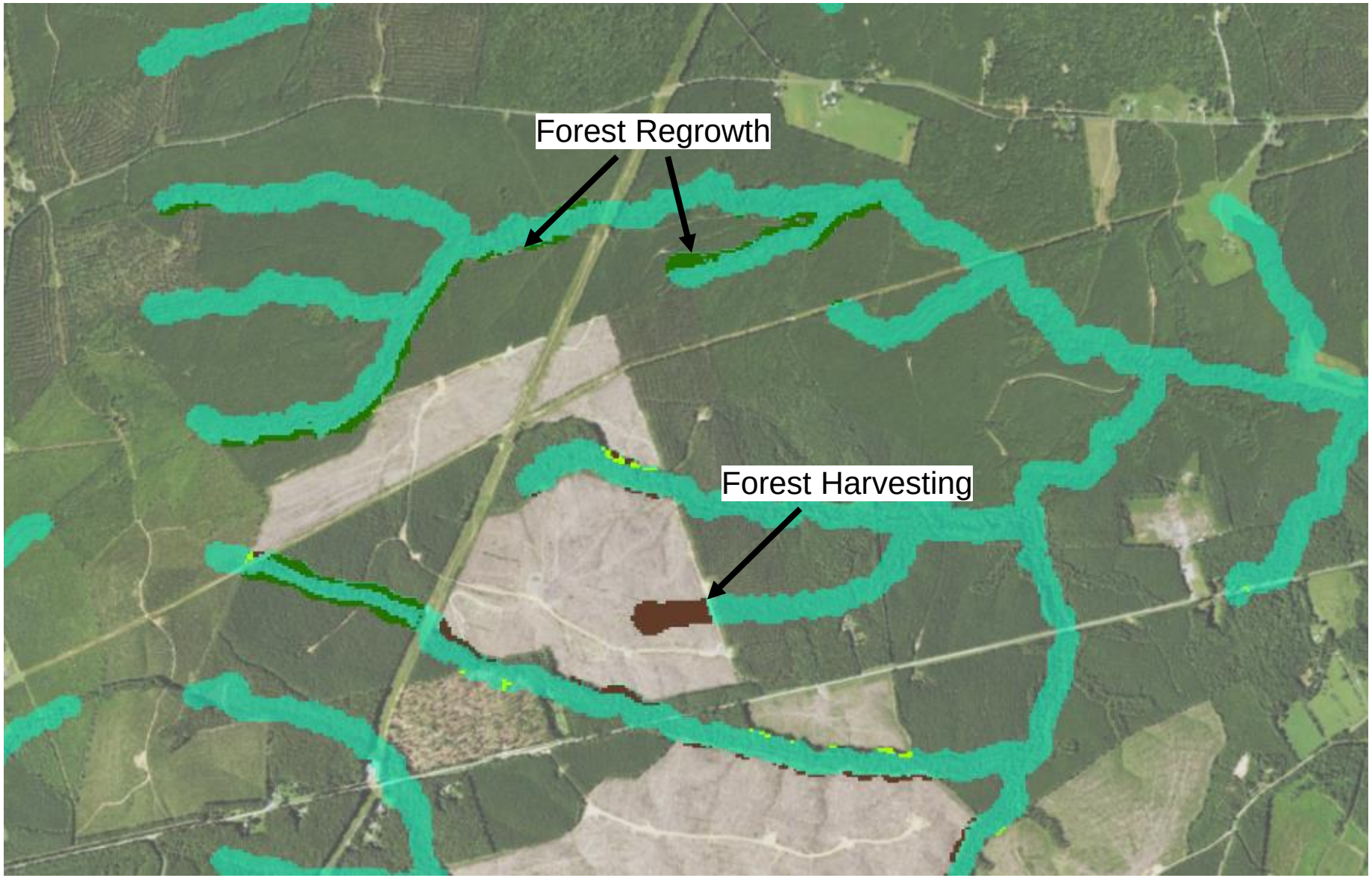


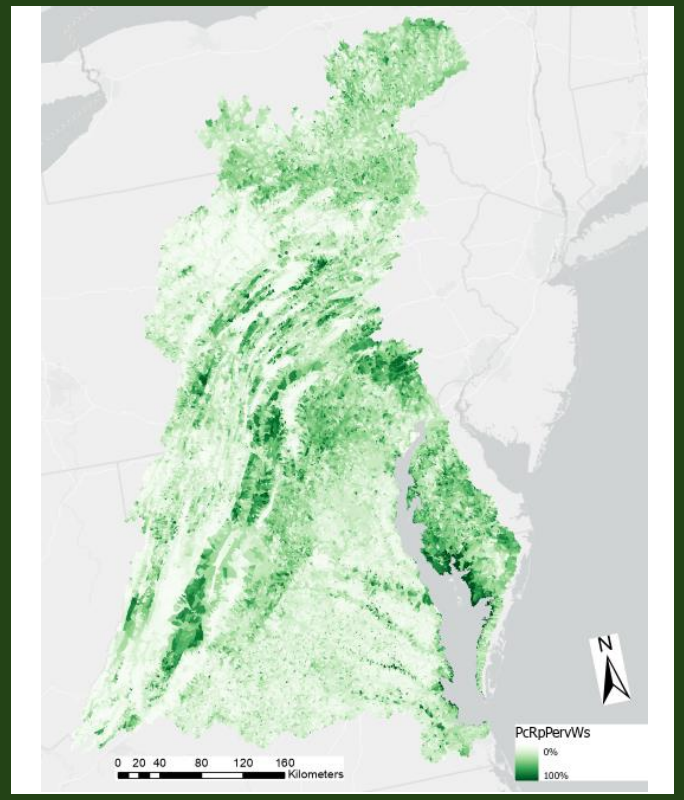
2015 Aerial Imagery

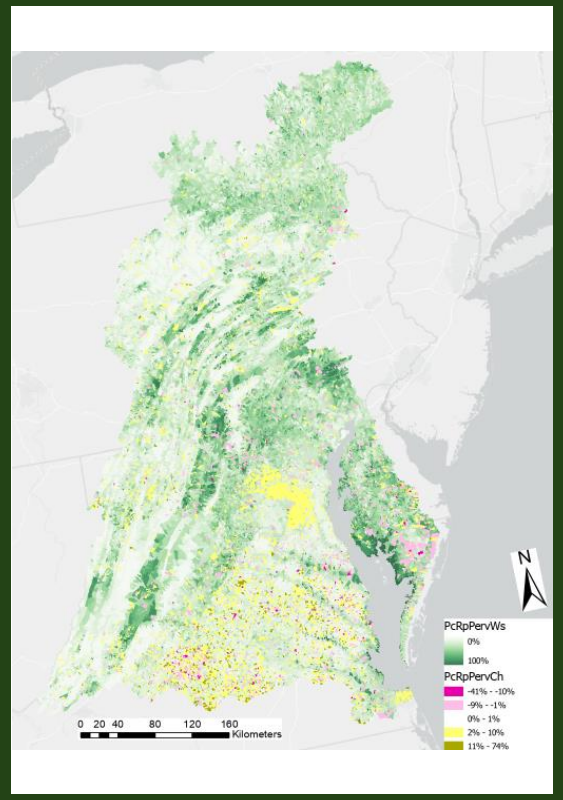


2019 Aerial Imagery

Land Use/Land Cover Change in the 30-meter Riparian Zone







Proposed New Metrics for 2023: Riparian Pervious Lands and Riparian Pervious Change

What?

Indicator of pervious land in 30-meter (100-foot) riparian zone by catchment and watershed.

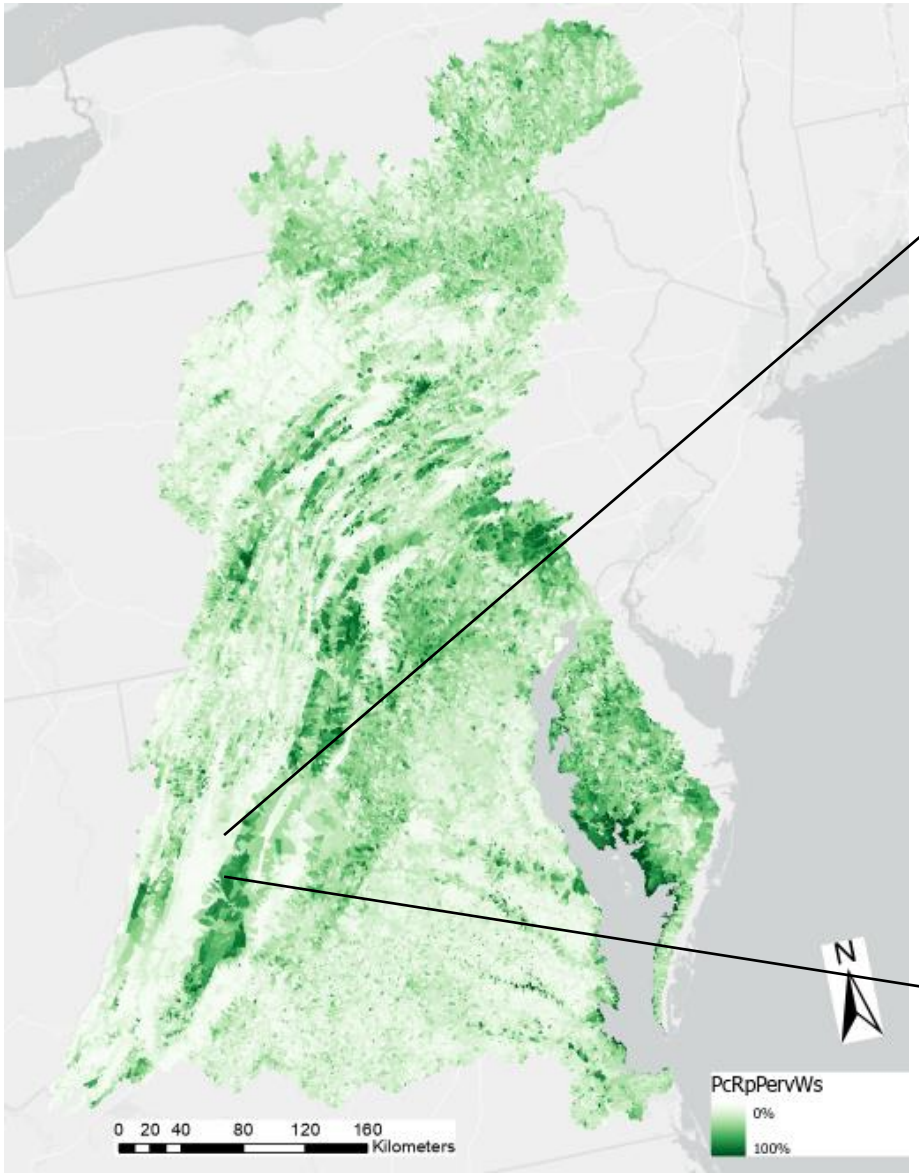
Why?

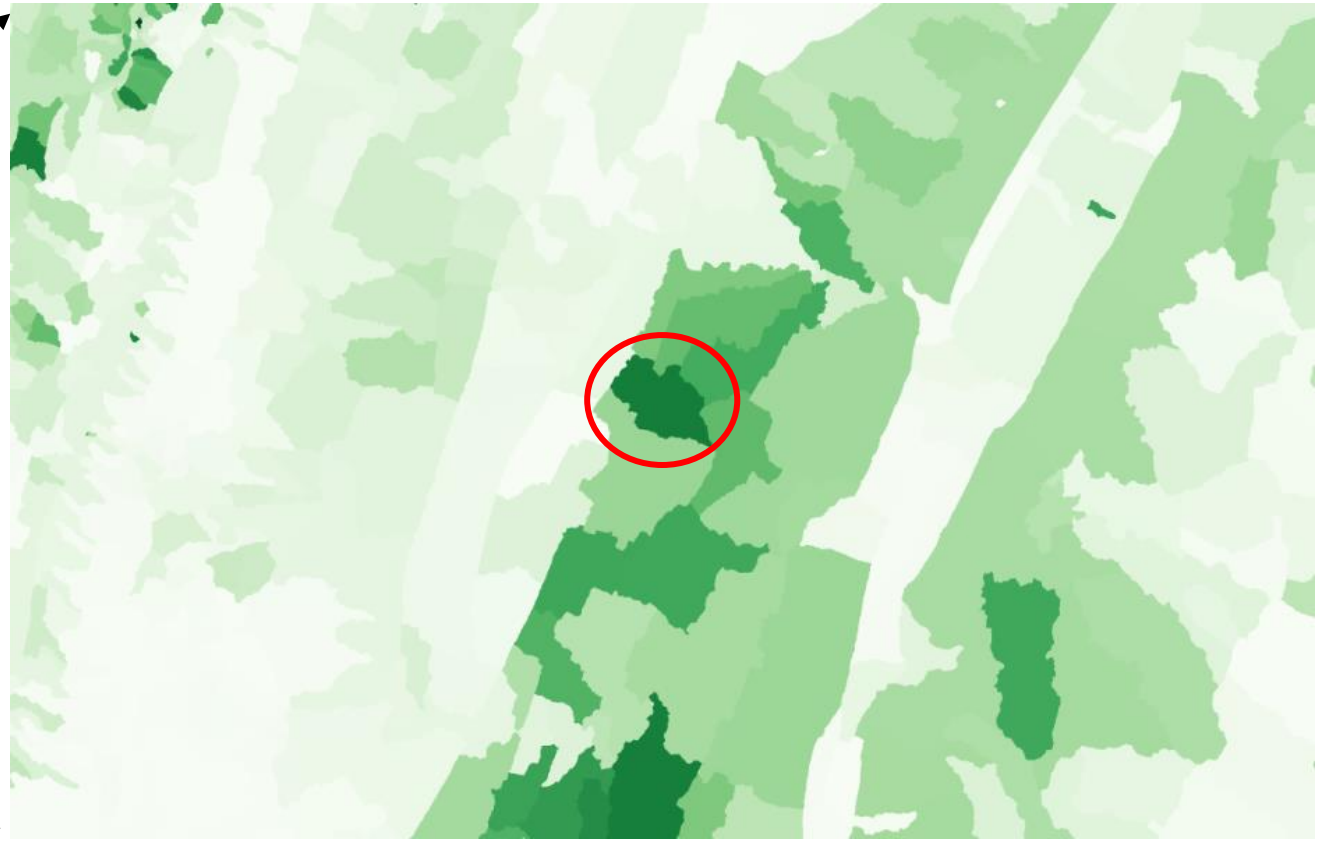
Pervious land within the riparian zone is an estimate of “plantable” areas for forest buffers. This includes agricultural fields, turf grass, and wetlands within the riparian zone. This information can guide on-the-ground restoration efforts in the identification of plantable areas.

Monitoring change in pervious lands in the riparian zone improves our understanding of trends in the lands most impactful to streams. Increases in pervious lands can mean loss of trees (or tree canopy), while decreases in pervious can mean increases in forest buffers.

Pervious = CROP + PAST + TURF + PDEV + HARF + NATS + RIVW + TERW + TDLW

Riparian Pervious Example: Shenandoah, Virginia

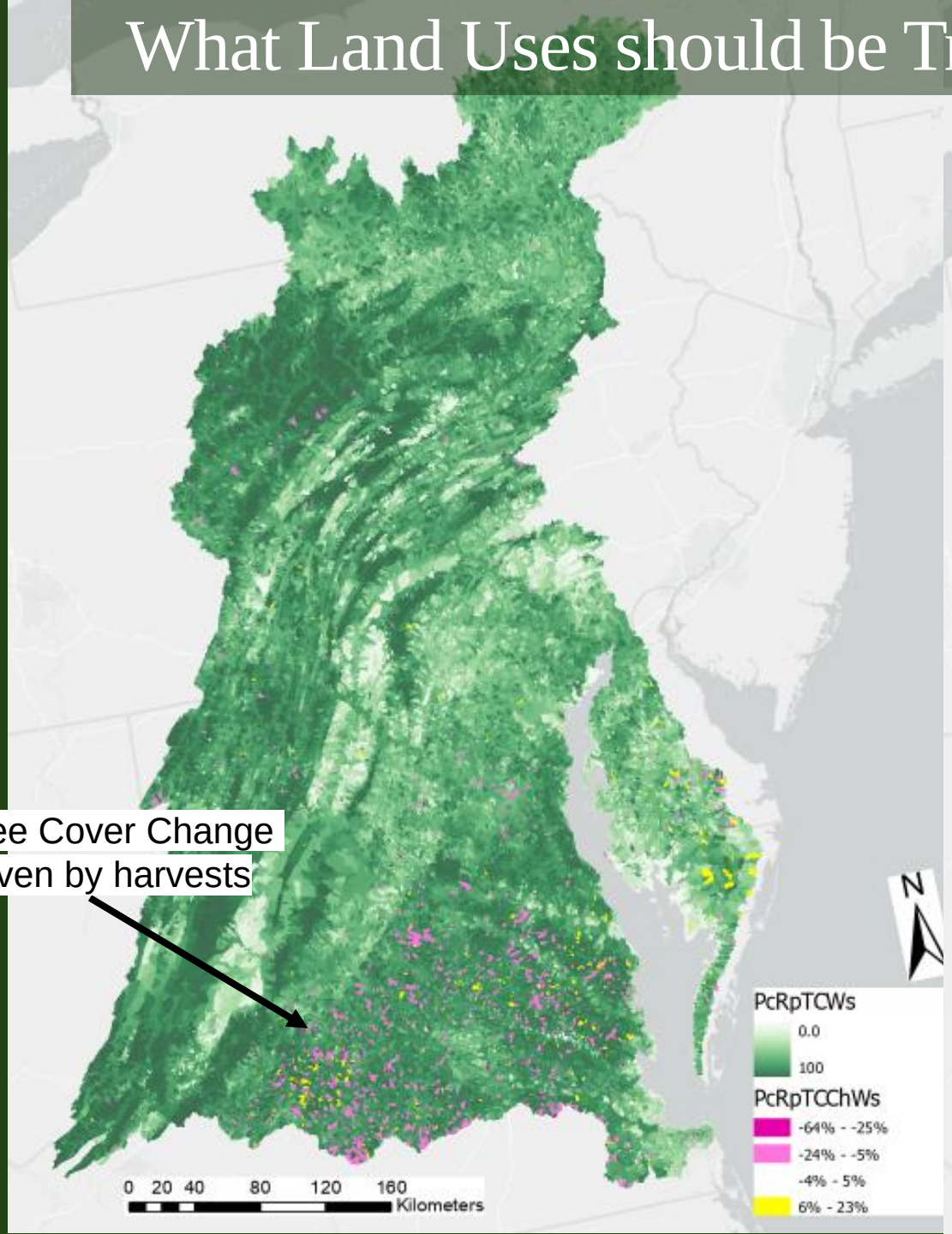


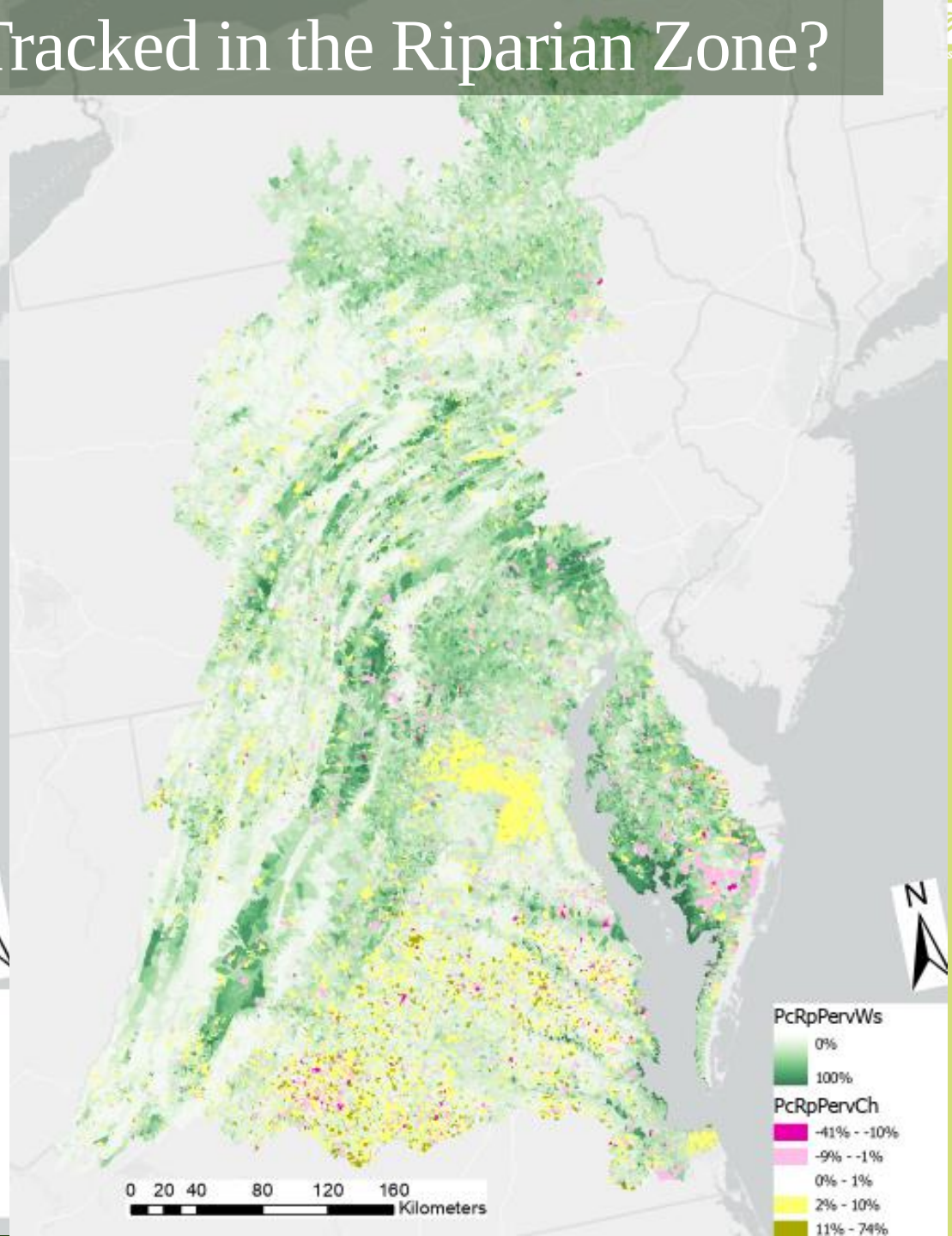


Aerial Imagery

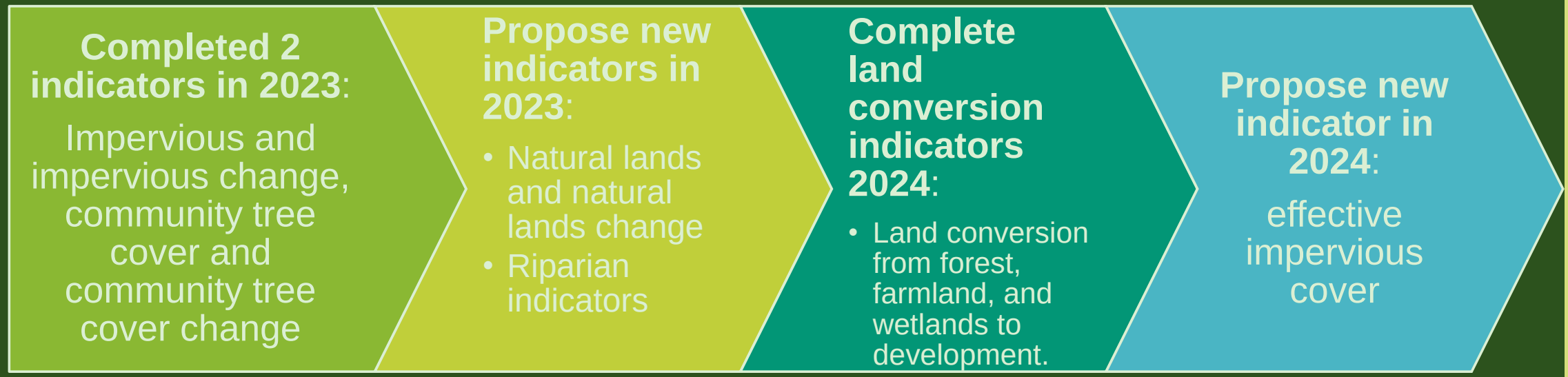
Land Use/Land Cover in Riparian Zone

What Land Uses should be Tracked in the Riparian Zone?





Timeline


Completed 2 indicators in 2023:
Impervious and impervious change, community tree cover and community tree cover change
Propose new indicators in 2023:
• Natural lands and natural lands change
• Riparian indicators
Complete land conversion indicators 2024:
• Land conversion from forest, farmland, and wetlands to development.
Propose new indicator in 2024:
effective impervious cover

Contact

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