QUARTERLY PROGRESS MEETING – March 2023

Chesapeake Bay Program

Land Use Methods and Metrics

Peter Claggett,
U.S. Geological Survey
Land Use Workgroup Coordinator

Our “Ask”

1. Advise the USEPA that continued monitoring of high-res land use change through the year 2034 is needed to support the achievement of multiple outcomes and the Phase 7 model.

2. Support a broader charge for the Land Use Workgroup to provide land use data and forecasts to serve the needs of multiple CBP outcomes and actions of local governments and other stakeholder groups.

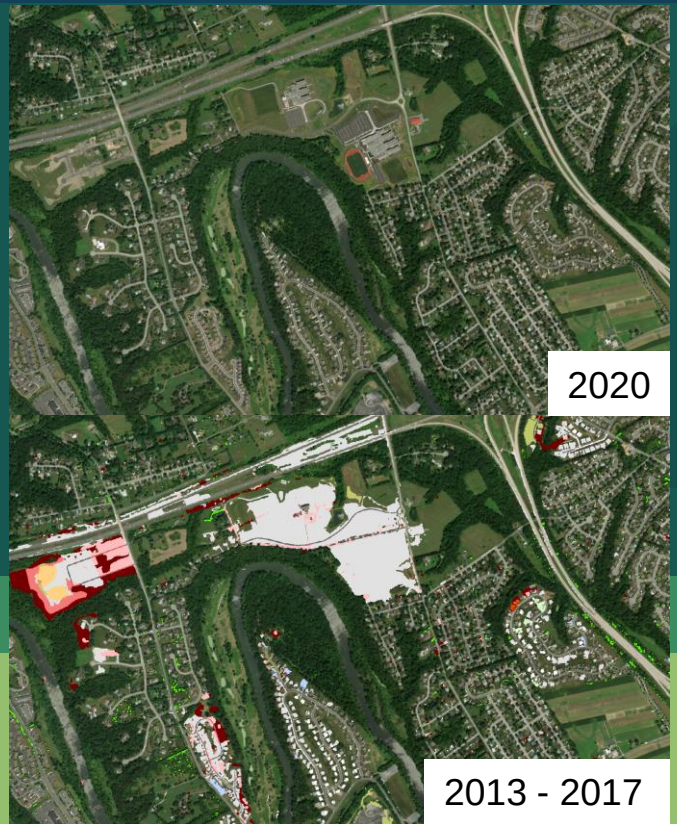
Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

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

Goal: *Land Conservation*

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…*



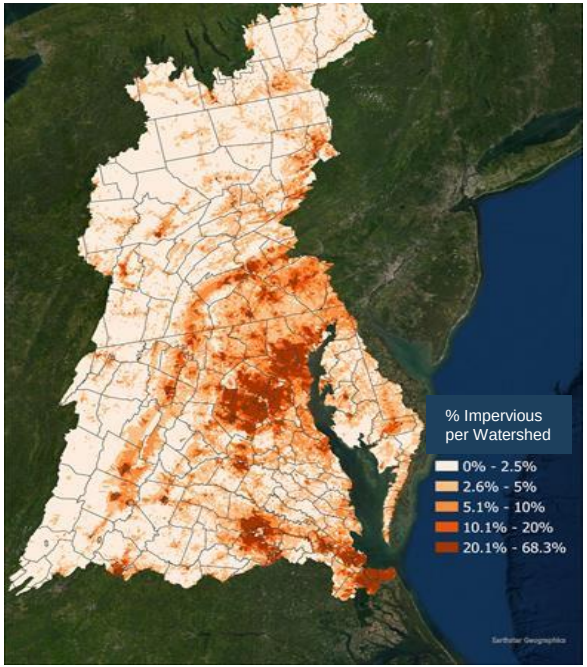
1. Measure rate of farmland, forest and wetland conversion, and the extent and rate of change in impervious surface coverage.

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

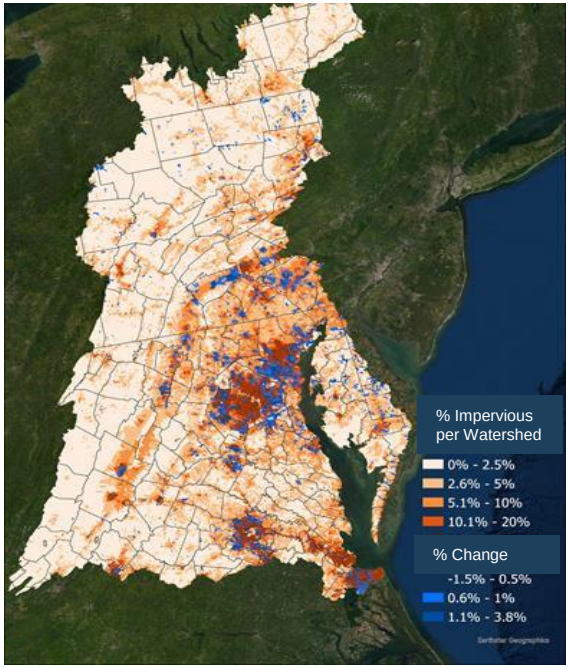
3. Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.

What is our Outlook and Recent Progress?

OUTLOOK ON COURSE

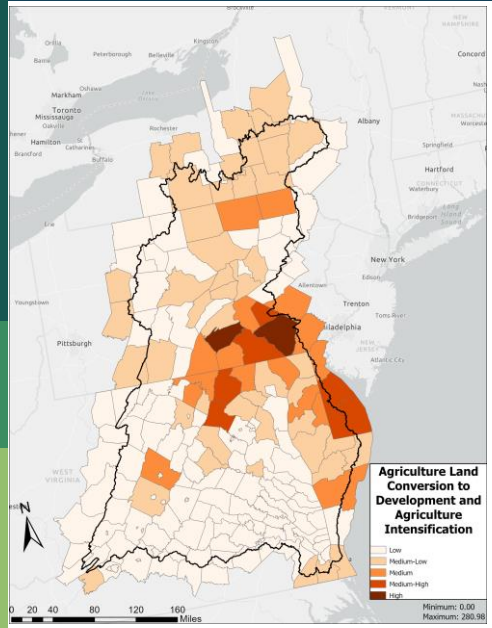


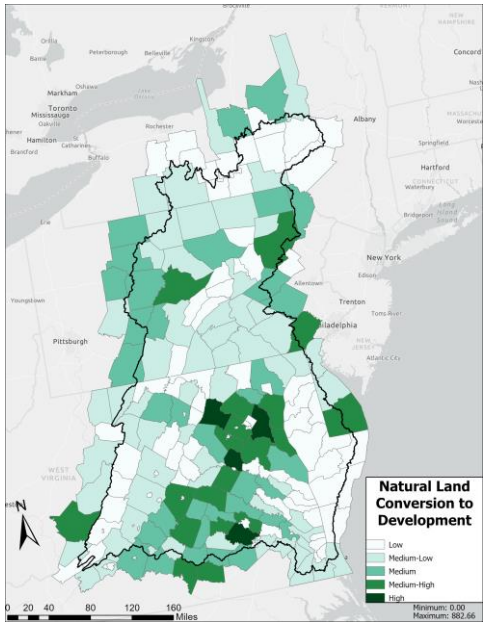
Impervious Cover, 2017/18



Impervious Cover Change, 2013/14 - 2017/18

What is our Outlook and Recent Progress?





Ratio of Natural Lands (Forest and Wetlands) to Productive Lands (Cropland and Pasture) Converted to Development from 2013/14 to 2017/18

DRAFT

State	Ratio
DE	0.67 : 1
DC	n/a
MD	2.63 : 1
NY	1.5 : 1
PA	1.8 : 1
VA	5.28 : 1
WV	3.43 : 1

Example interpretation: for every acre of productive land converted to development in Virginia, 5.3 acres of natural land were converted.

What is our Outlook and Recent Progress?

2014

Development of citizen software to classify samples of high-res imagery

Land use change hot-spot mapping initiated with the National Land Cover Database

2018

2013 High-res land cover and land use datasets completed.

High-res updates for 2017 and 2021 funded by CBP Partners.

Land Policy BMPs developed and adopted in Phase III WIPs

2021

New 54-class high-res land use model developed.

Draft land use and land use change products produced and incorporated into CAST-21.

2023

1-meter, 54 class land use data completed for 2017/18 and 2013/14 (revised).

Impervious Surface and Community Tree Cover indicators completed.

County Tree Cover Fact Sheets completed.

Riparian tree cover and land conversion metrics in development (May 2023).

Draft hyper-resolution hydrography data under review (March 2023).

What is our Outlook and Recent Progress?

- Completed draft high-res land use data for CAST- 21
- High-res land use data used in the Chesapeake Healthy Watershed Assessment, Data Dashboard, Community Tree Cover indicator, and County Tree Cover Fact Sheets.
- Delivered the land use data through an interactive website and in multiple formats: raster, tabular change matrices, tabular county summaries. https://www.chesapeakeconservancy.org/conservation-innovation-center/high-resolution-data/lulc-data-project-2022/
- Published the high-res land use data as state-wide mosaics with citable references. https://doi.org/10.5066/P981GV1L

Learn

What have we learned in the last two years?

Success & Challenges

Monitoring land use change over 4-8 years is too short of a period to:

- Differentiate episodic events from persistent rates of change;
- Understand the drivers of change;
- Relate land use change to changes in water quality, watershed health, and communities;
- Assess progress for multiple outcomes: tree canopy, forest buffers, wetlands, black ducks, healthy watersheds, and climate resiliency.

Monitoring land use change every 4-years is too long an interval to:

- Relate land use change to changes in water quality, watershed health, and communities.

Reducing the rate of land conversion requires anticipation of future land use change in addition to awareness of past and present change.

Success & Challenges

Reducing the rate of land conversion through land use planning and land conservation requires a new strategy.

- Current CBP strategy is passive and lacking sufficient incentives. It is focused on monitoring and reporting land use change and publishing information on policies and programs of potential use for managing growth with no ability to assess progress in planning or conservation.

A

Adapt

How does all of this impact our work?

Based on what we learned, we plan to …

1. Publish land conversion and riparian forest metrics on Chesapeake Progress.

2. Complete the 2021/22 land use data and update change from 2013/14 with improved accuracy, temporal consistency, and categorical detail.

3. Assess the use of existing databases for mapping the location and area of approved new construction permits.

Based on what we learned, we plan to …

Funding commitment needed from USEPA and CBP Partners!

4. Draft a new Cooperative Agreement to monitor land use change for an additional 5 years that:
   - Adapts to changes in technology and CBP needs while ensuring consistency over time;
   - Couples monthly satellite imagery with more periodic aerial imagery;
   - Leverages advances in computational power and artificial intelligence;
   - Addresses the needs to monitor wetland change for black ducks, anadromous fish, and climate resiliency;
   - Evaluates effectiveness of the data for BMP verification.

   A subsequent 5-year agreement will be needed to cover the years 2029-2034.

Based on what we learned, we plan to …

5. Develop a new <u>active</u> strategy to reduce the rate of land conversion that:
   - Fully integrates the management strategies of the Land Use Methods and Metrics and Land Use Options Evaluation Outcomes;
   - Makes the high-res land use change and hydrography data “actionable” at the local level;
   - Identifies and supports “translator” positions in each major jurisdiction or sub-basin with representation on the Land Use Workgroup;
   - Refocuses the Land Use Workgroup to provide land use, land use change, and land use forecasts in support of multiple outcomes and the broader CBP Partnership (not just for the watershed model);
   - Develops water quality “credit” incentives for land conservation and land use planning.

Equitable and inclusive restoration …

Support CBP workgroups to characterize land use conditions and change in underserved communities to raise awareness and support CBP Partner efforts to conserve and restore landscapes and enhance public access and climate resiliency.

Fill the Gap

How can the Management Board help achieve the Outcome?

Filling the Gap

1. Advise the USEPA that continued monitoring of high-res land use change through the year 2034 is needed to support the achievement of multiple outcomes and the Phase 7 model.

2. Support a broader charge for the Land Use Workgroup to provide land use data and forecasts to serve the needs of multiple CBP outcomes and actions of local governments and other stakeholder groups.

Filling the Gap

What: A new Cooperative Agreement to monitor land use change in five-year intervals through 2034.

Who: USEPA with support of CBP Partners

Urgency: High

Risk: Failure to monitor progress of multiple CBP outcomes, failure to support the land use needs of the Phase 7 model, lack of local use of the data to establish restoration goals and monitor progress.

Resources: $7.25 million for the first 5-years from fall 2024 through summer 2029.

Discussion