

Planning for a Flood-Resilient Future

High-Resolution Land Use Land Cover Data for Resilience Planning Environment Virginia | April 10, 2025



Today's Presentation

Goal

Attendees leave with a deeper understanding of the Commonwealth's use of Chesapeake Conservancy's Chesapeake Bay Program Land Use/Land Cover Data (CBP LULC) for flood resilience planning.

Agenda

- Introduce the Office of Resilience Planning
- Use Case: rainfall-driven flood modeling
- Use Case: flood impacts on the landscape
- Key Takeaways





DCR Office of Resilience Planning

Planning for a flood-resilient future.









Develop and Implement State-led Flood Resilience Plans **Coordinate Action**

Supply Data, Information and Resources Conduct Outreach and Engagement



Coastal Resilience Master Plan Pluvial Modeling: Data Development





Transportation



Urban Area (Kenmore Ave., Fredericksburg, VA)



CBP LULC



NLCD



Friction Surface Comparison



(Manning's N)

Urban Area (Kenmore Ave., Fredericksburg, VA)

CBP LULC





Infiltration Grid



(Curve Number)

NLCD

High Runoff

Low Runoff

Urban Area (Kenmore Ave., Fredericksburg, VA)





- Horizontal Impact:
 - Flooding extent decreased with high-res land cover
 - Areas removed from floodplain using CBP shown in Red



Vertical Impact:

- Difference < 1.25'
- Max difference in dark blue

Mixed Urban / Industrial:

(Pitt St., Fredericksburg, VA)

CBP LULC





Friction Surface Comparison



(Manning's N)

High Friction

Low Friction

Mixed Urban/Industrial:

(Pitt St., Fredericksburg, VA)

CBP LULC





Infiltration Grid



(Curve Number)

NLCD

High Runoff

Low Runoff

Urban Area - Fredericksburg, VA



Horizontal Impact:

- Flooding extent decreased with highres land cover
- Areas removed from floodplain using CBP shown in Red





Vertical Impact:

- Difference < 1'
- Max difference in dark blue

Rural (Sylvania Heights, VA)

CBP LULC



NLCD





High Friction

Rural (Sylvania Heights, VA)

CBP LULC



NLCD



Infiltration Grid



(Curve Number)

High Runoff

Low Runoff

Rural - Sylvania Heights, VA



Horizontal Impact:

- Flooding extent decreased with highres land cover
- Areas removed from floodplain using CBP shown in Red



Vertical Impact:

- Difference < 0.7'
- Max difference in dark blue



Flood Impacts on the Landscape

Ecosystem Service Benefit Analysis

CHESAPEAKE CONSERVANCY LAND USE/ LAND COVER CLASSIFICATION	FEMA BCA ECOSYSTEM SERVICES CLASSIFICATION	BENEFITS (USD/ACRE/YEAR)
Wetlands, Tidal Marsh Non- forested	n/a*	\$8,955/acre/year
Wetlands, Riverine Non-forested	Inland Wetland	\$8,171/acre/year
Wetlands, Terrene Non-forested	Inland Wetland	\$8,171/acre/year
Forest	Forest	\$12,589/acre/year
Tree Canopy, Other	Forest	\$12,589/acre/year
Tree Canopy, Over Turf Grass	Forest	\$12,589/acre/year
Turf Grass	Rural Green Open Space	\$10,632/acre/year
	Urban Green Open Space	\$15,541/acre/year
Harvested Forest	Rural Green Open Space	\$10,632/acre/year
Natural Succession Herbaceous	Rural Green Open Space	\$10,632/acre/year
	Urban Green Open Space	\$15,541/acre/year
Natural Succession Scrub/Shrub	Forest	\$12,589/acre/year
Cropland	Rural Green Open Space	\$10,632/acre/year
Pasture/Hay	Rural Green Open Space	\$10,632/acre/year

Working Lands Flood Hazard Impacts



reference coastal flood event.



Key Takeaways

- Continuous coverage supports large-scale assessments of vulnerable ecosystems/habitat.
- Rainfall-runoff applications sensitive to infiltration benefit from high-resolution land cover data.
- Datasets should be updated frequently to reflect ongoing changes in land cover land use patterns.
- Consistent statewide data is desirable for statewide applications.



Thank you.

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