

VGIN Board Meeting
July 12, 2016

Virginia Statewide Land Cover Dataset

Jenni Ellsworth
Worldview Solutions

Land Cover Background

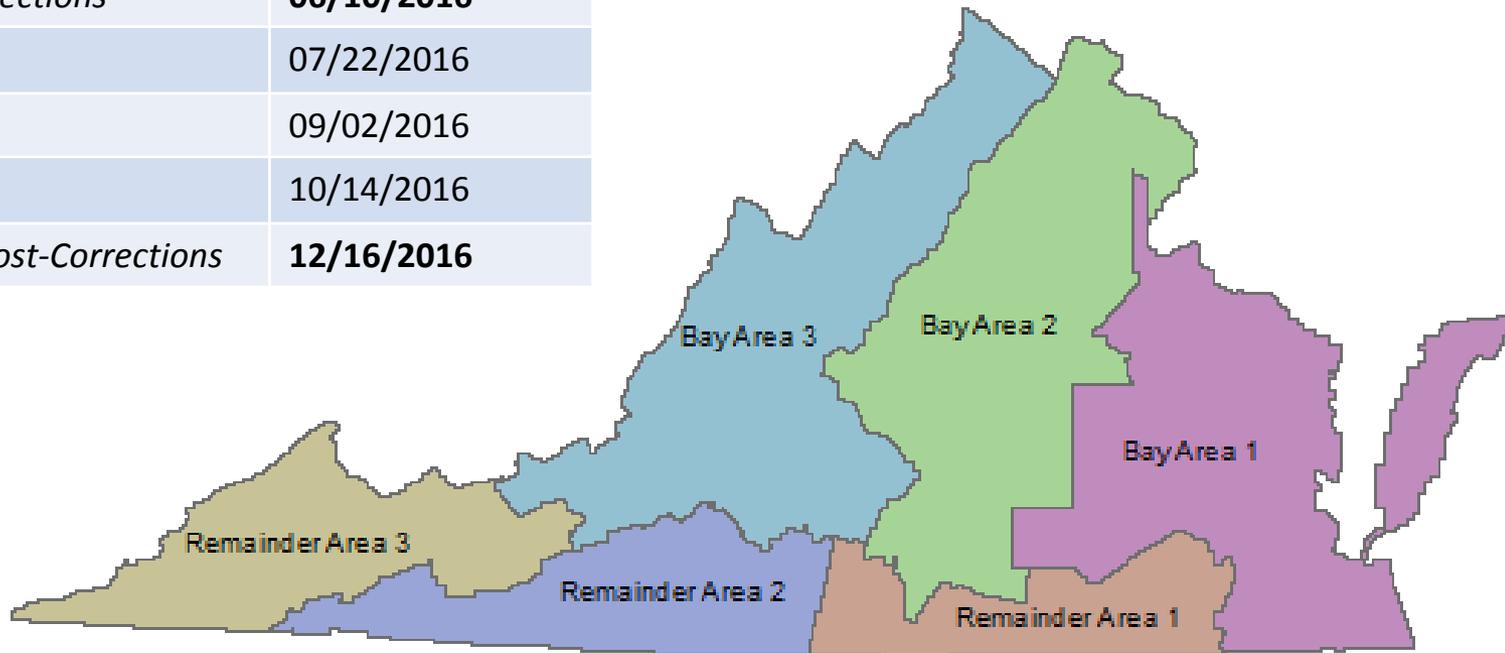
- June 16, 2014 governors of the Bay's headwaters states signed **Chesapeake Bay Watershed Agreement**
 - full participation in Bay Program & collaboration between states
 - Goal - Implement teams to develop strategies and coordinate actions within one year
- A 2015 **Coastal Zone Management Needs Assessment** outlined Cumulative & Secondary Impacts (CSI) from development a top priority
 - Stated - action would likely be required by VA in coming years to meet commitments and achieve outcomes outlined in agreement
 - Stated - currently no studies illustrate effectiveness of Virginia's management efforts to address CSI of development
 - Stakeholders wanted to develop new strategy to complement CBP goal of protecting two million new acres by 2025

Land Cover Funding

- **EPA grant** - Chesapeake Bay Regulatory and Accountability Program
 - updated version of Watershed Model
 - Virginia Department of Environmental Quality (VDEQ) received grant
- **DEQ funding** to the Virginia Geographic Information Network (VGIN) for statewide orthophotography
 - assist localities in planning and implementing stormwater management programs
 - support activities related to management of recurrent coastal flooding
- Immediate **interest** in Virginia land cover
 - The Virginia Institute of Marine Science (VIMS)
 - Hampton Roads Planning District Commission (HRPDC)
 - Department of Conservation & Recreation (DCR)

Virginia Statewide Land Cover Schedule

Delivery Area	Delivery Date
Bay Area 1	11/30/2015
Bay Area 2	02/05/2016
Bay Area 3	04/15/2016
<i>Bay Area Post-Corrections</i>	06/10/2016
Remainder State 1	07/22/2016
Remainder State 2	09/02/2016
Remainder State 3	10/14/2016
<i>Remainder State Post-Corrections</i>	12/16/2016



Virginia Statewide Land Cover Dataset



- 1 Meter, Vector & Raster Product
- 12 Classes, 85-95% Targeted Accuracy
 1. TurfGrass
 2. Impervious Extracted
 3. Impervious Collected
 4. Forest
 5. Tree
 6. Harvested Forest
 7. Scrub/shrub
 8. Cropland
 9. Pastureland
 10. NWI/Other Wetlands
 11. Water
 12. Barren

Data Development Overview

- Feature Extraction from imagery
- Manual Editing and Quality Control measures
 - 10 In-house imagery analysts
 - VBMP orthophotography
- Classification cleanup
 - Improve misclassifications
 - Incorporate external datasets
- Quality Assurance vendor
 - Sanborn accuracy matrix review for each delivery



	Water	Impervious	Barren	Forest	Tree	Scrub/Shrub	Harvested/Disturbed	TurfGrass	Pasture	Cropland	Woody Wetlands	Total	User's Accuracy
Water	60	0	0	0	0	0	0	0	0	0	0	60	100%
Impervious	0	75	0	0	0	0	1	0	0	0	0	76	99%
Barren	0	0	27	3	0	7	1	0	6	0	0	44	61%
Forest	3	0	0	984	8	6	3	3	13	1	2	1023	96%
Tree	1	0	0	12	56	0	0	5	1	0	0	75	75%
Scrub/Shrub	0	0	3	2	0	47	0	0	6	1	0	59	80%
Harvested/Disturbed	0	0	1	1	0	2	50	0	0	0	1	55	91%
TurfGrass	0	0	1	1	3	1	0	113	19	0	0	138	82%
Pasture	0	0	1	0	0	0	0	0	0	0	0	1	55%
Cropland	0	1	0	0	0	0	0	0	0	0	0	1	77%
Woody Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	100%
Total	64	76	33	1003	67								
Producer's Accuracy	94%	99%	82%	98%	84%								
Kappa	94%	99%	81%	96%	83%								

Overall Accuracy 91.8%

Kappa 87.7%

N 1829

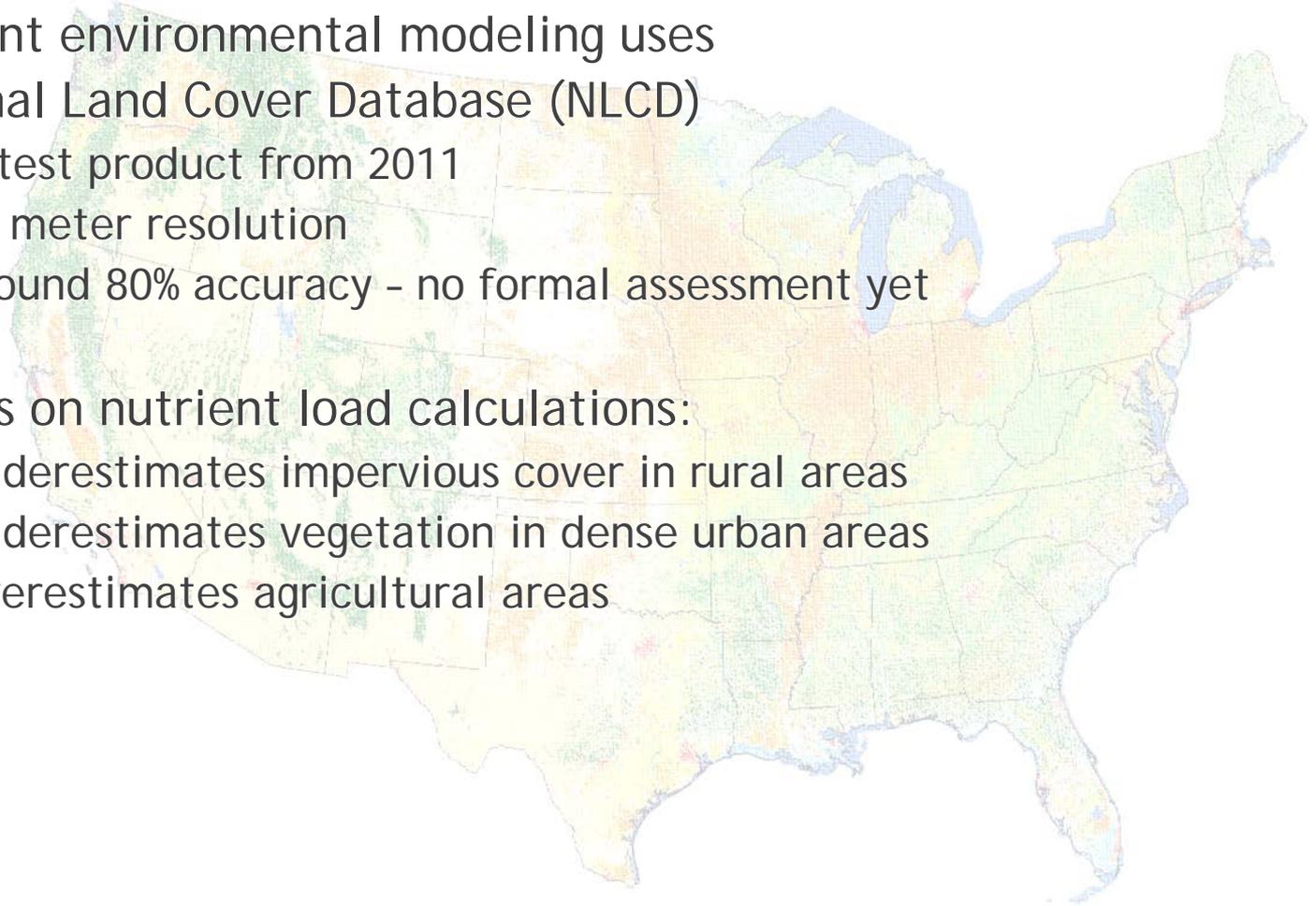
External Datasets Utilized

- Locality Data requests for **direct implementation**
 - Building Footprints
 - Other impervious planimetrics where available
- Additional data used for **feature identification**
 - Local Parcels, hydro,
 - VA Railroad centerlines
 - DCR BMP & loafing lot datasets
 - DMME mining points
 - VDOF harvesting permit locations
 - NASS land classifications



Product Comparison

- Current environmental modeling uses National Land Cover Database (NLCD)
 - Latest product from 2011
 - 30 meter resolution
 - Around 80% accuracy - no formal assessment yet
- Effects on nutrient load calculations:
 - Underestimates impervious cover in rural areas
 - Underestimates vegetation in dense urban areas
 - Overestimates agricultural areas



➤ How these products compare...

2015 VBMP Imagery



NLCD 2011



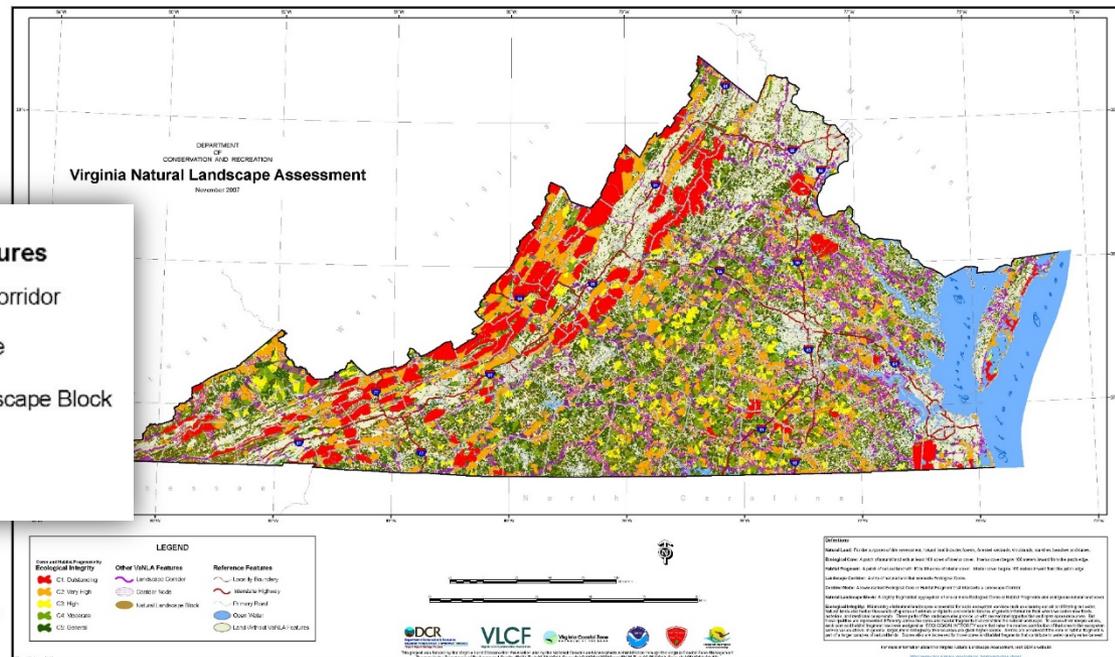
VA Land Cover Dataset



Additional VA Land Cover End-Users

➤ Virginia statewide Initiatives

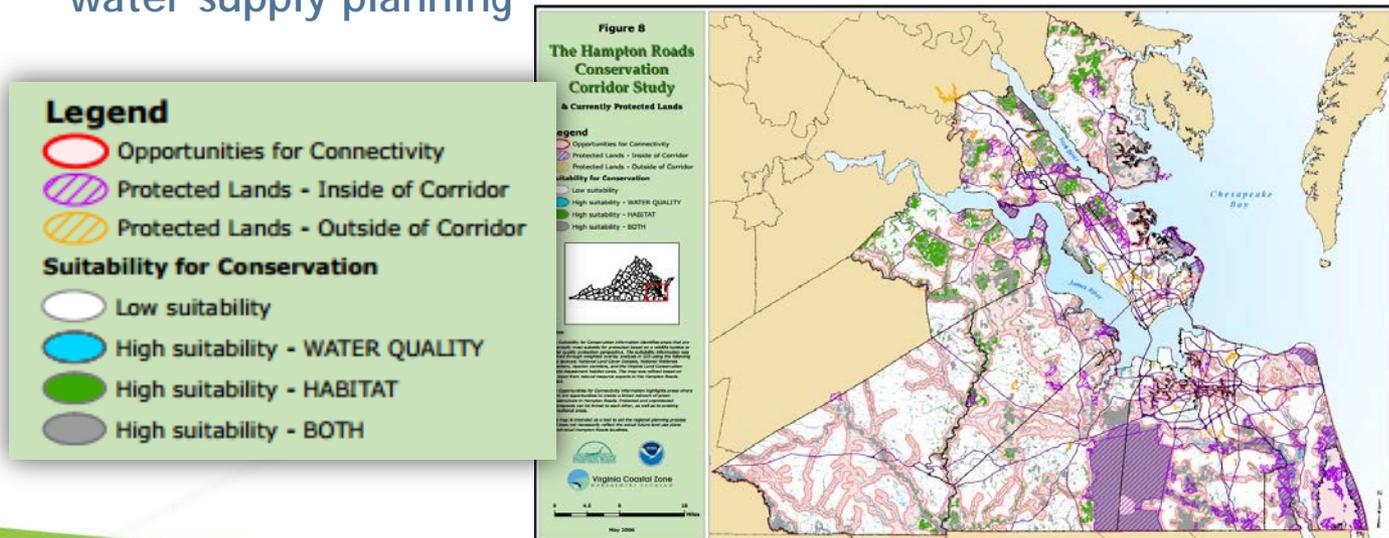
- DCR - Nonpoint Source Pollution Assessment incorporating land cover to develop estimates of **Nonpoint Source loads** of nitrogen, phosphorous, and sediments
- DCR - VA Natural Heritage Program (ConservationVision) benefiting from land cover inputs to **protect biodiversity** and conserve VA ecosystems



Additional VA Land Cover End-Users

➤ Regional Initiatives and Planning Efforts

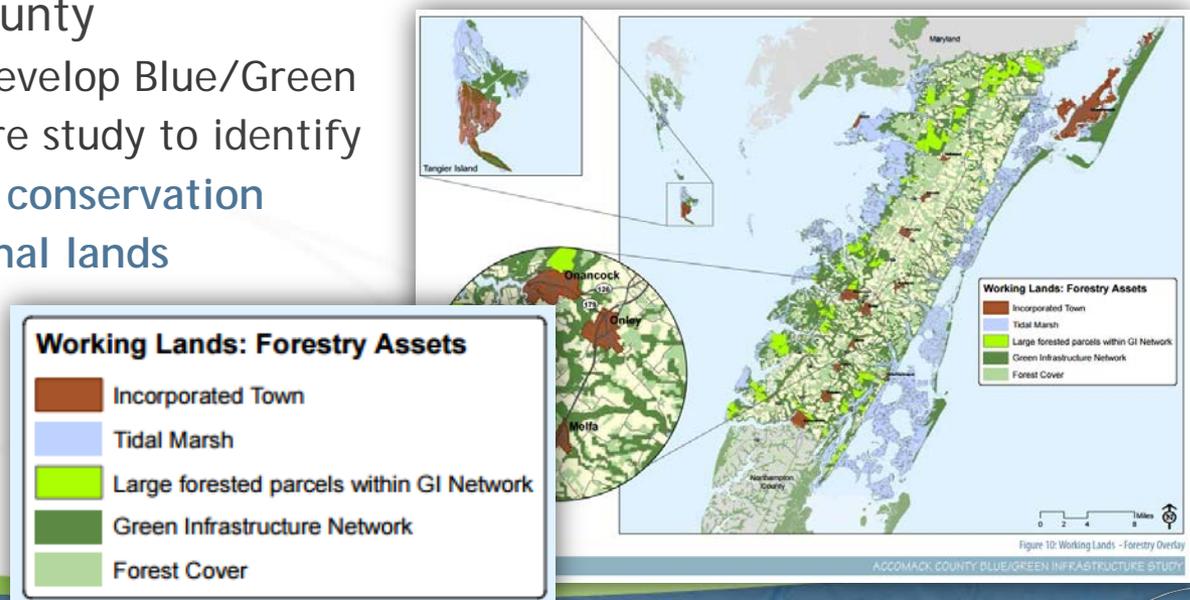
- Richmond Regional PDC **Green Infrastructure** Project land cover update and %ISA estimates to support Long Reach **Transportation Planning**
- The Roanoke Valley-Alleghany Regional Commission and New River Valley Regional Commission plan to conduct county-level land cover change analyses for **tracking land development** as well as for **natural disaster management**
- HRPDC Conservation Corridor Study to support **habitat protection**, stormwater runoff, and Total Maximum Daily Loads (TMDLs) modeling for **water supply planning**



Additional VA Land Cover End-Users

➤ Localities

- Cities of Norfolk and Virginia Beach
 - regional **effects of sea level rise** and storm surge will be mapped in an upcoming joint land use study with the Navy
- Albemarle County
 - Using land cover data to identify forested lands in addition to other land use classes as part of their TMDL action plan to **reduce pollutants of concern** (POCs) - phosphorous, nitrogen, and sediment
- Accomack County
 - Used to develop Blue/Green Infrastructure study to identify and **protect conservation & recreational lands**



Overall Use Cases

- Impervious Surface estimates
 - Indicator of urban disturbance and population growth
 - Meet EPA reporting requirements
- Stormwater Management
 - Better manage the effects of stormwater runoff
 - Support development of a complete stormwater model - rainwater infiltration and runoff rates
- Urban Planning
 - Monitor and model urban sprawl
 - Implement existing urban planning models, such as urban energy & water
- Conservation Planning
 - Assist in greenway planning for habitat conservation and recreation
 - Identify, monitor, and assess Resource Protection Areas (RPAs)
 - Enable geographically targeted approach to nutrient management in determining downstream loading rates and identifying critical source areas

Old Town Petersburg Historic District



Quantico Marine Corps Base, Prince William



Dismal Swamp Canal, Chesapeake



Downtown Richmond City



Data: When, Where, and How

- **June 2016:** Complete Bay Area
- **Dec 2016:** Remainder of State, Use Case Paper

- Free VGIN hosted data download & feature service
 - Vector & raster data downloads, reports, & web service
 - <http://vgin.maps.arcgis.com/home/item.html?id=6ae731623ff847df91df767877db0eae>

For more information:

Jennifer.Ellsworth@WorldViewSolutions.com

