



Virginia Information Technologies Agency

# Statewide Land Cover GIS Data

**Dan Widner**

Virginia Geographic Information Network

James Davis-Martin

Virginia Department of Environmental  
Quality

---

August 12, 2015



# Agenda

- Origins of the project
- Project management
  - Project requirements & initiation
  - Project deliverables
  - Project phases & timelines
- Processing steps
- Supporting GIS data needs
- Land cover classifications
- Q&A



# Legislative Language

Item 363 #2s

## Natural Resources

Department Of Environmental Quality

### Language:

Page 306, after line 26, insert:

"4. Out of such funds available in this item, the Department shall provide funding to the Virginia Geographic Information Network in an amount necessary to implement statewide digital orthography to **improve land coverage data** necessary to assist localities in planning and implementing stormwater management programs. As part of this authorization, the Department shall also include data to update prior LIDAR surveys of elevations along coastal areas to support activities related to management of recurrent coastal flooding."

### Explanation:

(This amendment authorizes DEQ to use available funding to work with Virginia Geographic Information Network to provide better data to support local stormwater programs and activities to manage recurrent coastal flooding.)



# Project Initiation Process

- Identify Land Cover requirements
  - Gather Subject Matter Experts to identify:
    - Classification Scheme
    - Resolution
    - Accuracy
  - Develop into a Statement of Requirements
  - Solicit proposals through state IT GIS services contract



## Deliverables

- Raster and vector feature classes for each land cover class
- Data will be freely accessible via the GIS Clearinghouse upon completion
  - Web services
  - Data downloads

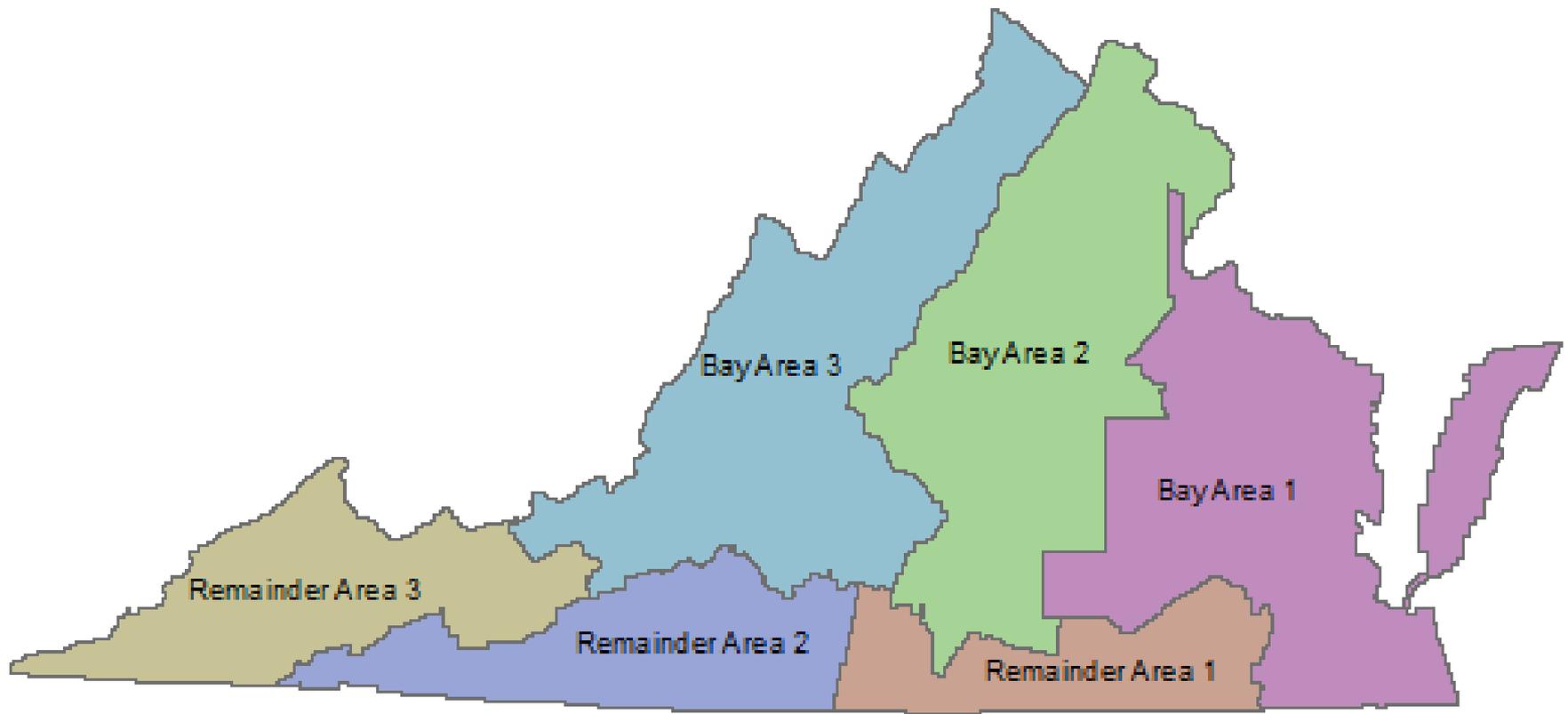


## Three Major Phases

- Five pilot locations
- Chesapeake Bay Watershed
- Remainder of the state

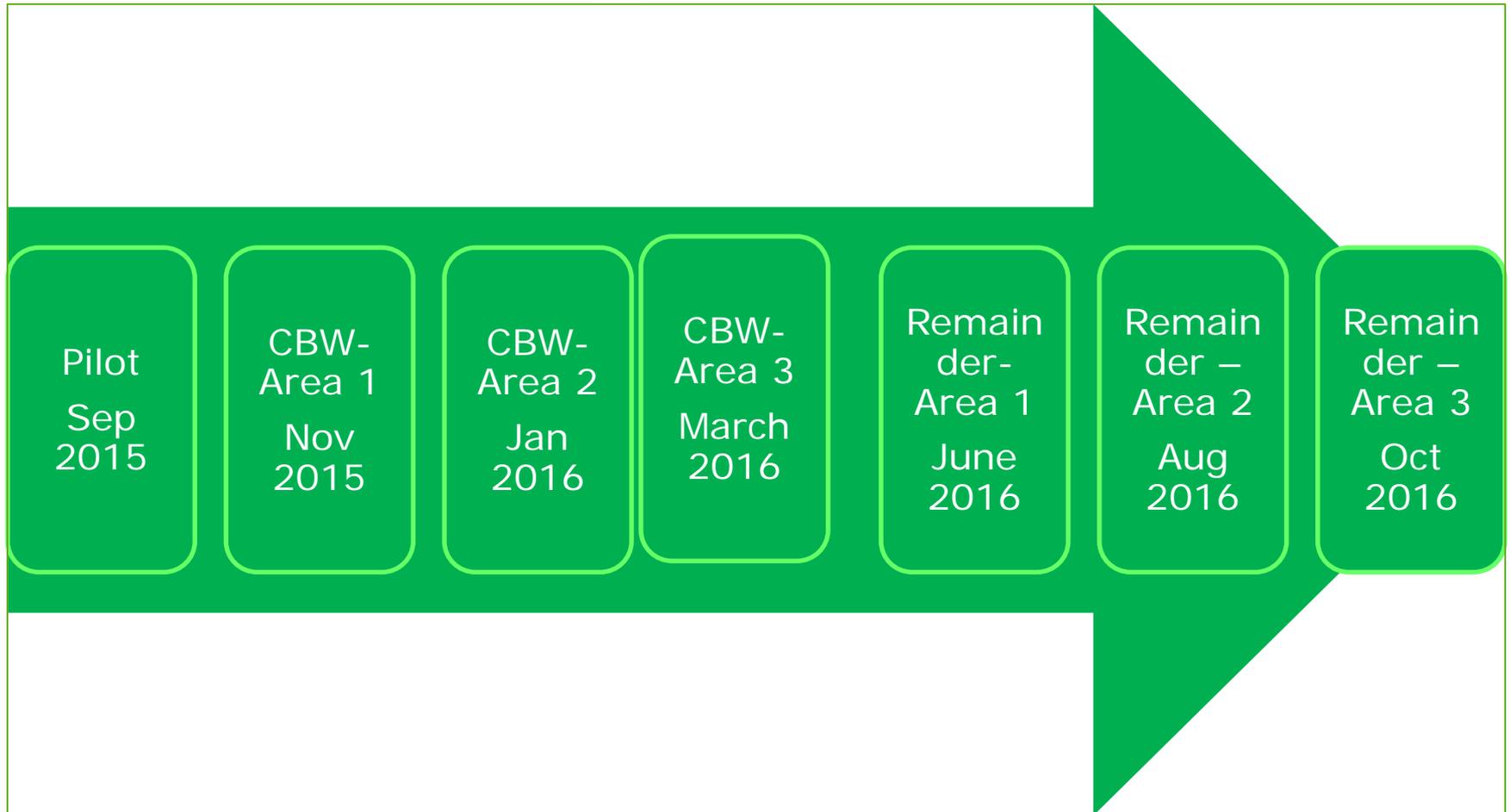


# Deliveries by Region





# Project Timeline





## Process Steps Overview

- Feature Analyst training data creation
  - Initial extraction from 4 band VBMP imagery
- Manual classification/reclassification
  - Review results with ancillary data
- QA/QC

Available source data will be compiled for the project from local government, regional, state and federal data sources



## Project Data Needs

- VBMP 4-band Imagery 2011-2014
  - Primary source for feature extraction
- Additional supporting data, especially “impervious – ness” indicators
  - Road Centerlines
  - Building Footprints



## Federal Data Sources

- Wetlands (National Wetlands Inventory data)
- Hydrography (National Hydrography Dataset - NHD)
- US Census Urban Areas (2010)
- NAIP Leaf-on 1 Meter Imagery



## State Data Sources

- DCR Statewide Agricultural Land Use (developed by WorldView in 2014)
- DCR Agricultural BMP (Latest - 2013)
- Statewide Forestry Dataset (VDoF 2005)
- Statewide Timber Permitting dataset (VDoF)
- Statewide Land Use Dataset (VDoF 2005)
- LiDAR Dataset (where available)
- VDMME Mining Permits Data
- VBMP Othophotography (2011/2013/2014)
- VBMP Digital Terrain Model (DTM) (2011/2013)
- VBMP Road Centerline Data



## Local and Regional Data Sources

- Locality Impervious Basemap Data (where available)
- Locality Basemap Data – parcels, building footprints, land cover, hydro, etc.
- Hampton Roads Land Cover (HRPDC - 2012)
- Rivanna River Watershed Land Use / Land Cover (developed by WorldView 2011)
- Hanover County Land Use / Land Cover (developed by WorldView 2012)
- Accomack County Land Use (developed by WorldView 2009)



## Data Requests

- Identify gaps in available datasets
  - WorldView outreach to localities

Leverage available source data = better final product

## Classification Categories

Land Cover		Minimum Mapping Unit	Resolution	Accuracy
Pervious	Turf Grass	Less than 1 acre	1 Meter	85%
Impervious	Buildings, driveways, parking lots, etc	Match resolution	1 Meter	95%
	Roads	Road centerline dependent	1 Meter	95%
Forest	Forest	1 acre w/ min width restrictions	1 Meter	95%
	Tree	Less than 1 acre	1 Meter	95%
	Harvested/Disturbed Forest	1 acre w/ min width restrictions	1 Meter	85%
Scrub/Shrub	Scrub/Shrub	1 acre w/ min width restrictions	1 Meter	85%
Agriculture	Cropland	1 acre w/ min width restrictions	1 Meter	85%
	Pastureland	1 acre w/ min width restrictions	1 Meter	85%
Wetlands	Emergent Wetlands	As defined by NWI and TMI	1 Meter	85%
	Woody Wetlands	As defined by NWI and TMI	1 Meter	85%
	Mudflats	As defined by NWI and TMI	1 Meter	85%
Barren	Barren	Higher than the resolution	1 Meter	85%
Water	Water	Higher than the resolution	1 Meter	95%

# Pilot

Mudflats	Accomack	A008
Barren (Beach)	Accomack	A008
Turf Grass	Fairfax	PL22
Forest	Fairfax	PL22
Tree	Fairfax	PL22
Barren (extractive)	Wise	TP01
Disturbed Forest	Buckingham	JM52
Cropland	Mecklenburg	RL11
Pasture	Mecklenburg	RL11

**Table 2: Pilot Project Localities and Classifications**



**Figure 1: Pilot Project Localities and Hydrologic Units**

# Pilot Preview

- Harvested & Disturbed
  - Less than 30% canopy cover at current state
  - Normalized Difference Vegetation Index values assessed



# Pilot Preview

- Barren

- Bedrock, sand, and clay w/ little or no vegetation
- Extractive mining areas, with transitional areas of activity classified as Disturbed



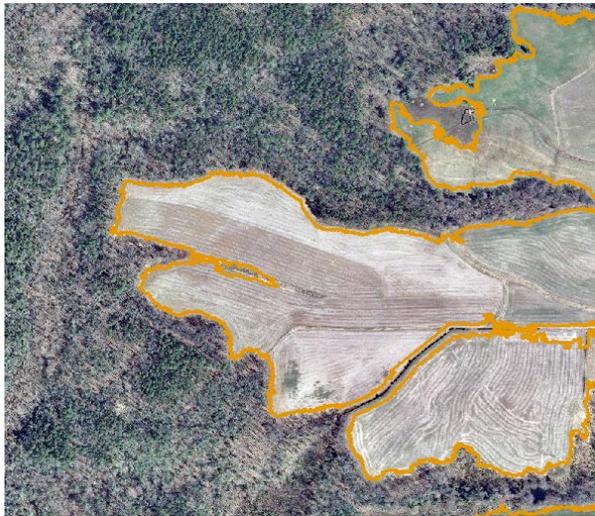
# Pilot Preview

- Emergent Wetlands
  - Periodically saturated soil or substrate
  - NWI & NHD datasets complemented with visual analysis



# Pilot Preview

- Cropland/Pastureland
  - Individual classes based on planting/cultivation
  - DCR consulted data points available for many lots
  - Only includes land areas greater than an acre in size



# Pilot Preview

- Forest/Tree
  - Individual classes based on size of tree stand
  - Forest including stands greater than an acre in size, and additionally meeting length to area ratio criteria
- Turf Grass
  - Managed & Unmanaged grasses without planting/cultivation
  - Lots less than an acre in size, unless identified as recreational

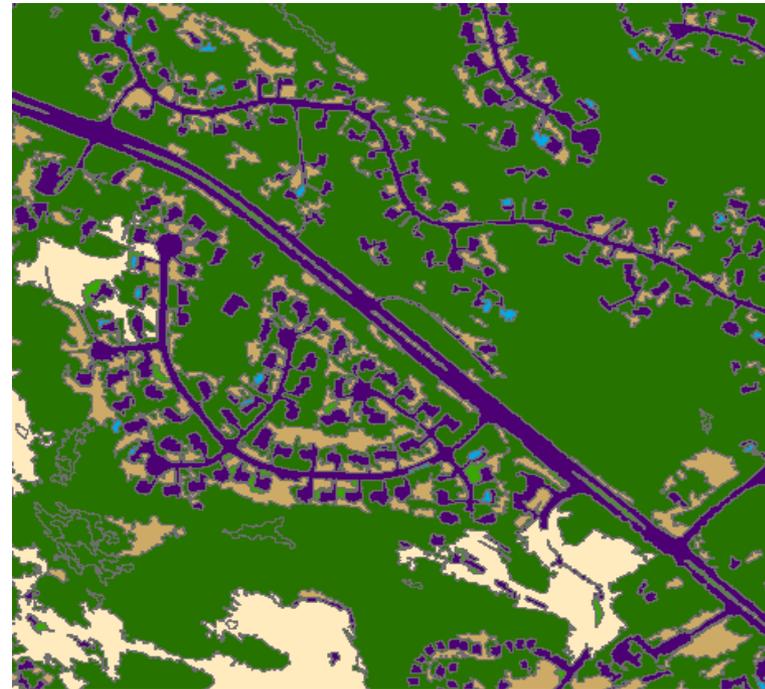
- Forest
- Tree
- Turf Grass



# Pilot Preview

- Overall Land Cover

- Combination of feature extraction, reclassification, local data resources, & cleanup
- 1 meter output
- Additionally including:
  - Impervious
  - Hydro





# Questions?