Virginia Cooperative Extension

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The Virginia GIS County Data Series

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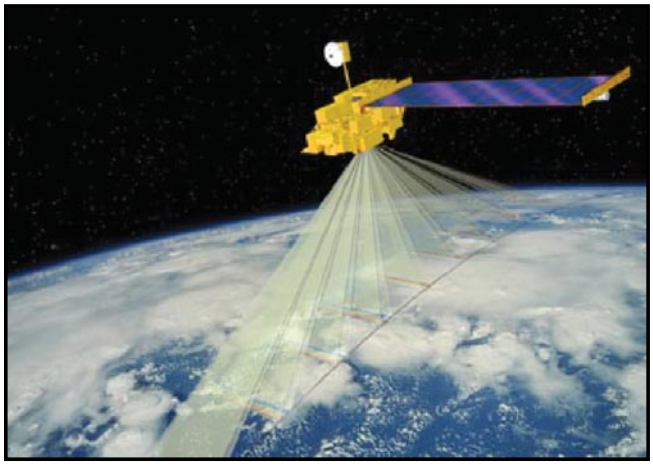
Description

The Virginia GIS (geographic information system) County Data Series is part of an effort by the Virginia Geospatial Extension Program to facilitate increased awareness of and access to geospatial products and services by educators, local governments, state agencies, and other entities. This extensive collection of GIS data provides some of the most up-to-date and accurate framework data available. All of the layers have been formatted and are "GIS-ready."

The Virginia GIS County Data Series provides an extensive collection of spatial data that is disseminated by locality. The data are disseminated on DVD, and as a rule of thumb, each county DVD requires approximately 1.5 gigabytes of space. These data are compatible with the full suite of ArcGIS software. All raster projection files (.AUX) are provided with each layer to support "projection on the fly." The DVD contains AUX files to support ArcGIS software as well as other GIS software products.

The Virginia Geospatial Extension Program is working in conjunction with the Virginia Department of Education and Virginia Cooperative Extension to extend the appropriate county data resources to middle and high schools in the commonwealth. Additional information regarding the Virginia GIS County Data Series and other geospatial training and educational opportunities are available from the Virginia Geospatial Extension Program (*www.cnr.vt.edu/gep*).



Virginia Geospatial Extension Program
A partnership between VSGC and VCE

VirginiaView
www.VirginiaView.net

www.ext.vt.edu

Produced by Communications and Marketing, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University

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Virginia Tech
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VIRGINIA STATE UNIVERSITY

Virginia Base Mapping Program (VBMP) Aerial Photography (2002)

The Virginia Geographic Information Network (VGIN) acquired the Virginia Base Mapping Program (VBMP) aerial photography through funding provided by the E911 Services Board. The photography was captured in the spring 2002 (during the leaf-off season). This is a statewide product. The aerial photography was initially captured at 1- or 2-foot resolution (contingent on local population density) in true color. In addition, some localities opted up for a 6-inch-resolution product. The data set provided on the DVD is a 1-meter resampled product. It is available in Virginia Lambert Conformal Conic (a customized projection developed by VDOT; see projection information in Appendix A). Note that areas associated with military bases and other points of national interest have been resampled at 5-meter resolution. The imagery is stored in tiles that measure ~3 miles on each side. Additional information on the VBMP aerial photography program and other VBMP data products available in *www.vgin.virginia.gov/VBMP/VBMPHandbook_r2.pdf*

Data Type:	Raster
Pixel size:	1 Meter
Data Format:	Mr. Sid
Projection Information:	
	Virginia Statewide Lambert Conformal Conic*
	Units: Meters
	Spheroid: GRS 1980
	X shift: 0
	Y shift: 0
	1st Standard Parallel: 37.0
	2nd Standard Parallel: 39.5
	Central Meridian: -79.5
	Latitude of Projection Origin: 36.0
	False Easting: 0
	False Northing: 0
Source:	VGIN

*Custom projection for Virginia developed by VDOT and used by a majority of state agencies.

NRCS Aerial Photography

The National Resource Conservation Service (NRCS) captured these photographs through the National Agricultural Imagery Program (NAIP). Dates differ by county, but may be as recent as 2005. All the photographs are tiled together by county to produce this seamless 2-meter resolution product. The imagery was captured during the late spring/early summer (during the leaf-on seasons). The purpose of the NAIP is to provide imagery during the agricultural growing season so that the Farm Service Agency (FSA) can provide estimates of crops and acres under cultivation. Certainly, this product can be used for other applications as well.

This product is available in a universal transverse Mercator (UTM) coordinate system. The NAIP imagery provided by the Geospatial Extension Program is either a near infrared (NIR) false-color composite or true color product. NIR imagery depicts healthy vegetation (high amounts of chlorophyll activity) in bright shades of red (note the fertilized lawns in the image below). This image is available as a Mr. Sid (proprietary format that is "readable" by ArcGIS or web browser plug-in). While a majority of Virginia localities have data, the imagery may not cover all portions of every county.

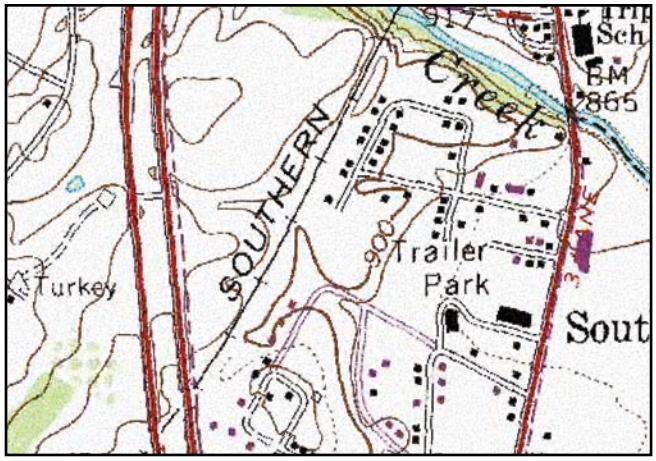
Data Type:	Raster
Pixel size:	1 - 2 Meters (contingent on year)
Data Format:	Mr. Sid
Projection Information:	
	Universal Trans Mercator
	Zone: 17 or 18 (Contingent on locality, refer to UTM map in the Appendix)
	Units: Meters
	Spheroid: NAD 83
Source:	NRCS Geospatial data Gateway

Digital Raster Graphic (DRG)

(often referenced as a Digital Topographic Map)

The digital topographic map is a United States Geological Survey (USGS) product. The original topographic maps for each county have been scanned and rectified (assigned coordinate information). The collars (the white margins along the sides of the map) have been removed. In addition, *all topographic maps for a given county have been tiled together to provide seamless topographic coverage for each locality*. The source scale of this product is 1:24,000. It is available as a Mr. Sid (proprietary format that is "readable" by ArcGIS).

Data Type:	Raster
Pixel size:	~2.4 Meters
Data Format:	Mr. Sid
Projection Information:	
	Universal Trans Mercator (UTM)
	Zone: 17 or 18 (Contingent on locality, refer to UTM map in the Appendix)
	Units: Meters
	Spheroid: NAD 83
Source:	NRCS Geospatial data Gateway
Additional Information:	*www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prod&topic=clu-ab*



Common Land Unit Boundaries (CLU)

As part of its effort to assess land cover across the agricultural areas in the United States, the U.S. Department of Agriculture (USDA) has established the Common Land Unit (CLU) as a standardized GIS data layer.

The USDA defines a CLU as: "…the smallest unit of land that has a permanent, contiguous boundary, a common land cover and land management, a common owner and a common producer association." (*www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prod&topic=clu-ab*)

This layer includes all farm fields, managed forested tracks, and other managed areas. CLU data is often used with other GIS layers to support a variety of applications including: public safety and disaster response, agriculture and natural resource management and monitoring, regional planning, economic development, and natural disaster planning and mitigation.

CLU is a vector file. The illustration below shows CLU boundaries (left) and CLU boundaries superimposed over aerial photography (right). Note: Most of the attribution (descriptive information) associated with the CLU boundaries on this file has been deleted by the FSA to protect individual privacy. Attributes that are available to the public include field size in acres.

Data Type:	Vector / Polygon
Attribution:	CalcAcres: Area in acres / polygon
Projection Information:	
	Universal Trans Mercator
	Zone: 17 or 18 (Contingent on locality, refer to UTM map in the Appendix)
	Units: Meters
	Spheroid: NAD 83
Source:	Farm Service Agency through the Natural Resource Conservation Service (NRCS) Geospatial data Gateway

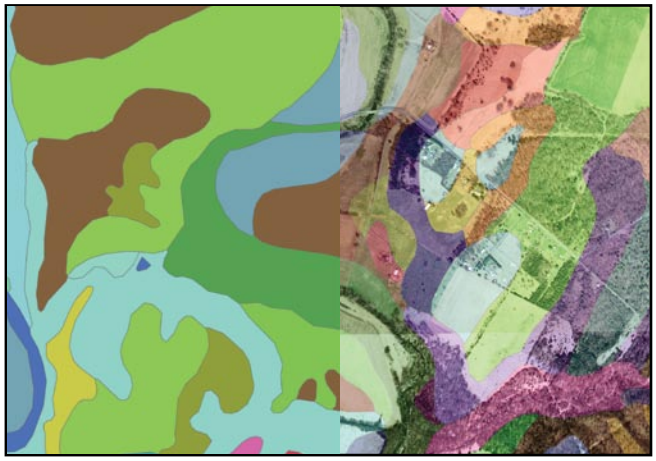
Soils (Soil Survey Geographic Database: SSURGO)

The SSURGO soils data are the most accurate and comprehensive federal soils products available. The levels of soils data include:

- **SSURGO** is the most detailed county-level data.
- **STATSGO** is less detailed statewide map.
- **NATSGO** is a very general soil map of the entire U.S.

The SSURGO level of soil mapping is designed for use by landowners, townships, and counties for natural resource planning and management and regional applications. It is appropriate for watershed planning and some agricultural uses. The user should be knowledgeable about soils data and their characteristics. This database is scheduled to be completed for the entire country in 2008. Approximately 85 percent of all counties in Virginia have digital SSURGO soils data available. The illustration below shows SSURGO soil data (left) and SSURGO soils data made "transparent" and superimposed over aerial photography (right).

The SSURGO soil polygons associated with the Virginia County Data Series have been permanently joined with selected attributes. Not all attributes have been joined to the spatial data. These polygon files are disseminated as Shapefiles, and may be large in size (1 to 2 MB).



Data Type: Polygon

Data Format: Shapefile

Attribution:

MUSYM(Map Unit Symbol) a symbol used to identify the soil map unit on the soil map.

MUKEY – A symbol created by concatenation of the soil survey area symbol (ssaid) and map unit symbol (musym). It uniquely identifies a map unit within a state. For example, ssaid 061 and musym 1 are stored as muid 061001. The muid is used as a key for linking information in the MUIR tables.

SYMBOL – same as MYSYM

NAME – Soil name and general slope information.

KIND – Code identifying the kind of map unit: Consociation; Association; Undifferentiated Group; Complex.

TTLAcres – the total number of acres by MYSYM group

Class – The Prime Farmland Classification of the map unit.

HEL – The highly erodible lands rating for the soil map unit. The rating is based an evaluation of the wind erosion hazard of the components of the map unit. If all components are of a single class that class applies, if not then a 2 (Potential Highly Erodible) is assigned.

HEL Water – The highly erodible lands rating for the soil map unit. The rating is based an evaluation of the water erosion hazard of the components of the map unit. If all components are of a single class that class applies, if not then a 2 (Potential Highly Erodible) is assigned.

Projection Information:

Zone: 17 or 18
(Contingent on locality, refer to UTM map in the Appendix)

Units: Meters

Spheroid: NAD 83

Source: NRCS Geospatial data Gateway

Hydrography

The hydro layer was digitized from the 2002 Virginia Base Mapping Program (VBMP) imagery. This hydro layer includes rivers, streams, ponds, lakes, and other bodies of water. Attribution of this data set is limited. It does not indicate the directional flow of water. The image below shows the hydro layer (left side of illustration) and the hydro layer superimposed on top of aerial photography (right side of the illustration). Also note that only visible water resources were digitized. (Water passing below underpasses was not digitized). This data set is the most spatially accurate available, but it does not conform to National Hydrography Dataset (NHD) specifications (due to limitations associated with attribution, water flow, segmentation, and connectivity).

Intermittent streams are likely not contained in this file. Data was only collected in canals and ditches where water was visible (using aerial photography from spring 2002. It should be noted that 2002 was an exceptionally dry spring in Virginia).

Ancillary data sets contained on this CD or from other sources (including the Digital Elevation Model (DEM), contour lines, and even the Digital Raster Graphic [DRG] can be integrated with this file to support the delineation of flow direction.

Spatial hydrologic features include:

Streams and Rivers – Only streams with visible water will be collected. Streams will be single line up to 8 feet wide for 100 scale, or 30 feet wide for 200 and 400 scale. Double lines, representing left and right bank, will be collected where those dimensions are exceeded.

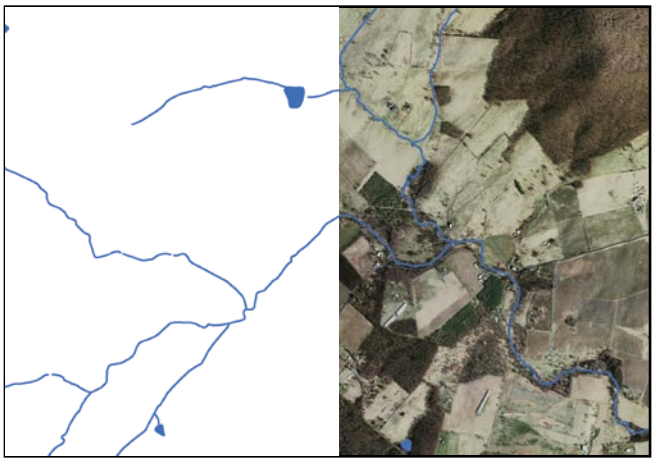
Lakes and Ponds – Lakes and ponds will not be differentiated. Only lakes and ponds with visible water will be collected. The minimum dimension for collection is 100 feet in length or width.

Canals and Ditches – Canals and ditches will not be differentiated. Only canals and ditches with visible water will be collected. Canals and ditches will be single line up to 8 feet wide for 100 scale, or 30 feet wide for 200 and 400 scale. Where those dimensions are exceeded, two lines will be placed, one to represent each bank.

Swamps and Marshes – Swamps and marshes will not be differentiated. Only clearly identifiable swamps and marshes will be collected. The minimum dimension for collection is 1,000 feet in length or width.

Shorelines – Shorelines for the Atlantic Ocean and Chesapeake Bay will be collected at the visible land/water interface. If the shoreline is bordered by tidal marsh, the shoreline will be collected at the land/marsh interface, not the marsh/water interface. Tidal marshes will be collected in Layer 4.

Data Type:	Line / Polygon
Format:	Shapefile
Attribution:	Very limited
Projection Information:	
	NAD 1983
	State Plane Virginia North or South (Contingent on locality, refer to index map in the Appendix)
	Linear Unit: US Foot
Source:	Virginia Geographic Information Network (VGIN)



Digital Terrain Model (DTM)

The digital terrain model was initially generated by Center for Geospatial Technology (CGIT) for the Virginia Geographic Information Network (VGIN) using the mass points and break lines from the 2002 VBMP aerial photography. This effort represents the most accurate digital terrain model (DTM) ever generated statewide for Virginia. The Triangulated Irregular Network (TIN) provides seamless coverage for each county in Virginia. TINs are used to ascertain landscape characteristics and to serve as a topographic model to support surface drapes (for imagery, etc.). Ancillary data sets are often generated from TINs. These data sets may include: slope, aspect, contours, digital elevation models, etc. Note that the DTM is appropriate for general planning purposes only.

Data Type: Tesseral

Format: TIN

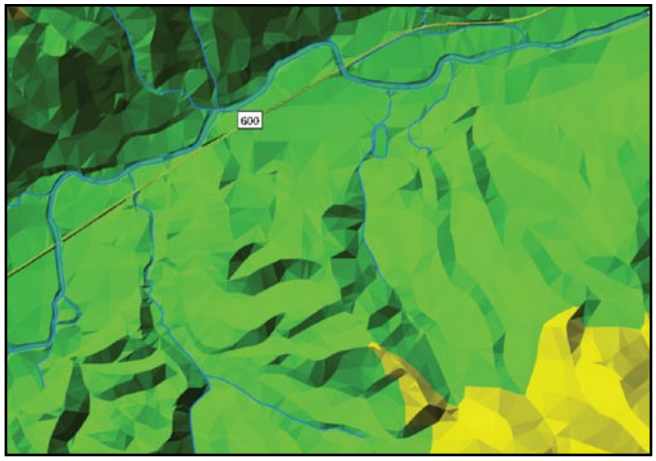
Projection Information:

NAD 1983

State Plane Virginia North or South (Contingent on locality, refer to index map in the Appendix)

Linear Unit: US Foot

Source: The Virginia Geographic Information Network (VGIN)



Aspect

Aspect is the **compass** direction in which a topographic **slope** faces. The aspect layer contained on this DVD is a polygon Shapefile. This layer was generated from the TIN (see the description under DTM). The illustration below shows categorized color-coded aspect data, coded aspect (left side), and categorized (color coded) aspect data made transparent and draped over aerial photography (right side).

The Virginia Geospatial Extension Program developed the aspect layer using the TIN. It is suitable for general (regional) planning purposes. Aspect is often used for suitability analysis purposes in agriculture, economic development, and other site location applications. These data are suitable for general planning purposes only, and should be verified.

Data Type: Polygon

Format: Shapefile

Attribution: In this layer, all surfaces were categorized as being either:

Aspect Code	Direction	Direction (compass degrees)
-1	Flat	–
1	Facing North	>0 – 22.5°
2	Facing Northeast	>22.5 – 67.5°
3	Facing East	>67.5 – 112.5°
4	Facing Southeast	>112.5 – 157.5°
5	Facing South	<157.5 – 202.5°
6	Facing Southwest	>202.5 – 247.5°
7	Facing West	>247.5 – 292.5°
8	Facing Northwest	>292.5 – 337.5°
9	Facing North	>337.5 – 360°

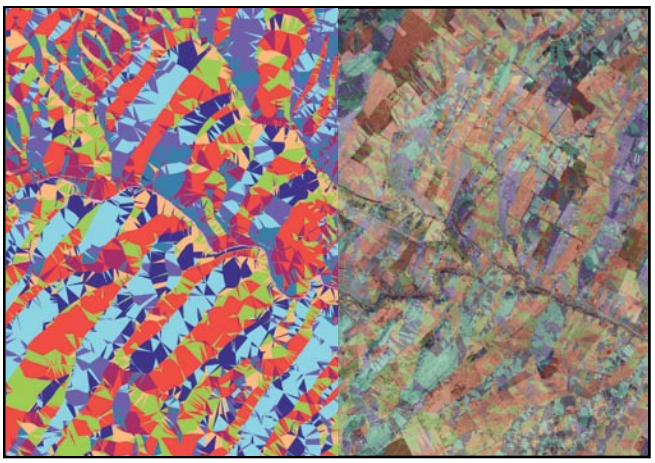
Projection Information:

NAD 1983

State Plane Virginia North or South (Contingent on locality, refer to index map in the Appendix)

Linear Unit: US Foot

Source: Virginia Geospatial Extension Program



Slope

Slope is a measurement of the incline, or the steepness, of a **surface**. Slope was derived from the TIN (see description under DTM on page 6). Slope was generated as a percent slope (which is the rise divided by the run multiplied by 100). The illustration to the right shows slope classifications and hydro (left side) and slope classifications with aerial photography and hydro. Slope layers are often used in site suitability analysis to support economic development, community planning or zoning, agricultural suitability analysis, precision agriculture, natural resource management, and water retention and surface water runoff modeling.

The Virginia Geospatial Extension Program developed the slope layer using the TIN. It is suitable for general (regional) planning purposes and should be verified.

Data Type: Polygon

Format: Shapefile

Attribution: In this layer, all surfaces were categorized as being either:

Slope Code	Slope Percentage
1	0% (Flat)
2	>0% – 2.15%
3	>2.15% – 4.64%
4	>4.64% – 10%
5	>21.5% – 46.4%
6	>46.4%
>8	Overturned

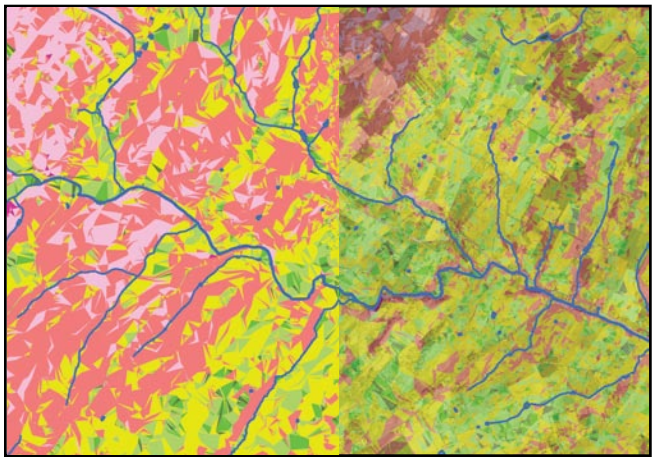
Projection Information:

NAD 1983

State Plane Virginia North or South (Contingent on locality, refer to index map in the Appendix)

Linear Unit: US Foot

Source: Virginia Geospatial Extension Program



Contours

A contour line is an imaginary line (isoline) on the surface of the earth that connects points of the same elevation. These contours are represented as vector data (lines). Each contour line is associated with an elevation (number of feet above sea level) in the attribute database. Contours were generated from the TIN (see description under DTM on page 6). *Note that these contours are suitable for general landscape planning and educational purposes only. They are not survey-grade quality, and are not intended to support applications that require survey-quality data. These contours should be used for general reference and educational purposes only.* The contour interval is 20 feet for counties/localities that lie west of the fall line (I-95 corridor) and 10 feet for localities that lie east of the fall line (I-95). The illustration below shows contours (left) and contours draped over aerial photography (right).

Contours are used as a visual tool to understand general topographic landscape characteristics. In addition, contours can be "queried" so that users can quickly identify areas above or below certain elevations. However, these contours have been interpolated, and are only approximate. Applications requiring precise elevation measurements will require the assistance of a professional surveyor.

The Virginia Geospatial Extension Program developed the contour layer using the TIN (described under DTM on page 6).

Data Type: Line

Format: Shapefile

Attribution: Contour: values are expressed in feet

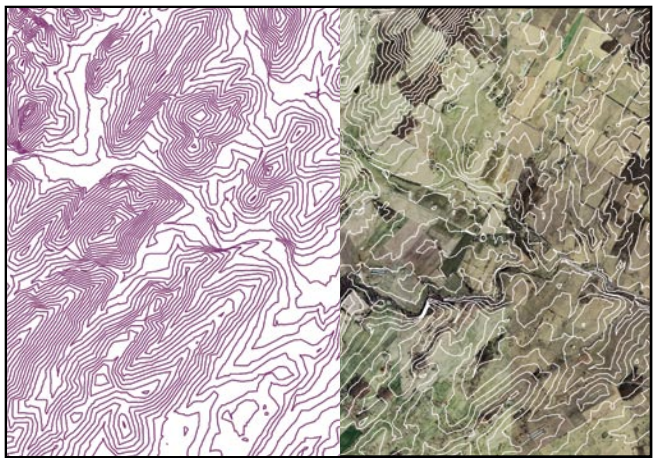
Projection Information:

NAD 1983

State Plane Virginia North or South (Contingent on locality, refer to index map in the Appendix)

Linear Unit: US Foot

Source: Virginia Geospatial Extension Program



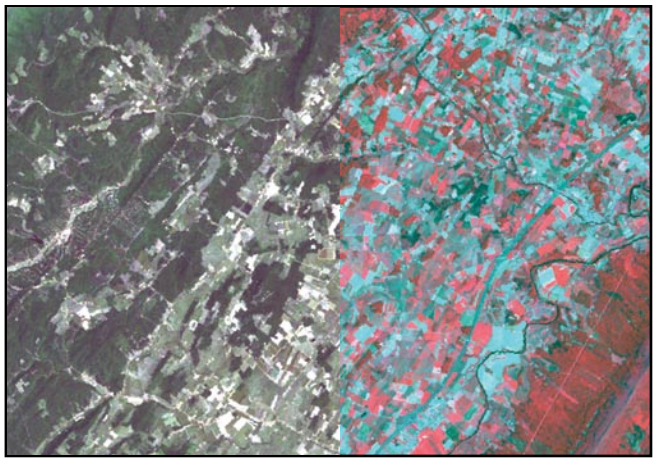
Landsat Satellite Imagery

The Landsat program has been operational since 1972. This program involves generations of Earth-observing satellite missions, and has resulted in one of the most extensive archives of earth imagery available and is the most extensive archive of baseline satellite data available.

Landsat data is often used to assess land-cover characteristics and changes in land cover for regional (county, multi-county, state, and multi-state) areas. It maintains a 30-x-30-meter pixel size. A Landsat image covers an area approximately 115 miles from east to west. Furthermore, Landsat is a multispectral sensor and collects 7 bands of data. This provides additional information and knowledge about many aspects of the Earth's surface that would not be easy to discern otherwise.

Note that due to processing limitations, Landsat imagery is only available for selected counties and localities. Stakeholders can select and download Landsat imagery through VirginiaView (*www.virginiaview.net/*).

Data Type:	Raster
Pixel size:	30 Meter
Data Format:	IMAGINE Image
Projection Information:	
	Universal Trans Mercator
	Zone: 17 or 18 (refer to UTM map in the Appendix)
	Units: Meters
	Spheroid: NAD 83
Source:	VirginiaView / United States Geological Survey (USGS)



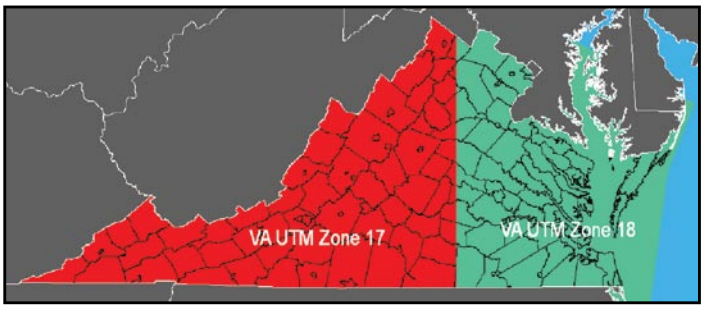
Selected Statewide Layers

In addition to the county-level data, several data sets are made available on a statewide level. These data sets were acquired from state and federal sources, and include:

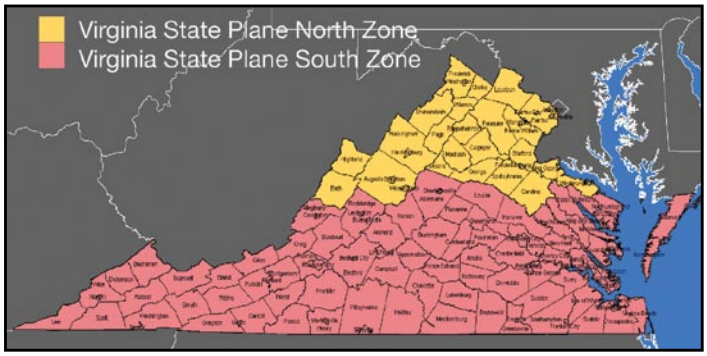
- Selected Census
- Virginia Cities
- Community Colleges
- Congressional Districts (Virginia)
- Counties (Virginia)
- Virginia Cooperative Extension Districts
- Federal Land (Virginia)
- Fire Districts (Virginia)
- Golf Courses (Virginia)
- PhotoTiling Scheme for the VBMP imagery
- K-12 Schools
- Solid Waste Storage Sites
- States (all)
- Tracts (Census Virginia)
- Land Cover (Virginia)
- State Plane Zones
- UTM Zones
- Virginia Department of Health Districts

Appendix

Virginia UTM Zones



State Plane Coordinate Zones



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