

The Virginia Geospatial Newsletter

Showcasing GIS, Remote Sensing and GPS Supported Products and Services in the Commonwealth

Volume 2, Number 2

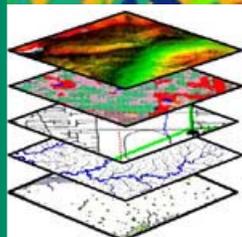
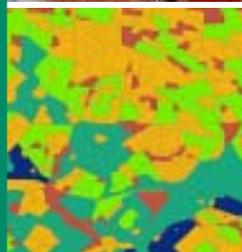
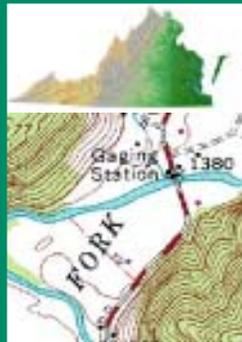
Spring, 2004

The Virginia Geospatial Extension Program is a partnership between the Virginia Space Grant Consortium and Virginia Cooperative Extension

Virginia Base Mapping Program Update: Seamless Statewide Road Centerline and Address Project (RCL)

by Bill Shinar
Coordinator

The Virginia Geographic Information Network



The Virginia Geographic Information Network (VGIN) is working with local governments across the Commonwealth to build a consistent, seamless, statewide digital road centerline file with address, road name, and route number attribution, as part of the Virginia Base Mapping Program (VBMP). The Road Centerline Project (RCL) again leverages the investment of the VBMP digital orthophoto-graphy and is focused on meeting the needs of Wireless (and Wireline) E-911 operations, as well as, a wide variety of other state and local governmental operations. The project will deliver all roads, driveways and trails in the commonwealth over 200 feet in length with addresses, road names, and route attribution.

Background

The Virginia Base Mapping Program (VBMP) as described in a previous article [Fall 2003 Newsletter] produced statewide digital orthophotography for every city and county in Virginia. The ongoing goal of the VBMP is to establish a consistent, seamless base and foundation for local and state government mapping systems (GIS) that will help us all increase efficiency and reduce redundant efforts in developing these systems. The seamless VBMP base is critical to the effective and efficient delivery of wireless E-911 and many other

The Goal of the VBMP is to establish a consistent, seamless base and foundation for local and state government mapping systems (GIS)...

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The Virginia Geospatial Newsletter is a quarterly publication developed through the Virginia Geospatial Extension Program, a partnership between the Virginia Space Grant Consortium (VSGC) and Virginia Cooperative Extension (VCE). The newsletter is published in conjunction with The Virginia Geographic Information Network (VGIN).

The purpose of the Virginia Geospatial Newsletter is to highlight innovative geospatial products and services throughout the commonwealth and to widely disseminate geospatial knowledge and awareness throughout Virginia.

If you have suggestions or comments, or if you would like to contribute to the newsletter, please contact John McGee at the Virginia Geospatial Extension Program (jmcg@vt.edu or [540] 231-2428).

Regional Initiatives

by:

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Virginia Geospatial Extension Program

In response to an increasing regional demands for education and public awareness regarding the potential applications of geospatial tools to facilitate economic development, workforce development, planning, and resource management at local and regional levels, two regional geospatial symposiums were held earlier this spring .

The Fifth District Symposium

Congressman Virgil Goode's office, in partnership with the Virginia Space Grant Consortium (VSGC), the Virginia Geospatial Extension Program, Virginia Cooperative Extension, Virginia Tech, Averett University, and Danville Community College organized a Geospatial Symposium for Virginia's Fifth Congressional District.

The purpose of *Location Location, INFORMATION! Using Space Age Technology to Further Economic Development in Virginia's Fifth District* was to facilitate the awareness of geospatial applications in economic development, workforce development, and resource management. The symposium was held at the Institute for Advanced Learning and Re-

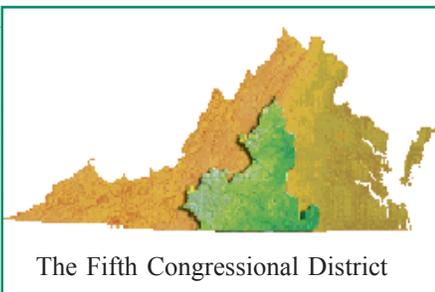


Interactive workshops provided additional learning opportunities

Regional Symposiums Generate Geospatial Awareness

search (IALR) in Danville on April 21, 2004, and was attended by approximately 170 participants. Symposium participants representing an array of service areas and professions which included local governments, extension agents and district directors, economic developers, public administrators, local public safety officials, and educators were on hand from every corner of the Fifth District.

In addition to a sessions that featured 20 different presenters, attendees also had access to the *Geospatial Applications Hall*. This exhibit hall was comprised of over 15 booths, that provided additional geospatial educational opportunities and live demonstrations of applications and services.



The Fifth Congressional District

Participants at the symposium also had access to a series of geospatial workshops that included hands on GPS exercises, curriculum concepts using GIS and GPS in

precollege education, and techniques for visualizing GPS data using aerial photography. An introductory ArcGIS workshop was also offered.

Due to the financial support of the sponsors, and the financial and in-kind contributions of the symposium's organizers, there were no registration fees for the symposium and workshops . Sponsors included: Environmental Systems Research Institute (ESRI), The Virginia Community College System Institute of Excellence in Advanced Technology (IE-AT), SpaceImaging, and the Future of the Piedmont Foundation.

For more information about the symposium, refer to the 5th District Symposium Web Page (<http://www.vsgc.edu.edu/>). Archived Webcasts of selected portions of the symposium are also available online: <http://164.106.50.133/Events/IALR/>

[IALR_GIS.htm](#) (note that some of the Webcasts are of higher quality than others...).

Thomas Nelson CC Symposium

On April 28th, a workforce development symposium was held at Thomas Nelson Community College in Hampton, Virginia. The purpose of this symposium was to demonstrate how geospatial products and services are currently being used at local, regional, and state levels throughout the Commonwealth, and to demonstrate how these tools support a variety of employment areas. Presenters included Matthieu Denuelle (ESRI), Bob Rike (Virginia Geographic Information Network [VGIN]), Stuart Blankenship (Virginia Economic Development Partnership [VEDP]), Korine Leonard (York County), and John McGee (Virginia Geospatial Extension Program).

The Thmoas Nelson Workforce Development Symposium was organized through a partnership between Thomas Nelson Community College and the Virginia Geospatial Extension Program . This symposium was sponsored by EMA, Inc.



Congressman Goode addressed the plenary session through live video-feed

NASA Langley DEVELOP Program Demonstrates Community Benefits of Earth Science

At NASA Langley Research Center in Hampton, Virginia, there is a student program extending the benefits of NASA's Earth Science program to communities. The DEVELOP Program enables students to apply Earth science research results to assist communities in addressing local concerns. Students tackle problems presented to them by state and local governments using NASA technology and research. These activities focus on Earth Science Applications of National Priority, which are: Coastal Management, Water Management, Ecological Forecasting, Invasive Species, Homeland Security, Agricultural

visualizations. These visualizations assist the public in understanding how science and technology can be applied to local problems. For example, in Patrick County,

...visualizations assist the public in understanding how science and technology can be applied to local problems.

Virginia, the students created a visualization model of cellular "dead



This is a student created visual showing the cellular "dead zones" in Patrick County, Va.

meetings. This generates interest in DEVELOP activities and often leads to more project requests from communities. These projects usually require partnerships with industry, non-profit organizations and local governments to attract supporting resources. NASA contributes by funding students and provides information and science advisor support. These alliances attract technology and education benefits to communities. Once NASA students complete a project, communities are often inspired to support other student research activities.

In addition to research projects, DEVELOP provides computers for schools. Students take excess government computers, refurbish them and establish computer labs at Title I and Empowerment Zone schools. These labs include Earth Science education materials.

The DEVELOP program began in 1998 with three students and has expanded to become a national program that has included over 500 students. High school through graduate level students from across the country are eligible to participate. The DEVELOP National Program Office is headquartered at NASA Langley Research Center. The program office is supported by other NASA centers, including Ames Research Center in California and Stennis Space Center in Mississippi, in addition to local community representatives across the country.

(Continued on the bottom of Page 7)



Students overlay different sets of data together to create one meaningful visualization.

Efficiency, Energy Management, Aviation, Air Quality, Carbon Management, Public Health and Disaster Management. Students gain real world experience working with community leaders on projects addressing these areas of concern.

Students take NASA data sets and layer them with other information, such as maps, to create 3-D computer generated

zones," using NASA information. Other projects included identifying coal impoundment pollution, West Nile Virus habitats, urban encroachment, pollution in rivers, and local flooding issues.

DEVELOP students regularly present their projects at high level forums, such as governors' conferences and association

The VBMP Road Centerline Project

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government services and is a critical component in the development of spatial data guidelines and a standards, supporting the cost-effective sharing of GIS data and expertise across the Commonwealth.

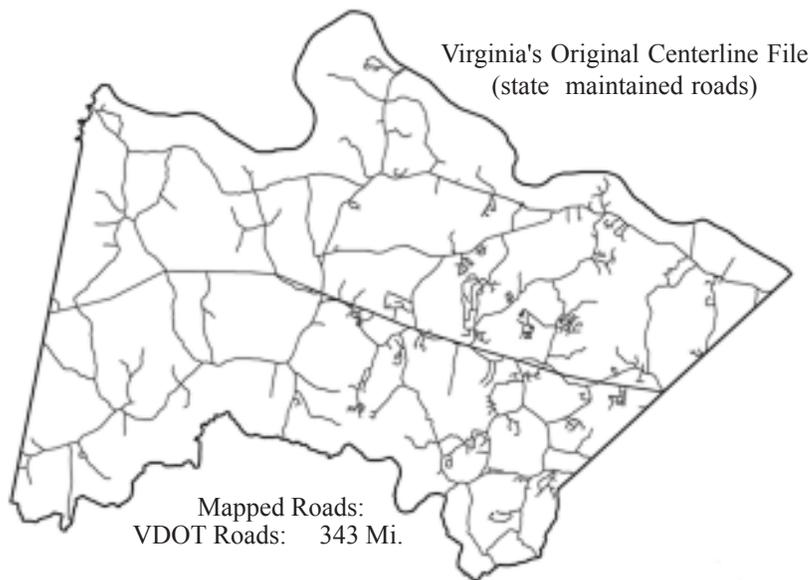
With significant cost savings (cost avoidance) realized by essentially making “group purchase” of digital orthophotography through the VBMP (estimated at upwards of 50%), VGIN was asked by the Wireless Services Board to invest the remaining VBMP appropriation into development of a statewide: (1) digital hydrography file (streams, rivers and lakes) and (2) a seamless digital street (road) centerline file with addresses, street names, and other appropriate attribution.

The VBMP Road Centerline project (RCL) involves several steps including:

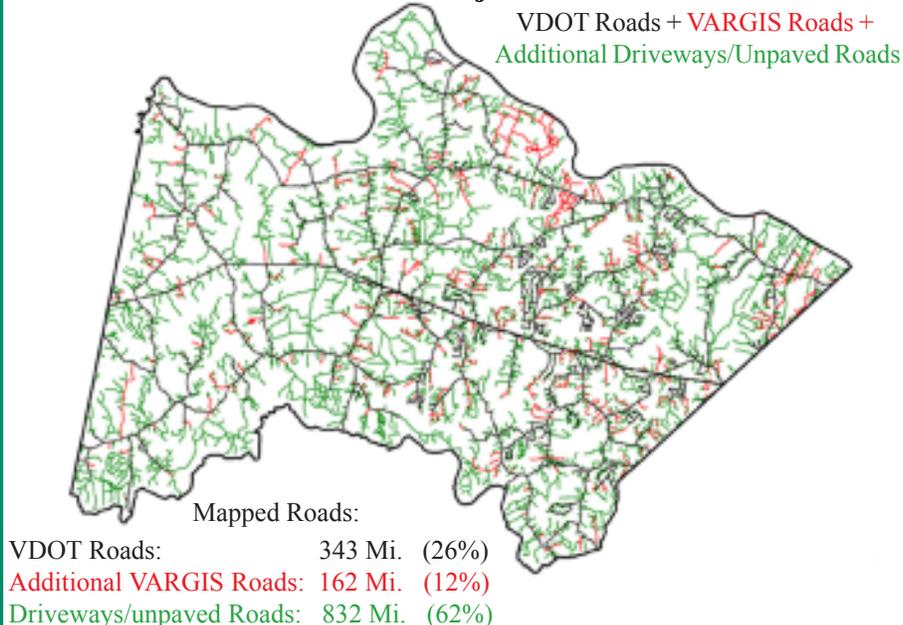
1. Digitizing of all roads and trails over 200 feet in length visible in the VBMP orthophotography.
2. Collection of digital road and address range datasets from local governments.
3. Conflation (transfer) of the Local Government road attribution data onto the newly digitized VBMP road centerline line work.
4. Quality control of the “draft” road centerlines by local governments with resolution of any differences between new and previously existing files.
5. Quality controlled road centerlines are returned to VGIN.
6. Conflation of the VDOT road data (VDOT maintained road centerlines and attribution including route numbers, exit numbers, mile markers) onto the quality controlled line work and final resolution of any differences.
7. Delivery of the finished County/ City Road Databases to each local government.

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Powhatan County Before the VBMP RCL Pilot Project



Powhatan County: Results of the VBMP RCL Pilot Project



Through the VBMP Road Centerline Project, all roads and trails, public and private, paved and un-paved, surfaces that are accessible by a two wheel drive vehicle are being captured. In addition, the RCL project is also capturing driveways over 200 feet in length for every locality in Virginia.

From Research to Decision Support: VAccess-MAGIC Supports Public Health

by:
Hank Wolf and Zuotao Li
Center for Earth Observing and Space
Research,
George Mason University

In 2003, Lyme Disease, [ticks] and malaria [mosquitoes] were reported in Virginia, and, in 2002, mosquitoes were the assumed cause of human West Nile Virus (WNV) cases. Increased public awareness resulted of vector diseases, health risk factors and their geospatial/temporal characteristics. Complex disease lifecycles and risk factor interrelationships demand protocols to visualize data that enables public health officials to monitor events, detect trends, identify geographic areas for in depth studies, apply mitigation strategies and provide public education.

Case data, collected by health organizations, is reported at county levels to state and federal entities and mapped as layers in a GIS, that integrates demographic, social, economic, political and physical data layers. These can be used to identify areas providing environmental conditions suitable for vector pools. Up-to-date remotely sensed environmental data, (surface temperature, precipitation, land cover type, vegetation cover and many other parameters) are integrated with measurements and spatial correlations with potential risk factors as well as the disease occurrence in any region of interest. The evolution from geographic information and remote

sensing research to Decision Support System (DSS) applications, has the potential to change the way we provide public health services in society.

Studies, led by David Wong, George Mason University, and Thomas Allen, Old Dominion University, focused on the disease vector (e.g. mosquitoes), its sentinel [dead birds], and surveillance and control. In figure 1, West Nile Virus Surveillance for January - December, 2002-2003, the Virginia Health Department captured data on dead birds

used to estimate high risk areas that match the human cases recorded. Remote sensed data and a spatial statistical model are used to identify high risk areas based on landscape characteristics. They overlap.

Spatial analysis and data mining methods can determine relationships among geographic patterns of disease distribution and physical/social environmental conditions. To identify environmental risk factors that link to public health issues, tools are needed to handle/analyze large volumes of

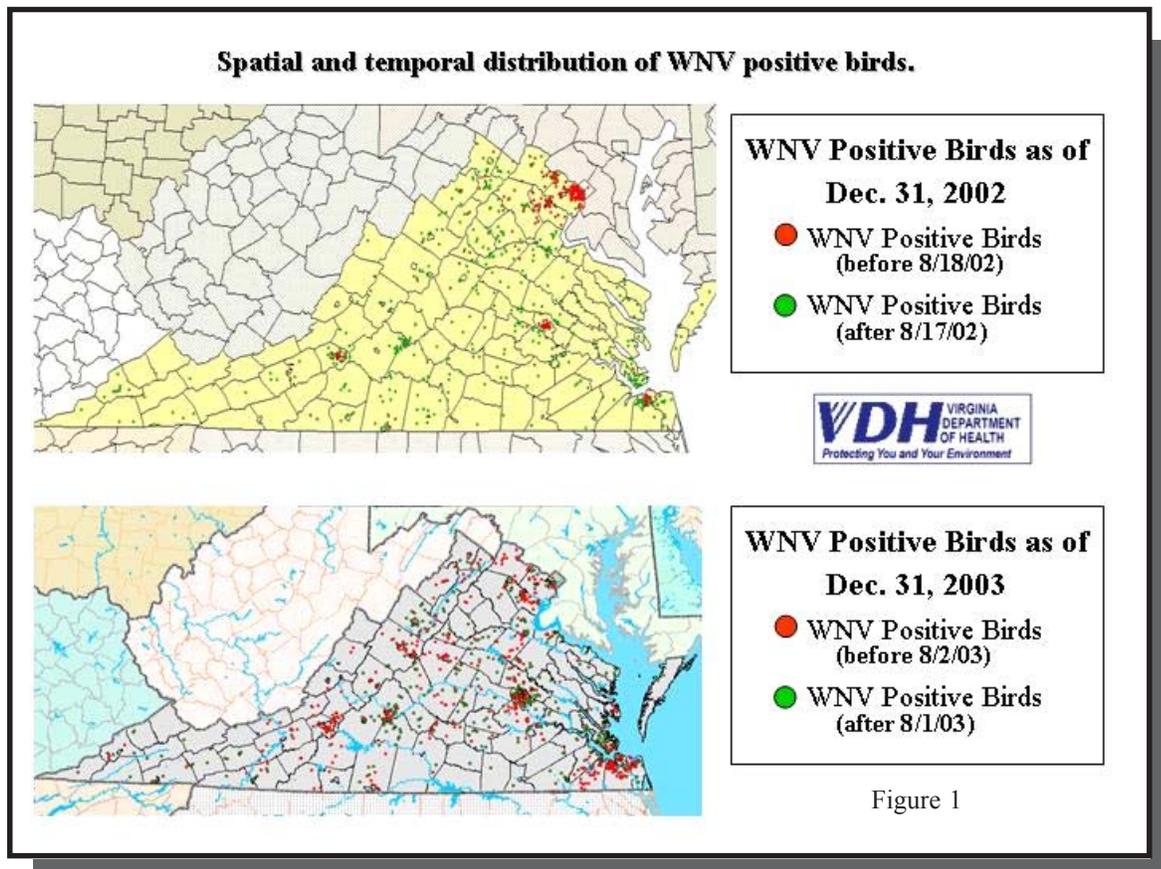


Figure 1

who tested positive for WNV. The bird locations serve as a sentinel for areas with high probability of infected mosquitoes and WNV risk.

We address a WNV case study via dead bird data, and spatial statistical methods

geospatial data sets and facilitate hypotheses building. One such tool is the dynamically conditioned choropleth maps, (CCMAP), developed at GMU. Figure 3 shows a three class conditional choropleth

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GIS and Public Health

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map with disease incidence for different levels of precipitation rate and poverty level. The technique can be applied for variables of any ordered data set, even for one state and its counties. Stratification into three classes for each variable yields

a 3 x 3 layout of partial maps. In this case, the left, middle and right columns contain regions with low, medium and high levels of precipitation, respectively. There are three dynamic partitioning sliders that enable the researcher to define the meaning of low, medium and high values. The slider at the top controls the assignment of color to regions based on lung cancer mortality rates in each row. The dynamic interaction is helpful in seeing clusters or spatial patterns and formulating hypotheses. In this case, most blue appears

in the West and much of the red appears in the Southeast. Other patterns, such as relationships among the selected variables, may be explored through user interactions as well.

For more information on VAccess-MAGIC, contact Hank Wolf (hwolf@gmu.edu) and Zuotao Li (zli@gmu.edu) at CEOSR, George Mason University or visit VAccess-MAGIC website at: <http://philler.scs.gmu.edu/VAccess/http://philler.scs.gmu.edu/VAccess-MAGIC>

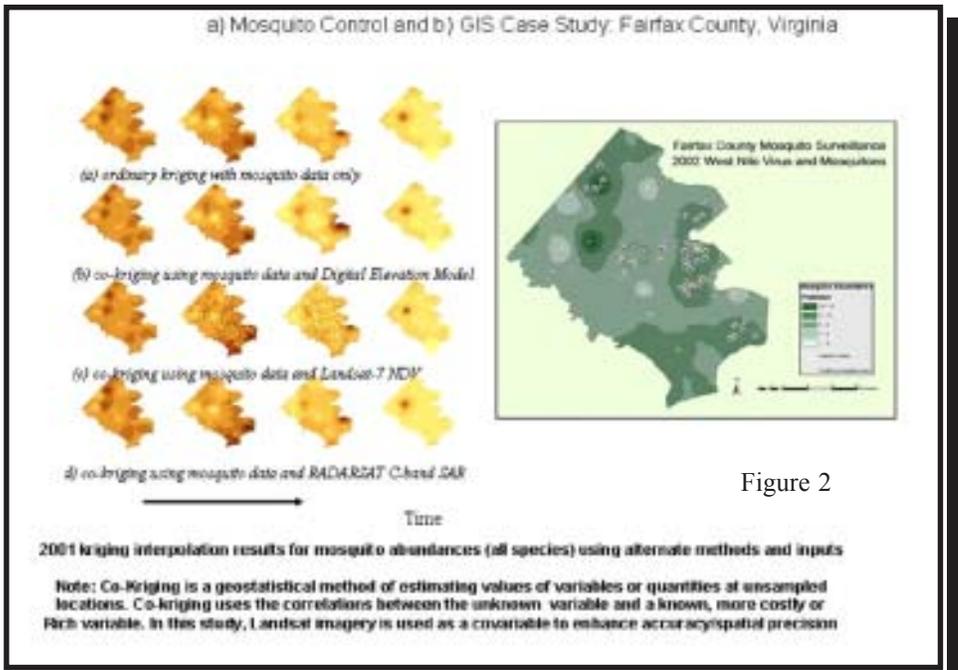


Figure 2

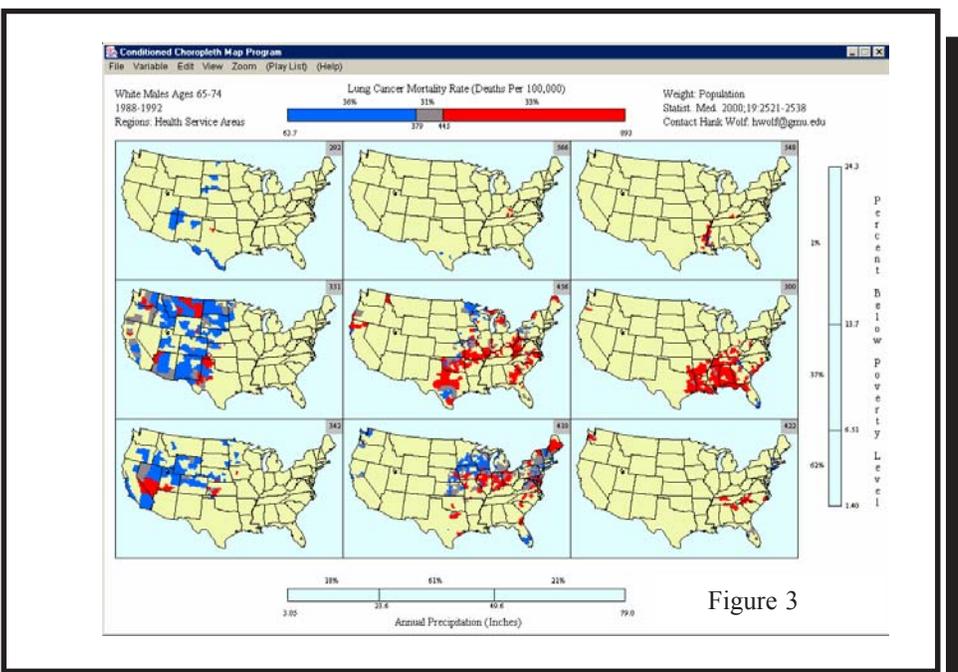


Figure 3

2004 Virginia GIS Conference

November 8-9, 2004

Hotel Roanoke

For additional info., check the Web

<http://www.rvarc.org/vagis/>

Save the Date!!!

Cosponsored by the VAPDC and VAMLS

Local Applications of VBMP Imagery

by Robert M. Love
GIS Coordinator
Halifax County

In 2002, The Commonwealth of Virginia distributed the foundation for a fully functional GIS program to every locality. This was in the form of aerial imagery known as The Virginia Base Mapping Program (VBMP) imagery. This was done in part through an effort by the General Assembly to facilitate GIS efforts at local levels and to create a consistent basemap throughout the state. In addition, the program enabled localities to achieve the goal of fully functional wireless E-911.

Using GIS Software applications, any locality can immediately begin using the VBMP Imagery. One might ask what can be done with the images? Imagery can certainly be used as a basemap from which other layers or datasets can be developed. But there are many more applications that are supported by the imagery that provide additional benefits to localities.

In Halifax County, the images have been utilized in review of property for Tax Reassessment purposes. We have used



Halifax County, VA
Interactive Geographic Information System

Welcome to the Halifax County, VA Interactive Geographic Information System.



them as a first visual review of Zoning Violations. In public meetings dealing with Zoning, Rezoning and Conditional Use permits, printouts have been invaluable in displaying the overall area affected by the proposed use. In addition, the local Drug Task Force and Commonwealth Attorney has used printouts as courtroom exhibits depicting crimes scenes by labeling where evidence was found. We have also used the images jointly with VDOT to cite new roadways for private landowners and with the Department of Game and Inland Fisheries for the locating of suitable recreational boat landings. We also developed a Web based Interactive

Mapping site that enables the public to view the images (<http://arcims2.webgis.net/halifax/>). The farming community have provided us with good feedback on this Website as the information has aided them in crop and forestry management. The potential products and services that can be developed with the support of the VBMP imagery are endless. These products and services can directly benefit citizens, various governmental departments, and elected officials. In addition, such services can also be used to build public support of a fully functional GIS Initiative in your locality.



NASA's DEVELOP Program

(continued from Page 3)

DEVELOP is a year round activity that operates on semester terms. If you are a student interested in applying, visit the DEVELOP website at <http://develop.larc.nasa.gov>.



Summer 2003 DEVELOP students.

The Virginia Economic Development Partnership: A GIS Profile

by Stuart Blankenship
GIS Manager

The Virginia Economic Development Partnership

Only a few locations can guarantee the right combination of resources that are crucial for business success. Virginia is one of those locations. The Commonwealth of Virginia offers a unique and diverse combination of resources that have encouraged businesses to prosper for nearly 400 years. To communicate the state's assets to corporate decision-makers worldwide, the Virginia Economic Development Partnership (VEDP) relies on an assortment of GIS tools.

Through its internal GIS system featuring ArcGIS and ArcSDE technology, VEDP streamlines the site selection process. Where is the closest highway? What are

produce maps for proposals and marketing brochures. With select criteria, VEDP can produce statistics, topography and aerial photography to conduct virtual site tours from anywhere – allowing for less time spent on the road and more time getting down to business.

Headlining the Commonwealth's GIS resources is VirginiaScan™, the state's innovative site and building database search system that puts Virginia at the fingertips of corporate decision-makers. Although it contains less information than VEDP's internal GIS system, VirginiaScan™ can be accessed anytime on VEDP's Website, <http://www.YesVirginia.org>. Users can search

For the Commonwealth's regions and localities, VEDP offers VanillaScan™, an interactive tool that allows Virginia's local economic development professionals to individually update their community's database in VirginiaScan™. In addition to ensuring consistent information on both the state and local level, VanillaScan™ allows Virginia's communities to use VEDP's database and GIS technology on their own web sites – at no cost. Although VanillaScan™ pulls information directly



from VEDP's server, the online database can be tailored to fit the individual look of each community's own web site.

With these three invaluable resources – Virginia's internal GIS system, VirginiaScan™ and VanillaScan™ – VEDP can minimize turnaround times and provide unparalleled service and information to corporate decision-makers.

The Virginia Economic Development Partnership, a marketing organization, was created by the Virginia General Assembly in 1995 to encourage, stimulate, and support the development and expansion of the economy of the Commonwealth. The Partnership is a state authority, which is governed by a 15-member Board of Directors appointed by the Governor. To accomplish its objectives of promoting economic expansion, the Partnership focuses its efforts on business recruitment, expansion and international trade development.



the building requirements? Who provides local utilities? Virginia's business development managers can efficiently answer prospects' questions with up-to-date information on the Commonwealth's regions, localities, sites and buildings. VEDP also uses GIS technology to

an online database of more than 1,800 Virginia sites and buildings from anywhere in the world. Using ArcIMS, VirginiaScan™ provides one of the fastest, most accurate and comprehensive preliminary site searches on the web.



by Dan Mertz
GIS Specialist
Farm Service Agency

GIS Applications Through the USDA's Farm Service Agency

The United States Department of Agriculture's Farm Service Agency (FSA) maintains a network of 50 local offices in Virginia for the purpose of administering national farm commodity programs, farm loan and ownership programs, and other services targeting the well being of American Agriculture.

Many producer benefits are based on planted and harvested acreages. Other programs depend on farmland use. Until recently, program administration relied on seasonally recorded aerial 35mm slides, on infrequently updated 24" X 24" orthorectified hard copy imagery and direct visits to farms and farm fields.

For years, farm field and farm tract boundaries were hand-drawn on the 24" X 24" imagery. The data, identification numbers, acreages, conservation determinations and other elements, was then added as labels. Depending on the size of the county, 50 – 150 of these "maps" are used to aid farm program administration.

Now, GIS is replacing the old mapping system. By the end of 2004 Virginia will have digitized all of the old maps for every county in the state. All of the lines on the old imagery are being transferred to an ArcView shapefile using heads-up digitizing on a digital orthophoto quadrangle (DOQ). The shape file is called the Common Land Unit (CLU) layer.

The base set of data complimenting the common land unit includes farm number, tract number, calculated polygon acreage, erodibility class (HEL), land class and other farm field characteristics.

FSA will use the base layer along with frequently updated digital imagery and other data to administer programs, monitor compliance and respond to natural disasters. Producers will be able to obtain the portion of the CLU shapefile specific to their operations. In addition,

While there is a steep learning curve associated with GIS and GPS, the resulting savings in time and manpower associated with regular program administration



Phyllis Harris, Program Technician at FSA's Bedford Service Center, reviews the county's common land unit (CLU)

ortho-imagery obtained annually for compliance determinations will be placed in the public domain available for a nominal processing and handling fee. Currently, the planned price (per county) ranges from \$40 - \$50. Acquisition information is supplied by FSA's Aerial Photography Field Office (APFO) in Salt Lake City, Utah: <http://www.apfo.usda.gov> (or call 801.975.3503).

Modernization of service center mapping is completed with the addition of global positioning systems in each Virginia service center. FSA will use GPS to provide program dependent measurement services to producers. The coordinates captured with the differentially corrected units can be downloaded to a GIS and converted to shapefiles complete with acreage calculations. These shapes can then be used to modify and update the CLU shapefile.

One meter-true color orthophotography was flown for Virginia in the Summer of 2003 (1:7920). This imagery is available to the public for \$40 - \$50 / county.

promises to be great. Producers will also benefit.

In the winter edition of the Virginia GeoSpatial Newsletter, Dr. Pamela Thomas provided an update on the status of Virginia's SURGOII soils shape files. These soils files used along with FSA's common land unit shapefiles and ortho imagery will facilitate farm planning, development of crop production strategies and decision making on the farm.

Additional information on FSA's use of GIS, GPS and creation of the common land unit layer can be found at:

- <http://www.fsa.usda.gov/pas/publications/facts/html/gis03.htm>
- <http://gis.esri.com/library/userconf/proc00/professional/papers/PAP353/P353.HTM>
- <http://www.esri.com/news/arcuser/0402/usda.html>





How do you work with elevation data in ArcGIS?

by Peter Sforza¹ and Bill Carstensen²

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Slope and aspect are important factors in determining the amount of sunlight a site receives. This has an impact on biological processes, soil properties, snowmelt, and climate. Slope is an important consideration for erosion, engineering of buildings and roads, or assessing site suitability for a particular crop (Figure 1).

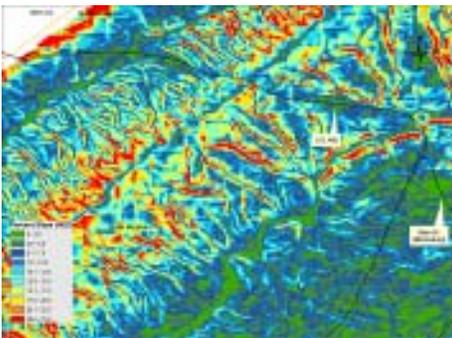


Figure 1: Slope map for Brush Mountain

The National Map provides access to public geospatial data for the entire U.S. through the USGS Seamless Data Distribution website (<http://seamless.usgs.gov/>). Numerous layers are available for viewing and download, including National Elevation Data, National Land Cover Data (NLCD), SRTM, orthophotography, MODIS, and other data. In this article, we will demonstrate how to download, import, project, and perform accurate slope and aspect calculations using National Elevation Data (NED) and ESRI ArcGIS 8.x software.

National Elevation Data for Slope and Aspect Calculations in ArcGIS

NED is a seamless digital elevation model for the entire United States which can be easily extracted from the website interface. There is a limitation of 100 MB per tile that can be downloaded, so that a large selection area will result in multiple files. For example, fourteen tiles were needed to cover 1 arc-second NED for the extent of Virginia, Maryland, Delaware, and West Virginia.

The Seamless Data Distribution of NED is based on the World Geodetic System of 1984 (WGS84). National Elevation Data is provided with latitude and longitude measured in decimal degrees and elevation measured in meters. For slope and aspect calculations, it is important to project the data from a geographic coordinate system (GCS) to a more suitable projection, such as Universal Transverse Mercator (UTM). The reason that such a transformation is needed is that latitude and longitude are measured in degrees and elevation is measured in meters. This would be less of a problem if x- and y-lengths of individual grid cells were equal. For example, in Blacksburg, Virginia, one degree of latitude is approximately 69 miles and one degree of longitude is approximately 54 miles, creating latitude and longitude coordinate systems resulting in grid cells with unequal x- and y-lengths. This can lead to large errors in slope calculations. This is because slope calculations in ESRI ArcGIS Spatial Analyst are based on the maximum rate of change for each cell and its eight surrounding neighbor cells. The equation used to calculate percent slope (rise divided by the run times 100) does not account for differing x- and y-lengths of a cell and eight surrounding cells. This problem also arises in aspect calculations, in which values are assigned to cells using the steepest downslope direction from each cell to its neighbors. Spatial Analyst does provide a z-factor, which allows for constant unit conversion (e.g. feet to

meters), but this cannot resolve the problem of different x- and y- lengths of individual cells.

Procedure for NED projection and slope/aspect calculation

1. Define the extent and DEM resolution of the data to be downloaded from the USGS Seamless Data Distribution website (<http://seamless.usgs.gov/>). The entire U.S. is available at 1 arc-second (approximately 30 meters) resolution. In Virginia, 1/3 arc-second (approximately 10 meters) NED is available for western parts of the state.

2. When the SDDS Request Summary Page is displayed (figure 2), click on the 'Modify Data Request' button to specify the data format (options: ArcGrid, TIFF,

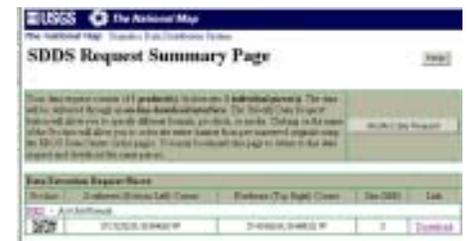


Figure 2: SDDS Request Summary Page

BIL, GridFloat), archive format (options: ZIP, TGZ), metadata format (options: HTML, TEXT, XML). Notice on the Modify Options page (figure 3) that the data use the WGS84 coordinate system for display. It will be important to project the data (step 5) into an appropriate coordinate system if the elevation data

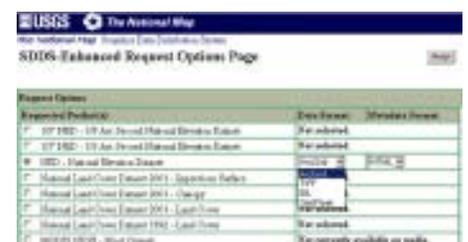


Figure 3: The Modify Options Page

(Continued on Page 11)

Slope and Aspect with the NED

(Continued from Page 10)

will be used to derive slope or aspect.

3. Download the data. When downloading large areas, the data will be broken into smaller pieces (maximum of 100 MB per piece). Once imported to a GIS, these pieces will align perfectly, without overlap.

4. Extract the data using appropriate software (WinZip, WinRAR, etc.). Metadata and a shapefile of the extent are included along with the actual elevation data.

5. If the data were downloaded in multiple tiles, you need to use the spatial analyst's Raster Calculator and the mosaic function to make a single grid prior to this step. Turn on the Spatial Analyst. For example, in the raster calculator you would create a new grid by entering an equation like:

mosaic(name1, name2, etc.) – replace name1, name2 etc. with the actual grids to be combined

After running mosaic, or if the data were downloaded all in one tile, use the ArcToolbox (figure 4) Project Wizard (coverages, grids) to convert from WGS84 to a suitable projection for the location of the data. Virginia is divided into two UTM zones (17 and 18). If the extent of the data crosses both zones, select the zone that contains most of your data. The projection will be slightly less accurate



Figure 4: The Projection Wizard

for data in the unselected zone, but should be adequate for most work. The extent selected from the National Map in this example falls in UTM zone 17. Be certain

that the projection provides units in meters. Meters are the standard for the Universal Transverse Mercator grid system, and will make the horizontal and vertical units equal.

6. Add the UTM elevation grid to ArcMap. If not already active, turn on the Spatial Analyst (SA) extension and select Options from the SA toolbar (Figure 5). Set the working directory and optional analysis mask. Click OK to close the options menu.

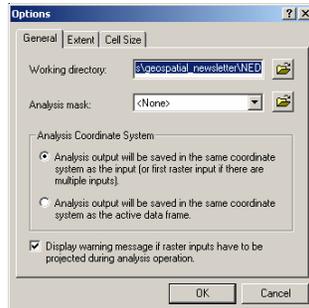


Figure 5: The Options Menu

7. On the SA toolbar, choose 'Surface Analysis', then 'Slope...' (Figure 6). The z-factor should be one and the output cell size will vary with location (by latitude), but should be nearly 27.72 meters (Figure 7).

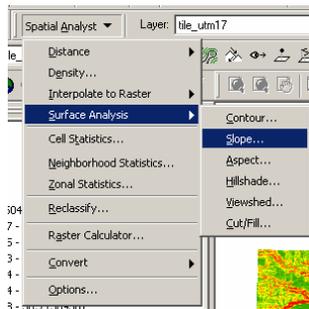


Figure 6: The SA Toolbar

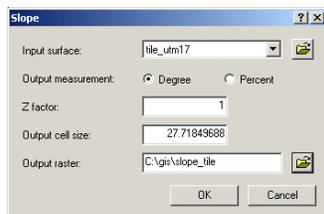


Figure 7: Slope Options

8. Calculate aspect from the SA toolbar

by selecting 'Surface Analysis', then 'Aspect...'

Considerations:

NED were developed from various sources, primarily from scanned hardcopy USGS topographic maps.

Some artifacts exist, originating from differences in source data, technology, etc. over the long period of time and person hours required to implement the National Map. Also, please consider the scale of the data for your particular application.

References

1. USGS. Seamless Data Distribution System: National Elevation Dataset. [On-line]. URL: <http://gisdata.usgs.gov/NED>
2. Gesch, D., Oimoen, M., Greenlee, S., Nelson, C., Steuck, M., Tyler, D. The National Elevation Dataset. Photogrammetric Engineering and Remote Sensing 68 (1): 5-11. On-line version: http://www.asprs.org/asprs/publications/pe&rs/2002journal/january/january_frame.html



Look for these upcoming articles in forthcoming editions of the Virginia Geospatial Newsletter:

The Extension Agent GPS Program

Using the Virginia Base Mapping Program's (VBMP) digital terrain model (DTM) to generate slope and aspect in ArcGIS...

Using VBMP data (imagery, DTM's) to generate "virtual fly throughs"...

The VBMP Road Centerline Project

(Continued from Page 4)

8. Delivery of adjacent County/City Roads with standardized data attached (road names and address ranges, VDOT route number, etc.) in regional Road datasets for use by localities.
9. Scheduled Update and Maintenance.

Status of the VBMP RCL Project:

VGIN has completed steps 1 & 2 above and we are working on steps 3 and 4 – “conflation” of the datasets and local government “quality control”. During the “conflation” process, VGIN is identifying areas where the digital roads provided by local governments do not match the roads in the aerial photography and/or where the extent of responsibility for road centerline and addressing data between localities conflict. The major focus of this project is to insure that the local government addressing data is not compromised. As a result, once local government road data and addressing is conflated into a seamless road dataset, instances where “new” and “old” data do not conform will be identified, and conflicts between the

The VBMP RCL project will result in a consistent, high resolution road centerline file that will support statewide address matching.

sources must be resolved by each locality as part of the quality control process.

Schedule:

VGIN should complete testing the road centerline quality control process this

spring. Beginning on May 21 VGIN will be receiving at least six county and/or city road centerline files each week. Once these files go through a quick quality control process at VGIN they will be forwarded to each county or city for local quality control and resolution of any technical issues. VGIN (Bob Rike) will contact each local government to arrange



for the delivery of the “draft” files to the local government for quality control and schedule the local government quality control process. VGIN will also provide a workbook with step by step quality control procedures and will work with each local government to establish a reliable plan for ongoing updates of the digital files. Once the local government has completed quality control of the “draft” road centerline data and returned it to VGIN, VDOT’s attribution (i.e. route numbers, exit numbers, etc.) will be added and the final local and regional products will be produced and delivered back to the local government.

The following map shows the anticipated delivery schedule by locality.

Once all data conflicts and issues are resolved, VGIN will deliver two products to each locality:

- The VBMP digital road centerline data for the individual community with all local government attribution plus standardized addresses, road names, and route numbers.
- A regional VBMP digital road centerline dataset containing all digital roads, driveways and trails for all communities surrounding any jurisdiction/local government, with standardized data

attribution (i.e., road names, address ranges, VDOT route numbers, etc.).

Questions about the VBMP Road Centerline Project should be sent to VGIN’s special email at VGIN_LG@vgin.virginia.gov



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