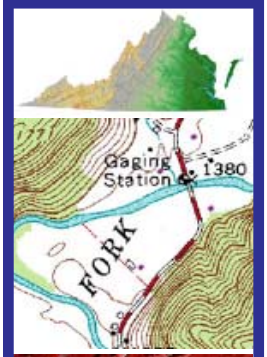
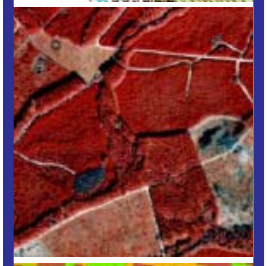
The Virginia Geospatial Newsletter

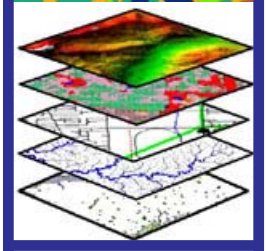
Showcasing GIS, Remote Sensing and GPS Supported Products and Services in the Commonwealth

Volume 7, Number 1 **Winter, 2009**

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







For more information contact:

The Virginia Geospatial Extension Program
(540) 231-2428
www.cnr.vt.edu/gep
jmcg@vt.edu

The Virginia Geospatial Extension Program: Facilitating Tourism Development Along the Blue Ridge Parkway

By:
John McGee, Geospatial Extension Specialist,
Virginia Geospatial Extension Program

A multidisciplinary research team is working on a project to support the planning and development of a sustainable tourism centerpiece and information center for the Rocky Knob area along the Blue Ridge Parkway in Virginia. The multidisciplinary research team, which includes faculty and staff from the Virginia Geospatial Extension Program (Virginia Tech College of Natural Resources, Department of Forestry), Virginia Tech's Department of Hospitality and Tourism Management (Pamplin College of Business) and Clemson University (Department of Parks, Recreation and Tourism Management and Department of Planning and Landscape Architecture), received funding from the National Park Service and Blue Ridge Heritage, Inc. (BRHI).

When constructed, the destination centerpiece/visitor center will take into account and augment the unique environmental, cultural, and economic fabric of these communities.

The grant, obtained with the assistance of Congressman Rick Boucher, is providing support for the principal researchers' work, their undergraduate and graduate assistants, field work, equipment, transportation, and other needs of the field-based research.

The goal of the project is to identify an appropriate and sustainable 'theme-driven' tourist visitor center that will attract visitors to the region without compromising the environmental integrity of the landscape, while also respecting the unique local flavor of the communities in the region. The identified tourist themes will be based on local community needs and preferences, as well as the needs and preferences of existing and potential tourists.

(Continued on Page 8)

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).

What's Inside

VAMLIS Update

By:
Qiana C. Foote,
VAMLIS President

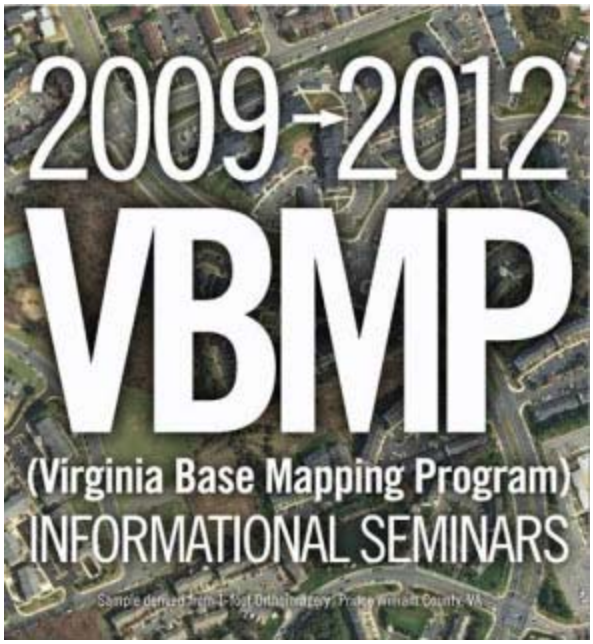
It is a New Year and full of new promise and opportunity. VAMLIS is looking forward to these opportunities to serve and support our membership. There are several ways in which the Executive Board intends to do just that. First is the expansion of our new website. This site will continue to expand with more information and resources for our members. Also, on our web site we will be looking for our members to report on the things that they are doing or have done in the last year that have an impact on the geospatial community in Virginia. Be sure to see the website for details.

Another important opportunity this year is to participate in one of the VAMLIS committees. Remember that VAMLIS is a volunteer organization that is only as strong as its members. Each of the committees serves very important roles in the VAMLIS organization. The Communications Committee is responsible for information on the website, hardcopy publications and technology updates to our membership. The Education Committee is a critical resource for developing educational policies, programs and standards for the geospatial sciences in Virginia. This committee is also responsible for providing membership continuing education and training opportunities. The Legislative Committee is responsible for informing the membership of legislative items that impact mapping and land information professions in Virginia. The Membership Committee is responsible of keeping a membership directory and developing programs to obtain and retain membership levels. Nominating Committee is to administer the nominating provisions set forth in Article V of the Constitution of the Association. The Activities Committee is to organize events, meetings and socials for the membership. Each of these committees provides an essential role in the vitality of VAMLIS. Please consider volunteering.

As mentioned in the last update VAMLIS will be holding its Annual meeting this year on May 28th (location TBA). While this meeting is required by the bylaws of the organization for elections and other organizational business it is also an opportunity to network and learn. Details will be posted on the VAMLIS website or contact our executive director at vamlis_org@yahoo.com.

The 2009 Virginia GIS Conference planning is well underway. The planning committee is making considerable progress on the location, program, and logo of the Conference. The theme contest was won by Stefanie McGuffin: **"Virginia GIS: A New Spirit of Collaboration".** Look forward for more details in the coming months.

Happy New Year!!



VBMP Update

2009-2012 Orthoimagery Program

The Virginia Base Mapping Program (VBMP) first acquired aerial photography of the state during the spring of 2002 and recently updated the imagery with flights during 2006 and 2007. The orthophotography program was established to promote effective and economically efficient development and sharing of spatial resources across the Commonwealth. The Commonwealth of Virginia also sought to establish a consistent foundation or base map resource upon which local government spatial data, applications, and GIS could be consistently developed and maintained.

Virginia is now committed to sustaining this program through regular updates of the photography. The program is funded through a combination of sources including the Virginia Wireless Services Board, state agencies, and revenue from sale of the data.

2009-2012 Orthophotography
On December 23, 2008, the Commonwealth of Virginia contracted with the Sanborn Map Company for the period of 2009 - 2012 to provide aerial data acquisition, ground control, aerotriangulation, DTM, and digital orthophotography.

200 scale, 1 foot pixel resolution orthophotography will be provided as the base product from VGIN with optional upgrades to 100 scale, 6 inch and 3 inch pixel resolution orthophotography. Other upgrade options include contours, structure planimetrics, and LiDAR. The eastern half of the State will be flown during 2009 and the western half during 2011

Local, state and federal government can utilize this contract for a variety of geospatial services. Highlights of the contract include:

- one foot base resolution
- pricing for six inch and three inch resolution updgrades

(Continued on Page 11, Column 2)

Higher Education

Geospatial Activities at James Madison University

By:
Dr. James W. Wilson,
Assistant Professor,
Geographic Science Program

The study and application of modern geographic tools and theory have come a long way in the last 30 years. When Dr. Glen Gustafson arrived at JMU in the fall of 1978, there was no dedicated geography lab and the program shared drafting tables with the math department. Dr. Gustafson (now Professor Emeritus, gustafgc@jmu.edu) had previously used SYMAP and immediately added it to the cartography curriculum. He continued to modernize the program as time and resources permitted. In 1988 Dr. Gustafson and I heard Jack Dangermond give a paper at the ACSM-ASPRS Annual Convention in St. Louis. The room was filled to capacity as Jack talked about problems with digital spatial data and encouraged geographers to get involved because they had the requisite background to understand the problems and to help with solutions. We approached Jack after his presentation and asked if he could help us acquire GIS software for our program. Jack indicated he would be glad to help us if we could get the University to pay a portion of the price. Dr. Gustafson was able to obtain this commitment from the university and we soon had a copy of PC Arc/Info. Soon thereafter Dr. Gustafson also received a $50,000 NSF grant to acquire a Compaq PC and ERDAS software. The academic program continued to modernize and Dr. Helmut Kraenzle was hired in 1996 as the first full-time faculty member focused on GIS. Through the years the diversity and number of users all across the campus and in the community have continued to expanded. Below is a sampling of current activities.

Shenandoah Valley GIS Users Group

Dr. Helmut Kraenzle and Dr. James Wilson organize and lead the Shenandoah Valley GIS User Group. The group was organized by Dr. Wilson in 1993 and currently consists of approximately 140 GIS professionals, researchers and educators from the Shenandoah Valley region. The group meets three times a year, and most of the meetings are hosted at James Madison University. A variety of topics and technical issues in the field of geospatial science and technology are presented at each meeting. Within the last two years topics included ESRI's ArcGIS Server, GIS mobile applications, reports and updates on GIS activities from various local governments, Internet GIS, metadata, GIS standards, GIS workforce development and the geospatial technology market. VGIN (Virginia Geographic Information Network) also regularly participates and provides updates on the current status of various GIS and mapping projects. The user group is actively supported by presentations, workshops, and information from ESRI and other software vendors, VGIN, USGS, and other governmental and non-governmental organizations. For additional information, contact Dr. Helmut Kraenzle, Director and Professor of Geographic Science Program,kraenzhx@jmu.edu

Alternative Energy

The Virginia Coastal Energy Research Consortium (VCERC) was created by the Virginia General Assembly in 2006 as part of the landmark "Virginia Energy Plan" to "serve as an interdisciplinary study, research, and information resource for the Commonwealth on coastal energy issues" with an initial focus on offshore winds, waves, and marine biomass. The Consortium is made up of several universities and industry partners from around the state including JMU, Virginia Tech – Advanced Research Institute, ODU, Norfolk State, and VIMS. VCERC has been working on three offshore wind projects, one of which is the creation of a preliminary mapping and GIS tool being done by JMU, ODU, VT-ARI and VIMS. The purpose of this project is to develop a geospatial database that can be queried by standard GIS tools to characterize the offshore wind resource, extreme survival conditions, bathymetry, and seabed geology. Additional data layers of other ocean uses such as military exercises, commercial shipping, sand mining, and dredge spoil disposal were compiled to indicate areas

(Continued on Page 9)

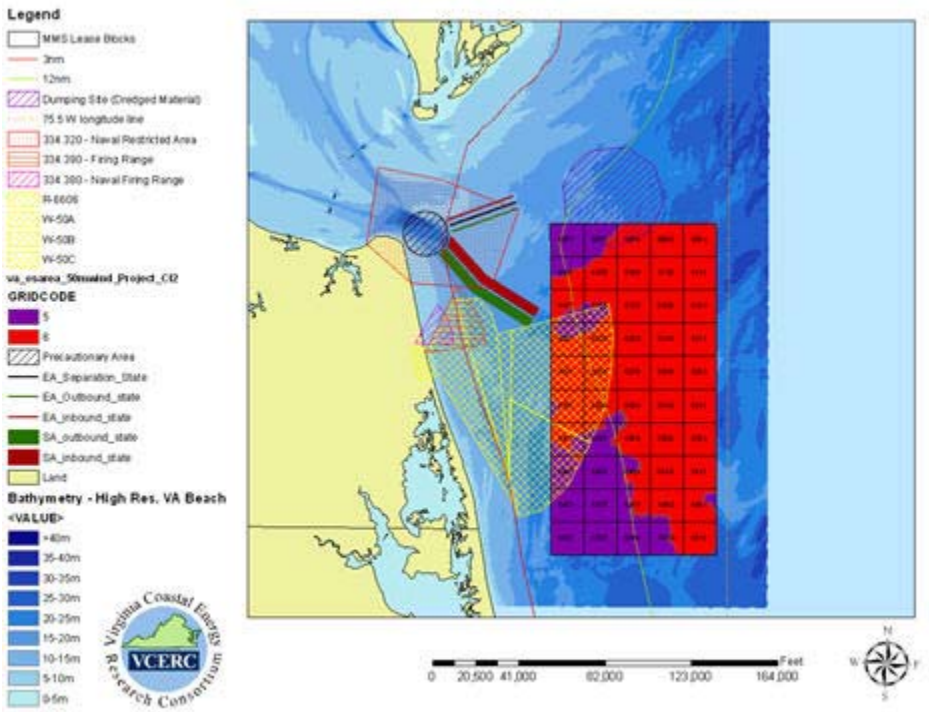


Figure 1: Map of the major ocean uses and wind resource within 50 MMS lease blocks off the coast of Virginia.

Local Government

Bringing It All Together - Norfolk Address Information System (Norfolk AIR)

by:
Fraser Picard
Team Supervisor
Department of Information Technology
City of Norfolk, Virginia

Introduction

In July 2008 the Applications and Geospatial Development Team began developing an intranet application that would provide a portal to help centralize information for every address within the city. The goal was to bring together GIS maps, orthophotography (current and historical), and data from various databases, stored on different servers, into a single web page. There were several driving forces for the development of this application including; 1) city employees and citizens had to use different applications to get all the information about a parcel; 2) the applications currently used are built on older ArcIMS technology from ESRI, and 3) IT staff was having to maintain and monitor multiple web based applications.

Development

The application was developed in a team environment where each of the seven employees had responsibilities that were combined to produce the final product. The whole team worked on developing the layout and navigation, and then each team member was assigned different parts of the application to work on. The application was developed using ArcServer, ASP.NET, and AJAX technologies. The final product is designed to retrieve data from eight SQL databases on three different servers (Figure 1). Models were developed within ArcGIS to process attribute information for each address, and the orthophotographs were cached to reduce the time needed to retrieve and display the image.

Search Interface

The opening screen in Norfolk AIR was modeled after the very simple Google search screen. There is only one search option where the application must detect at least four keystrokes before it determines if the user is typing an address, street name, account number or GPIN. The application will return a list of matching records and as the user types more the list if further refined. The user must select one option from the list and click on the search button (Figure 2).

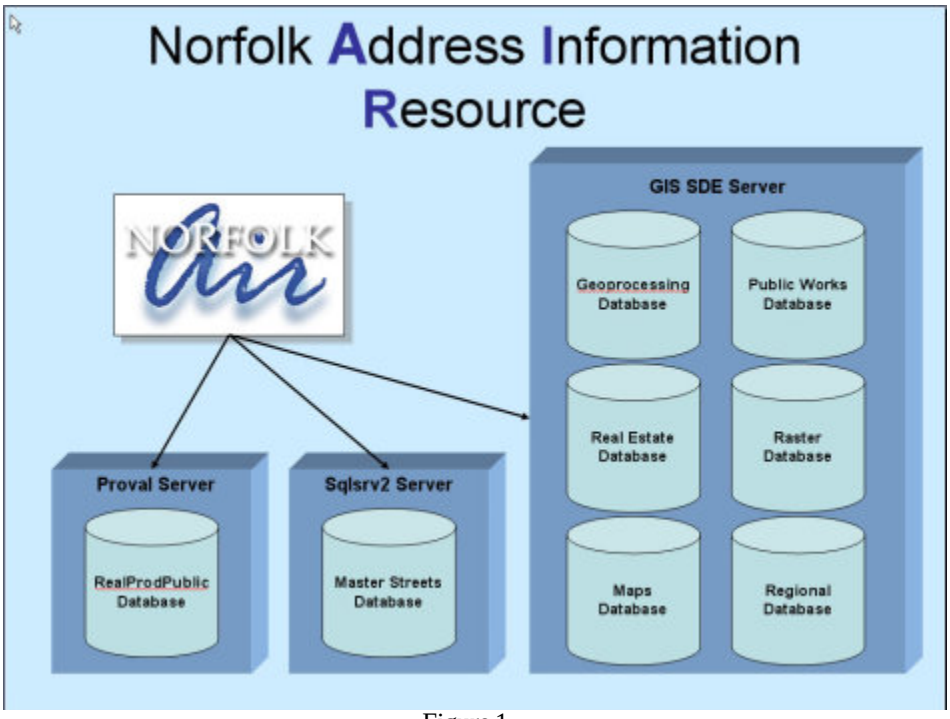


Figure 1

Display Interface

As seen in Figure 3 the display screen is divided into three sections:

1) The aerial photography window displays orthophotographs from 1999, 2002, 2006, and 2008. There is also an option to display all four years in single window to help identify changes on a property. Additionally, there is also an option called *Block View* which allows the user to display Google's Street View application.

2) The GIS map window displays the parcel boundary, parcel dimensions, and addresses. This window includes tools to pan, zoom, and identify other parcels displayed in the window. The aerial photography window and this window are synchronized, so if the pan tool is used to navigate to another area of the parcel map the aerial photography window will update to the same location as the GIS map window.

3) The data window displays 111 fields of tabular information for the address. The accordion design eliminates the need for users to scroll to see information. This includes information on:

- Property ownership, assessments & sales history, building description
- School attendance zones
- Municipal Services (trash collection, recycling, street sweeping, etc.)
- Planning Data (zoning, census tract/block, special districts/zones)
- Public Safety (Police car districts/sectors, flood zone, airport sound/accident potential)
- Civic Information (Polling location, city council representative, civic league information)

(Continued on Page 12, Column 1)

State Agency

by:
Ben Stagg
Environmental Engineer, Habitat Management Division
Chief Engineer, Western Area, Engineering/Surveying Dept
Newport News, VA

Virginia Marine Resources Commission uses GIS & GPS Technology to Make Environmental Permitting & Shellfish Leasing Program More Efficient

The Marine Resources Commission is a State Agency with approximately 150 Employees. It is headquartered in Newport News, Virginia and was established in 1875. The Commission serves as a steward of Virginia's marine and aquatic resources, and protector of its tidal waters and homelands, for present and future generations. The Commission processes in excess of 3,000 Joint Permit Applications each year for projects as diverse as marine terminals to private piers and erosion control structures. Environmental permitting efficiency can be greatly enhanced with the use of GIS technology by combining multiple layers of information that previously were maintained in various formats, locations and scales. For many years the Habitat Management Division of the agency used an in-house created Arcview GIS platform to assist in evaluating these applications. However, over the years, much of the information became outdated and portions of the program had become non-functional. After receiving results from a study of agency information requirements conducted in 2005, the agency entered into a contract, in mid-2007, with Worldview Solutions, a GIS consulting firm, to create a new and revised GIS product. After numerous meetings with VMRC staff and Worldview Solutions personnel, it was determined that ArcGIS (9.2) would be the software platform. Additionally, since the Engineering and Surveying Department within the agency was also upgrading their digital shellfish lease mapping system within AutoCad, those maps could be incorporated into the new GIS layers, along with the ability to update the GIS with that information on a routine basis, using customized model builder scripts.

After numerous work sessions with VMRC and Worldview staff, the product was delivered in late 2008 and placed into test use by the Habitat Management Division. Information layers include places, road names, shellfish leasing information, boating access, reef sites, water body names, condemnation areas, fisheries management areas, wetlands, topographic maps and VGIN 2002 and 2007 aerial photographs. The ability to overlay these layers in various combinations right from the engineers desktop saves considerable man-hours previously spent using both electronic and hardcopy versions of the information, often created at different scales. The shellfish lease information can be retrieved with reports and maps created directly from the program (Figure 1).

Use of this information can also be used when applicants visit the Marine Resources Office to discuss their projects as well as for power point presentations at monthly Commission meetings where staff presents projects that are controversial or for which

(Continued on Page 12, Column 3)

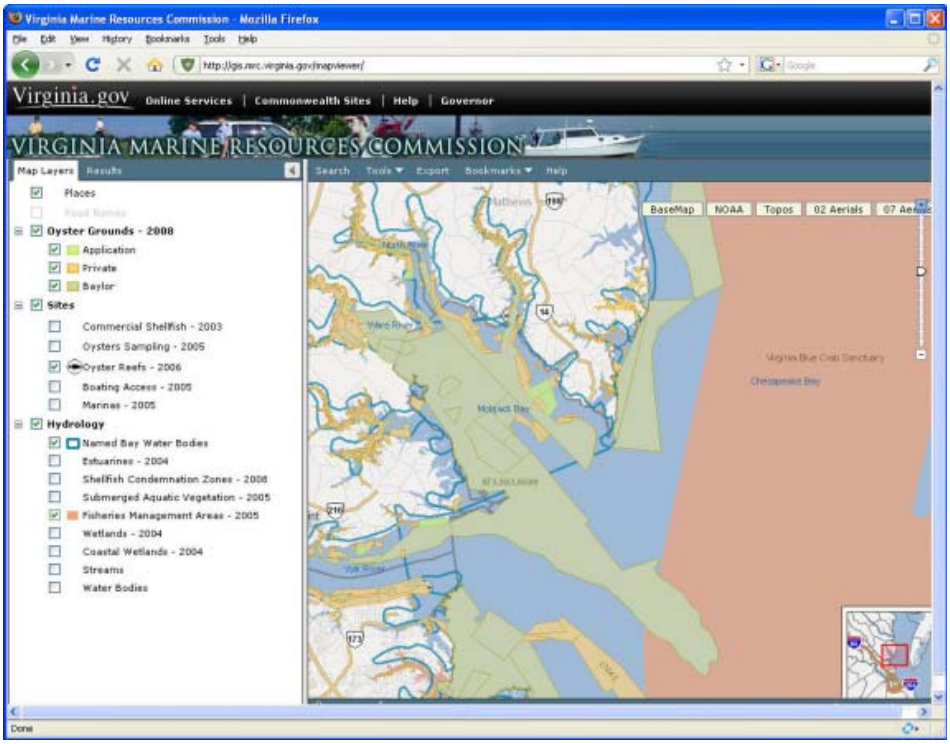


Figure 1. VMRC webGIS

Community College

Tidewater Community College Unveils New Career Studies Certificate in GIS

by:
George M McLeod
GIS Engineer, Old DOminion University;
GIS Instructor, TIdewater Community College

Within their role in the NSF grant project *Geospatial Technician Education through Virginia Community Colleges: An Integrated Approach in the Commonwealth of Virginia*, TCC's GIS planning team, Rodney Clayton and George McLeod, invested considerable time in the creation and deployment of a web-based survey instrument designed to gauge the demand for geospatial technicians in Virginia and identify the existing industry-required skill set for entry-level technicians. This web survey was followed up by extensive telephone or in-person interviews of thirty-three selected Virginia geospatial employers (local governments, regional entities, state and federal agencies, private companies, and non-profit organizations). The responses from these two surveys were summarized and used as a foundation for the development of a highly informed GIS curriculum intended to provide geospatial employers with a larger pool of skilled technicians. Input from the aforementioned survey instruments was used to create a new "Entry-level" Geospatial Technician DACUM geared specifically to the needs of Virginia and Hampton roads employers. Using the Virginia Geospatial Workforce Survey and the newly developed Virginia Geospatial DACUM, the TCC planning team developed a new GIS Career Studies Certificate within the Department of Information Technology & Business. In past years, TCC has only offered two GIS courses, GIS 200 and GIS 201. These courses were previously unrelated to any defined curricular pathway. This "orphan" status led to predictably low enrollments. However, these low registration numbers were not due to lack of employer demand, but rather a lack of a proper academic pathway at TCC. The challenge of creating this pathway was met by the TCC planning team through a series of meetings which produced the following academic certificate program (as 2009 TCC Catalog, Figure 1).

It was determined that the inclusion of five concentrations (Business, Civil Engineering, Environmental Sciences, GIS Generalist, and Information Technology) would best meet the highly variable demands of the regional geospatial workforce within Hampton Roads. The GIS Approved Electives available within each concentration are as follows:

Business:
GIS 220 – Introduction to Urban and Regional Planning (4 credits)
AND two of following:
BUS 100 – Introduction to Business (3 credits)
BUS 130 – Maritime Logistics Afloat (3 credits)
BUS 131 – Maritime Logistics Ashore (3 credits)
BUS 165 – Small Business Management (3 credits)
BUS 200 – Principles of Management (3 credits)

Civil Engineering Technology:
CIV 115 – Civil Engineering Drafting (3 credits)
CIV 116 - Topographic Drafting (3 credits)
CIV 171 – Surveying I (3 credits)
CIV 256 – GPS for Land Surveying (3 credits)
CIV 258 – Photogrammetry and Remote Sensing (1 credit)
CIV 259 – Virginia Coordinate Systems (1 credit)

Environmental Sciences:
GOL 105 - Physical Geology OR GOL 110 Earth Science (4 credits)
GOL 225 – Environmental Geology (4 credits)
GIS 230 – GIS Applications in Environmental Science (3 credits)

GIS Generalist:
GIS 220 – Introduction to Urban and Regional Planning (4 credits)
GIS 290 or GIS 297 – Coordinated Internship or Cooperative Education (3 credits)
GOL 105- Physical Geology OR GOL 110 Earth Science (4 credits)

Information Technology:
ITD 132 – Structured Query Language (4 credits)
ITE 150 – Desktop Database Software (4 credits)
ITP 112 – Visual Basic.NET I (4 credits)
ITP 170 – Project Management (4 credits)

Semester	Course #	Course Title	Credits	Prerequisite
1	GIS 200	Geographical Information Systems I	4	ITE 115*
1		GIS Approved Elective[1]	3-4	
2	GIS 201	Geographical Information Systems II	4	GIS 200
2		GIS Approved Elective[1]	3-4	
3	GIS 205	GIS 3-Dimensional Analysis	4	GIS 201
3	GIS 210	Understanding Geographic Data	4	GIS 201
3		GIS Approved Elective[1]	4	
		TOTAL MINIMUM CREDITS	26-28	

Figure 1. Certificate program as seen in the 2009 TCC Catalog

(Continued on Page 14)

Non-Profit

Rail-to-Trails Conservancy Makes Progress Collecting Nation-wide Trails Dataset

by:
Timothy Rosner
GIS Specialist,
Rails-to-Trails Conservancy

With the recent spike in gas prices and renewed talk of the environmental impact of fossil-fuels, the importance of a nation-wide spatial dataset of biking and walking trails has become readily apparent. In 2004, Rails-to-Trails Conservancy (RTC), a nationwide non-profit that works to promote the conversion of unused rail corridors into a network of trails, anticipated the need for a comprehensive trails dataset and embarked on a project to map all of the rail-trails in the nation.

Data Collection

Funded by a generous grant from the Tawani Foundation, the initial effort began by sending RTC staff members into the field with consumer-grade GPS units. During these trips staff members travel to specific trails and collect GPS data for each trail, including specific waypoints for key trail features such as public parking, restrooms, drinking fountains and tunnels (Figure 1).

Figure 1. RTC Staff Members Collect GPS Data

Once teams return from the field, the raw GPS data is downloaded using the Minnesota Department of Natural Resources' DNRGarmin program and imported into ESRI's ArcGIS 9.2 GIS software package. Since consumer-grade GPS data is frequently inaccurate by hundreds of feet, the data is then checked for quality and accuracy against high-resolution aerial imagery, and corrected as necessary. This step is critical in creating a high-quality spatial dataset that is suitable for a wide variety of cartographic and analytic needs (Figure 2).

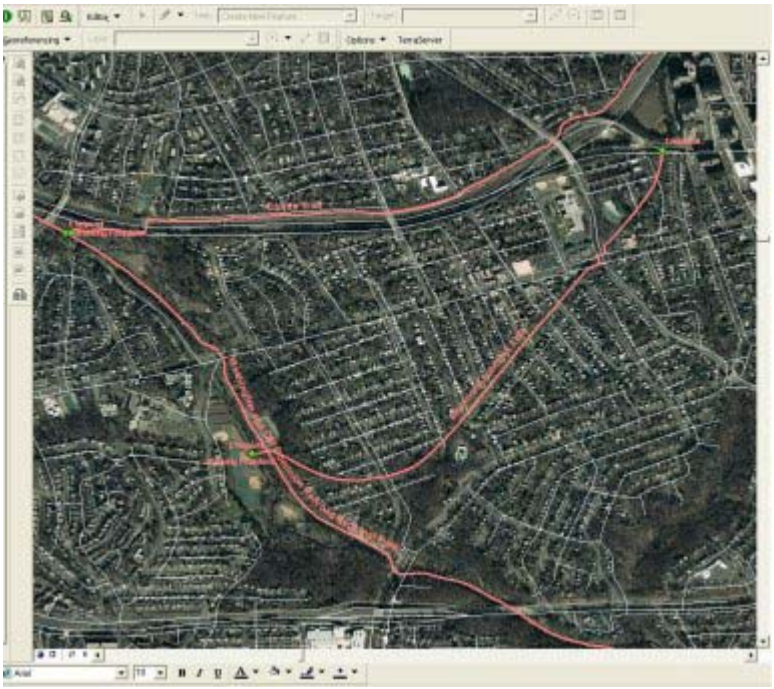


Figure 2. Data is Checked for Accuracy Using High-Resolution Aerial Imagery

Once the spatial data has been corrected several attributes, pulled from an internal trails database, are added to each spatial record. These attributes include the trail status (Open, Partially Open, Project), the trail name, the states and counties the trail passes through, along with may others. Finally, the trail data is appended to the master geodatabase which houses all of RTC spatial data.

RTC has also included the efforts of many dedicated volunteers. These volunteers use GPS units and follow the same procedures as RTC staff members to collect data in the field and send it back to RTC for quality control. Recently, due to the resource-intensive nature of GPS data collection, RTC has focused on researching trails by contacting localities and trail managers, and using a heads-up digitizing process to collect data. This collection method still uses high-resolution aerial imagery to maintain the positional accuracy of the data.

(Continued on Page 15)

Blue Ridge Parkway Tourism Project

(Continued from Page 1)

During the first phase of the project, the research team will identify regional and local

community assets, and will develop a comprehensive GIS-based community mapping inventory. This inventory will provide a solid foundation to support the identification of tourist themes. Furthermore, the community mapping inventory is designed to show how well these local assets can be leveraged within the broader regional landscape. According to Nancy McGehee, Co-PI on the research team, "The project's goal is to develop a strategy for the area that will attract new tourists and better satisfy the needs of regular visitors, so that they more fully experience the area and make a greater economic impact while sustaining what is unique and special about the region."

The Virginia Geospatial Extension Program organized two community stakeholder-driven workshops in both Floyd and Patrick Counties in September 2008. These workshops were open to the public and were also attended by local officials. The workshops provided local community members with the opportunity to interact with the project by examining customized maps of the Floyd and Patrick County region. One objective of the workshop was to solicit the local expert knowledge of community members. Workshop participants identified, located, and verified assets that might be of importance to tourists which often were not available from other 'mainstream' data sources.

While participating at the workshops, community members pored over approximately 30 different layers of information that included economic and infrastructure themes (accommodations, roads, restaurants); recreational assets (trout streams, parks, recreation areas) environmental assets (conservation easements, endangered species) and cultural assets (architectural and historic resources). By integrating local knowledge with the project, the research team was able to gain a more comprehensive understanding and accurate spatial inventory of these communities. Local involvement also provided community members an opportunity to provide valuable feedback on various aspects of the proposed project to the research team members. Workshops also provided the public with an opportunity to become more fully engaged with the project. Several participants at the workshop responded that they felt a greater sense of ownership in this initiative after attending the workshop.

The second phase of the project will further build on the community mapping inventory that has been conducted. Supported by the mapping inventory, augmented through field work and from information gathered from 'traditional' surveys and augmented by GPS-based surveys (GPS data loggers placed in the vehicles of tourists), the research team will generate several conceptual scenarios of different potential destination themes. These destination scenarios will provide local stakeholders with the opportunities to better understand how destination themes could be implemented, integrated and leveraged to support the tourism and economic development efforts of their respective communities.

The final product of this project will provide specific recommendations to develop a viable and sustainable tourist destination centerpiece and information center in the Rocky Knob region.

Tips & Tricks

VBMP Imagery Alignment

If you are having trouble getting your 2006- 2007 VBMP imagery to line up correctly try deleting the aux.xml file. It is known to have incorrect geotransform information contained within the aux.xml file. This will cause the imagery to be placed in the wrong location.

To find and delete the files quickly you can use the search function in Windows to find all of the .aux.xml files and delete them from there.

If there are any questions feel free to contact Stu Blankenship, Geospatial Projects Manager at Virginia Information Technologies Agency (VITA),
(804) 416-6208 (voice)
Stuart.Blankenship@vita.virginia.gov

Geospatial Activities at JMU

(Continued from Page 3)

that would be excluded from offshore wind development (Figure 1). The final report for these 2007 projects is in the process of being completed and will be available on the VCERC website (vcerc.org) in the coming months. For additional information, contact Remy Luerssen, Mapping and Education Specialist, Virginia Coastal Energy Research Consortium, luerssrm@jmu.edu.

Cultural Resource Management

JMU faculty and students continue to test the limits of survey-grade GPS through extensive archaeological studies and landscape reconstructions in the Virginia Blue Ridge. A Cooperative Agreement between the National Park Service and the Department of Integrated Science and Technology has provided funding for nine years of work in Shenandoah National Park (SNP), on sites ranging in age from over 10,000 years old to a 1942 WWII Army Corps of Engineers Training Camp. Directed by Carole Nash of the Geographic Science Program, the SNP projects are studies of human settlement and adaptation in upland settings. The most recent project involves the mapping of a significant 19th century iron works in Rockingham County, Virginia and analyzing long-term environmental changes associated with extractive industry. A second long-term research agreement with the Wintergreen Nature Foundation relies on survey-grade GPS data to test predictive models of Native American settlement in rugged mountain settings. Preliminary findings suggest that the ecological heterogeneity of the Virginia Blue Ridge encouraged a wide range of human uses and patterns of movement that synch with known climate changes. For additional information, contact Carole Nash, Part-time Instructor, Geographic Science Program, nashcl@jmu.edu

Education: Geospatial Semester at JMU

The Geospatial Semester (GSS) at JMU is a unique dual-enrollment program offered in collaboration with high schools across Virginia. Students in their senior year of high school learn about geospatial technologies, including GIS, GPS, and remote sensing as they work on local projects. Their efforts earn them both high school credit and JMU credit (this latter credit is offered at a substantial discount). JMU faculty mentor the K-12 students and teachers and provide project and technical support. The GSS is in its fourth year and more than 700 students have taken part. In the current year, high schools in Albemarle County, Arlington County, Clarke County, Colonial Heights City, Loudoun County, Portsmouth City, Page County, Rappahannock County, Stafford County, and the Shenandoah Valley Governor's School are participating. Student projects have included work with the Nature Conservancy in evaluating methods to identify candidate lands for conservations, the development of an evacuation plan for Hopewell, evaluation of crime patterns in Colonial Heights, just to name a few. One of the major outcomes is that the students are engaged throughout their senior year (even to the point of working over school holidays and weekends, in some cases) and they're developing 21st Century skills that have led to internships and college majors and (we hope) to geospatial careers. For additional information, contact Dr. Bob Kolvoord, Professor, Integrated Science and Technology and Educational Technologies; Co-Director, STEM Education and Outreach Center, kolvoora@jmu.edu

Watershed Assessments

The pollution of natural waters by high levels of nutrients (especially nitrogen and phosphorus) is a continuing problem in Virginia. High levels of nutrients can lead to algal blooms that can result in deoxygenation of waterways. This situation is currently leading to a deterioration of the aquatic environment in the Chesapeake Bay. I am interested in the relationship between landscape factors (such as land use, land cover, slope, and topographic index) and the levels of nutrient pollution in the watersheds of the Shenandoah Valley. We use nutrient data (nitrate, phosphorus, turbidity, etc.) that are regularly collected at a large number of sampling sites in the Valley by the Friends of the Shenandoah River. We calculate the watershed area that is upstream from each sampling point, and determine various geographic metrics for each watershed (Figure 2). We then use classification methods (such as discriminant analysis and decision tree models) to determine the

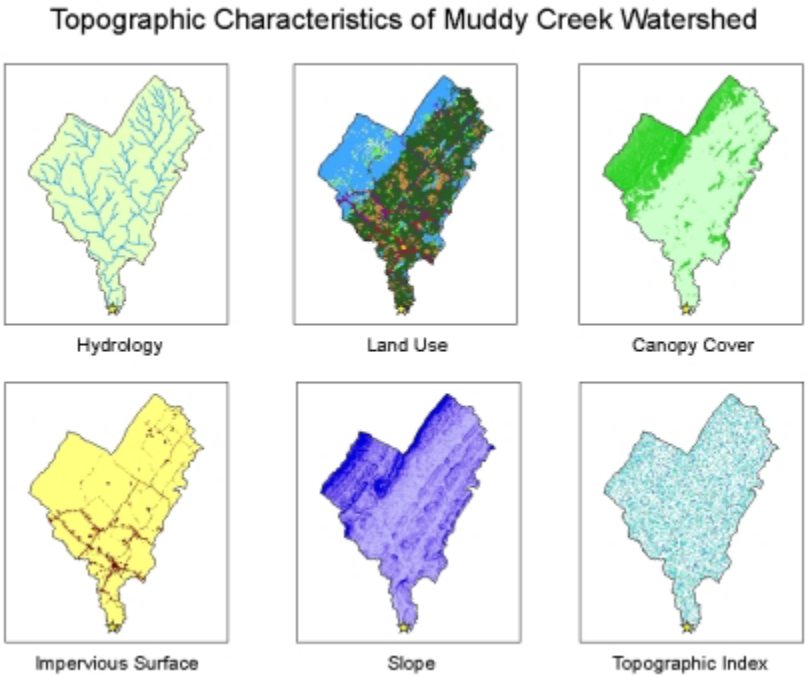


Figure 2: Topographic Characteristics of Muddy Creek Watershed

(Continued on Page10)

Geospatial Activities at JMU

(Continued from Page 9)

relationships between the landscape metrics and the nutrient levels. Our hope is to be able to predict which factors are major contributors to nutrient pollution, and to determine the effect of the karst geology of the region on these predictions. For additional information, contact Dr. Bruce Wiggins, Professor, Department of Biology, wigginba@jmu.edu

South Fork Shenandoah Rapid Watershed Assessment

The Center for Energy and Environmental Sustainability at JMU was a project partner with the Virginia Department of Conservation and Recreation in conducting the South Fork Shenandoah Rapid Watershed Assessment. This project was funded by the Natural Resource Conservation Service (NRCS), and involved a characterization of the social, biological, economic, agricultural, and geophysical characteristics of the watershed, including its major stressors and efforts at conservation. The NRCS rapid watershed assessments are GIS- and map-intensive resources, and present an ideal opportunity to engage students in practical, hands-on, "real life" GIS projects. Two students enrolled in Dr. Bob Kolvoord's GIS for Environment course contributed significant GIS efforts to the final published report. Under supervision Dr. Maria Papadakis (the project's faculty investigator), Ms. Katie Shepard and Ms. Maria Havinga worked with primary data and government shape files to generate a number of maps on natural resource characteristics in the watershed (Figure 3). For additional information, contact Dr. Maria Papadakis, Professor, Dept. of Integrated Science and Technology and Geographic Science, papadamc@jmu.edu

Facilities Management

The Facilities Management Engineering Department at James Madison University was recently able to acquire a cutting edge GPS system to aid in their daily operations. A permanent base station, composed of a Trimble Zephyr Geodetic 2 Antenna and a Trimble NetR5 Reference Station, was mounted on the top of the newly constructed East Campus Library. This location provides an unobstructed view of the horizon in all directions, making it an ideal location for a base station. This base station is used to transmit RTK corrections to a Trimble R8 GNSS Rover coupled with the TSC2 Controller. This equipment is currently being used to collect survey grade data to update and expand the University's GIS. In the few short weeks that this equipment has been operational it has already proven to be an extremely valuable investment by significantly increasing the efficiency of routine activities. For additional information, contact Abe Kaufman, Stormwater Coordinator, Facilities Management – Engineering, kaufmaat@jmu.edu

Open Source Geographic Information System (GIS) for Simulating Container Movement

The Open Source Geographic Information System for Simulating Container Movement (GISSCM) project looked into the possibilities of open source GIS software packages to visualize and simulate container movement (Figure 4). In contrast to commercial software packages that often cost thousands of dollars, open source software may be downloaded for free, which helps businesses and organizations with small budgets. In addition, as the word "open source" implies, the source code is available for the public to view. The open source code enables the public to see the underlying details and algorithms that make the software work. Also, keeping the source code open prevents hidden source code to be embedded in the software and possibly compromise security.

With millions of shipping containers traveling toward US ports annually, ensuring the safety of the country is a high priority. The open source GISSCM project uses open source GIS software to visualize the movement of containers traveling toward the US via ships, trains and trucks. Once in the US, the GISSCM continues to track each container as it travels via train or truck to its destination. Businesses and organizations in the following areas may benefit from the Open Source GISSCM project: trade, transportation, port security and homeland security. The Institute for Infrastructure and Information Assurance at James Madison University funded this project. For additional information, contact Dr. Helmut Kraenzle, Director and Professor of Geographic Science Program,kraenzhx@jmu.edu

(Continued on Page 11, Column 1)

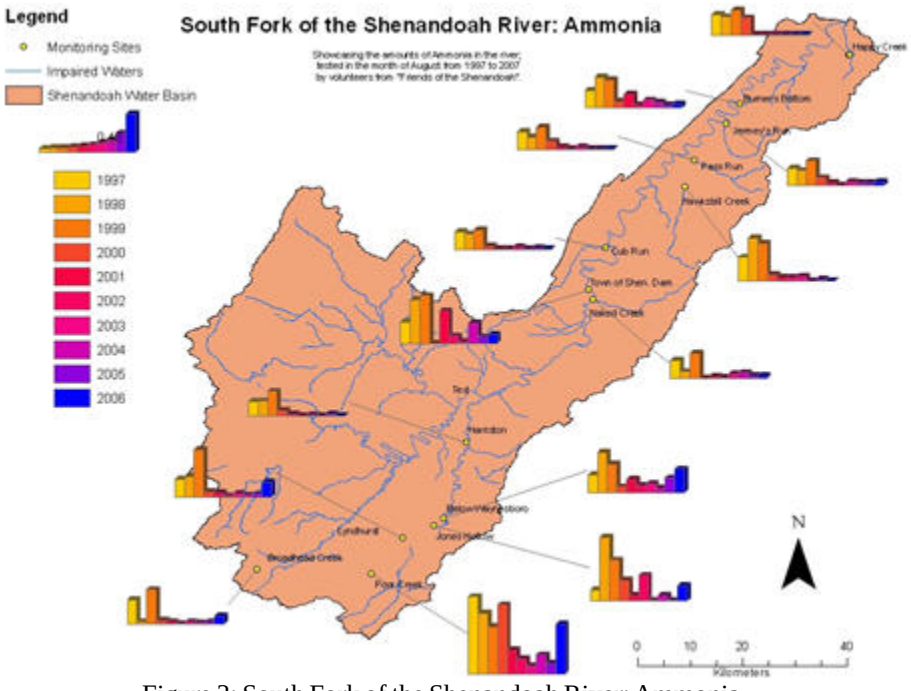


Figure 3: South Fork of the Shenandoah River: Ammonia

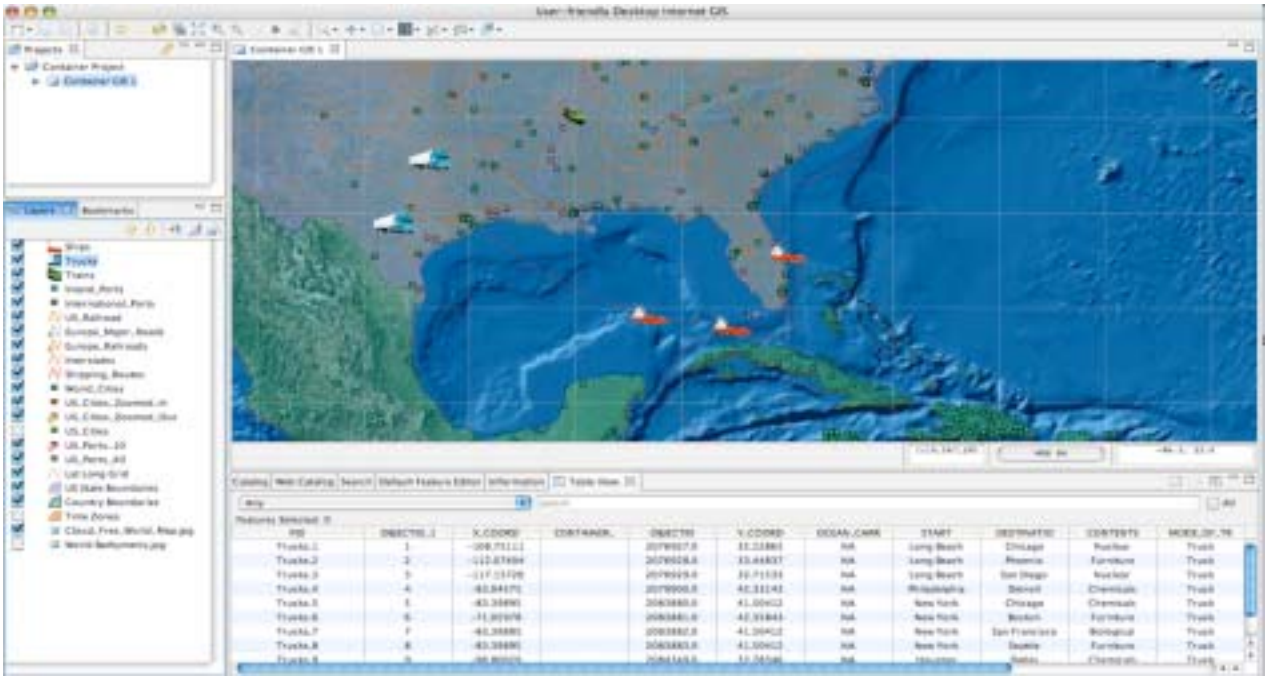


Figure 4: GISSCM running on uDIG Open Source GIS software

Geospatial Activities at JMU

(Continued from Page 10)

Geographic Visualization

Dr. James Wilson and Andrew Torget, director of the Digital Scholarship Lab at the University of Richmond, are organizing a U.S. National Endowment for the Humanities funded workshop on "Visualizing the Past: Tools and Techniques for Understanding Historical Processes" which will be held at the University of Richmond February 20-21, 2009. The workshop advisory board includes noted scholars and specialists: Dr. Terry Slocum of the University of Kansas, Dr. Edward Ayers of the University of Richmond, David Arctur and David Schell of the OGC, Peter Bol of Harvard University, and Richard White of Stanford University. Approximately 25 people from around the world will gather to present and discuss current work on visualizing historical processes, and together consider:

1) How can we harness emerging cyberinfrastructure tools and interoperability standards to visualize, analyze, and better understand historical events and processes as they spread out across both time and space?

2) How can user-friendly tools or web sites be created to allow scholars and researchers to animate spatial and temporal data housed on different systems across the Internet?

For further information contact Dr. Wilson at wilsonjw@jmu.edu, or visit the workshop website at http://dsl.richmond.edu/workshop/index.php.

2009-2012 Orthoimagery Program

(Continued from Page 2)

- color infrared (4 band color) included in deliverable
- pricing for four and two foot contour upgrades
- pricing for structure and other planimetric upgrades
- pricing for Lidar
- off year flights available
- 6 month delivery from acquisition date
- pricing for land cover mapping
- additional options

Pricing

- Pricing for many upgrade options is available at: http://www.isp.virginia.gov/geo2009_2011/pricing_overall.pdf
- Land cover mapping pricing is available from: http://www.isp.virginia.gov/geo2009_2011/pricing_landcover.pdf
- Planimetrics pricing is available from: http://www.isp.virginia.gov/geo2009_2011/pricing_structures.pdf

Refer to the http://www.isp.virginia.gov/vbmporthophotography.shtml for additional product specifications, pricing, and ordering information, or contact VGIN.

Norfolk Address Information System

(Continued from Page 4)

The application also includes the ability to create a report that allows the user to print, or export the report to a PDF, MS Word, Crystal Report, Excel, or a text file.

Future Enhancements

Over the last couple of months Norfolk AIR has been demonstrated and tested by select users within the organization. As a result a list of enhancements has been compiled. During the next six months the team will be focusing on enhancing the application to:

- Include active code enforcement activities.
- Add a Pictometry image interface to allow users to see the property from different directions and provide some measuring tools.
- Include distance to nearest fire hydrant.
- Provide customized reporting that would allow users to choose what they want to print/export.
- Add the ability to search by an alias/ common place name.
- Deploy a version of Norfolk AIR to the Internet.

In conclusion, the development of Norfolk AIR has proven to be a successful project of integrating a wide variety of data and information in different formats. Although it is still a new application within the organization there has been a lot of positive feedback. The anticipated success can be attributed to the ability to add a "time" component through the use of historical orthophotographs, a simple search function, and the vast amounts of attribute data. It has also shown that rapid application development can be achieved in a team environment with careful planning and clear definition of roles and responsibilities. Although the application was originally targeted to be used by City employees, it will soon be available to the public and should become a valuable resource. With future enhancements Norfolk AIR is positioned to be the one place city employees and the public can go to obtain vast amounts of information on an address…a place where it all comes together.

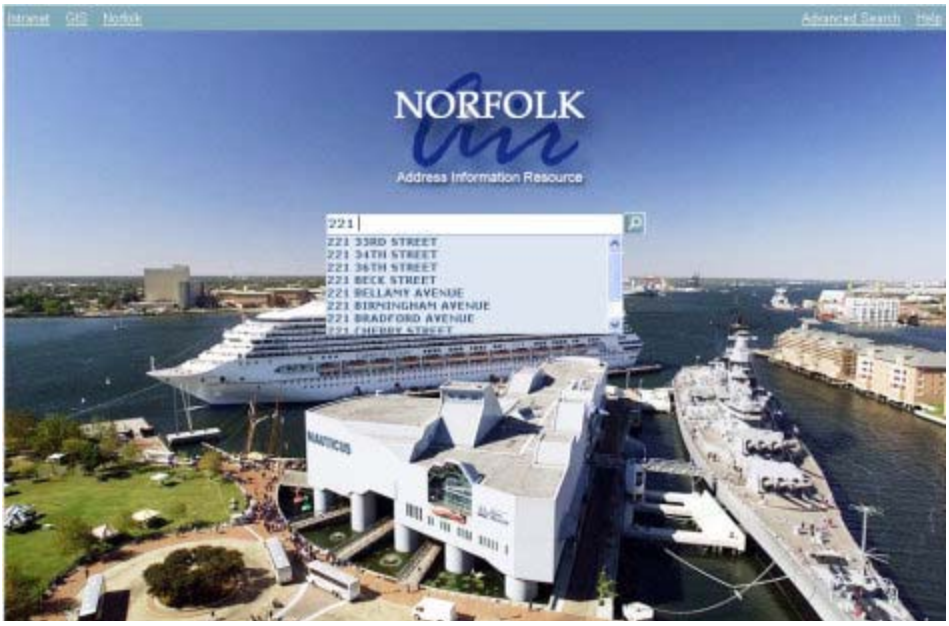


Figure 2

Figure 3

VMRC Permitting Program

(Continued from Page 5)

staff cannot support the project as proposed by the applicant.

The Engineering / Surveying Department is responsible for surveying and mapping subaqueous ground for public and private shellfish cultivation, leasing private shellfish grounds, and maintaining oyster ground lease records. This includes the accounting for work performed and the annual rent accounting of the leased oyster ground, the platting and composite mapping of these parcels and the adjacent waters. There are over 300,000 acres of public ground and approximately 95,000 acres of private ground for which the department is responsible. The Department also manages the surveying and marking of the Maryland/ Virginia State line, where it borders or falls

(Continued on Page 13)

VMRC Permitting Program

(Continued from Page 12, Column 3)

within the waters of the two states. The Engineering / Surveying Department is also responsible for the identification and mapping of state-owned marshes and meadowlands on the Eastern Shore of Virginia.

The original public grounds set aside within the Constitution of Virginia were surveyed by methods used at the time, which included sextants and rather primitive methods compared to those used today. The agency progressed from transits, to theodolites, to electronic total stations to survey lease grounds upon the waters of the Commonwealth. All of these methods, while progressively more efficient that its predecessor, were still rather time consuming and required numerous personnel. With the advent of GPS technology the potential to survey theses same areas much more efficiently and with less personnel became apparent. In the 1990's the Department purchased Trimble GPS equipment and began using it for some of the work required for the leasing program. However, the equipment was heavy, required two units left on upland sites, and was not well suited to working in the marine environment. With the advent of better technology, smaller more rugged units, and the recent establishment of permanent base stations that broadcast satellite and radio information through a subscription service, and the age of the existing Trimble equipment, new equipment was evaluated. The Engineering / Surveying Department purchased Leica GPS equipment beginning in 2005 and subscribed to RTK-net through Loyola Spatial Systems (a Leica equipment dealer). This allows department staff to do virtually all of its survey related tasks with a single GPS unit, administered by a single staff person, thereby reducing both personnel requirements and considerable time (Figure 2). The GPS survey grade units can produce real time accuracies within a few centimeters. If you ever tried to set a pvc pipe in 15 feet plus depths of water, having the knowledge that the survey equipment is very precise makes department staff confident that the accuracy of the surveys very strong.

Figure 2. Surveying and mapping

The agency's Fisheries Division issues fixed fishing device licenses which are enforced by the Law Enforcement Division. A new Engineering / Surveying Department project involves the location and mapping of all of the existing fixed fishing devices in the state using GPS equipment beginning in early 2009. The E/S Department can also provide mapping information to applicants and both the Fisheries and Law Enforcement Division on proposed new fixed fishing device locations to assure that they meet current regulations for spacing, length, and public notification requirements.

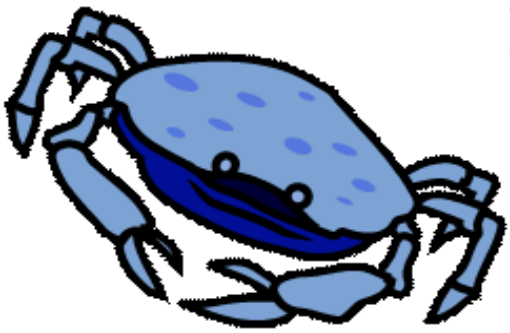
In light of current budget restraints, and with the support of agency Commissioner Steven G. Bowman, the use of both GPS and GIS technology, allows the Marine Resources Commission to more effectively and efficiently administer its mandated mission related to the marine environment. While the implementation of the newly upgraded GIS platform is currently for internal agency use and is not yet implemented to all divisions, once final testing of the system is completed, it can be expanded agency wide, provided to other agencies with overlapping mandates, and, potentially, a read only version can be implemented for public use, accessed through the agencies web page sometime in the near future.

For additional information about mapping information maintained by the Engineering and Surveying Department, contact:

Ben Stagg, (ben.stagg@mrc.virginia.gov | 757-247-2225),

or

Royce Bridger, (Royce.bridger@mrc.virginia.gov | 757-247-2230)



TCC Certificate Program

(Continued from Page 6)

ITP 193 – Introduction to Modeling and Simulation (4 credits)
ITP 212 – Visual Basic.NET II (4 credits)

This model will be one in which students receive instruction in GIS technologies using a "multidisciplinary approach". Graduates are prepared for entry-level positions in Geographic Information Systems (GIS) in a variety of fields. They will be trained to use GIS to visualize, analyze, and model systems to help in the planning and decision-making processes of their organizations.

TCC has an excellent track record of sustaining successful programs. TCC plans to continue to work closely with regional employers promote the certificate program, to host workshops, and to develop practical GIS exercises. With the help of these employers, revolving internship opportunities will be established and filled by students currently enrolled in the program.

Also of critical import to the success of this program is TCC's intent to supply a GIS lab assistant who will be available to students for technical support during "open" lab hours. Given that workforce-oriented GIS courses are technical in nature, the amount of faculty time available in the traditional classroom setting is often not sufficient to address difficulties encountered by each and every student. The availability of a lab assistant will ensure that faculty time may be focused on curriculum development, instruction (Figure 2), and mentoring.

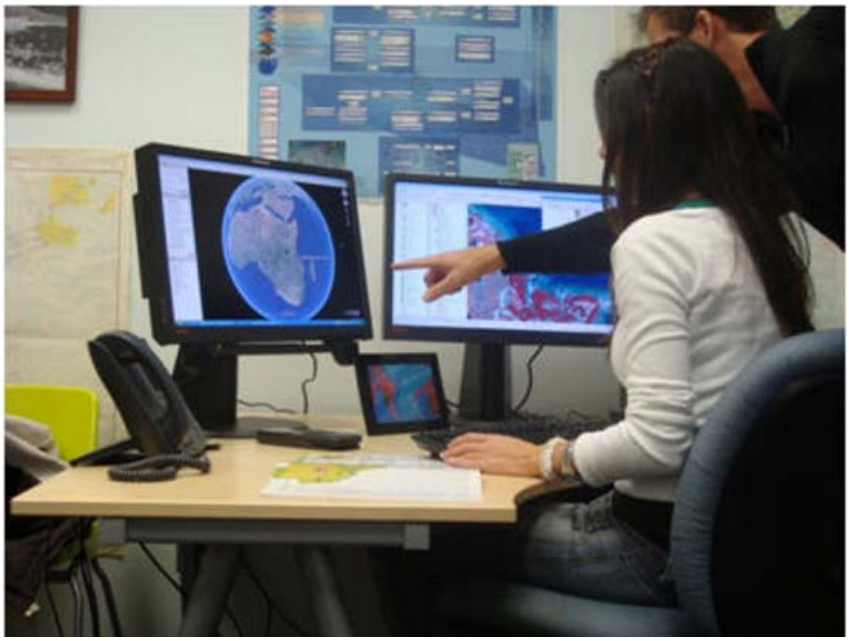


Figure 2. Instructor McLeod assists a GIS student

About the College

Founded in 1968 as a part of the Virginia Community College System, Tidewater Community College (TCC) serves the South Hampton Roads region with campuses in Chesapeake, Norfolk, Portsmouth, and Virginia Beach, a regional Visual Arts Center in Olde Towne, Portsmouth, the TCC Jeanne and George Roper Performing Arts Center in the downtown Norfolk theater district, and a regional Advanced Technology Center on its Virginia Beach Campus. Forty-five percent of the region's residents who attended a college or university in Virginia last fall were enrolled at TCC. (Figure 3)

TCC is the largest provider of higher education and workforce development services in Hampton Roads, enrolling over 39,000 students annually—the second largest undergraduate student body in the Commonwealth of Virginia. The college's economic impact on the South Hampton Roads region is $300 million annually; it generates some 3100 jobs in the local economy. For each $1 in public support provided to it, TCC generates $3.54 in revenue for the region.

The college is committed to meeting the region's education and training needs as it advances the quality of life of the region through an educated, globally aware, and technologically engaged citizenry. TCC students do as well as the native university students when they transfer to four-year schools, and area employers consistently register high levels of satisfaction with the performance of their employees who are TCC graduates.

Figure 3. TCC location

Rails-to-Trails Conservancy

(Continued from Page 7)

Making the Data Public

Thanks to the efforts of RTC staff and volunteers, more than 12,000 miles of trails have been collected. In an effort to provide this data to the public, RTC has launched a trail-finder Web site, www.traillink.com, which allows users to search for trails anywhere in the U.S. (Figure 3). The spatial data, when available, is provided to users though the implementation of the Google Maps API (Fig. 4). The API allows RTC to use custom markers to denote the location of the various trail waypoints in addition to the trail itself, as well as allowing users to get customized driving directions to each trail. TrailLink.com also provides a detailed trail description of each trail and allows users to upload trail reviews and photos from their trips.

In addition to the public face of RTC's trail data, TrailLink.com, the creation of this high-quality dataset allows for detailed analysis to be performed in-house. This dataset is critical as RTC begins to assess its goal of having 90 percent of Americans living within three miles of a trail network by 2020. RTC is also able to use this data to help build a convincing case for more trails through the detailed demographic analysis of populations surrounding trails, as well as illustrating key "missing-links" in existing trail networks.

Figure 3. TrailLink.com is the Public Face of the Dataset

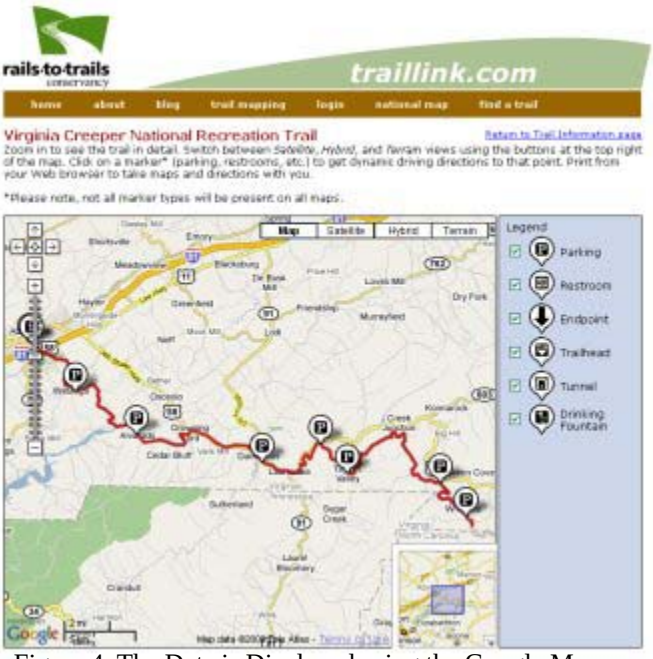


Figure 4. The Data is Displayed using the Google Maps API

RTC recently partnered with the Pennsylvania Department of Conservation and Natural Resources (DCNR) to collect data for all of the rail-trails in Pennsylvania. RTC staff spent hundreds of hours collecting GPS data and preparing it for the DCNR. The data was delivered to DCNR following their specified data dictionary. Upon receipt of the data, one member of the DCNR GIS team proclaimed the data "should serve as a model for others working on all types of trails everywhere!"

The Future

RTC continues to grow this dataset and hopes to have all 15,000+ miles of rail-trails collected soon. RTC recently launched a new interactive trail-mapping tool on TrailLink.com that allows users who do not have GPS units to help map trails by providing us with lines and points sketched off of the Google Maps interface. This data is still checked for quality and accuracy, but allows participation from a much wider audience of trail users.

This trail dataset is critical for encouraging Active Transportation. Active Transportation is the act of walking and biking for transportation, in addition to recreational uses. The economic benefits of Active Transportation have recently been quantified in the report Active Transportation for America (available at: http://www.railstotrails.org/whatwedo/trailadvocacy/ATFA/index.html). By providing potential trail users access to locational information, we hope to see an increased shift from car-oriented transportation to increased investment in walking and biking at the local, state, and federal levels.

To find out more about Rails-to-Trails Conservancy and its mission, visit www.railstotrails.org. To locate a trail in your area, visit Rails-to-Trails Conservancy's trail-finder Web site, www.traillink.com.

Save the Date!

Mention or failure to mention any event or workshop does not constitute an endorsement by the Virginia Geospatial Extension Program or its partners.

Intro to GPS for Virginia Cooperative Extension, March 6, 2009, Holiday Lake, VA
Central Extension District - Open to Extension Agents & Specialists
For additional information please contact Dan Goerlich

Loudoun GIS Forum Connecting GIS, March 12, 2009, Loundoun, VA
Theme - Resource Conservation: How we allocate our environmental, fiscal, and human resources
For additional information please contact Susan Hembach
at susan.hembach@loudoun.k12.va.us or call (571) 252-1154

Intro to GPS for Virginia Cooperative Extension, March 16, 2009, Abingdon, VA
Southwest Extension District - Open to Extension Agents & Specialists
For additional information please contact Kathy Thomas

22nd Annual Towson University Geographic Information Sciences Conference (TUgis),
March 16-17, 2009, Towson, MD.
Theme - WebGIS:New Tools for Data Sharing and Collaboration
For additional information and registration - http://tugis.towson.edu

Intro to GPS for Virginia Cooperative Extension, April 8, 2009, Madison, VA
Northern Extension District - Open to Extension Agents & Specialists
For additional information please contact Christine Kastan

VAMLIS Annual Meeting
May 2009 (TBA)

ESRI Education User Conference (EdUC), July 11-14, 2009, San Diego, CA
Theme: Explore the Power of Spatial Thinking
For additional information - http://www.esri.com/events/educ/index.html

ESRI International User Conference (ESRI UC), July 13-17, 2009, San Diego, CA
Theme: GIS: Geography in Action
For additional information - http://www.esri.com/events/uc/index.html

2009 Virginia GIS Conference, Sept 21-23, 2009, Richmond, VA
Hosted by VAMLIS and VAPDC
Theme - Virginia GIS: A New Spirit of Collaboration
For more information, stay tuned to www.vamlis.org & www.vapdc.org

The Virginia Geospatial Extension Program
319 Cheatham Hall (0324)
Blacksburg, VA 24061
(540) 231-2428
http://www.cnr.vt.edu/gep

The Virginia Geospatial Newsletter is published by the Virginia Geospatial Extension Program, a partnership between the Virginia Space Grant Consortium and Virginia Cooperative Extension.

The newsletter is developed in conjunction with the Virginia Geographic Information Network (VGIN).