



WV GIS Technical Center 2012 ANNUAL REPORT

Executive Summary

The West Virginia GIS Technical Center, located in the Department of Geology and Geography, Eberly College of Arts and Sciences, West Virginia University, provides focus, direction and leadership to users of geographic information systems (GIS), digital mapping and remote sensing within the State of West Virginia. The primary objectives of the Center can be grouped into three major divisions – GIS data and map development, housing, and dissemination for the state and nation; provide technical support, technical guidelines, and applied research for GIS; provide training, education, and outreach in the field of GIS. Drs. Trevor Harris and Gregory Elmes direct the eight full time staff and numerous students in these endeavors.

The WV GIS Technical Center maintains two major portals to help with GIS data dissemination in the state. The WV GIS Clearinghouse (<http://wvgis.wvu.edu>) features over 300 unique datasets valued at more than \$50 million dollars. MapWV.gov (<http://mapwv.gov>) is a public gateway to online mapping resources in the Mountain State, providing a wealth of high-quality maps and geographic data via the Internet. Several critical infrastructure layers were developed or updated last year. The WV GIS Technical Center greatly expanded the statewide imagery infrastructure by publishing the Sheriffs' Association imagery as a publically available dataset. It updated the state's streams and water bodies within the state. It also partnered with the WV Department of Transportation to develop and publish a new road centerline dataset. The Center field collected about 500 miles of trails for central and northern West Virginia. It updated 2,740 structural and cultural features for the national gazetteer known as the Geographic Names Information Systems (GNIS) database. Other data layers updated or published include flood data, tax parcels, and elevation datasets.

Mapping applications continue to remain an important focus of the WV GIS Technical Center. The Center created a new internet mapping application to help businesses and researchers explore unconventional energy resources (<http://unconventionalenergyresources.com/>), such as Marcellus shale gas resources, throughout the nation. It rolled out a new viewer to support the National Carbon Sequestration Program. The Center updated the statewide Flood Mapping Portal, the WV Trout Stocking Portal, the State Historic Preservation Mapping Portal, and updated the state's mapping viewer.

The WV GIS Technical Center once again organized and hosted the West Virginia State GIS Conference in which 200 people joined together to discuss the future of GIS in the state. The Center also hosted over 20 different workshops and training events for over 350 students. The training events covered basic ArcGIS software, server usage, advanced GIS programming, map design, and topical areas such as flood mapping and cadastral mapping.

Mission and Objectives

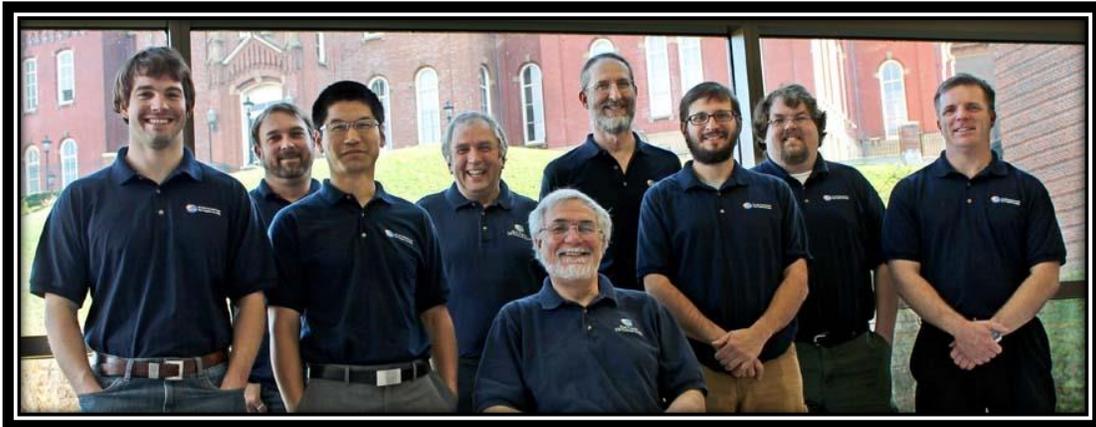
The West Virginia GIS Technical Center, located in the Department of Geology and Geography at West Virginia University, provides focus, direction and leadership to users of geographic information systems (GIS), digital mapping and remote sensing within the State of West Virginia. The WV GIS Technical Center (WVGISTC) was established under Executive Order No. 4-93 and continued under Executive Order No. 10-10, which specify that the Technical Center shall provide technical services to support the development and operation of GIS in West Virginia.

The primary objectives of the Center are to reduce the duplication of GIS data development among organizations; disseminate GIS spatial data, Web map services, mapping applications, and other geographic information free-of-charge through the Internet; develop and build new data additions to the West Virginia Spatial Data Infrastructure; assist with strategic planning, development and implementation of GIS and mapping guidelines statewide; provide advisory services and training programs in GIS; and conduct research and provide education towards improvement of geographic information technologies in West Virginia.

Personnel

The staff consists of two geography professors who serve as co-directors, eight full-time employees, and student and temporary employees hired periodically to accomplish project tasks. This past year external funding permitted the hiring of another GIS Programmer.

- Dr. Gregory Elmes, Co-director
- Dr. Trevor Harris, Co-director
- Kurt Donaldson, Manager
- Frank LaFone, Technical Lead
- Evan Fedorko, GIS Analyst
- Eric Hopkins, GIS Analyst
- Kevin Kuhn, GIS Analyst
- Maneesh Sharma, NATCARB Coordinator/GIS Analyst
- Xiannian Chen, GIS Programmer
- Corey Schafer, GIS Programmer



L to R: Corey Schafer (programmer), Kevin Kuhn (analyst), Xiannian Chen (programmer), Trevor Harris & Greg Elmes (co-directors & geography professors) , Eric Hopkins (analyst), Evan Fedorko (analyst), Frank Lafone (tech lead), Kurt Donaldson (manager), Maneesh Sharma not shown

Staff Education

| Degree | Geography/GIS | Geology | Computer Science | Other |
|--------------|---------------|---------|------------------|-------|
| Bachelors | 5 | 2 | 3 | |
| Masters | 5 | 2 | 1 | 4 |
| Ph.D. | 2 | 1 | | |
| | | | | |
| <i>total</i> | 12 | 5 | 4 | 4 |

Summer Employees



Funding and Programmatic Oversight

Primary FY 2011-12 funding of \$287,863 was received from the state-appropriated Mineral Lands Mapping Program (Fund 0253, Activity 207) approved under House Bill 2222 in February 1995. Fiscal management of this program was delegated to the WV Geological & Economic Survey. Additional external funding was obtained from several grants and service contracts.

Projects and Activities 2012

Geographic Information Network Services

WVGISTC provides a suite of Internet services to disseminate geographic data and information, including the MapWV.gov (<http://www.mapwv.gov/>) portal, State GIS Data Clearinghouse, and GIS People Directory. This past year external funding allowed for updating the hardware infrastructure with new virtualized servers and expanded storage to 120 TB.

MapWV.gov: MapWV.gov is a public gateway to online mapping resources in the Mountain State, providing a wealth of high-quality maps and geographic data via the Internet. The site provides access to static and dynamic maps as well as Web map services. The target audience of MapWV.gov is the general public or casual user who is seeking geospatial information.

Data Clearinghouse: The State GIS Data Clearinghouse features over 300 unique datasets valued at more than \$50 million dollars. Mapping professionals in the state and nation are the target audience for this website. Data is accessed by FTP download, Web map services, or links to data stewards who routinely post geospatial data on their websites. The Data clearinghouse can be found at the WVGISTC website: <http://wvgis.wvu.edu//data/data.php>.

GIS Contacts and News: WVGISTC maintains a list of people interested in GIS news, events and activities in West Virginia. A WV GIS People Directory is maintained by an Access Database connected to a Web interface, accessible through the WVGISTC website. WVGISTC also provides support with news postings, online surveys, electronic mail lists, and the Constant Contact email marketing service utilized by the WV Association of Geospatial Professionals.



Computer Servers: External funding allowed for updating the hardware infrastructure with new virtualized servers (2 node VM cluster, 2 six core processors) and expanded storage to 120 TB. This past year the Center deployed ArcGIS 10.1 desktop and server software.

- 2 Node VM Cluster
 - 96 GB RAM
 - 2 six core processors
 - 120 TB storage
- Bandwidth
 - 1 gbit to building
 - 300 mbit from college



Build and Disseminate State’s Spatial Data Infrastructure

The WVGISTC supports digital data conversion, data development, and coordination with federal geospatial data initiatives, statewide mapping programs, and local (county, municipal) data producers. The Center collaborates with its partners to create a value-added, high temporal and spatial resolution base map for West Virginia. Base layers such as imagery, elevation, transportation, streams and administrative map layers benefit the public. Refer to the [base layer framework data report](#) for more information. Many of the data layers are available as Web mapping services:

WVGISTC Web Map Service

Web: <http://services.wvgis.wvu.edu/ArcGIS/rest/services>
 ArcMap: <services.wvgis.wvu.edu/ArcGIS/services>

Cooperative Partners: WVGISTC works with many cooperative partners to complete data development tasks including publishing map data on the Internet.

Cooperative Partners

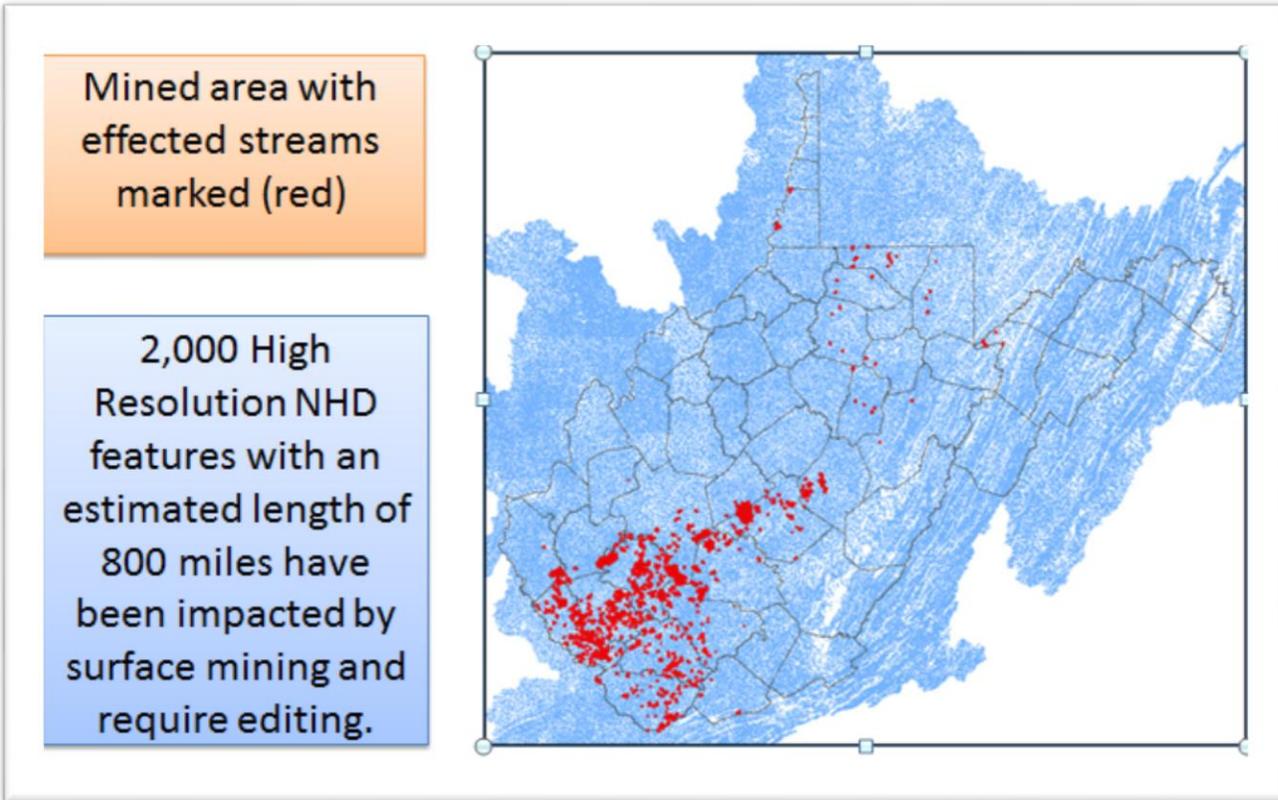
| | | |
|--|---|--|
| <p>Federal: FEMA NRCS USGS U.S. Census U.S. DOE U.S. Health</p> | <p>State: DHHR DHSEM DOT DNR DTR GES Leg. Services NFIP OGC SHPO</p> | <p>Local: Cities Counties Regional</p> <p>Non-Profit: WVAGP Mountain Institute WRI</p> |
|--|---|--|

Data development efforts for the past year included the following:

Census and Redistricting Files: Published 2010 Census and redistricting GIS layers specific to West Virginia, to include: Block Groups with Population Data, Blocks with Population Data, Census Tracts with Population, Census Designated Places, Incorporated Places, Census with Population > 10,000, Census with Population > 2,500, Metropolitan Statistical Areas, County Subdivisions, State House Districts, State Senate Districts, U.S. Congressional Districts, Voting Districts, Zip Code Tabulation Areas, Census TIGER Roads, Railroads, and Streams Partners: US Census, WV Legislative Services.

Streams and Waster Bodies - National Hydrology Dataset (NHD): Completed the second year of NHD stewardship and maintenance in West Virginia. WVGISTC corrected approximately 74 miles across 143 high-resolution NHD features within the Gauley River watershed. A report was published that reveals 2,000 High Resolution NHD features with an estimated length of 800 miles have been impacted by surface mining and require editing. Partners: USGS, NRCS, WV OGC, WV DEP, WVU NRAC.

NHD Stream Updates



Elevation: Provided technical support and quality control for high-resolution elevation data for Monongalia County that was forwarded to FEMA to develop flood hazard models for West Virginia.

Road Centerlines: Develop a new statewide road centerline file from WV DOT (major roads) and Census (local roads). Partners: Census, WV DOT.

Geographic Names: Updated 2,740 structural and cultural features for the national gazetteer known as the Geographic Names Information Systems (GNIS) database. Included in this features update were cemeteries, city and town halls, auditoriums, arenas and stadiums, police stations, fire stations, post offices, libraries, museums, courthouses, summits, convention and conference centers, and theaters. USGS provided funding support while WV DHSEM provided critical infrastructure data from their participation in the WV broadband mapping grant program coordinated by the WV Office of GIS Coordination. Partners: USGS, WV DHSEM, WV OGC.

Addressable Structures: Updated locator services for site and street address data extracted from Statewide Addressing and Mapping System. Partner: WV DHSEM.

Surface Tax Parcels: Created a Web map service of surface tax parcels from data provided by Cabell, Hampshire, Monongalia, and Wood Counties.

Mineral Parcels: WVGISTC contributed to the State Tax Department, Property Tax Division (PTD) Mined Minerals GIS project by mapping 1,000 mine maps and 340 mineral parcels. Partners: WV DTR, WV OGC.

Trails: WVGISTC field collected about 500 miles of trails for central and northern West Virginia, and integrated this data with trails from other trail stewards, resulting in an updated statewide trail database. Partners: WV DOT, RTI.

Cultural Resources: Updated cultural resource geospatial data for National Register, architectural, archeological databases. Partner: SHPO

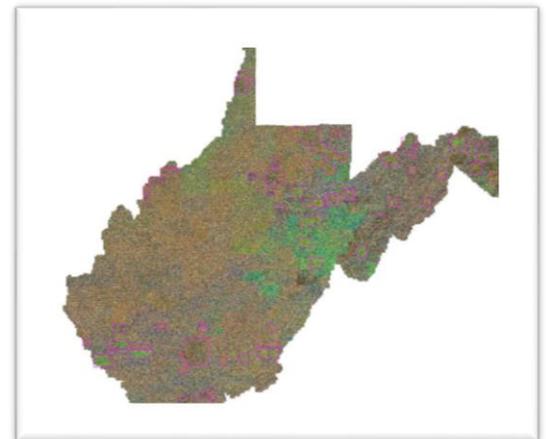
Flood Hazard Layers: Created a statewide seamless file of flood hazard data from 16 county effective and preliminary Digital Flood Insurance Flood Rate Maps. WVGISTC also published Advisory Flood Height (AFH) data for several counties. A significant achievement this next year will be that all WV counties will have digital flood data for inclusion in online maps. Partners: FEMA, WV NFIP Office (WV DHSEM), private sector.

Land Cover / Land Use: Coordinated with WV DNR/WVU NRAC to publish high-resolution land cover, ecological land units, and forest fragmentation layers based on 2011 NAIP imagery.

Imagery:

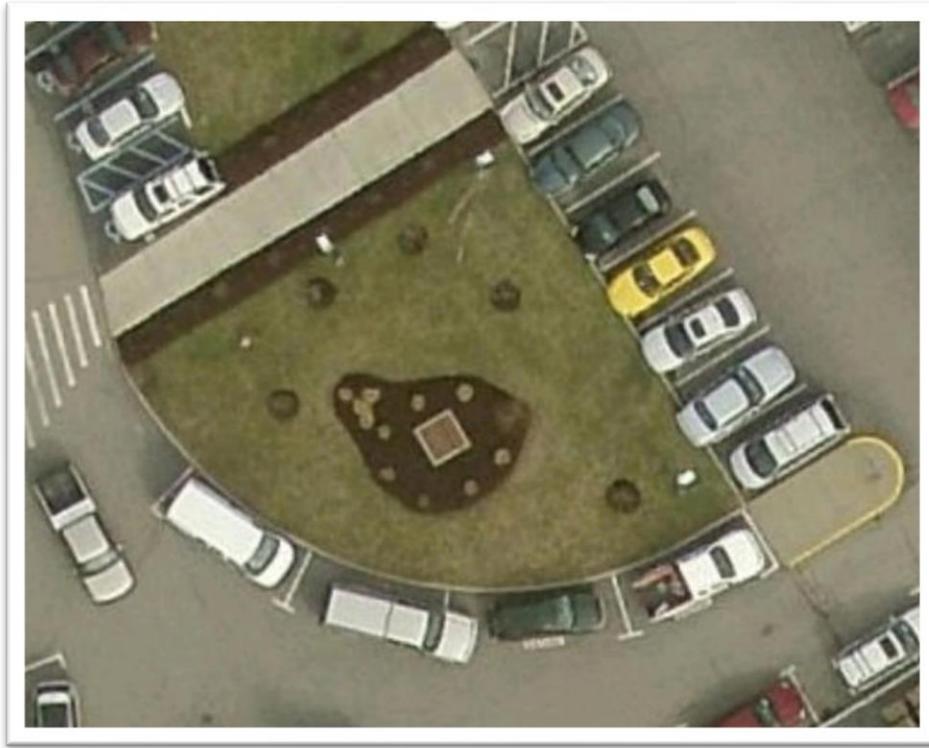
- 1) *County Imagery:* Obtained local imagery from several counties.
- 2) *NAIP Imagery:* Obtained in statewide natural color and color-infrared NAIP imagery (368 GB) from USGS in three formats (original TIFFs, compressed JPEG 4-band, and compressed JPEG 4-band quads) and converted the original files to compressed MrSID files for inclusion on the Web.
- 3) *WV Sheriffs Association (Pictometry) Imagery:* The WV Sheriff's Association received a federal grant in 2009 valued at \$3.4 million that allowed for Pictometry International to acquire statewide oblique and orthogonal imagery for public safety visualization software. In 2010-11 the oblique aerial photography company Pictometry captured 12" pixel resolution for the entire state and 4" pixel resolution for populated areas. In 2012 reflights of the 4" imagery were done for select areas.

12" and 4" Sheriff's Imagery Fused



WVGISTC acquired 9 TB of 2010-11 statewide oblique imagery including 2012 re-flights for 8 counties; published metadata, index files of tiles, and photo acquisition dates to the Data Clearinghouse; and created a statewide Web map service of the 12” and 4” imagery fused together.

High Resolution - 4” Sheriff’s Association Imagery



Mapping Projects and Applications

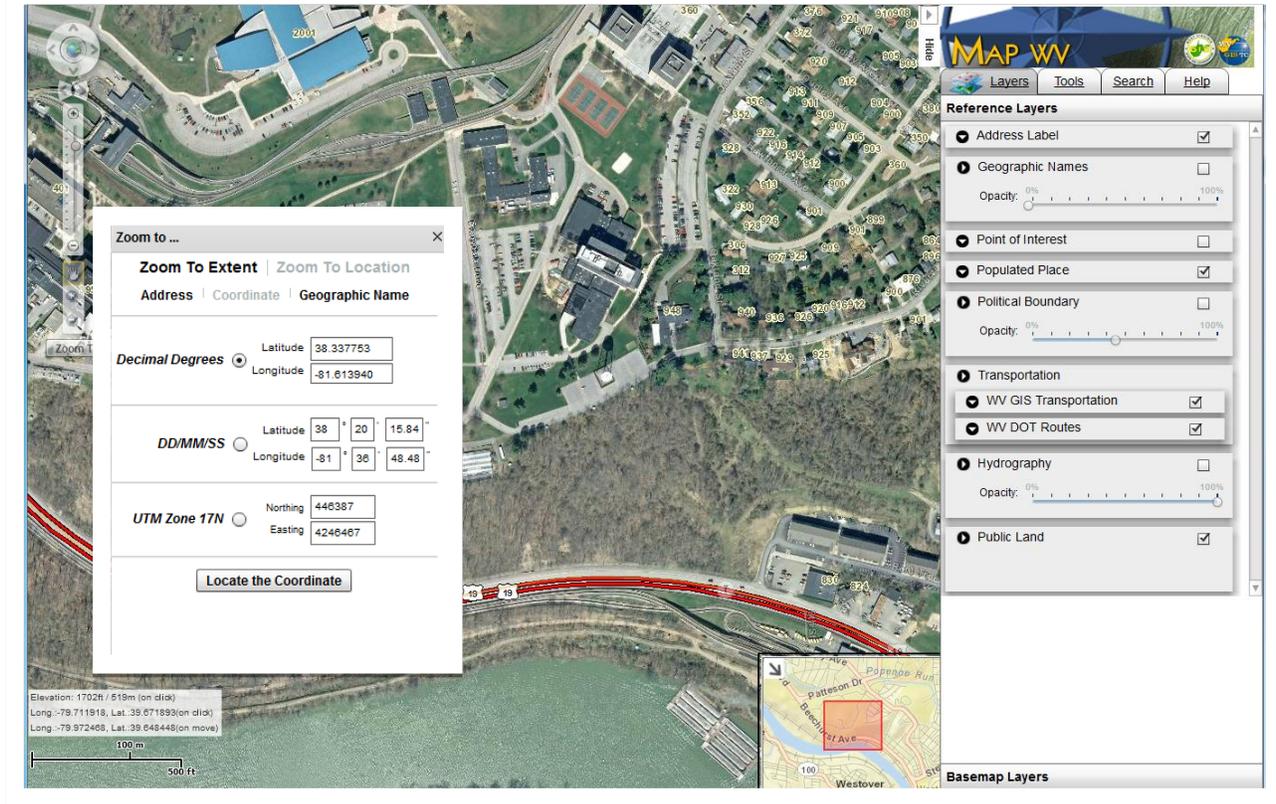
During year 2012, WVGISTC participated in a number of mapping projects. A major accomplishment was the conversion of all ArcIMS applications to ArcGIS server. Select projects are highlighted below: <http://www.mapwv.gov/viewer>

MapWV Viewer: The MapWV Viewer (<http://www.mapwv.gov/viewer>) provides users access to state and local data, customized search functions, various map tools, and a scalable design to easily include additional data layers and functions. In 2012 a new ArcGIS Server version was created to meet the aforementioned objectives and for better performance. In addition, data services are consumed from external servers to include commercial data layers (Esri, Bing, etc.), roads from WV DOT, and imagery from WV DEP.

**** Highlights of MapWV Viewer ****

- 1) **Best available DATA:**
 - a) 15 basemap and 8 reference layers
 - b) Best available WV base mapping data from state and local sources
 - i) Leaf-off imagery
 - ii) Address Labels
 - iii) Building Footprints
 - iv) Local-resolution streams
 - v) Elevation contours
 - vi) Building Footprints
 - vii) WVGISTC generated topographic-base map
 - c) Metadata links for data sources and dates
 - d) Consume shared Web map services from national and local sources
 - i) Bing/Esri
 - ii) WV DOT
 - iii) WV DEP
- 2) **Customized ZOOM and SEARCH FUNCTIONS** by:
 - a) Geographic name
 - b) Site and street addresses
 - c) Coordinates
 - d) Pre-defined extents (city, county, and quad)
 - e) GIS Features (text or geometry searches)
- 3) **MAPT TOOLS** include print, share map, mark-up, and display of coordinates
- 4) **FLEXIBLE DESIGN** allows easy expansion of data layers and mapping functions

MapWV Viewer



Screenshot in which map view shows leaf-off imagery provided by Monongalia County, address labels from WV DHSEM's Statewide Addressing and Mapping System, and major roads from WV DOT. Zoom to and coordinate display functions also shown.

SHPO Cultural Mapping: In cooperation with the State Historic Preservation Office, WVGISTC revamped their online mapping application with a user management system, new functions and enhancements such as linking sites to scanned reports and photos, and authorized access to archeological data. Link: www.mapwv.gov/shpo

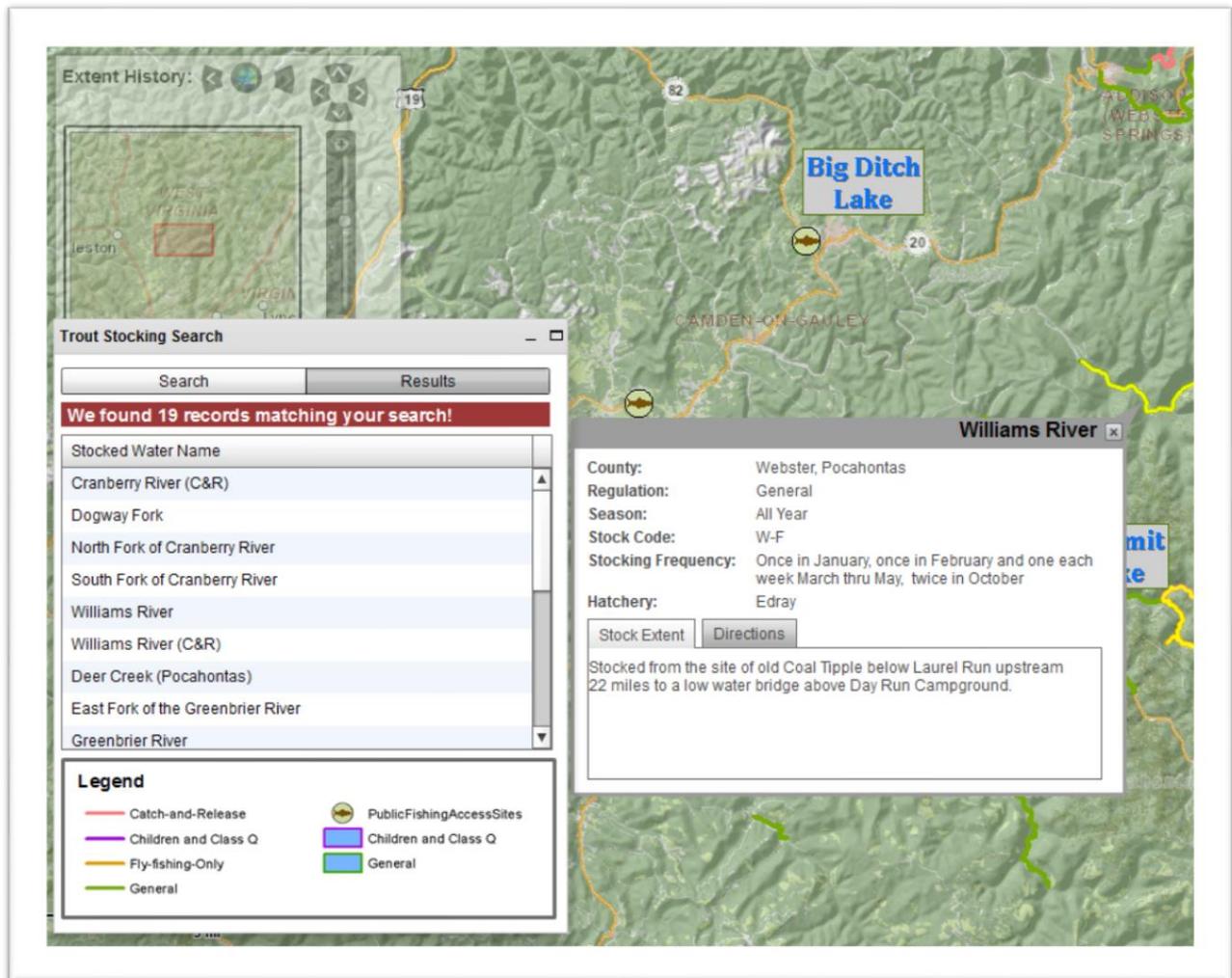
Energy Research and Mapping: An updated and redesigned version of the National Carbon Sequestration Database and Geographic Information System (NATCARB) was launched on the U.S Department of Energy website. The interactive online tool integrates a wealth of information about worldwide efforts to deploy CCS technologies. The tabs within NATCARB open different maps for query and analysis capabilities, including views for (1) RCSP, (2) ATLAS, (3) FIELD PROJECTS, (4) WCCS, and (5) ADDITIONAL PROJECTS. Links: http://www.netl.doe.gov/technologies/carbon_seq/ (launch page) and <http://www.natcarbviewer.org/> (map viewer).

In January 2012, the DOE awarded WVGISTC a perfect score on its performance review based upon work quality, schedule control, and cost control. It should be noted that a perfect score is extremely rare for site support contractor assessment scores.

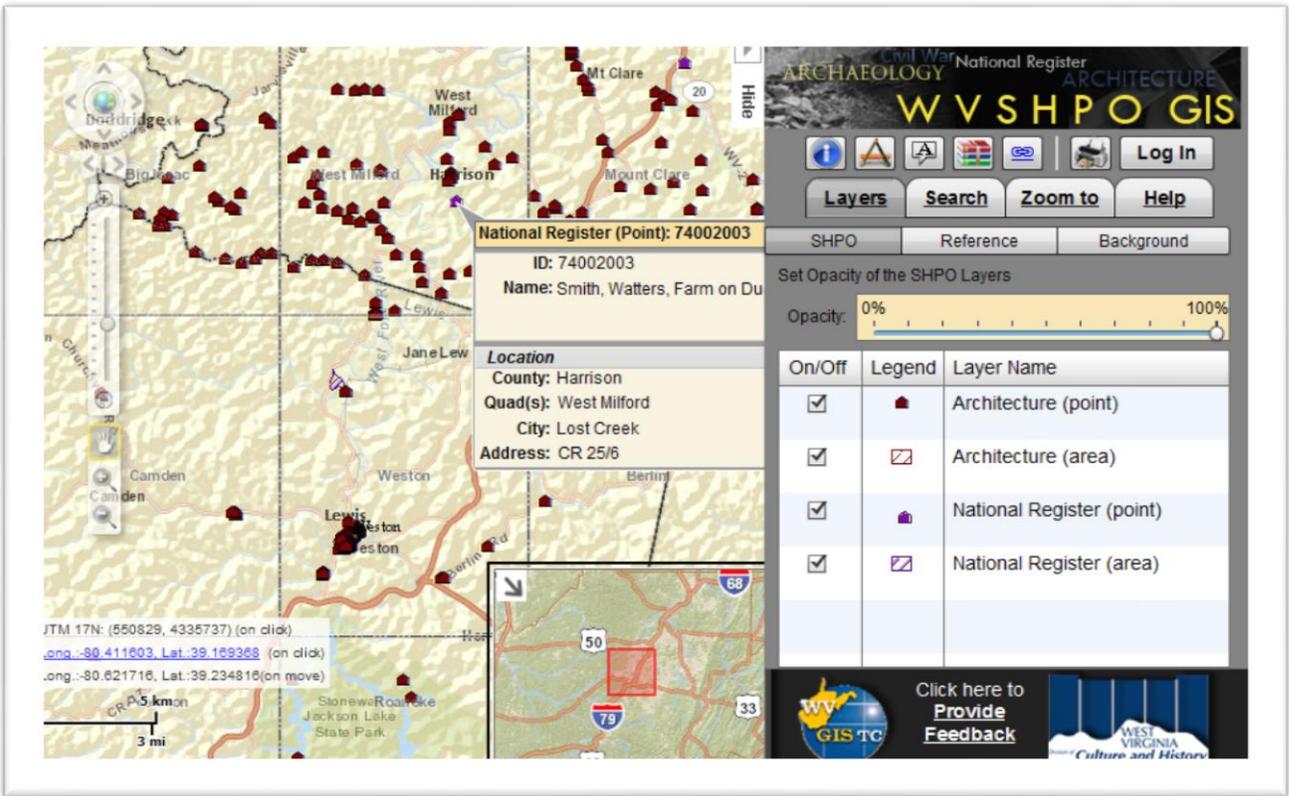
This past year WVGISTC also developed for the Department of Energy a new map viewer and reports database for unconventional oil and gas plays in North America. Link: <http://unconventionalenergyresources.com/>

DNR Mapping Applications: WVGISTC converted the Trout Stocked Streams (www.mapwv.gov/Trout) application for the WV Division of Natural Resources to ArcGIS Server. On another project sponsored by the WV DNR and Natural Resources Conservation Service, WVGISTC developed a conservation planning tool (www.mapwv.gov/ICT) that allows authorized users to receive avoidance measures and potential impacts (both beneficial and adverse) to federally threatened and endangered species.

Other Internet Mapping Applications: WVGISTC continued support for the WV Department of Education school application (<http://www.mapwv.gov/schools>). The Center also enhanced the WV Department of Health and Human Resources (<http://157.182.212.211/dhhr/>) source water application that provides authorized users information on source water and wellhead protection pertaining to Public Water Systems. Software upgrades and support continued for the WV Flood Tool (www.mapwv.gov/flood) with a major new version release to occur in 2013. A statewide trails application (www.mapwv.gov/trails) for WV DOT is also scheduled to be available in 2013.



Screenshot of Trout Mapping Application for WV Division of Natural Resources



Screenshot of online mapping application for State Historic Preservation Office

Assists with strategic planning, development, and implementation of statewide mapping guidelines.

WVGISTC continued its efforts with other partners on standards and business plans to advance the State’s Spatial Data Infrastructure. Specifically, WVGISTC provided strategic planning efforts focused on statewide cadastral and trail GIS data produced by multiple stakeholders.

Trail Standards: In cooperation with the Rahall Transportation Institute and WV DOT, WVGISTC is developing standards for a statewide trail database.

Cadastral Standards: WVGISTC provides support to the Property Valuation Training & Procedures Commission with standards and monitoring of county assessors associated with the maintenance and publishing of digital surface tax maps. This past year WVGISTC published a [status report and map](#) of digital tax maps produced by West Virginia counties.

Technical Support, Educational and Training Services

WVGISTC provides outreach, educational and training support, and advisory services to the citizens, government agencies, non-profit organizations, and businesses of West Virginia in the area of GIS and related spatial data technologies.

2012 WV GIS Conference: Since 2004, WVGISTC has been a lead organizer and administrative supporter of the biennial state GIS conference. The WVGISTC and the Department of Geology & Geography were hosts for the 2012 WV GIS Conference at WVU on May 8-11. Below are some highlights of the conference:

- Over 200 people and 22 exhibitors registered for the conference
- 8 plenary sessions, 37 individual oral presentations, 16 posters, 4 hands-on workshops
- Speakers State Senator Sypolt, Marion County Assessor Jim Priester, & GISCI Executive Director Sheila Wilson
- 3 evening socials for networking with professionals and friends
- 14 awards presented
- 4 WV GIS's recognized by GISCI Executive Director
- Published GIS Roll Call Report for not-for-profit agencies
- Geospatial Jeopardy and Geocaching and more!



Best Map and Poster Award presented by WVAGP President Robert Shaffer to Scott McColloch



Conference Location: Brooks Hall on WVU Downtown Campus



WV GISPs with GISCI Executive Sheila Wilson and GIS Coordinator Tony Simental



WV State Senator David Sypolt

GIS Training Survey: WVGISTC assisted with an online GIS training survey to identify and prioritize GIS training for the WV GIS community and published the results.

Certified Instructor-Led Training: WVGISTC and its partners organized and hosted 20 GIS training workshops throughout the year for over 350 students. WVGISTC has a staff member who is certified in teaching the Esri foundational ArcGIS desktop courses and the URISA Cartography and Map Design Workshop. This past year WVGISTC coordinated with the WV Association of Geospatial Professionals to expand GIS training opportunities to the WV GIS Community.



WVGISTC Training

| Instructor-Led Workshop | Training Dates | Location | Training By |
|---|--------------------------------------|---------------------------|--------------------|
| ArcGIS GIS Desktop II & III | Dec 5-9, 2011 | Morgantown | WVGISTC |
| Census Boundary and Annexations Surveys (BAS) | January 11, 2012 January 12, 2012 | Morgantown, Charleston | Census Census |
| ArcGIS GIS Desktop II & III | March 26-30 | Morgantown | WVGISTC |
| ArcGIS 10.0 Tips and Tricks | May 11, 2012 | Morgantown | WVGISTC |
| Internet Mapping Applications and Service | May 11, 2012 | Morgantown | WVGISTC |
| Understanding GPS | May 11, 2012 | Morgantown | Earth Vector Sys. |
| National Hydrography Dataset | May 11, 2012 | Morgantown | USGS/WVGISTC |
| Lidar Processing & Viewing in ArcGIS | May 11, 2012 | Morgantown | WV DEP |
| ArcGIS Desktop II | May 13-15 2012 | Charleston | WVGISTC |
| ArcGIS Desktop II | August 15-17, 2012 | Charleston | WVGISTC |
| ArcGIS Desktop I, II, III | October 1-9, 2012 | Morgantown | WVGISTC |
| ArcGIS 10.0 Tips and Tricks | November 1, 2012 | Morgantown | WVGISTC |
| ArcGIS Python | January 8-10, 2013 | Morgantown | WVU Geography |

2012 GIS Day: On November 14, 2012, the WV GIS Technical Center GIS organized a GIS Day event for over 100 AP Geography students from a local high school. Refer to newspaper article: http://www.wvagr.org/upload/news/GIS_Day_at_WVU.pdf

GIS Day (November 14, 2012)



Technical Support: WVGISTC provided a wide range of technical support services related to GIS data, map services, technical proposals, etc. Our agency often receives requests for large amounts of GIS data which are transmitted to customers by hard drive or FTP service.

WV Association of Geospatial Professionals: WVGISTC provided administrative support for the largest GIS User Group in the State. These services include support for the WVAGP main and conference websites, event registrations, ConstantContact email marketing, listserves, posting presentations online, GIS newsletters, surveys, and other information exchange services.

Other Outreach Efforts: Presented GIS papers at Esri, AAG, WV GIS Conference, and WV Floodplain Managers Conference. Co-authored an article on rural health research.

Services Support for WVAGP



**** Highlights ****

- 1) **Personnel:** Primary staff consisted of Co-Directors/Geography Professors Gregory Elmes and Trevor Harris and 8 full-time employees. Temporary staff comprised 8 student employees during the summer and 5 students during the school semesters.
 - 2) **Hardware System Architecture:** External funding allowed for updating the hardware infrastructure with new virtualized servers (2 node VM cluster, 2 six core processors) and expanded storage to 120 TB. Deployed ArcGIS 10.1 desktop and server software.
 - 3) **Geographic Information Services:** Provided continual support for the following services:
 - a) *MapWV.gov* gateway to static and interactive maps in State
 - b) *State Data Clearinghouse* to locate WV GIS data and Web mapping services
 - c) *People Directory* to located WV GIS professionals
 - d) *GIS News and Data Exchange* via listserves, newsletters, email services, website, surveys, etc.
 - 4) **GIS Data Development & Services:** Continued updating and publishing base layer GIS data and services to include geographic names, road centerlines, trails, streams, elevation contours, addresses locator services, and statewide orthophoto mosaics. Also supported GIS database development of mineral parcels, flood layers, and cultural resources. Published numerous geographic and redistricting GIS data layers originating from 2010 Census. Processed numerous public requests by phone and email for GIS data and services. Permitted discovery of geographic data and services via MapWV.gov and WV GIS Data Clearinghouse (www.wvgis.wvu.edu).
 - 5) **ArcGIS Server Online Map Application Development:** A major accomplishment this past year was to convert all remaining ArcIMS applications to ArcGIS server. Completed an ArcGIS Server version of the MapWV Viewer (www.mapWV.gov/viewer) that provides users access to state and local data, customized search functions, various map tools, and a scalable design to easily include additional data layers and functions. Developed online mapping applications for US DOE, FEMA/WV NFIP Office, WV DOT, WV DHHR, WV DNR, and SHPO.
 - 6) **Outreach, Training, and Technical Support Services:** Lead organizer of 2012 WV GIS Conference in which 200 people and 22 exhibitors attended. Published a GIS Roll Call report as part of the conference proceedings. Assisted in a training survey and organization of 20 GIS workshops which were highly attended. Many of these workshops were taught by certified Technical Center staff. For GIS Day 2012 provided GIS training and demonstrations for 100 high school AP Geography Students. Provided GIS technical support to the public and presented at a number of public meetings. Assisted WVAGP with administrative support to include communication services, workshop registrations, information exchange, etc.
 - 7) **Standards:** Continued with other partners on standards and business plans for statewide cadastral and trail data layers.
-
- 1) **Personnel:** The staff consists of two geography professors who serve as co-directors, eight full-time employees, and student and temporary employees hired periodically to accomplish project tasks. This past year external funding permitted the hiring of another GIS Programmer.
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- c) Kurt Donaldson, Manager
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- e) Evan Fedorko, GIS Analyst
- f) Eric Hopkins, GIS Analyst
- g) Kevin Kuhn, GIS Analyst
- h) Maneesh Sharma, NATCARB Coordinator/GIS Analyst
- i) Xiannian Chen, GIS Programmer
- j) Corey Schafer, GIS Programmer

2) Hardware System Architecture - The past two years the Tech Center made major upgrades to its computing infrastructure. To accommodate the increased data serving demands as well as increases in application technology updates, the Tech Center moved to a virtualized infrastructure for its server environment. This virtualization allows for easier expansion of server capabilities as needed and a rapid turnaround from needs assessment to server implementation. In terms of computing power, the servers were upgraded to latest generation Xeon processors and 96 GB RAM. Storage has been expanded to 120 TB of raw storage to accommodate currently expected and future large imagery datasets. The bandwidth is 1 gbit to the building, and 300 mbit from the college.

- a) 2 Node VM Cluster
 - i) 96 GB RAM
 - ii) 2 six core processors
 - iii) 120 TB storage
- b) Bandwidth
 - i) 1 gbit to building
 - ii) 300 mbit from college

3) Geographic Information Network Services

- a) MapWV.gov – Public gateway to mapping applications and links to other geographic information
- b) WVGISTC Website: Access State Data Clearinghouse (<http://wvgis.wvu.edu>) – discover and access GIS data, people, and other resources
- c) WVAGP Communication Networks
 - i) Websites
 - ii) Email marketing and newsletters
 - iii) ListServes/Electronic Mail Listings
 - (1) WVAGP (WVAGP@LISTSERV.WVU.EDU)
 - (2) WVAGP Board (WVAGP_Board@LISTSERV.WVU.EDU)
 - (3) Cadastral (WVCADASTRAL@LISTSERV.WVU.EDU)
 - (4) E-911 (WVADDRESSING@LISTSERV.WVU.EDU)
 - iv) Online Surveys (SurveyMonkey)

4) GIS Data Development and Web Services

- a) Updated the [base layer framework report](#) for West Virginia.
- b) Geographic Names / Gazetteer

- i) GNIS Cultural Features: Updated 2,740 structures and cultural features. Included in this feature update were *cemeteries, city and town halls, auditoriums, arenas and stadiums, police stations, fire stations, post offices, libraries, museums, courthouses, summits, convention and conference centers, and theaters.*
- ii) USGS provided funding support. WV DHSEM provided critical infrastructure data from their participation in the WV broadband mapping grant program coordinated by the WV Office of GIS Coordination.
- iii) See [2012 Cultural Features GNIS Report](#).
- iv) GNIS Data Clearinghouse link: <http://wvgis.wvu.edu/data/dataset.php?ID=99>
- c) Road Centerlines
 - i) Consumed WV DOT major roads as a Web map service into mapping applications.
 - ii) Attended WV DOT coordination meeting about the integration of multiple statewide transportation datasets to support linear referencing, routing, and addressing.
 - iii) 2011 TIGER Roads. Coordinating with WV DOT to obtain new local roads for entire State to replace Census TIGER roads. <http://wvgis.wvu.edu/data/dataset.php?ID=300>
- d) Streams & Water Bodies
 - i) NHD streams development.
 - (1) WVGISTC corrected approximately 74 miles across 143 high-resolution NHD features within the Gauley River watershed
 - (2) 2,000 High Resolution NHD features with an estimated length of 800 miles have been impacted by surface mining and require editing.
 - ii) Funded by USGS.
 - iii) Published [NHD Stewardship Report](#).
- e) Imagery
 - i) Created [Imagery Catalog](#) of Data Clearinghouse holdings
 - ii) WV Sheriffs Association Statewide Orthophotos (Pictometry)
 - (1) Acquired imagery including re-flights from Pictometry
 - (2) Published 12" & 4" index files of tiles
 - (3) Published imagery acquisition graphics by year, month, and towns
 - (4) Data Clearinghouse: <http://www.wvgis.wvu.edu/data/dataset.php?ID=437>
 - (5) Created Statewide Web map service for top-down views:
 - (a) Processed and published statewide 12" files
 - (b) Processed and published 4" re-flight tiles
 - (c) Link: http://services.wvgis.wvu.edu/ArcGIS/rest/services/Image/wv_sheriff_association_1ft/MapServer
 - iii) 2011 NAIP CIR & NC Imagery
 - (1) Obtained original TIFFs, compressed county mosaics, and compressed JPEG 4-band images from USGS.
 - (2) Converted TIFFs to NC & CIR, MrSID format, USGS quarter-quad tiles
 - (3) Published 3 compressed data formats to Clearinghouse: <http://wvgis.wvu.edu/data/dataset.php?ID=441>
 - iv) County 6" Imagery – acquired and published local imagery from several counties
- f) Addresses

- i) Updated statewide locator services in July 2012 from WVDHSEM addressing and mapping files.
 - ii) WV Addressing Locator Services: <http://wvgis.wvu.edu/data/dataset.php?ID=411>
- g) Recreational Trails
 - i) WVGISTC collected about 500 miles of trails for central and northern West Virginia.
 - ii) Developed trail inventory map application (<http://www.mapwv.gov/trails>) for validating trail collections.
 - iii) Published new recreational trails data for West Virginia: <http://wvgis.wvu.edu/data/dataset.php?ID=413>
 - iv) Funded by WV DOT
- h) Elevation
 - i) Provided technical support and quality control for high-resolution elevation data for Monongalia County.
 - ii) Investigating the feasibility of incorporating high-resolution elevation data (2-ft contours, DEM, hillshade) as Web map services.
- i) Land Cover
 - i) Coordinated with WV DNR/WVU NRAC to publish high-resolution land cover and forest cover based on 2011 NAIP imagery.
 - (1) [WV Landuse/Landcover \(2011\)](#)
 - (2) [WV Ecological Land Units](#)
 - (3) [WV Forest Fragmentation](#)
- j) Surface Tax Parcels
 - i) Created Web map service of surface tax parcels from data provided by Cabell, Hampshire, Monongalia, and Wood.
 - ii) Obtained parcel information from Fayette County to provide surface parcels to public with restricted access.
- k) Mineral Mapping Parcels (WV DTR, WVGES)
 - i) 2012 Mineral Parcel Mapping Project. Funding from MLMP.
 - (1) 1,000 mine maps digitized (new blocks of coal)
 - (2) Located and digitized 340 mineral parcels
 - (3) Partners WV DTR and WV GES
 - (4) See [2012 Mineral Parcel Mapping Project](#)
- l) Flood Data Layers (FEMA, WVDHSEM)
 - i) Advisory Flood Heights (Water Surface Elevations)
 - (1) <http://wvgis.wvu.edu/data/dataset.php?ID=414>
 - (2) Processing multi-county AFH models for Clearinghouse and Flood Tool application
 - ii) DFIRMs
 - (1) DFIRM Link: <http://wvgis.wvu.edu/data/dataset.php?ID=367>
 - (2) Merging effective and preliminary DFIRMs for 16 counties into statewide file
 - (3) Statewide Flood Polygons - <http://wvgis.wvu.edu/data/dataset.php?ID=373>
- m) Cultural Resources (SHPO)
 - i) Updated cultural resource geospatial data for National Register, architectural, archeological databases.

- n) WV Rural Health Center & DHHS HRSA
 - i) Research and spatial analysis of environmental health for rural populations
- o) Census - Published 2010 Census and redistricting files
 - i) [Block Groups with Population Data](#)
 - ii) [Blocks with Population Data](#)
 - iii) [Census Tracts with Population](#)
 - iv) [Census Designated Places](#)
 - v) [Incorporated Places](#)
 - vi) [Census with Population > 10,000](#)
 - vii) [Census with Population > 2,500](#)
 - viii) [Metropolitan Statistical Areas](#)
 - ix) [County Subdivisions](#)
 - x) [State House Districts](#)
 - xi) [State Senate Districts](#)
 - xii) [U.S. Congressional Districts](#)
 - xiii) [Voting Districts](#)
 - xiv) [Zip Code Tabulation Areas](#)
 - xv) Census TIGER Roads, Railroads, and Streams (see Data Clearinghouse)

5) ArcGIS Server Mapping Application Development & Support

- a) A major accomplishment this past year was to convert all remaining ArcIMS applications to ArcGIS server.
- b) MapWV Base Map (www.mapWV.gov/viewer)
 - i) Converted base map viewer from ArcIMS to ArcGIS Server to improve performance. Focus of viewer is on best available base layers in West Virginia.
 - ii) Added base map layers including integrated topographic map
 - iii) Enhanced viewer functions.
 - iv) Application consumes Web map services from other agencies.
- c) WV DHHR (Source Water Assessment and Protection Program)
 - i) Enhanced ArcGIS Server application that provides authorized users information on source water and wellhead protection pertaining to Public Water Systems.
 - (1) SWAP Program link: <http://www.wvdhhr.org/oehs/eed/swap/>
 - (2) ArcGIS Server Application Link: <http://157.182.212.211/dhhr/>
- d) US DOE Energy Projects
 - i) NATCARB - An updated and redesigned version of the National Carbon Sequestration Database and Geographic Information System (NATCARB) was launched on the NETL website. The interactive online tool integrates a wealth of information about worldwide efforts to deploy CCS technologies. The tabs within NATCARB open different maps for query and analysis capabilities, including views for (1) RCSP, (2) ATLAS, (3) FIELD PROJECTS, (4) WCCS, and (5) ADDITIONAL PROJECTS.
 - (1) Performance Review: In January 2012, the DOE awarded the project team a perfect score on its performance review based upon work quality, schedule control, and cost

control. It should be noted that a perfect score is extremely rare for site support contractor assessment scores.

- (2) Links:
 - (a) Launch page: http://www.netl.doe.gov/technologies/carbon_seq/
 - (b) Map Viewer: <http://www.natcarbviewer.org/>
- ii) Unconventional Resources (US DOE). Developed a new map viewer and reports database for unconventional oil and gas plays in North America.
<http://unconventionalenergyresources.com/>
- e) WV DNR (trout streams, R&E species)
 - i) Rare & Endangered Species: Developed a conservation planning tool that allows authorized users to receive avoidance measures and potential impacts (both beneficial and adverse) to federally threatened, endangered or candidate species including eagles through an Endangered Species Act programmatic agreement.
 - (1) Funded by NRCS & WV DNR
 - (2) Link: www.mapwv.gov/ICT
 - ii) Trout Stocked Streams - Converted application to ArcGIS Server
 - (1) Link: www.mapwv.gov/Trout
- f) WV DHSEM & FEMA (flood risk determinations)
 - i) Updated new WV Flood Tool (<http://www.mapwv.gov/flood/>) which incorporated new functions and Web services, including consuming data services from WV DEP & WV DOT.
 - ii) Added parcel information to application.
 - iii) Data and functional enhancements in progress:
 - (1) All 55 counties will have digital flood data incorporated into application.
 - (2) Ability to download H&H models and stream profiles.
 - iv) WV DEHSEM authorized providing programming code to State of Maryland for their use.
- g) WV SHPO (cultural)
 - i) Revised cultural resources application with new functions and enhancement, including linking sites to scanned reports and photos.
 - ii) Link: www.mapwv.gov/shpo
- h) WV DOT (trails)
 - i) Created new trail Statewide trail inventory application.
 - ii) Link: www.mapwv.gov/trails
- i) WV Legislative Services (state/delegate districts) – New application with 2012 redistricting files; in progress.
- j) County Web Services Support

6) Outreach, Training, and Technical Support Services

- a) Lead organizer of [2012 WV GIS Conference](#)
 - i) Over 200 people and 22 exhibitors registered for the conference
 - ii) 8 plenary sessions, 37 individual oral presentations, 16 posters, 4 hands-on workshops
 - iii) Speakers State Senator Sypolt, Marion County Assessor Jim Priester, & GISCI Executive Director Sheila Wilson
 - iv) 3 evening socials for networking with professionals and friends
 - v) 14 awards presented

- vi) 4 WV GIS's recognized by GISCI Executive Director
- vii) Published [GIS Roll Call Report](#) for not-for-profit agencies
- viii) Geospatial Jeopardy and Geocaching and more
- b) GIS Day 2012
 - i) Provided GIS training and demonstrations for 100 high school AP Geography Students
 - ii) Newspaper article: http://www.wvaggp.org/upload/news/GIS_Day_at_WVU.pdf
- c) Training
 - i) Conducted statewide GIS training survey and published results
 - ii) Certified Esri & URISA instructor.
 - iii) Staff assisted with 20 training workshops. Sample training:
 - (1) National Hydrography Dataset
 - (2) Esri ArcGIS 10 Desktop I, II, III; tips & tricks
 - (3) ArcGIS Python
 - (4) Intro to GIS for K-12 teachers and professional surveyors
 - iv) Served as training host site for other institutions.
- d) WVAGP administrative support – communication services, workshop registrations, information exchange, etc.
- e) Technical Support queries
- f) Map proposal assistance for counties

7) Standards Development

- a) Cadastral
 - i) Member of the Property Valuation Training & Procedures Commission charged with modernizing tax map procedures, map sales, and data distribution guidelines.
 - ii) Published a [status report and maps](#) on the status of digital tax maps.