

# Federal Geographic Data Committee Newsletter

2007 Winter Edition

## Carol Brandt Receives NSGIC Dedicated Service Award

Carol Brandt was posthumously awarded the Dedicated Service Award at the NSGIC Annual Conference in Madison, Wisconsin in September 2007. The award was established in honor of Carol who devoted a lifetime of service to the Federal government. Carol received a BA in Geography from the State University of New York Geneseo in 1976. She began her federal career at the Defense Mapping Agency (DMA) in 1981. After almost 5 years at DMA, she decided to take a break from federal service and pursue other interests. In 1988, she joined the Census Bureau's Geography Division. In 1995, after 7 years of working on the TIGER files and other Census projects, she moved on to become the Spatial Database Manager at the U.S. DOT's Bureau of Transportation Statistics (BTS). Shortly after she started at BTS, she became a supporter of NSGIC, attending her first conference in 1996. She also became active in the FGDC, participating in the Coordination Group and accompanying the U.S. DOT representative to the Steering Committee meetings. Carol flourished at BTS, and in 1999 she was promoted to Geospatial Information Program Manager. In that position, she received two Secretary's Awards from U.S. DOT. Early in 2007, Carol was promoted again, and she joined BTS Senior Staff as the Associate Director for Information Systems.

After a long bout with breast cancer, Carol passed away on July 9, 2007. Throughout her career, she was committed to efficient and effective government



Carol Brandt and the GIS gang.



Carol Brandt

through the prudent adoption of geospatial information technologies. Carol is the first recipient of this award. The Dedicated Service Award is one of NSGIC's highest service recognition awards and a recipient's exemplary service must exceed the normal expectation of duty and have occurred over the length of a career.

Carol's dedication to her work was surpassed only by her dedication to her family, friends, and colleagues. She is greatly missed by those who knew her and were touched by her dedication, humor, compassion and friendship.

## Framework Web Services Online

The FY 2004 and 2005 Cooperative Agreement Program (CAP) included a category for the development of Web Feature Services (WFS) on Framework data sets. Awards in this category designed and prototyped geospatial data services that use the draft ANSI/INCITS Framework Data Content Standard. Through the CAP awards, feature data services have been prototyped and documented for selected national data and for state-wide data themes in Minnesota, Wisconsin, Vermont, Arkansas, New England, Virginia, North Carolina, and Rhode Island.

The purpose of this article is to highlight the availability of national-scope geospatial data services arising from CAP projects that support data encoding according to

the draft ANSI Framework standard. The first project, led by the small company, GeoLeaders, has developed national WFS services for several key themes. The second project was conducted by George Mason University to serve both Virginia transportation data and the National Transportation Atlas Database (NTAD).

### Implementing the Framework Data Content Standard

The draft ANSI/INCITS Framework Data Content Standard is designed to provide an abstract model – like an enhanced data dictionary – for the seven Framework data themes. This allows producers and users of geospatial data to understand the features, data types, and values that would be expected in data management and transfer. The Standard is actually composed of twelve parts – a base specification plus eleven parts that correspond to each of the seven Framework themes and, in the case of transportation, five sub-themes.

The standard includes many diagrams and tables that explain the Framework data design using the Unified Modeling Language (UML). This UML describes a logical, implementation-neutral model that could be interpreted to help in database design, data capture, and data transfer. One of the features of UML modeling tools is the ability to automatically interpret the UML model and create instantiations in databases, programming languages, or data formats. The capability exists to convert a UML logical data model into its representation in GML. To facilitate use of the abstract model for the purpose of data transfer the Standard also includes a representation of the Framework data model encoded in Geography Markup Language – an ISO and OGC standard for geographic data encoding. As GML, the data can be served and used by a variety of software. It is the service of GML-formatted data that is being demonstrated by these CAP projects.

### Framework WFS for USGS

GeoLeaders deployed a set of Framework data services based on data provided by the U.S. Geological Survey in its native Oracle database format and developed a conversion strategy by creating “views” on the database that facilitate the creation of the data as GML consistent with the ANSI Framework standard. Initially, the project was scoped to convert and serve the National Hydrography Dataset (NHD) but the availability of nationwide road and boundary data hosted by USGS but derived from a partnership with the Census Bureau provided content for additional services. Subsequently, in FY 2006, the USGS contracted with GeoLeaders for hosting, synchronization, and additional services to continue public access to these data through WFS. In addition to WFS, a Web Map Service (WMS) interface was also published to generate images of the data in map form for viewing by any portal or client application.

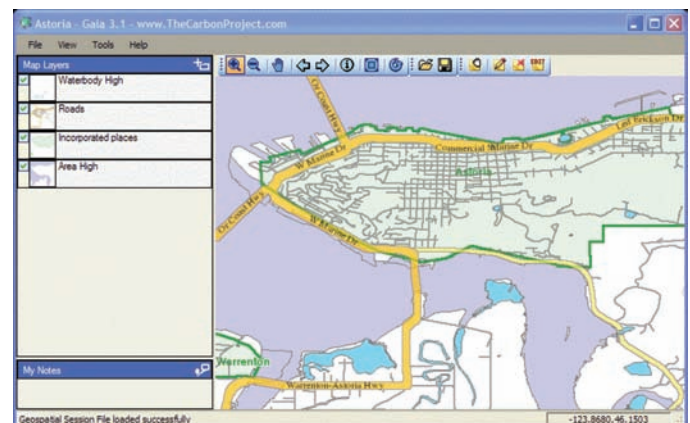
### VDOT and NTAD Transportation Data Online

George Mason University received a CAP award in FY 2004 to deploy WFS for ANSI Framework data using the Intergraph GeoMedia server. On behalf of the Virginia Department of Transportation, GMU acquired the statewide road network and converted it for service in the WFS. They continue to receive periodic updates from the state and provide public access to the entire road network in GML format that conforms to the draft Framework standard. In addition to the state data, GMU acquired the National Transportation Atlas Database (NTAD 2006) from the federal Bureau of Transportation Statistics and have implemented WFS for their many feature types including roads, railways, waterways, airport runways, ports, hazardous material routes, and other data layers for context. Like the GeoLeaders project, these transportation data are also viewable through a public Web Map Server that symbolizes the data and lets users compose maps with other data from other sources.

### Issues and Next Steps

The establishment of standards-based services is fully aligned with the emerging Geospatial Line of Business, an activity overseen by the FGDC to improve the coordinated investment and stewardship of geospatial data and services. The Line of Business endorses the geospatial standards described by the Geospatial Profile of the Federal Enterprise Architecture. The use of standard data exchange protocols and formats will potentially increase the use of data by a broader audience than proprietary or one-of-a-kind solutions.

These Web Feature Service experiments have confirmed that although data can be generated as GML from a database very quickly, the transmitted data tend to be large and slow to transfer. Experiments are underway to demonstrate the use of standard data compression techniques to negotiate the compression of GML data. So far, this appears to be a practical solution that reduces data volumes and delivery times by 80%



A view of the ANSI Framework data from USGS as a Web Map Service showing selected boundaries, hydrography, and roads.

or more, but will require community understanding and adoption of this practice to ensure its availability.

The draft ANSI Framework standard is expected to become approved by ANSI and then be an American National Standard within the next few months. If there are changes identified during the review of the standard or in its practical application, they would need to be incorporated into established WFS services.

The relative role and value of Web Feature Services and Web Map Services need to be better explained and understood. Web Feature Services provide access to full-detailed geospatial data. Web Map Services deliver only a picture of the data. Anecdotal evidence suggests that the vast majority of end-user interest in geospatial information may be satisfied by WMS. However, WFS and GML are useful to GIS analysts and data stewards require the exchange of feature and attribute data for their work. A comparison of traditional file-based download with WFS and GML data access would be useful to the community in clarifying the use of appropriate technology. Contact: Doug Nebert, dnebert@usgs.gov.

## 10<sup>th</sup> Global Spatial Data Infrastructure (GSDI-10)

The GSDI-10 conferences are opportunities to meet and exchange views about implementing and developing spatial data concepts and practices. From national and international agency perspectives to local grassroots initiatives, the conference provides an occasion for interaction and cooperation among disciplines and practitioners that use and develop spatial technologies and databases. Policy-makers at local, regional and global levels are provided with an opportunity to interact with a global community fostering spatial data infrastructure developments in support of addressing important worldwide needs.

### Features of GSDI-10

The conference program is being designed to accommodate opening and closing plenary sessions with keynote speakers, daily plenary sessions focused on the conference theme and related topics, technical paper sessions in several parallel tracks, pre-conference and post-conference workshops freely open to all registrants, a poster exhibit and competition, an exhibition area highlighting agency initiatives and corporate product and service offerings, and numerous organized round table discussions to allow people from common regions of the globe or with common interests to present, discuss, and share issues, experiences and plans. Specifically GSDI-10 plans for:

- 30 Technical Sessions
- 9 Workshops

- 4 Plenary Sessions
- 6 special Panels
- 7 Round-table discussions

### GSDI 10 Conference Theme

The selected theme of GSDI 10 is “Small Island Perspectives on Global Challenges: The Role of Spatial Data in Supporting a Sustainable Future.” The pressing needs of small island nations are a particular (but not the only) emphasis of the conference and includes such concerns as:

- sustainable development,
- disaster prevention, warning, management, response, and recovery,
- alleviation of poverty and crime,
- economic development,
- lessening the digital divide including access to information technologies,
- ensuring food security,
- support of transportation, health and communication systems, and
- facilitating land ownership

GIS, spatial data infrastructure concepts, and affiliated tools and technologies are being utilized worldwide to help address all of these and related issues. We look forward to enjoying your company and benefiting from your insights. Please come! Contact: [astevell@usgs.gov](mailto:astevell@usgs.gov).



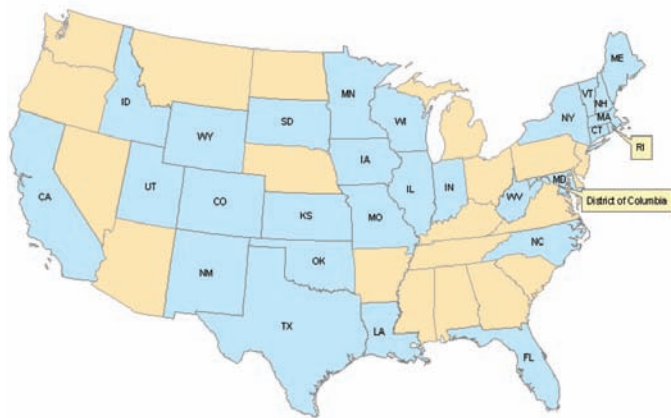
Poster for GSDI 10 conference to be held in February 2008.

## Fifty States Steps Forward

The Fifty States Initiative is based upon a fundamental belief that when all stakeholders are represented and working together to build solutions that they can accomplish great things. In October of 2005 the FGDC Steering Committee endorsed the Fifty States Initiative, since then 28 states and the District of Columbia have received funding to advance the initiative. These states are working to improve geospatial coordination through the development of statewide strategic and business

plans. A key partner in the initiative is the National States Geographic Information Council (NSGIC).

As of October 2007, a total of about \$1.4 million has been awarded. Funding has been awarded primarily through the FGDC Cooperative Agreements Program (CAP). The EPA has provided some support. In addition, the Partnership office of the US Geological Survey has also funded the initiative. The next round of FGDC CAP has just been announced. The intent is to make 10 additional Fifty State awards by March of 2008.



Map showing all the states that have received funding as of October 2007.

The primary focus of the initiative is on developing strategic and business plan for statewide geospatial coordination. Because the Fifty State projects have different start dates and States are approaching the projects in slightly different ways, many of the projects are in progress. The Table below summarizes the status of Fifty State projects as of October 2007.

Number	Status	States
4	Complete	LA, MD, NH, OK
7	Complete Pending Final Report	CT, RI, MA, MN, WY, WV, WI
18	In Progress	CA, CO, DC, ID, FL, IA, IL, IN, KS, ME, MO, NM, NY, SD, UT, VT

The Initiative has created several key tools for states to use. The primary tools include a strategic plan template, a business plan template, a Return On Investment workbook, and new outreach materials. These products are available from the FGDC and NSGIC web sites. In fiscal year 2008 efforts are under way to improve the outreach materials. In addition there are plans to outreach to other organizations about the initiative.

In 2007 the value of the Fifty State initiative was featured in two reports conducted by the National Academies. "Successful Response Starts with a Map: Improving Support for Disaster Management" highlights the role

of the Fifty State initiative to voluntarily improve data sharing. The Florida Division of Emergency Management is leading Florida's effort to produce a strategic plan that will facilitate the implementation of NSDI in Florida. Louisiana's effort focused on getting utilities more engaged in statewide coordination especially as it relates to disaster response and recovery. In General statewide councils bring improved consistency to the NSDI which can smooth data across the current patchwork of complex data needed for emergency management and response.

In addition, the National Academies 2007 Report "National Land Parcel Data; A Vision for the Future" mentions the Fifty state initiative several times as a way to achieve the necessary coordination at the state level to realize a national land parcel database. It explicitly mentions in one of the recommendation that the National Land Parcel Coordinator should embrace the Fifty State Initiative and require that every state establish a state parcel coordinator. Maine and South Dakota have projects with a strong cadastral spotlight.

What to the states that have received funding think? Here's a sample of what they have said:

The process of ... carrying out the strategic planning project has forced us to pull back from urgent daily activities and focus on longer term important partnerships.

By involving over 200 different stakeholders in the needs assessment survey we gave the GIS community ... a chance to participate in the strategic planning process.

The real challenge to coordination and building of a statewide GIS infrastructure ... is to convince the decision makers... This is why our CAP project has strongly resonated with the return on investment ...

The funding from the CAP has allowed us to bring in professional assistance to enable us to make our case as cogently as possible

The Fifty State Initiative is stepping forward and making an impact. The NSDI is built by working together. Working state by state, step by step, statewide spatial data coordination is improving. Together we can accomplish great things. Contact: Milo Robinson, mrobinson@usgs.gov.

## Geospatial One-Stop Update

Geospatial One-Stop (GOS) continues the development of its Web portal, [www.geodata.gov](http://www.geodata.gov), for intergovernmental information sharing, making it faster and easier for users to find geospatial data and resources. The portal combines thousands of geospatial

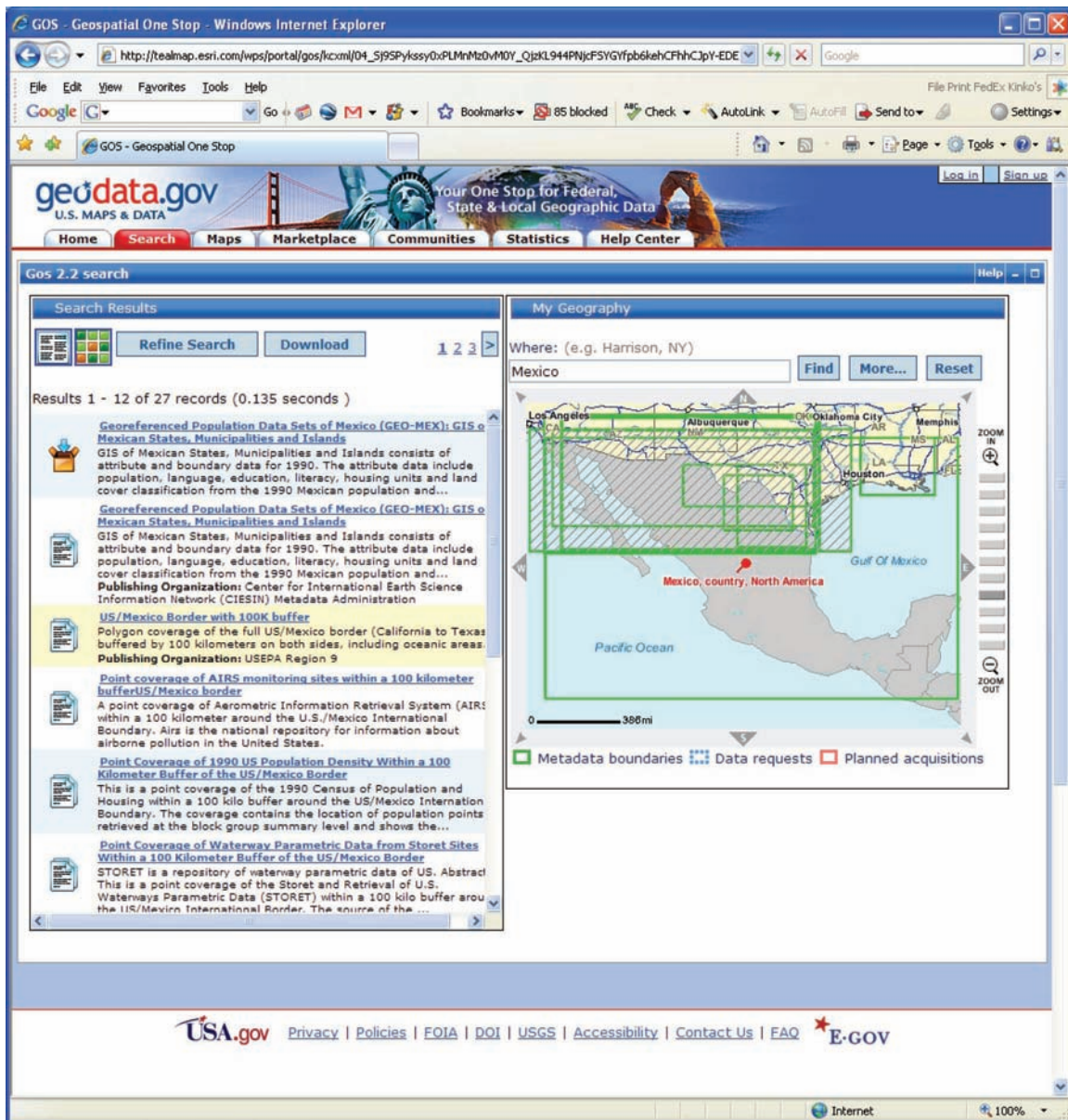


Figure 1. New search results interface for GOS version 2.2. Dataset footprints are now shown on the map and are linked the metadata results list.

resources from Federal, state, local, tribal and private sources and makes them available from a single website.

In May 2007, version 2.1 of the portal was released. One of the key enhancements was improvement in the search results so that the most geographically relevant data are listed first. Tools were also improved for data providers to add and manage their metadata on the portal. A harvest “Test” button was added to the harvest configuration procedure so a publisher can get immediate feedback that their harvest is set up correctly. A harvesting report was also implemented to give publishers clear feedback on which metadata records succeed and which fail in a harvest, and why. Another enhancement was to include links to access live data services metadata from the Map Viewer.

Version 2.2 is due for release in late 2007 and will feature improved visualization of search results. An international gazetteer is included enabling world-wide searches. The list of metadata results is tied to the footprints of the datasets shown in the map. A search for data along the U.S. – Mexico border is shown in Figure 1. The result highlighted in yellow is tied to its footprint on the map shown in green hatching. New capabilities from the search results allow you to zoom to the extent of a specific data set, easily contact a metadata owner, and see data in 3-D globe viewers. The new search interface provides a count of the number of records found and the ability to quickly jump to different results pages. Search results can be exported to an Excel spreadsheet. The search results can also be viewed as thumbnails. These new search features also apply to Marketplace searches. The Marketplace features

information on potential opportunities to leverage resources and collaborate on planned data acquisitions.

The GOS Web portal continues to gain support from metadata providers and end users. The number of metadata records in the system has grown from about 100,000 in September 2005 to over 150,000 in September 2007. The number of partnership opportunities in the Marketplace grew from approximately 600 in FY 2005 to over 2,000 in September 2007. The number of visits to the site overall has increased from approximately 30,000 per month in 2005 to about 60,000 per month in 2007.

Communities of interest continue to grow. Communities are specialized areas for sharing information in specific data categories such as Administrative Boundaries, Agriculture, Environment, etc. Some of the dynamic new content can be seen in the Earth Information Exchange Gateway, Fire Mapping, Local Governments, Oceans and Coasts, Homeland Security, and Geological and Geophysical communities.

The GOS management team continues to work closely with community stewards and metadata publishers to enhance the portal content. The Interagency Working Group for Ocean and Coastal Mapping (IWG-OCM) has been charged with a mandate by the president and the US Ocean Action Plan to devise and implement an inventory of the geospatial resources of the coastal and oceanic environments. The IWG-OCM selected GOS as the tool for developing this data inventory. A cross border initiative by the FGDC Homeland Security Working Group (HSWG) led to the development of additional content in the Homeland Security community that features geospatial data resources for the US international border regions. These activities exemplify the intergovernmental cooperation and support that are helping to develop the GOS portal.

The GOS project employed two part-time staff from State and local government through the Intergovernmental Personnel Act (IPA) to help build participation from their constituents, consisting of state, county, city, and regional agencies. Over 400 publishers from state and local agencies now provide data to the portal.

Four National Spatial Data Infrastructure (NSDI) training modules on GOS are in development. These training modules cover topics on the use of GOS for finding geospatial data, publishing metadata to GOS, and specialized training for community stewards. A training workshop held on April 25-26, 2007 that was attended by community stewards.

GOS is an intergovernmental project managed by the Department of the Interior in support of the President's Initiative for E-government. GOS works with other Federal geospatial programs and initiatives to improve the ability of the public and government to use geospatial

information to support the business of government and facilitate partnerships and decision-making. Contact Robert Dollison, rdollison@usgs.gov.

## Virginia's Metadata Buzz

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

### Background

In 2006, the Virginia Geospatial Extension Program, in partnership with the Virginia Geographic Information Network (VGIN) and James Madison University (JMU) acquired funding through the Federal Geographic Data Committee (FGDC) to support metadata development and training in the Commonwealth.

Informal surveys were disseminated to selected Virginia stakeholders to assess 'the state of metadata in Virginia'. Forty-six individuals responded to the informal survey. Findings suggest that, in terms of metadata, many of Virginia's stakeholders were ill-equipped and ill-prepared. For example:

- 50% (23) of respondents admitted that their organization/agency currently had no metadata records;
- 4% (2) stated that their organization had adopted a metadata process;
- 4% (2) maintained that metadata was "included in any job description" (for new hires)...;
- 67% (31) maintained that they would be interested in posting their metadata on a state maintained metadata clearinghouse.

When asked to identify barriers to metadata implementation:

- 8% (4) maintained that there was no incentive
- 65% (30) maintained that there was no administrative support
- 85% (39) maintained that there was "too little time"
- 8% (4) maintained that there were no metadata tools available
- 30% (18) maintained that they lack the expertise necessary to generate metadata
- 20% (9) stated that they do not know "how to get started" (overwhelmed)

While there was a clearly established need for a comprehensive metadata program in Virginia, the resources have not historically been available to support a targeted and sustainable metadata initiative. Through the support of the FGDC, the leadership of VGIN, the efforts of the Virginia Geospatial Extension Program and other sponsors and partners, Virginia has is now a buzzing with metadata activity. This article summarizes

some of the outcomes and impacts associated with the Virginia metadata implementation program.

### Initiating a Metadata Buzz...

In 2006, The Virginia Geospatial Extension Specialist attended initial metadata training at the Coastal Services Center, in South Carolina (FGDC 2005 CAP Grant). About this time, the Virginia Geographic Information Network (VGIN) gained new leadership and additional resources. These initiatives culminated in 2006, when the Virginia Geospatial Extension Program (<http://www.cnr.vt.edu/gep>), in partnership with VGIN and James Madison University, was awarded a 2006 FGDC CAP grant.

Supported by the FGDC CAP funding, fourteen metadata workshops have been conducted since 2006 at various locations across the Commonwealth (Figure 1). These workshops are designed to support the efforts of local governments, as well as state agencies, the private sector, and federal agencies working in Virginia to both:

- 1.) gain an understanding of the importance of properly documented metadata, and;
- 2.) provide stakeholders with hands-on experience with metadata documentation and publishing.

A key component of this strategic effort was the development of a comprehensive and sustainable metadata program that would support the geospatial metadata requirements of Virginia's stakeholders over the long haul.

These workshops were supported by a comprehensive metadata training manual (the *Virginia Metadata Toolkit*), that was specifically compiled for the purpose of providing targeted metadata training to support Virginia's geospatial community (Figure 2). This resource

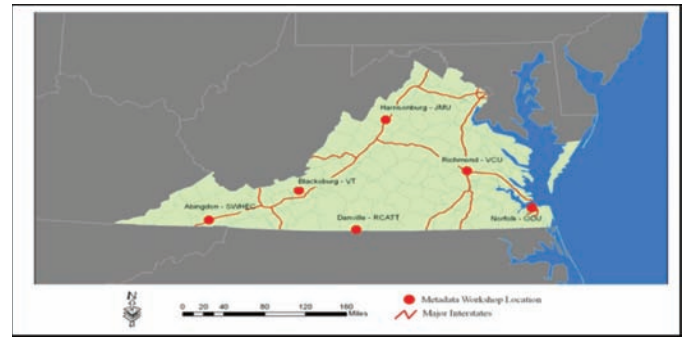


Figure 1: Locations of Metadata Workshops

was designed to be replicable, so that it could be easily transferred, adopted and customized by other metadata trainers within Virginia, as well as by other organizations nationally through The National Geospatial Technology Extension Network (NGTEN: <http://www.geospatialextension.org>) and to other regional and national groups to support their individual training needs.

The metadata workshop circuits were marketed through the Virginia Geospatial Newsletter, a quarterly newsletter that is edited and disseminated through the Virginia Geospatial Extension Program (<http://www.cnr.vt.edu/gep/archive.html>).

While impacts associated with these efforts can be measured in several ways, the most measurable impact cannot be quantified. This impact is associated with the metadata "buzz" that has been generated in Virginia. Many of the metadata workshops were not only well attended, but also had waiting lists. Two years and fourteen workshops later, local governments and state agencies continue to request additional metadata training opportunities. The interest in metadata information has been spurred by the workshops themselves, as well as through the recent implementation of a Virginia Metadata Clearinghouse.

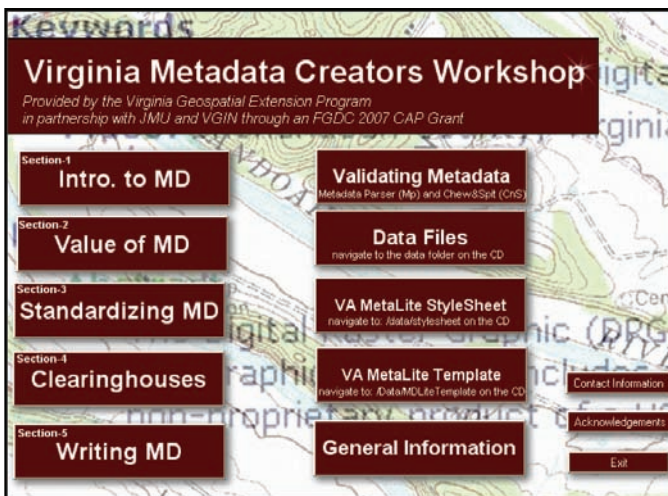


Figure 2: The Virginia Metadata Toolkit is available in hardcopy, digital, and can be downloaded from the Internet ([http://www.cnr.vt.edu/gep/metadata\\_res.html](http://www.cnr.vt.edu/gep/metadata_res.html)).

## The Virginia Metadata Portal - A Hive of Activity

Metadata workshop participants expressed their ideas, concerns, and needs during the design and development phase of the Virginia Metadata Clearinghouse. Their feedback helped to shape the design and functionality of this resource. Not only has this process provided valuable feedback to VGIN, but it has also resulted in generating a sense of ownership among Virginia's geospatial community.

The Metadata Clearinghouse was developed by VGIN in response to a legislative mandate, which called on VGIN to: *Develop, maintain and provide in the most cost effective manner access to the catalogue of Virginia geographic data and governmental data users.* VGIN determined that metadata and a functional metadata clearinghouse is the most efficient vehicle to support this mandate. The clearinghouse will encourage stakeholders to meet the mandate, by facilitating their efforts to develop, publish, maintain, their own metadata records, and to search and identify the collective metadata assets associated with the Commonwealth.

Funded and supported by the leadership at VGIN, and based on feedback from Virginia's geospatial community, the Virginia Metadata Portal (<http://gisdata.virginia.gov>) came online in July of 2007. During August 2007, Virginia Metadata Workshop participants served as a pilot audience to test the metadata portal. Workshop participants were encouraged to become authorized Virginia Metadata Portal Publishers, and were provided with hands-on instruction, not only on how to generate metadata records, but how to publish metadata to the portal, and set up harvesting options. See Figure 3 for an illustration of the Virginia Metadata Portal.

To date, there are 48 metadata records posted on the Virginia Portal. There are 72 registered users of which 49 individuals have taken the additional step of becoming metadata publishers. Of these metadata publishers, 26 are associated with local governments or



Figure 3: The Virginia Metadata Portal – <http://www.gisdata.virginia.gov>

regional planning organizations, 21 with state agencies or higher education, and 2 with other organizations. In 2006, over 100 individuals participated in the CAP supported metadata workshops. A breakdown of workshop attendees is as follows:

Local government employees: .....61%  
 State government employees: .....26%  
 Planning District commission employees: .....4%  
 Private Sector employees: .....9%

In 2007, Virginia's metadata instructors have provided seven follow-up workshops to support VGIN's efforts to catalogue Virginia's geographic data (FGDC 2007 CAP Grant) through the *Virginia Metadata Academy*. The Metadata Academy was developed in recognition that all government entities (and the private sector) are not created equal when it comes to technical metadata training and user needs. Essentially, when it comes to metadata training in Virginia, "one size does not always fit all". During the Summer of 2007, Virginia began offering several metadata training options through the Virginia Metadata Academy. These options included:

1. Virginia Metadata Creator Workshops - similar to the 2006 circuit, with an added element that will cover the Virginia Metadata Clearinghouse.
2. Metadata Creator Retreats - provided constituents with the opportunity to extract themselves from daily routines to promote metadata development and generation in an informal, yet structured setting.

## Keeping Virginia's buzz humming...

Virginia is working to sustain its metadata program through a multi-pronged approach involving several important components. The first is the Virginia Geospatial Extension Program. This program is located

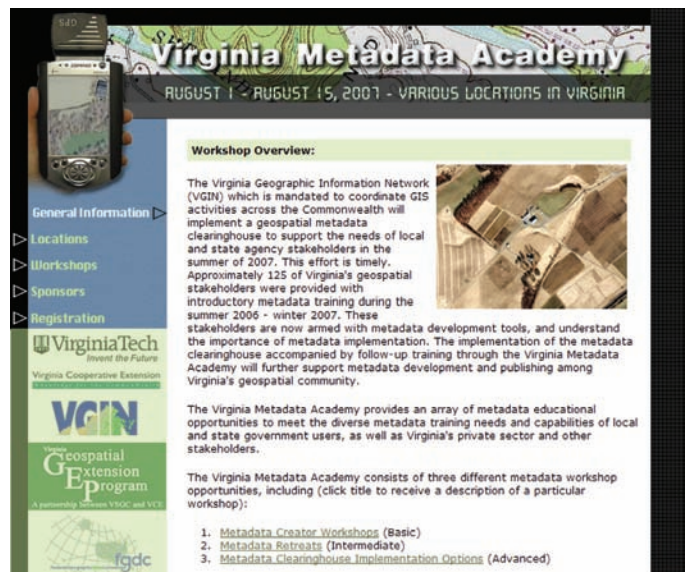


Figure 4: The Virginia Metadata Academy Website



at the Virginia Tech College of Natural Resources, and funded through Virginia Cooperative Extension. The Geospatial Extension Specialist is a 100% outreach oriented position. This program has played, and will continue to play, a key role in the education and promotional components of the metadata program.

The Virginia Metadata Portal is serving as a catalyst to support the development and publishing of metadata in the Commonwealth. The portal plays an important role because the Virginia legislature has acted proactively, by mandating that state agencies develop, maintain, and submit metadata to VGIN. This gives legislative weight to the efforts so that Virginia's spatial data assets can be leveraged by Virginia's geospatial community as a whole. Beginning in January 2008, all state agencies will be required to submit their metadata records to the Portal, so they are starting to gear up now.

To ensure the quality of the metadata published on the portal, VGIN is requiring portal publishers to take the metadata training course before being granted publisher status. VGIN is already organizing follow-up workshops to support this requirement. Additionally, VGIN will continue to manage and enhance the metadata portal, while, at the same time, encourage Virginia's stakeholders to submit metadata catalogues.

In addition to providing hands-on instruction and resources to support existing geospatial employers in Virginia, the project also recognizes that metadata training should begin prior to employment. Metadata training resource material has therefore been disseminated to augment the metadata educational efforts of institutions of higher education in Virginia (both community colleges and four year colleges and universities). Copies of the metadata training resources were disseminated to geospatial faculty and staff at 4-year and 2-year universities and colleges across Virginia. In addition, metadata training resources have also been provided to selected educational institutions nationwide.

Metadata development and educational programs are not a one-shot deal. They need to be continued to support new hires, new tools, and new issues, approaches and even standards. The Virginia metadata program is a sustainable model by which the geospatial community can continue to be served in the future through professional development opportunities and through the tools and resources associated with the Virginia Metadata Portal. While the clearinghouse is still in its infancy, it will continue to grow.

Virginia has Metadata trainers located geographically across the state. Metadata training facilities have been established and can now be efficiently accessed and utilized. A metadata brochure (*Mind Over Metadata*) has been designed and printed. This resource is being disseminated to stakeholders. The brochures serve to

both reinforce the need for metadata, and as a summary reference resource for stakeholders.

Other resources including Virginia Metadata stylesheets and templates have been established to support the needs of Virginia's geospatial community. These resources have also been made available through the Virginia Metadata Academy Workshops.

Collectively, these activities combined have created quite a metadata buzz in Virginia. Contact: John McGee, [jmccg@vt.edu](mailto:jmccg@vt.edu).

## FEMA Disaster Grant and FGDC Metadata Training Success Story with Bishop Paiute Tribe, CA

### Overview

#### Bishop Paiute Tribal History

The Paiute people who live on the Bishop Paiute Reservation are descendants of the "Nu-Mu", the original people of the Owens Valley. In 1912, the U.S. Government reserved over 67,000 acres of lands in the Owens Valley for the Indians of this area. In 1932, President Hoover revoked the 67,000 acres reserved land and placed the lands in watershed protection status for the City of Los Angeles. In 1936, the City of Los Angeles wanted the remaining lands and the federal government traded these lands for the 875 acres that now comprise the Bishop Paiute Reservation located at the base of the magnificent Eastern Sierra Nevada Mountains. Today the Paiute people are the fifth largest California Tribe, with 2,000 members and one of the smallest land bases. Despite our land predicament the Tribal government has upgraded technical capabilities and developed infrastructure for the present and future growth of the Bishop Paiute Reservation. To support



Sophi Beym, Cameron Stone, James Denver and Mitch David



James Denver, Cameron Stone and Mitch David

Tribal growth the Tribal government developed and established the Toiyabe Indian Health Project and Dialysis Center, Head Start and Day Care, Education Center, Economic Development Center, Career Development Center, Paiute and Shoshone Cultural Center and Museum, Elders Program, and a Casino.

**Problem Identified**

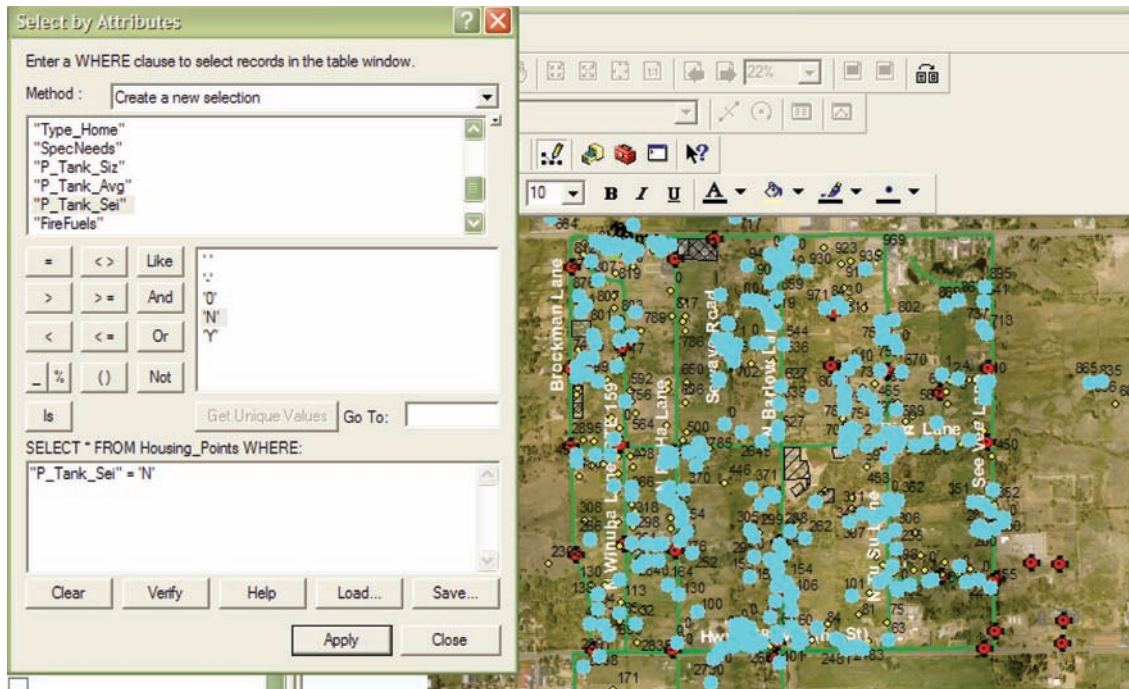
Now, fast forward to September 2005 when the Bishop Paiute Tribe was awarded ~\$43,000 from FEMA (Federal Emergency Management Agency) for Pre-Disaster Mitigation (PDM) Planning. Using ideas from Confronting Catastrophe: A GIS Handbook by R.W. Greene and HAZUS, the free disaster modeling software from FEMA, a strategy was developed using a geographically specific hazard vulnerability analysis or HVA. With one request to Al Kilgore of California Office of Emergency Services, Geographic Information Systems or CA OES/GIS, the Bishop Paiute Tribe was provided GIS data pin-pointing the Bishop Paiute reservation as center point. Through this collaboration a more precise HVA conferred seismic activity as the highest probability and highest potential for complete destruction and elevated loss of life. This information was combined with the Local Emergency Planning Committee/Tribal Emergency Response Commission or LEPC/TERC analysis and pin pointed residential propane tanks as being the highest concentration and distribution of hazardous chemical on the Bishop Paiute reservation. In order to prove the hypothesis was correct, crews of Bishop Paiute Tribal members were hired, with the specific instructions to: GPS houses, assign housing type codes (according to the Advanced Engineering Building Module or AEBM within HAZUS), visually inspect propane tanks for seismic compliance and flag an address as: an Elders or Special Needs alert; agriculture animal or as cultural/historic building. The matrix below was built for Tribal use only using HAZUS for matrix guideline.

**Description**

The actual GPS of over 500 residential structures on the Bishop Paiute reservation took about six months and was funded using the FEMA PDM planning grant. Crews of Bishop Paiute Tribal members learned the fundamentals of GPS and have learned basic GIS editing skills which included metadata training. Using the curriculum from an FGDC Metadata training, my crew is cognizant of the benefits and uses of metadata information. The FEMA PDM Housing Survey created the ability to create a series of thematic maps using GPS data and the aerial photo of the reservation as reference. By using ArcMap, V.9.2 displaying a high number of non-seismic residential propane tanks is simple using the selection tools. Once complete, a thematic map was created for public and policy maker comments.

Next, the Critical Infrastructure / Key Resources (CI/ KR) of the Bishop Paiute reservation were identified. First on the list is the Bishop Indian Utility Organization which provides about 600 Bishop Paiute residents with water and wastewater services. Under the direction of

	LAT
Input from GPS Unit	LON
House Number	H_NO
Direction	DIR
Barlow, Diaz...etc.	SName
W1, MH, RM1, RM2, S1	T_Home
	SNeeds
	Y/N
100, 500, 1000	P_Tank_Size
1/4, 1/2,3/4,F	P_Tank_Avg_Qty
	P_Tank_Seismic
	Y, N, C
	FireFuels_
	Y, N, C
	Historic
	Y/N
	AG Animal
C, P, H, G/S, E	



Select Propane Tank Seismic = No  
 By using the selection tool within ArcMap, the blue dots indicate the lack of seismic propane tanks and their location within a sector of the Bishop Paiute reservation.

Environmental Specialist, Sophi Beym, BIUO director, Lee Cox and BIUO operator, Neil Watterson, the matrix for BIUO was created. Using the DHS National Infrastructure Protection Plan, 2006 and FGDC National Spatial Data Infrastructure, Utilities Data Content Standard, June 2000 we created a database of KR/CI for feature class and feature types: Water System feature class with Water fire connection point, defined as “an apparatus which dispenses fluids for use in fire management” and Wastewater system feature class with wastewater line feature type and defined as “a pipe used to carry a substance from location to location (main line, service line, force main line, etc)”. After meeting with Tribal Council, BIUO Board members and other decision makers, a plan was developed and resources were identified, then prioritized. Fire Hydrants topped of the KR/CI list. Each of the 49 hydrants were GPS'd and inventoried under the FGDC / UDCS. The matrix is as follows:

### Conclusion

Within the FEMA “how-to” guides are specific actions that create avenues for compliance with other agencies, such as the USEPA, or DHS. According to the Department of Homeland Security, National Infrastructure Protection Plan, the Environmental Protection Agency is the sector-specific agency responsible for drinking water and water treatment systems (p3, NIP, 2006). Also, within the Homeland Security Presidential Directive - 7 (HSPD-7) are specific protection programs for managing risks. Using FEMA “how-to” guides and HSPD-7, as reference, BIUO has identified Critical Infrastructure and Key Resources

(CI/KR) and the next step will be to prioritize and protect BIUO CI/KR from “catastrophic health effects and mass casualties” (p142, NIP, 2006). Therefore, by choosing to complete the Security Vulnerability Analysis (SVA) template supplied by the California Rural Water Association, BIUO has voluntarily complied with the “Public Health Security and Bioterrorism Preparedness and Response Act of 2002”, as a mitigation process. This federal regulation for small water systems is

Unique identifier		
W_Sys	Water System	Feature Class
CON	Water Fire Connection Point	Feature Type
HYD	An apparatus which dispenses fluids for use in fire management	Definition
Database Integration		
BIUO	Facility identifier (Default)	
Hyd_ID	Unique feature identifier	
	Graphic feature link	
	water line identifier	
fire "hydrant" "fire hydrant"	metadata identifier (keyword):	
	water valve location identifier	
	x coordinate (decimal degree)	
	y coordinate (decimal degree)	
	z coordinate (decimal degree)	
Physical Properties		
	model number code	
	ground elevation dimension	
	connection design code	
	hydrant outlet 1 diameter dimension	
	pipe diameter measure code	
	inlet diameter dimension	
	diameter unit measure code	
	hydrant dimension	
	hydrant measure type code	
	inlet diameter dimension	

administered by the EPA, but only required for water systems that have over 1000 hookups. BIUO has 600. Through use of the Security Vulnerability Analysis (SVA), BIUO is, also, in compliance with the National Infrastructure Protection Act of 2006. BIUO is proactively developing and implementing a Critical Infrastructure and Key Resources (CI/ KR) protection

program as a component of their homeland security program using the SVA as guidance. The SVA will also serve as baseline criteria for assessment methodologies to come. Although, the work completed by BIUO is basic – the intent is to fully comply and possibly initiate the State, Local and Tribal Governments Coordinating Council (SLTGCC) in the Inyo County area. Another key component of BIUO PDM achievement is the Emergency Response Plan (ERP) which has been approved by BIUO and is being reviewed by the BIUO Board of Directors. We will soon conduct a table-top exercise to evaluate, improve and edit the current version of the ERP. I hope to include members of the BIUO Board of Directors in the table-top exercise. As the FEMA PDM plan coordinator, I am proud to say Bishop Paiute Tribe and Bishop Indian Utility Organization have completed an assessment of their vulnerability to natural disaster, terrorist attack or other intentional acts and remain clear in the goals of the FEMA PDM for Bishop Paiute reservation, *Salus Populi suprema lex, The people's safety is the highest law (Ancient Roman Legal Maxim)*. Contact: Sophi Beym, [sophi.beym@bishoppaiute.org](mailto:sophi.beym@bishoppaiute.org), Environmental Specialist, Bishop Paiute Tribe, Bishop, CA

## **Coeur d'Alene Tribe Works with County Governments on the Idaho Collaborative Roads Project**

The Coeur d'Alene Tribe's aboriginal territory in the northwestern United States covers almost six million acres in Idaho, Washington, and Montana, and the tribe has spent a significant amount of time and money maintaining its geographic information system (GIS) road data for this area. Wanting to make this process more efficient and ultimately enhance services such as emergency response, the Coeur d'Alene Tribe began working with Nez Perce, Kootenai, Bonner, and Boundary counties in northern Idaho to create one set of accurate and current road data that they can all utilize.

Creating and maintaining an integrated road transportation layer has long been a goal in Idaho's GIS community. Prior to 2006, Kootenai County was the only local government entity that was updating public domain road transportation data and metadata and making it available online. Then in 2006, the Coeur d'Alene Tribe along with Nez Perce, Boundary, and Bonner counties began doing the same for the purpose of integration.

With the Coeur d'Alene reservation, which is partially located in Kootenai County, and the aforementioned counties often maintaining overlapping road data, there were redundancies in data and its collection and management. The governments, all using ArcGIS Desktop software, decided to band together to create a homogeneous road dataset and ultimately save a significant amount of time and money.

The U.S. Geological Survey (USGS) provided grant funding for this Idaho Collaborative Roads Project, which is still in the pilot stage and could eventually include all counties in the state. Another partner in the effort is the Interactive Numeric and Spatial Information Data Engine (INSIDE Idaho), Idaho's statewide geospatial clearinghouse and part of the University of Idaho Library, which is playing a critical role in the partnership. INSIDE Idaho created, and is maintaining and enhancing, an automated geoprocessing application that integrates road data from the various entities and is hosting the centralized data. Ultimately, the data will be published to the *National Map*.

### **Uniting for the Good of All**

Collaboration has been one of the major achievements of this project. It can be difficult to coordinate an effort of this magnitude where all parties agree on procedures, road geometries, and attributes.

"Developing an environment of sharing and working together, which hasn't typically been embraced on reservations across the United States, is a big part of this effort," says Frank Roberts, GIS manager, Coeur d'Alene Tribe. "I think showing that we can work together and the tribe can help the counties is a great thing."

The partners also had to agree on which government would manage certain roads and road segments. Luckily, all parties have embraced the project, and these kinds of decisions were made easily. The Coeur d'Alene Tribe is also working with private timber companies on the reservation since they have substantial GIS data holdings and roads they maintain in their GIS.

"I think the proof is in the pudding," notes Roberts. "At this point in time, we have a complete road layer for most of northern Idaho, which is a pretty big chunk of land, more than five million acres. Everyone really wants this to happen, so it's exciting."

All the parties can contribute unique data, which creates a robust, more complete road dataset. The counties, for example, maintain a significant amount of detailed road data for E911 activities, while the tribe and some of the privately held timber companies on the reservation have their own forest road data only they maintain.

The centralized road data from the many governments gives the partners the best available, most updated information with which to make decisions. "Giving our emergency responders the most accurate information available means that individuals on the reservation, both tribal and nontribal, are going to have faster response times in emergency situations. That's big," says Roberts.

### **Behind the Scenes**

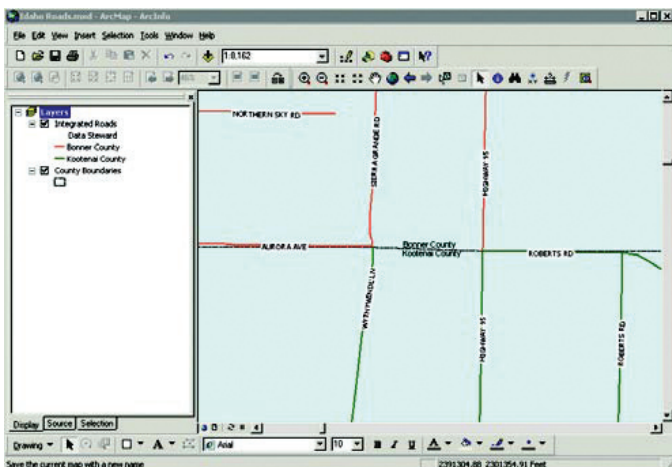
An automated application running on a server at the University of Idaho Library harvests ZIP files

containing shapefiles from the counties and the tribe each evening. Though the Coeur d'Alene Tribe and INSIDE Idaho have begun using ArcGIS Server, not all the other governments have, so instead of syncing geodatabases (a capability with ArcGIS Server 9.2), the university server processes updates by copying all the information for each dataset. ArcObjects is used to geoprocess the data. Features are then selected based on a stewardship attribute, and those features are displayed on an Idaho state projection. Attribute column names are normalized using a lookup table, and all the shapefiles are merged into one ArcSDE feature class. Feature lengths in meters, miles, and feet are calculated as part of the process, and Federal Geographic Data Committee-compliant metadata is created for the feature class. In addition to using ArcObjects and ArcSDE, the university is using ArcIMS to make the data available as a feature service, which users can connect to via ArcGIS Desktop software.



layers. In addition, this allows an organization to hold back data that they don't want published. The final step in setting up the layer for harvesting is providing an attribute schema so INSIDE Idaho can map its attributes to the attributes in the integrated layer.

Bruce Godfrey, GIS specialist with INSIDE Idaho, says eventually they will want all the counties to migrate to ArcGIS Server to take advantage of database synchronization and geoprocessing services. When all the governments have ArcGIS Server 9.2 running, they can be synced up automatically to streamline the process even more. "All the partners involved are looking at the ArcGIS Server platform as a way to increase efficiencies," he notes. Contact Frank Roberts, GIS manager, Coeur d'Alene Tribe, at [fmroberts@cdaTribe-nsn.gov](mailto:fmroberts@cdaTribe-nsn.gov).



This image shows roads at the jurisdictional boundary between Bonner and Kootenai counties. GIS facilitated decision making about which steward would maintain a shared feature and where the responsibility begins and ends for features that exist in more than one county such as Highway 95. Developing a good integrated layer from the individual layers has required coordination from all the data stewards.

It's important to note that the automated application was designed to integrate themes other than roads. For example, the automated application geoprocesses structure data nightly as well. Now, however, structure data is only available for Kootenai County. The architecture is in place to support the integration of multiple themes if the road layer serves as a proof of concept for data integration.

"The beauty of this project is that the participants do not have to make radical changes to their data," says Roberts. "This means participation in the project doesn't interrupt their normal in-house business process, and because of this we have had very good participation." The only requirement, he notes, is that contributors add one attribute called GIS steward, which enables INSIDE Idaho to only harvest the line segments that the individual government wants to include in the integrated

## 2007 Upcoming Conferences

February 25-29	GSDI	St. Augustine, Trinidad
March 9-12	GITA	Seattle, WA
March 9-12	NSGIC Mid-year	Annapolis, MD
April 20-24	MAGIC	Kansas City, MO
April 28-May 2	ASPRS	Portland, OR
July 11-15	NACO	Kansas City, MO
August 4-8	ESRI	San Diego, CA
September 7-11	NSGIC Annual	Keystone, Colorado

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