Final Report

Date:
3/15/2010

Agreement Number:
G09AC00087

Project Title:
Metadata 101: Hands on Training and Support
for North Carolina

THE CENTER FOR COMMUNITY SAFETY

Safeguarding the Community Ideal through Data-Driven Collaboration.

Organization:
Center for Community Safety
301 North Main St
Winston Tower, Suite 900
Winston-Salem, NC, 27101

Principal Investigator:
Timothy Mulrooney, Data Research and Analytics Lead, Center for Community Safety
336-779-7313
mulrooneyti@wssu.edu
http://myweb.wssu.edu/mulrooneyti/

Collaborating Organizations: None

Executive Summary
The Center for Community Safety (CCS) staff developed a 2-day training workshop. The workshop was offered five times during the year in the CCS GIS Classroom which is a one stop GIS-based lab located at Winston-Salem State University, located in Winston-Salem, North Carolina. The training was open to anyone who practices GIS for the state of North Carolina. This includes members of academia, non-profit organizations, contractors, state employees and regional or national GIS specialists that include GIS data for the state of North Carolina in their work.

Project Narrative
GIS metadata training undertaken by the CCS has taken on a variety of different forms. Students experienced lectures, demonstrations and hands-on laboratory exercise focused on all facets of accessing, editing and programmatically manipulating GIS metadata. Given the sparse coverage of metadata in GIS curriculum at the college level, students learned a lot and were been receptive to the workshop.

One major success in this course has been introducing students to the concept of metadata and the variety of data sources available to them. They were introduced to the FGDC metadata workbook and the FGDC required and suggested elements. However, these only represent the very minimum metadata elements

that should be populated. In reality, many more metadata elements could and should be populated.   We started the workshop by showing students a GIS data layer representing a crime that occurs throughout our city (our lab maps crime and other anthropologic quality of life issues). While the points were interesting and near our location, attendees had a number of questions about these points. They wanted to know what these points represented (they were DUI offenses within the city), how we defined a DUI offense, when these data were created, who was in charge of these data, how we created these data and contact information for the person who distributes this information. All of this information can be encapsulated within the metadata. I think this example about the importance of metadata really set the tone for the class and the importance of metadata within each attendee's organization.

The other major success in this course has been in introducing attendees to tools and programming tips to help streamline and automate the metadata process. One major complaint about metadata is the time that it takes to populate metadata elements, most of which are redundant. This workshop discusses basic ArcObjects programming tools so users could automate the process of populating redundant features such as contact names, distribution contacts, metadata contact, access/use constraints and accessibility for an organization's data. This was done for students with little to no prior programming experience. This could save an organization valuable time and resources. Previously, this programming was done by GIS programmers with specific knowledge. Most organizations which attended the workshop did not have the manpower or resources to hire someone with such skills. Users were given an opportunity to create these tools specific to their organization and guidance on how to bring them into their own GIS system.

In addition, students have come to understand and appreciate the value of metadata. Populating only the FGDC minimum requirements is not acceptable for most organizations. Attendees are now able to think critically about their data assets and determine which metadata elements are necessary during the data collection and development process. Attendees collected their GIS data a number of different ways, whether it be from GPS, digitizing from imagery or PLAT maps, downloading it off the Internet or interpreting them from survey documents. We talked about how to capture source information within the confines of GIS metadata. Another major success in this workshop has been in introducing students to the FGDC and documentation about metadata and larger GIS data standards.   Through the exercises, students have become aware of the USGS as not only an administering agency, but an organization which actively publishes and creates GIS data for use in the GIS community.   Given the current economic climate, attendees could integrate low-cost and reliable GIS data into their work as opposed to more expensive and resource intensive alternatives because they now know what resources exist.

Lastly, a major success has been in the creation of aspatial metadata. One of the conference attendees worked with both spatial and aspatial data and wanted ways to collect and query information about these aspatial data that may be stored in an Access database. We sat down with them and helped to crosswalk all of the valuable GIS metadata fields that could also be used for aspatial data, minus the references to spatial information. We developed a form within Access so the users of this database could populate the appropriate information for this database.

The one challenge in this workshop has been trying to teach to all different skill sets and experience level of the participants. Some attendees have little GIS experience and know very little about metadata while others want to enhance their existing metadata skills. While this wasn't a GIS workshop, people had questions about how we created some of the data layers or even maps that we used in our exercises or

displayed in our lab (sources of imagery, geocoding processes, projection information). In our free time, we tried to provide guidance of this nature when and where we could. Another challenge is in providing assistance from a distance. While we had a positive reception from throughout the state, current economic constraints have prevented people from far away from attending. Two people (one from NC State and another from Jacksonville) inquired about us teaching the workshop at their facilities. We were unable to do that within this grant.

Training and outreach assistance:
The training workshop consisted of a combination of lectures and hands-on exercises. It incorporated elements from the FGDC Metadata Workshop Core Curriculum to help determine a minimum content standard for those attendees. This content, combined with custom exercises provided a holistic approach about effective strategies to create, edit and ultimately manage metadata. Importantly, the workshop provided hands-on guidance to attendees about tools and techniques that can streamline the metadata population processes.   Attendees were given a workbook with the class presentations, exercises, and answers to the exercise questions, sample code to automate metadata creation and assessment, and directions to customize this process to suit their needs. A CD with all of the aforementioned materials was also provided.

This workshop was offered 5 times throughout the year over a 2 day period. Given the size of the lab and the availability of instructors, a maximum 10 attendees were allowed at the time of registration. The workshop dates were:

- June 8 - 9, 2009
- August 10 -11, 2009
- October 22 - 23, 2009
- December 7 - 8, 2009
- February 22 - 23, 2010

A Sample Schedule for the Workshop is Below:

Day 1			Day 2		
Time	**Activity**		**Time**	**Activity**	
8:00 – 8:30	Welcome and Refreshments		8:00 – 8:30	Welcome and Refreshments	
8:30 – 9:00	Welcome to WSSU and Course Logistics		8:30 – 9:15	Advanced Topics in GIS Metadata	
9:00 – 9:45	Introduction to FGDC Metadata		9:15 – 9:45	**Exercise** Advanced Topics in GIS Metadata	
9:45 – 10:00	Break		9:45 – 10:00	Break	
10:00 – 10:45	Understanding FGDC Metadata		10:00 – 10:15	Extending the CSDGM	
10:45 – 11:45			10:15 – 11:45	Using ArcObjects to Access and	

Time	Activity
11:45 – 1:00	Lunch
1:00 – 2:00	**Exercise** Understanding and Viewing FGDC Metadata
2:00 – 3:00	Editing FGDC Metadata
3:00 – 3:15	Break
3:15 - 4:45	**Exercise** Editing FGDC Metadata
4:45 – 5:00	Follow Up Break for Day

Time	Activity
	Manipulate GIS Metadata
11:45 – 1:00	Lunch
1:00 – 2:30	**Exercise** Creating Tools to Automate Metadata Creation
2:30 – 2:45	Working Backwards: Getting Information from GIS Metadata
2:45 – 3:00	Break
3:00 - 4:30	**Exercise** Creating Tools to Assess Metadata
4:30 – 5:00	Final Comments and Course Evaluation

The five workshops have been completed with 36 total attendees. All workshops had all been full, but we had a few last minute cancellations or no-shows. Given the time between the cancellation and the upcoming workshop, people placed on a waiting list for the workshop could not change their schedules to attend the workshop. In the future or if possible, getting a refundable deposit from each attendee may better guarantee attendance or at least a place for that organization to the workshop. Information for attendees is in Table 1 in the Appendix.

We received a very positive reception from attendees and most responded that they were happy to have a forum to learn about metadata, as most of their GIS training in college barely mentioned metadata. The Center for Community Safety has previously worked with a few of the attendees and their organizations, such as the City of Winston-Salem, Davie County, University of North Carolina - Greensboro, Forsyth Futures and the North Carolina Department of Corrections. However, this workshop has facilitated new relationships with the following agencies: City of Salisbury, Kerr-Tarr Regional Council of Governments, High Country (Boone area) Council of Governments, Rockingham County, Town of Fuquay-Varina, The Jervey Group, Kotis Properties, Randolph County Planning Office, City of Mount Airy, Surry County Tax Department and Camden County Local Government.

In addition to providing this training, the CCS worked with the Center for Continuing Education at Winston-Salem State University to provide continuing education certificates for the time spent at this workshop. In some organizations, professionals are required to take education related to their professional work. This certificate provides proof to employers that attendees have taken the equivalent of 1.5 credits (15 contact hours) of this education.

Status of Metadata Service
Metadata for the exercises in this workshop were derived from data holdings residing at the CCS. We currently have our GIS data residing in a few file geo-databases, only accessible to proprietary CCS GIS

staff. Most attendees were from smaller organizations that had their data in this configuration. A few attendees had their GIS data and metadata saved in some enterprise database format, but did not participate in high-level metadata sharing and harvesting. Attendees were introduced to the need for metadata through the Geospatial One-Stop Portal and were given a demonstration of geodata.gov during the workshop.

Given the minor programming aspect of this workshop, users were familiarized the viewing of FGDC GIS metadata in XML format. This could be done using a text editor, the XML Notebook software application, or by using the XML style sheet using ESRI ArcCatalog. Users could automatically populate redundant metadata elements that will be the same for every metadata layer (distribution contact, metadata contact, primary contact, etc.) with a simple click of the button. However, they need to know 'where' each of these elements resides. XML in its nested format provides the schema so users can see exactly how to drill down to an individual element that they want populated. For example, we know how to access the phone number for the metadata contact through ArcCatalog's GUI editor. We merely click on the Metadata Reference button, the Details button and the Contact Voice Telephone will appear in a text box. How can you tell programming code to do this? This process is automated using the XML path of *metainfo/metc/cntinfo/cntvoice*. This gives student some familiarity with XML and ways that their metadata can be harvested through larger clearinghouses such as the Geospatial One-Stop Portal. Many are not at that level yet, but it does give students examples of robust metadata and the organization creating this metadata.

Most attendees worked for local organizations that had retained little legacy information about their assets. Some were newer personnel looking for ways to populate metadata under these constraints or seeking guidance on where to start. Other organizations, such as the City of Greensboro, had an enterprise GIS database of more than 300 data layers. They wanted to sit down and develop GIS metadata standards for the 30 or so people that did GIS within the city. We used SOP (Standard Operating Procedure) documents implemented by other organizations to help guide these decisions, in addition to the data we had provided. These data sources provided information about source information, horizontal accuracy statements and distribution liability for future population for this and other organizations with a more robust GIS infrastructure.

Pictures taken from October 22 – 23, 2009 Workshop

Pictures taken from December 7 – 8, 2009 Workshop

Pictures taken from February 22 – 23, 2010 Workshop

Next Steps:

While this FGDC grant has expired, it has provided us with other opportunities. We have created a web page for resources and news about GIS metadata that can be viewed by anyone. In addition, we are available for conference attendees and others who may have questions about metadata. I have helped a few attendees on the programming aspects of the course so they can automate metadata creation and assessment for their particular organization. I have been also been asked by the North Carolina ArcGIS Users Working Group to write a short document for their newsletter about Metadata.

In terms of future projects of this nature, we would like to migrate this project and our expertise of this project into the future CAP grant and other projects. A number of attendees were impressed with our metadata, how we documented the data collection process and our understanding of GIS data

development standards. We would like to parlay this into a workshop so users can create, research and develop both spatial and aspatial data for use by local, non-profit and academic agencies. Metadata would obviously be an integral part of this training.

Feedback on Cooperative Agreements Program
Our experience with the CAP program was very positive. Everyone that we dealt with at the FGDC was receptive to any questions, concerns or problems. All of our dealings with Sharon Shin, Linda Wayne, Brigitta Urban-Mathieux and Steve Strader (the USGS North Carolina GIS liaison) were nothing less than professional and positive.   In addition, they provided a forum in which our workshop could be advertised to a larger community than what we could reach.

As a former government contractor, I have seen too much money go into management and overhead, and too little go into training and the direct improvement of GIS data quality. We feel this program makes a difference because most of the money in this program goes to grass-roots efforts to improve GIS work in our state. This work provides tangible results, as evidenced by the 36 people who received GIS training, the couple dozen data layers that we checked out for metadata integrity, in addition to the countless GIS data layers in the future that will be better as a result of our workshop. Most of the attendees worked for local cities, counties and organizations. The knowledge and skills learned in these workshops and through the CAP programs directly affect GIS professionals everywhere and in turn the people they serve on an everyday basis.

Appendix

Table 1: Attendees for all workshops of Metadata 101 Workshop attendees at Winston-Salem State University.

Name	E-Mail	Company Name
Brian Taylor	btaylor669@triad.rr.com	City of Winston Salem
Byron Brown	bbrown@nwpcog.org	Northwest Piedmont Council of Governments
Chris Badurek	badurekca@appstate.edu	Appalachian State University
Christina Starick	cristina.starick@gmail.com	Tyonek Solutions
David Barr	dbarr@ci.burlington.nc.us	Burlington Police Department
David Edwards	dedwards@doc.state.nc.us	NC Dept of Correction
David Moore	dsmoore6@gmail.com	city of Winston-Salem
Doris Paez	doris@forsythfutures.org	Forsyth Futures
Doug Kale	kalewd@forsyth.cc	Forsyth County Housing Program
Geraldine Dumas	gdumas@kerrtarcog.org	Kerr-Tar Regional Council of Governments
Jacob Vares	jacobv7@gmail.com	Cape Fear Council of Governments
Jennifer Goble	jgobl@salisburync.gov	City of Salisbury
Jessica Brannock	jbrannock@regiond.org	High Country Council of Governments
John Gallimore	john.gallimore@co.davie.nc.us	Davie County GIS
Joni Dauphinais	joni.dauphinais@gmail.com	Town of Fuquay Varina
Joyce White	joycew@cityofws.prg	Winston-Salem Department of Transportation
Julie Hawkins	julieh@cityofws.org	City of Winston-Salem
Kathryn Clifton	katclif@salisburync.gov	City of Salisbury
Kevin Edwards	KEVINE@cityofws.org	City of Winston-Salem Dept. of Transportation
Kevin Pearson	kpearson@mountairy.org	City of Mount Airy
Khaula Alkaabi	alkaabik2@gmail.com	UNC-Greensboro
kristin davidson	kristind@cityofws.org	City of Winston-Salem
Lil Sparks	jerveygroup@yahoo.com	The Jervey Group
Lynn Ruscher	lynnr@cityofws.org	City of Winston-Salem
Mihail Radu Rosu	rmr13@doc.state.nc.us	NC Department of Correction
Penny Miller	penny@kotisprop.com	Kotis Properties
Shanelle Bullock	sbullock@nccommerce.com	Dept. of Commerce- Div. Community Assistance
Sharon Stacy Blackwell	blackwell@andassoc.com	Anderson & Associates
Stacy Tolbert	stolbert@co.rockingham.nc.us	Rockingham County
Thomas Burk	tburk@camdencountync.gov	Camden County Local Government
Timothy Mangum	tvmangum@co.randolph.nc.us	Randolph County Planning & Development
Todd Hayes	todd.hayes@greensboro-nc.gov	City of Greensboro
Wess Gaither	jgaithe0@email.cpcc.edu	NONE
Will Moore	moorew@co.surry.nc.us	Surry County Tax Department
Yuri Potawsky	yp62484@appstate.edu	Appalachian State University
Zhi-Jun Liu	z_liu@uncg.edu	UNC-Greensboro