2008 Conference

24th Annual New York State GIS Conference

You are invited to join us on October 5-7, 2008

Holiday Inn

Syracuse-Liverpool - Exit 37,

441 Electronics Parkway,

Liverpool, NY 13088

ÒItÕs a great way to see what others are doing around the state.Ó

The NYS GIS conference has a long standing tradition of providing attendees with an opportunity to meet fellow New Yorkers active in the GIS field, exchange information and real experiences, and seek solutions to your geographic data management needs.

Professional networking opportunities help you develop a network of fellow GIS users which will continue through the years. In the exhibit

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software, analytical techniques, and services.

Conference Traditions for you to enjoy:

- Attend the Sunday evening reception at a unique place to get to know other conference goers and begin your network,
- MondayÕs State of the State address precedes our highlighted keynote address - don't miss either,
- Monday evening will find you at a poster / map contest with a reception and then an elegant banquet with a non-GIS speaker,
- End your conference experience with the Tuesday luncheon and a fun raffle for prizes.

Who Attends?

Participants who attended the conference in 2007 include:

3.5% Federal employees, 25% State employees, 16% from local government,

2% non-governmental organizations,

13.5% from academic institutions,

30% comprised of consultants and vendors and another 10% with various affiliations.

Save the Date in 2009: Sunday, October 25 - Tuesday, October 27, 2009 at the Crowne Plaza in Lake Placid

Links worth a look. . .

- Google Timeline and Mapview
- NASA Meets Photosynth
- Google Maps Street View
- NYS GIS Association
- NYS Office of Cyber Security and Critical Infrastructure Coordination - GIS clearinghouse (Outreach)

ESRI

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- Catalog (degree requirements)
- Departments
- Graduate Programs
- Honors Program
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- Study Abroad
- Undergraduate Programs

Useful Links

- About ESF
- Bookstore
- Bursar
- Calendar
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State University of New York College of Environmental Science and Forestry
SUNY-ESF | 1 Forestry Drive | Syracuse, NY 13210 | 315-470-6500

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24th Annual NYS Geographic Information Systems Conference

October 6 - 7, 2008

Holiday Inn - Liverpool - Exit 37, 441 Electronics Parkway, Liverpool, NY 13088

We invite you to get involved with the conference as a sponsor to help us educate, inform and understand the uses of GIS. Make your check payable to SUNY Research Foundation at these levels:

$2500 Platinum
$2000 Gold
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Sponsor logos will be posted on the conference website and in the printed program. Platinum plus and platinum sponsors will be acknowledged from the podium prior to introduction and welcome at the plenary session. Sponsors may place an ad in the printed program. *Design and delivery of the ad is the responsibility of the sponsoring organization.

You may sponsor a component of the program with signage:

• Monday or Tuesday Luncheon	$2500 ***Platinum***
• Sunday evening reception	$2000 ***Gold***
• Monday Keynote Speaker	$1500 ***Silver***
• AM or PM Break refreshments	$1000 ***Bronze***

Benefits	Platinum $2500	Gold $2000	Silver $1500	Bronze $1000
Event signage and Printed Program	Top billing	Prominent logo listed	Logo listed	Logo listed
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Website listing, link, and recognition	YES	YES	YES	YES

Contact Maureen Wakefield, mwakefield@esf.edu with questions. Fax the signed form: 315-470-6890. Thank you!

Agenda

24th Annual New York State GIS Conference

Ten Best Ideas

- On Your Own - Syracuse Sights and Activities

Sunday, October 5, 2008

- 1:00 - 5:00 pm
  - Pre-Conference Workshops with 4 PDHs each (Professional Development Hours)
    - GIS Basics, Hands-on beginner level, Instructor: Eddie Bevilacqua, on the SUNY-ESF campus,
    - 434 Baker Lab
    - Raster Analyst, Hands-on advanced level, Instructor: Lee Herrington, on the SUNY-ESF campus,
    - 437 Baker Lab
    - Data Quality, Lecture and presentation, Instructor: Michael Goodchild, at the Holiday Inn Liverpool, Onondaga Room
- 5:30 - 9:00 pm
- Reception and Dinner at the Rosamond Gifford Zoo at Burnet Park - a time for networking, making new connections with people and animals. Birds of a feather will mingle with guests. Space is limited, so join us to rumble in the JUNGLE.
  - FREE Shuttle service - deluxe motorcoach
    - Two departure times from hotel to the zoo: 5:00 pm and 5:45 pm
    - Two return times from the zoo to the hotel: 8:00 pm and 9:00 pm
  - Directions from Hotel
  - Directions from SUNY-ESF

Monday, October 6, 2008

Program At A Glance

Presentation Abstracts

- 8:00 - 9:00 am

- 9:00 - 10:00 am Session 1
  - Concurrent Sessions
    - Forest Panel - part 1
    - Real Property
    - How to Visualize your community
    - Coordinating Mapping Efforts
- 10:00 - 10:30 am
  - Visit our exhibitors and Coffee Break
- 10:30 - 12:00 pm Session 2
  - Concurrent Sessions
    - Forest Panel - part 2
    - Land Value
    - GIT Panel Session
    - LiDAR Panel
- 12:00 - 1:00 pm
  - Luncheon sponsored by PhotoScience Geospatial Solutions
- 1:00 - 3:00 pm
  - Welcome
  - Annual State of the State Address by Bill Johnson
  - Keynote Michael Goodchild

- 3:00 - 3:30 pm
  - Visit our exhibitors during a Coffee Break
- 3:30 - 5:00 pm Session 3
  - Concurrent Sessions
    - Forestry
    - Local Government
    - Human Health
    - Analysis
- 5:00 - 6:30 pm
  - Poster Session and Reception
- 6:30 pm
  - Banquet dinner with special presentation by Joseph Chamie followed by the Partnership award ceremony

Tuesday, October 7, 2008

- 7:30 - 8:30 am

Registration sign in and Breakfast (We start EARLY)

- 8:30 - 10:00 am Session 4
  - Concurrent Sessions
    - Geo Web
    - Utilities
    - Mobile / field
    - Analysis
- 10:00 - 10:30 am
  - Visit our exhibitors and Coffee Break
- 10:30 - 12:00 pm Session 5
  - Concurrent Sessions
    - Geo Web
    - Data Collection
    - Mobile / field
    - Environmental Modeling with GIS
- 12:00 - 1:15 pm
  - Lunch followed by a raffle of prizes
  - *1:15 - 1:30 pm Walk About*
- 1:30 - 3:00 pm Session 6
  - Concurrent Sessions
    - Map Critique
    - Privacy Panel
    - Analysis
      - GIS Association Meeting (1:30 - 2:30 pm) followed by
      - RFP Workshop (2:30 - 3:30 pm)
- 3:00 - 3:30 pm Session 7
  - Vendor Sessions in 3 rooms, RFP Workshop in 4th room
- 3:30 pm Conference concludes

Wednesday and Thursday, October 8 and 9, 2008

ESRI offers a two day "Introduction to ArcGIS Server" post conference training opportunity

State University of New York College of Environmental Science and Forestry
SUNY-ESF | 1 Forestry Drive | Syracuse, NY 13210 | 315-470-6500

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Invited Speakers for 2008

24th Annual New York State GIS Conference

Monday's Keynote Speaker: Michael Goodchild

- Presentation Topic: Leveraging the Power of Web 2.0:
  The Impact of Volunteered Geographic Information on the GIS Community

Michael F. Goodchild is Professor of Geography at the University of California, Santa Barbara, and Director of spatial@ucsb. He received his BA degree from Cambridge University in Physics in 1965 and his PhD in Geography from McMaster University in 1969. After 19 years at the University of Western Ontario, he moved to Santa Barbara in 1988. He was Director of the National Center for Geographic Information and Analysis from 1991 to 1997.

Goodchild serves on the editorial boards of ten other journals and book series. His published books include *Accuracy of Spatial Databases*; *Geographical Information Systems: Principles and Applications*; *Environmental Modeling with GIS*; *Scale in Remote Sensing and GIS*; *Interoperating Geographic Information Systems*; *Geographic Information Systems and Science*; *Uncertainty in Geographical Information*; *Foundations of Geographic Information Science*; *Spatially Integrated Social Science*; *GIS, Spatial Analysis, and Modeling*; and *Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools. In* addition he is author of some 350 scientific papers. He was Chair of the National Research CouncilÕs Mapping Science Committee from 1997 to 1999, and currently chairs the Advisory Committee on Social, Behavioral, and Economic Sciences of the National Science Foundation. His current research interests center on geographic information science, spatial analysis, and uncertainty in geographic data.

- Dr. Michael Goodchild's home page
- Wikipedia on Goodchild
- Spatial Center homepage

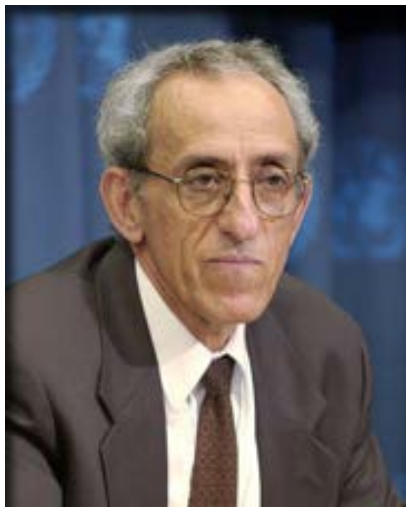
Monday's State of the State Address by Bill Johnson

Bill Johnson is Assistant Deputy Director & CIO for the New York State Office of Cyber

agency, overseeing both GIS and Cyber Security. He also Chairs the 18-member NYS GIS Coordinating Body which oversees the Statewide GIS Coordination Program. Previously, Bill was CSCIC's Manager of Geographic Information and Critical Infrastructure Coordination.

- Bill Johnson's 2007 State of the State Address

Monday Evening Banquet Speaker: Dr. Joseph Chamie



- Presentation Topic: Approaching 7 Billion: Humanity in Transition
- Dr. Joseph Chamie's Biographical Sketch
- How to change the world: Ten Questions with Dr. Joseph Chamie, Demographer
- More by Joseph Chamie
- Knock, knock, who's there?

Advisory Committee

24th Annual New York State GIS Conference

Advisory Council Meeting Schedule

Ã	Day and Date	Time	Location	Focus
Ã	Tuesday, Dec. 11, 2007	11 am-2 pm	213 Marshall Hall, SUNY-ESF campus	Debrief
Ã	Thursday, Feb. 21, 2008	10 am-2 pm	213 Marshall Hall, SUNY-ESF campus	Program, Marketing, Sponsors
Ã	Monday, March 24, 2008	9 am-11 am	Subcommittee Conference calls (call in at your time)	11-1:30 Program support, Sponsorship, Activities, Workshops
Ã	Thursday, April 17, 2008	10 am-2 pm	213 Marshall Hall, SUNY-ESF campus	Workshops, social, keynote
Ã	Monday, June 2, 2008	11 am-1 pm	Subcommittee Conference calls (call in at your time)	Abstracts, posters, program and marketing
Ã	Thursday, June 19, 2008	10 am-2 pm	213 Marshall Hall, SUNY-ESF campus	Define program - slots ABSTRACTS and Abstract List
Ã	Thursday, Aug. 28	10:30 - 2:00 pm	Holiday Inn - Liverpool	Room usage, order abstracts, identify moderators
Ã	Tuesday, Sept. 2, 2008	10:30 am-2 pm	Saratoga Hilton, Saratoga Springs	Final - moderators, final marketing, etc.
	Thursday, Oct. 2, 2008	11 am-2 pm	Holiday Inn - Liverpool (open to all)	Walkthough

Important Dates and Deadlines

- June 4, 2008 - Presentation abstracts were due
- August 20, 2008 - Maps and Poster abstracts were due
- September 5, 2008 - Hotel room rate cut off

Advisory Council Members

Prefix	First Name	Last Name	Phone	Email	Subcommittee
Mr.	John	Barge	(518) 891-4050, ext. 285	jwbarge@gw.dec.state.ny.us	Activities
Dr.	Eddie	Bevilacqua	315-470-6697	ebevilacqua@esf.edu	Workshops
Mr.	Bob	Brower	(315) 252-8669	bbrower@iagt.org	Program
Mr.	Clark	Burdick	(315) 727-4247	clarkburdick@yahoo.com	Marketing and Program
Mr.	Girk	Cakmak	(518) 443-5913	gcakmak@bownegroup.com	
Dr.	Ann	Deakin	(716) 673-3884	Ann.Deakin@fredonia.edu	Program
Mr.	Mickey	Dietrich	(315) 785-2389	MICKEY@tughill.org	
Prof.	Myrna	Hall	(315) 470-4741	mhhall@esf.edu	Program
Mr.	Eric	Herman	(518) 471-5890	eric_herman@thruway.state.ny.us	Activities
Dr.	Lee	Herrington	(315) 470-6674	lpherrin@mailbox.syr.edu	
Mr.	Jeff	Herter	(518) 486-7942	jeff.herter@dos.state.ny.us	Activities and Sponsorship
Ms.	Cathy	Keenan	(315) 477-6525	cathy.keenan@ny.usda.gov	
Mr.	William	Johnson	(518) 473-5861	William.johnson@cscic.state.ny.us	Sponsorship
Ms.	Susan	Nixson	(607) 272-1717 x236	snixson@cityofithaca.org	
Ms.	Sharon	Oskam	(518) 474-5212	Sharon.Oskam@cscic.state.ny.us	
Dr.	Lindi	Quackenbush	(315) 470-4727	ljquack@esf.edu	Program
Mr.	Paul	Szemkow	(315) 470-6635	pszemkow@syr.edu	Workshops
Ms.	Maureen	Wakefield	(315) 470-6888	mwakefield@esf.edu	

Sponsorship

- Sponsor Information (PDF)

NY State GIS Conference 2008

Pre-Conference Workshop:
Geographic Information Systems (GIS) Basics
Sunday October 6, 2008

Instructor: Eddie Bevilacqua, Associate Professor,
SUNY ESF, Dept. Forest and Natural Resources Management

Aim: To provide a basic introduction to Geographical Information Systems (GIS), mapping, and their use in various applications, including environmental sciences and natural resources management. Participants will gain an understanding of relevant theoretical aspects of geography and mapping, along with practical experience of using GIS.

Learning objectives: By the end of the workshop, participants should be able to:

- Describe what geographical information systems are, and recognize some of their benefits and limitations.
- Compare and contrast raster and vector data models.
- Describe the difference between spatial and aspatial information.
- Gain some basic practical experience in retrieving, storing, manipulating, analyzing, and displaying spatial data derived from various sources using GIS.
- Appreciate some of the potential applications of GIS in natural resources management and environmental sciences.

Course outline: The course will cover: introduction to GIS and data models; display and analysis of spatially referenced data; NY State related geographies and geographic data; applications in natural resources, and environmental sciences.

Who the course is intended for: This course is intended for individuals with little or no prior experience in using GIS. The course is a broad-brush introduction to both theory and practice in GIS applications. Further software-specific training may be required if participants wish to gain further skills.

Software: Practical elements of this course will be taught using ESRI's ArcGIS software. Concepts and skills are transferable to other packages, such as MapInfo, but these other packages are not available for teaching on the course.

Teaching time: 4 hours consisting of a combination of presentations and computer based exercises.

NY State GIS Conference 2008

Pre-Conference Workshop:
Analysis with Raster Data
Sunday October 6, 2008

Instructor: Lee Herrington, Professor Emeritus of Resources Information Management
SUNY ESF, Dept. of Forest and Natural Resources Management

Aim: To provide an introduction to the use of raster (grid) data in analysis in ArcGIS.

Learning objectives: By the end of the workshop, participants should be able to:

- Carry out basic processing of grid data using, as an example, elevation grids (Digital Elevation Models, DEMs). The Spatial Analyst Extension for ArcGIS will be used to carry out the following operations:
    - Symbolization
    - Classifying (in symbolization and in data)
    - Smoothing (low pass filtering)
    - Computing slope and aspect
    - Using basic arithmetic operations between layers
    - Converting grid data to feature data
- Apply acquired skills to solve two problems involving both raster and vector processing
    - Finding tax parcels that could be contributing sediment to town streams
    - Finding the best location for a TV relay tower (Viewshed)

Course outline:
The course uses both lecture and hands on exercises to cover the material. The course will cover: introduction to grid data models; display and analysis of DEMs; computation of slope and aspect, classification of the display of grid data and classification of the data itself; conversion of grid data to vector polygon data, and incorporation of grid data into vector analyses.

Who the course is intended for: This course is intended for individuals who have knowledge of and experience with ArcGIS and its operation. It is NOT an introduction to GIS.

Software: This course will be taught using ESRI's ArcGIS 9.2 and its Spatial Analyst Extension.

Teaching time: 4 hours consisting of a combination of presentations and computer based exercises.

NY State GIS Conference 2008

Pre-Conference Workshop:
Geospatial Data Quality Review
Sunday October 6, 2008

Instructor: Michael F. Goodchild, Professor of Geography
University of California, Santa Barbara

Aim: To provide a review of the data quality issues commonly encountered by users of GIS.

Learning objectives: By the end of the workshop, participants should be able to:

- Identify the issues likely to be encountered in the use of geospatial data and technologies
- Understand the fundamental components of data quality and their documentation in metadata
- Identify the fundamental concepts associated with geospatial data quality, including Tobler's First Law
- Be familiar with commonly employed strategies for dealing with error and uncertainty
- Understand the legal context of geospatial data quality

Course outline:
Use and analysis of geospatial data require careful attention to accuracy, since any digital representation is at best an approximation of ground truth. This workshop will begin with an overview of the accuracy issue for various classes of geospatial data. Error models will be introduced, with associated measures and parameters of accuracy. Currently implemented capabilities in GIS and related software will be reviewed, along with methods for propagating uncertainty from database to analysis products. The presentation will review existing and proposed standards for geospatial data quality, methods for visualizing data quality, and research on the implications of geospatial data quality for decision making.

Teaching time: * hours based on detailed notes, examples, illustrations, and demonstrations.

Holiday Inn - Liverpool, 441 Electronics Parkway, Liverpool, NY 13088

Sunday, Oct. 5, 2008	***Exhibitor Schedule***	**Times**		**Workshop**		
			Ballroom East (Banquet set)	**Onondaga Room (theatre) Geospatial Data Quality Review Workshop**	**Ballroom West (banquet set)**	**Convention Center A (theatre)**
Convention Center Foyer	***Convention Center A***	1:00- 5:00				
Registration 3:00 pm - 7:00 pm	*Exhibitors set up 6:00 pm - 9:00 pm in Convention Ctr B*					
Reception Location: Rosamond Gifford Zoo		**5:30 - 9:00 pm**				

Monday, Oct. 6, 2008

8:00- 9:00 am *Registration and Continental Breakfast	*Exhibitors set up 8:00 am - 10:00 am*	**8:00 AM**	**Concurrent Sessions**			
			Ballroom East	**Onondaga Room**	**Ballroom West**	**Convention Center A**
9:00 AM			**Session 1A Ballroom East Forest Panel - part 1** Moderator: Kurt Swartz	**Session 1B Onondaga Room Real Property Moderator: Girk Cakmak**	**Session 1C Ballroom West** Moderator: Eric Herman	**Session 1D Convention Center A Coordinating Mapping Efforts** Moderator: Paul Szemkow
*Registration Desk Hours: Monday 8:00 am - 12:00 pm and 1:00 pm - 5:00 pm		9:00 - 9:30	Kurt Swartz, Seeing the Forest Through the Trees; The Transformation of New York's Forest Records	Seth Myers, How Cheap Fossil Fuel has Contributed to Urbanization on Sensitive Lands in the NE United States	Mickey Dietrich, How to Visualize Your Community in 3D	Dennis Davidson, Small Unmanned Aerial Vehicles (microUAVs): A Remote Sensing Tool for Local Environmental Planning
	Exhibits open 10 am - 7:30 pm	9:30 - 10:00		Wende Mix, House Flipping in Buffalo, NY: a GIS based analysis		Susan Hoskins, Agricultural District Mapping - Guidelines Update
10:00AM - 10:30 AM	***AM break in Exhibitor area Convention Ctr. B***					
10:30 AM			**Session 2A Forest Panel - part 2**	**Session 2B Land value** Moderator: Girk Cakmak	**Session 2C GIT Panel** Moderator: Amy Work	**Session 2D LiDAR Panel** Moderator: Paul Szemkow
		10:30-11:00	Kurt Swartz, Seeing the Forest Through the Trees; The Transformation of New York's Forest Records	Bill Batt, GIS technology can revolutionize property assessment and taxation, with radical improvements for local economies as well.	Amy Work, SPECIAL SESSION PANEL DISCUSSION- The College Experience: Advancing GIT through Integration into Non-Traditional GIT Courses	Benjamin Houston, SPECIAL SESSION PANEL DISCUSSION- Recent Experiences with LiDAR Data: A Practical Look at Using LiDAR in NYS
		11:00 - 11:30		Girk Cakmak, Real Property Assessment Information System (RPAIS) - Schoharie County		
		11:30 - 12:00		Scott Mastellon, Use of GIS technology to enhance property inventory and improve access to property records within the Town of Babylon resulting in improved intra-governmental sharing and department efficiencies		
Noon	**Lunch in Grand Ballroom**					
1:00 PM		1:00 - 3:00	**Welcome, Dr. Eddie Bevilacqua, SUNY ESF, State of the State Address delivered by Bill Johnson and Frank Winters, CSCIC and Plenary speaker, Michael Goodchild in the Grand Ballroom**			
3:00 - 3:30 PM	**PM Break in Exhibitor area Convention Ctr. B**					
3:30 PM			**Session 3A Forestry** Moderator: Eddie Bevilacqua	**Session 3B Local Gov't** Moderator: Ann Deakin	**Session 3C Human Health** Moderator: John Barge	**Session 3D Analysis** Moderator: Clark Burdick
		3:30-4:00	Jacob Needle, ArcGIS Based Urban Forest Management System	Jill Babinski, A Model for Small Counties: Enterprise GIS in Genesee County	Tao Tang, GIS Based Spatial Prediction of Population Exposure to Airborne Fine Particulate Matters	Kenneth Pennock, Crime Analysis Mapping for City of Troy, NY
		4:00-4:30	David Murphy, THE RELATION BETWEEN LAND-COVER AND THE URBAN HEAT ISLAND IN NORTHEASTERN PUERTO RICO	Joseph T. Jones, Enhancing GIS Data for Use in a Municipal Data Sharing Environment	William Stiteler, Using Network Analysis to Compare Water Quality Tests to Disease Rates	Ashraf Ghaly, American and Global Perspectives of Infrastructure Needs and Expenditures
		4:30 - 5:00	Yinghai Ke, A comparison of three methods for individual tree crown detection and delineation from high spatial resolution imagery	Greg Coniglio, Erie/Niagara County GIS Partnership	Anna M. Stewart, Developing a spatiotemporal model of Dengue Fever transmission in Ecuador	Joe D Francis, Valuing Agricultural and Vacant Parcels--A Geographical Weighted Regression Approach
5:00 PM	**Reception / Poster Session in exhibitor area - Convention Center B**					
6:30 PM	**Banquet with Keynote Dr. Chamie ending with raffle in Grand Ballroom**					

Tuesday, Oct. 7, 2008

7:30 a.m. **7:30 - 8:30 am** ****Registration and Continental Breakfast**			**Concurrent Sessions**			
			Ballroom East	**Onondaga Room**	**Ballroom West**	**Convention Center A**
8:30 a.m.	*Exhibits open 8:30 am - 1:30 pm*		**Session 4A Geo Web** Moderator: Bill Johnson	**Session 4B Utilities** Moderator: Clark Burdick	**Session 4C Mobile/field** Moderator: Eric Herman	**Session 4D Analysis** Moderator: Lee Herrington
		8:30 - 9:00	Jim Hall, The Re-design of Mapping Westchester County	Jason Baum, Municipal Infrastructure GIS in the Town of Bethlehem	Jeffrey Volpe, Going Mobile - Overview, Advantages and Applications of Mobile GIS	Myrna Hall, Nutrient Loading, Agriculture, Forest Cover and Impervious Surfaces Now and in the Future: How Long Can Filtration Be Avoided in the New York City Watershed?
**Registration Desk Hours: Tuesday 8:30 am - 12:00 pm						

		9:00 - 9:30	Maxwell Ruckdeschel, The Regional Knowledge Network: Using ArcIMS to Offer Dynamic, Thematic Maps Over the Internet	Elena Laura, Sidewalk and Ramp Management Applications This will be demonstration of 2 custom GIS Applications developed by City of Ithaca GIS Program	Austin Fisher, Geospatial Adventure in Kosovo and How It Contributed to the Country's Independence	Justin Cole, Monroe County Land Cover Model for Impervious Surface Estimation
		9:30 -10:00	Greg Potter, Tompkins County/City of Ithaca Collaborative Web GIS-Successful Interactive Mapping for Staff and Public	Richard P Slutzah, Using GIS for Municipal Pavement Management	David Miller, Lessons from the Field: Using GIS and GPS to Follow the Trail of Lewis and Clark on the Missouri River	Benjamin Houston, GIS in Riparian Buffer Analysis: A Practical Approach to using the Riparian Buffer Delineation Equation
10:00 AM - 10:30 AM	**AM Break in Exhibitor area Convention Ctr. B**					
			Session 5A Geo Web Moderator: Jeff Herter	**Session 5B Data Collection** Moderator: Eddie Bevilacqua	**Session 5C Mobile /field** Moderator: Mickey Dietrich	**Session 5D Environmental Modeling with GIS** Moderator: Myrna Hall
		10:30 - 11:00	Rebecca Newhall, The New York Ocean and Great Lakes Atlas: The Real Thing	Ricardo Lopez-Torrijos, Hydrologic Information Systems: A Web Services Based Approach to Environmental Monitoring Data Management	Barry Blanchard, Low Cost, High Value, Secure GIS Data Deployment for Field Crews at OCWA - Central New York's Water Authority.	Alexis Ellis, Canopy Cover Change Model - A model for the simulation of canopy cover change in the greater Baltimore area
		11:00 - 11:30	Anya Rozanova, Web-based Geospatial solutions for non-GIS businesses	Robert Scardamalia, The Nightmare of Addressing: Preparation for the 2010 Census	Eric Brady, Mobile GIS for Septic Inspection	Lisa Giencke, Potential Climate Change Impacts on Long-term Viability of Red Spruce (Picea rubens) for Proposed Forest Reconstruction on the Tug Hill Plateau, NY
		11:30 - 12:00	Sam Wear, Expanding GIS Capacity Across Governments with Map Services: The New Data Sharing Paradigm	David Weaver, Large Scale Planimetric, Topographic and Orthophoto Base Maps	Elisabetta DeGironimo, Taking it to the Streets - The Mohawk Valley Water Authority goes Mobile	Ning Sun, GWLF-based Run-off Modeling: A case study at the Trout Creek in the Cannonsville Reservoir Basin, New York City Watershed, 1997—2007
12:00-1:30 PM	**12:00 - 1:15 PM**	**Lunch ending with Raffle and Award Presentations: Partnership Award in Ballroom**				
	1:15 - 1:30 PM	***Walk about***				
1:30 PM	*Exhibitor Tear Down 1:30 - 5:00 pm*		**Session 6A Map Critique** Moderator: Lee Herrington	**Session 6B Privacy Panel** Moderator: Sue Nixson	**Session 6C Analysis** Moderator: Giorgos Moutrakis	**Session 6D GIS Association Meeting followed by a Workshop**
		1:30-2:00	**Map Critique**	Steven Romalewski, Privacy and the importance of public access to spatial data	Lori Lui, Satellite-derived impervious surface detection with spatially-explicit uncertainty metrics	**GIS Association Meeting**
		2:00-2:30		Richard Reichert, Privacy Issues and GIS in County Government	Giorgos Mountrakis, Spatiotemporal analyses of moose-vehicle collisions in Vermont	
		2:30-3:00		Robert J. Freeman, Privacy Panel	Mi Yan, Tian Zhou, and Yue Zuo, Investigating spatiotemporal interactions between female and male white tailed deer	Bruce Oswald, Writing a Successful GIS RFP!
		3:00-3:30	**Vendor Sessions 7A** Paul Rooney, ArcGIS 9.3 – How to Maximize the Potential	**Vendor Session 7B** Craig Cleveland, Maintaining Data Integrity - Using Topology Related Tools in ArcView	**Vendor Session 7C** Linda Rockwood, Manifold IMS: a tour of three internet mapping applications	
	Conference Concludes					

Sunday, October 5, 2008

Pre-Conference Workshops

1:00 pm – 5:00 pm

Data Quality Workshop at the Holiday Inn in Onondaga Room

Michael F. Goodchild, Professor of Geography at the University of California, Santa Barbara

Use and analysis of geospatial data require careful attention to accuracy, since any digital representation is at best an approximation of ground truth.

This workshop will begin with an overview of the accuracy issue for various classes of geospatial data. Error models will be introduced, with associated measures and parameters of accuracy. Currently implemented capabilities in GIS and related software will be reviewed, along with methods for propagating uncertainty from database to analysis products.

The presentation will review existing and proposed standards for geospatial data quality, methods for visualizing data quality, and research on the implications of geospatial data quality for decision making.

1:00 pm – 5:00 pm

Raster Analyst Workshop at SUNY-ESF

Lee Herrington, Professor, SUNY-ESF

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Spatial Analyst: An introduction to ESRI's Spatial Analyst extension to ArcGIS and to working with raster data. Intended for ArcGIS users who are not familiar with raster processing and who have not used the extension. It is expected that attendees have experience with ArcGIS 9.1 or 9.2. Topics to be covered include:

- Introduction to raster data
- Setting the analysis environment
- Working with elevation data
- Reclassification
- Converting data from raster to vector and vector to raster
- Computing slope and aspect
- Simple analysis using both raster and vector data

1:00 pm – 5:00 pm

GIS Basics Workshop at SUNY-ESF

Eddie Bevilacqua, Certified Trainer, SUNY-ESF faculty, Hands on beginning level, (limit 20)

This workshop will provide a hands-on session intended for individuals with little or no prior experience in using GIS. The course is a broad-brush introduction to both theory and practice in GIS applications. Further software-specific training may be required if participants wish to gain further skills.

This workshop will provide a basic introduction to Geographical Information Systems (GIS), mapping, and their use in various applications, including environmental sciences and natural resources management. Participants will gain an understanding of relevant theoretical aspects of geography and mapping, along with practical experience of using GIS.

2 ABSTRACTS

Monday, October 6, 2008
9:00 am - 10:00 am

Session 1A Ballroom East

Seeing the Forest through the Trees; The Transformation of New York's Forest Records

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Senior Project Manager
Fountains Spatial Inc.

Following the proliferation of desktop computer systems in the early 1980's, business records and their associated procedures formerly reserved to paper media, began a migration process into digital formats. In general, unlike their database counterparts, spatial records lagged until desktop software such as ArcView became widely used. The migration of State Forest records follows a similar path, beginning with desktop database management systems and accelerating onto spatial information. Today this process continues, expanding where technology and innovation offer new opportunities for data management and efficient distribution. Following the introduction, a series of presenters will concentrate on key migration activities, including forest stands, forest inventory, forest mapping and public information distribution. Together, the presentations trace a decade of progress achieved by the Division of Lands & Forests, to transform its forestry records and automate forest business practices.

Session 1B Onondaga Room

How Cheap Fossil Fuel has Contributed to Urbanization on Sensitive Lands in the NE United States

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Humans decide upon locations for land development based in part upon a weighing of energetic costs and benefits, or energy return on energy invested (EROI). As a consequence,

development tends to concentrate near areas of higher faunal or floral productivity and away from areas of higher energetic costs, such as steep slopes and saturated soils. If money is viewed as a certificate redeemable for energy in the marketplace then we hypothesize that in areas of greater total income more energy has been available to overcome the constraints of poor site conditions leading to development on sites deemed unsuitable by our ancestors.

A spatial modeling analysis of the location of development within Connecticut between years 1985 and 2002 supports this hypothesis. Our results indicate that in areas of higher income, determined from Census data analysis, development, derived from time series satellite image classification, was less constrained by steeper topographic slopes.

Understanding how the location of human development is influenced by energy availability will aid the forecasting of future development patterns under different assumptions about future energy availability. As the areas developable by humans change as a result of energy availability, the modification of ecosystem function by humans and extent to which other species are wholly or partially excluded from certain locations will also likely change.

House Flipping in Buffalo, NY: a GIS based analysis

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Geographers have studied neighborhood change by characterizing life cycle stages generalized from examination of historical trends. The individual components of neighborhood change include physical deterioration and obsolescence of housing stock, social and demographic changes in place, investment/disinvestment, and housing mobility. Neighborhood life cycle analysis investigates these individual components and the interrelationships. "House flipping" is a relatively new phenomena impacting neighborhood change. Many media accounts of house flipping use anecdotal information to characterize the impact of this practice on neighborhoods.

This paper demonstrates how many disparate spatial and attribute data integrated within a GIS characterize the problems different neighborhoods may be confronting. The City of Buffalo is the focus of this demonstration. The spatial data includes parcel boundaries, neighborhood boundaries, community boundaries, and political jurisdiction boundaries developed by a City, as well as Census geography. Attribute data include trend information on the socio-economic characteristics, land use, property values, bankruptcy, real estate transactions, and foreclosures.

The socio-economic data used here correspond to the factors identified in the literature on neighborhood change, namely age, race, income, and housing tenure. These, combined with data on bankruptcy, real estate transactions, and foreclosures, aid in understanding which neighborhoods are in decline and what factors may be affecting the decline. Temporal issues associated with integrating disparate spatial and attribute information are discussed. A Markov modeling approach verifies studies in subprime mortgage lending that neighborhoods becoming more populated by minority residents tend to have a higher incidence of house flipping.

Session 1C Ballroom West

How to Visualize Your Community in 3D

Mickey Dietrich

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2 ABSTRACTS

The NYS Tug Hill Commission participated with several other organizations in the "Visualize Your Community in 3D" program that was presented by Green Mountain GeoGraphics, Ltd. back on January 25th, 2008. The tools used were Google Earth and Google SketchUp.

The program provided us with the techniques needed to construct 3D models that could assist not only our staff, but our communities as well. These tools will help with community planning, economic development, travel tourism and emergency planning. Also, these are great tools to help assist in utilizing the sun for energy savings.

We have been working with Lewis County in modeling the Village of Lowville. The models being generated are going into the Google 3D warehouse and we have already started the process of putting them in. Also, we have been assisting the Carthage Central School District in modeling the villages of Carthage and West Carthage.

This session will give you a quick overview of the Visualize Your Community in 3D program, what has been done for modeling so far, how it could be applied in communities, different techniques for constructing 3D buildings, and it will also show you how to use Google SketchUp and Google Earth to create your own 3D models.

Session 1D Convention Center A

Small Unmanned Aerial Vehicles (microUAVs): A Remote Sensing Tool for Local Environmental Planning

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Unmanned Aerial Vehicle systems (UAVs) are rapidly becoming an indispensable part of military operations worldwide serving as highly flexible remote sensing platforms. The scale of these UAVs ranges from nanoUAVs smaller than a butterfly, to microUAVs the size of birds or model airplanes, all the way up to jet-powered UAVs the size of a business jet. While satellites and piloted aircraft systems can deliver higher resolution spatial and spectral data than most UAV-borne sensors, UAVs offer superior resolution in the temporal realm. UAVs have the ability to loiter over a study area for hours or even days, something that a low-earth orbiting satellite cannot do.

Other UAV benefits include the ability to capture hyper-local remote sensing data (parcel, neighborhood, census tract); reach inaccessible terrain (cliffs, forest canopies); or acquire data sets customized on a project by project basis. For economic, technological and security reasons UAVs have not been widely available for civilian use. This is about to change. Interest in civilian use of this technology is growing, while the cost of off-the-shelf system components for small UAV systems is dropping. Yet significant challenges remain such as FAA regulatory approval, integrating UAVs into existing GIS applications, and of course, cost. This presentation will provide a brief overview of the UAV industry, describe existing microUAV systems that might be adaptable for environmental planning purposes, look at future technologies, and discuss the benefits of incorporating UAVs into a GIS to support the planning process.

Agricultural District Mapping - Guidelines Update

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Diane Ayers

Agricultural District Mapping Program Data

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The Agricultural District Program of the New York State Department of Agriculture and Markets protects over 8 million acres of land. Agricultural districting encourages the continued use of farmland for agricultural production. A part of the locally initiated districting process is the creation of a map representing the district. The Cornell University Institute for Resource Information Sciences reviews, distributes and archives all agricultural district maps for New York State. This presentation introduces current cartographic and data format guidelines for program map production, including the submission of digital data. A brief history of the mapping program will be provided as well as a description of the publicly available data set.

Monday, October 6, 2008
10:00 am – 10:30 am

Refreshment Break in Exhibitor area – Convention Center B

10:30 am – 12:00 pm

Session 2A Ballroom East

Seeing the Forest through the Trees; The Transformation of New York's Forest Records

Kurt Swartz et. al

Forester III

New York State Department of Environmental

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See abstract in Session 1A

Session 2B Onondaga Room

GIS technology can revolutionize property assessment and taxation, with radical improvements for local economies as well

Bill Batt, Ph.D.

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Bob Breglio

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Completed creation of property parcel shape files in New York State allows for the practical representation of land value assessment beyond what has ever before been possible. Land value maps have a history traceable to the work of New York City Assessor Lawson Purdy in 1909, and have been widely advocated by assessors, but they have always been such a labor intensive challenge that they were only occasionally created. GIS technology now changes all this, and portends even greater changes in the near future.

With the separate parcel assessment of land, required by state law, land value maps are now easily and inexpensively created, at least relative to prior history. We can not only make land value maps; we can also show the efficiency by which land sites are used by showing ratios between building to land value, or any other ratios. Land value gradients are easily calculated, and so also the impact of infrastructure investments upon site value. Anomalies in land assessment are quickly revealed and apparent.

Most importantly of all, simulating land value taxation can be shown -- who would pay more and who would pay less, showing how feasible such a tax regime actually is. The accurate valuation of land separate from improvements,

what has long been thought to be an obstacle to land taxation, can now be overcome. It may even be a short step to accomplishing the task of assessment itself using various algorithms and parcel sales records in conjunction with GIS technology.

Dr. Batt is former university professor and later the staff political scientist of the New York Legislative Tax Study Commission. Retired since 1992, he has devoted his efforts entirely to effectuating tax policies built on this school of economic philosophy. Mr. Breglio is a retired GIS Specialist, who worked for years for the Neighborhood Preservation Coalition of New York State as well as being an elected town Assessor and GIS instructor at SUNY Albany.

Real Property Assessment Information System (RPAIS) - Schoharie County

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Kenneth Pennock

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RPAIS is a web-based Geographic Information System (GIS) that combines Schoharie County's digital tax parcel and Real Property System (RPS v4) data in order to provide the public with invaluable just-in-time Tax, Comparables (Assessment and Sales), and Property Inventory information. The RPAIS application utilizes the County's Java-based Listener to retrieve changes in RPS v4 data and join with the digital tax parcels on the fly.

A public user has the ability to search and locate a property and retrieve all relevant and up-to-date information on that property. Property information includes general and school tax information, market value, and property characteristics such as acreage, property pictures, style, and condition. Users are also able to search assessment and sales comparables by defining their own property characteristics.

The session will present the application development approach and technologies used as well as demonstrate the RPAIS application and its features.

Use of GIS technology to enhance property inventory and improve access to property records within the Town of Babylon resulting in improved intra-governmental sharing and department efficiencies

Scott Mastellon

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The Town of Babylon received a Real Property Tax Administration Improvement Program (RPTAIP) grant from the New York State Office of Real Property Services (ORPS) in 2007 to improve the efficiency of obtaining property related information and cost effectiveness of the various Town related activities that require access to the property related information.

The project used GIS and GPS technology to obtain street level digital photographs of over 70,000 parcels within the Town. GPS data was collected using GPS enabled digital cameras and assigned to parcel tax map numbers using customized ArcGIS scripts. To efficiently distribute photographers in the field, a GIS enabled route optimization software product (RouteSmart for ArcGIS) was used to create andoptimized routes for each photographer throughout the project. All routes, photos and GPS

coordinates were effectively stored in the Town's GIS data warehouse.

A new property card data entry application was developed that enabled the Town to effectively move data residing on paper property cards to an electronic format. In addition, property cards were scanned into the Town's Enterprise Content Management System (Hyland OnBase). Photos obtained from the field, property sketches and GIS mapping were made available within the property card data entry application.

An existing ArcIMS GIS Viewer used for displaying basic information was enhanced to include property card data, links to property card images, links to street level photographs, links to property sketches, sales comparison search capabilities, and assessment comparison search capabilities, tax related information, and sales information.

Session 2C Ballroom West

SPECIAL SESSION PANEL DISCUSSION- The College Experience: Advancing GIT through Integration into Non-Traditional GIT Courses

Amy Work

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This 1.5 hour panel session will convene faculty members from Cayuga Community College (CCC), Mohawk Valley Community College (MVCC), Morrisville State College, and SUNY Oswego to discuss the development and incorporation of geospatial materials into existing college curriculums to enrich the student learning experience. Each institution has taken a unique approach to expanding GIT across their campuses. Faculty can explore their own research interests while exposing students to geospatial technologies through the integration of these technologies into existing course topics.

As part of an IAGT sponsored initiative, these four institutions have developed 11 different projects over the past year that incorporate GIT across a range of disciplines with particular focus placed on the areas of Homeland Security and Emergency Management, Natural Resource Management, Monitoring and Forecasting, and Risk, Vulnerability and Mitigation Assessments.

The session will follow the following format:

1. Introduction and overview of the Module Initiative (IAGT)

2. A series of presentations from a representative at each institution to discuss the institutional approach, such as the development of a template to share among colleagues, classroom experiences, field research, and interdisciplinary collaborations, the materials developed and the integration process into non-traditional GIT courses. (CCC, MVCC, Morrisville State College, SUNY Oswego)

3. Discussion from panelists to talk about the approaches taken and opportunities for further integration of GIT into courses across campuses that do not have a geospatial component included in the curriculum.

Session 2D Convention Center A

SPECIAL SESSION PANEL DISCUSSION- Recent Experiences with LiDAR Data: A Practical Look at Using LiDAR in NYS

Benjamin Houston

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IAGT will convene a panel of speakers/participants from Academia, Local/State Government, and the Private sector, and moderate/facilitate a discussion around current experiences with LiDAR data. The session is proposed to take 1.5 hours. Presentations will be included as necessary to introduce a topic or

provide adequate background information, but the emphasis will be on discussion amongst the panelists and questions from the audience. More detail beyond the cursory outline below can be provided upon request.

Proposed Topics are as follows:

Introduction/Overview presentations (10 minutes)

Typical LiDAR data formats (ASCII, LAS) - examples and description of data structures

Typical LiDAR data deliverables (using the Sanborn contract with NYSCSCIC as a baseline)

Proposed Discussion topics (could be modified/updated based on panel input prior to the conference) – 20 minutes each.

1. Software - what are the current trends in software

What software are folks using and what has their experience been? (GIS, CAD, LiDAR specific tools, etc.)

What are the cost/availability thresholds for a range of anticipated uses:

2. The range of applications (a survey from both the panel and the audience)

3. Derived products- what is the legacy of LiDAR data collections?

4. Promise vs. Reality- Practical experience using the data on real projects (anecdotal testimonies from the panel)

Monday, October 6, 2008

Lunch is served in Grand Ballroom

Monday, October 6, 2008

Plenary Session in Grand Ballroom

1:00 pm – 1:10 pm

Welcome and opening remarks

Eddie Bevilacqua, Co-Chair, SUNY-ESF

1:10 pm – 1:50 pm

State of the State Address

Bill Johnson and Frank Winters, NYS Office of Cyber Security & Critical Infrastructure

Introduction of Keynote speaker

Maureen Wakefield, Continuing Education Coordinator, SUNY-ESF

1:50 pm – 3:00 pm

Keynote address

Leveraging the Power of Web 2.0: The Impact of Volunteered Geographic Information on the GIS Community

Michael F Goodchild, Professor of Geography at the University of California, Santa Barbara

In recent months there has been an explosion of interest in using the Web to create, assemble, and disseminate geographic information provided voluntarily by individuals. Sites such as Wikimapia and OpenStreetMap are empowering citizens to create a global patchwork of geographic information, while Google Earth and other virtual globes are encouraging volunteers to develop interesting applications using their own data.

I review this phenomenon, and examine associated issues: what drives people to do this, how accurate are the results, will they threaten individual privacy, and how can they augment more conventional sources? I compare this new phenomenon to more traditional citizen science and the role of the amateur in geographic observation.

3:00 pm – 3:30 pm

Refreshment Break in Exhibitor area – Convention Center B

3:30 pm – 5:00 pm

Session 3A Ballroom East

ArcGIS Based Urban Forest Management System

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Urban forest management is a growing concern for many communities across the United States. With the rediscovery for the need of trees throughout an urban landscape and the always increasing environmental concerns, urban forest management has become a priority for many municipalities. Once known as the "City of Trees", Buffalo, New York was hit by a historic lake-effect snowstorm on October 13, 2006. The storm caused devastating damage to the urban tree population and rendered the existing urban forest management system inefficient for the task ahead.

As the acting urban forest manager for the City of Buffalo, WENDEL mobilized in house and city staff resources to re-inventory 68,000 city street trees including conducting damage assessments and trimming or removal recommendations. Utilizing a combination of the latest GIS technologies of ArcGIS Server and ArcIMS, WENDEL developed a map based asset management tool designed to manage inventory, scheduling, bidding, contract management and maintenance data for public trees. In operation over the past 18 months, the City of Buffalo has enjoyed a paperless management system which has improved the efficiency of record-keeping, maintenance, citizen complaint resolution, contracts, and tracked all tree related contractual expenses. This web based management system also allows the City to effectively plan for the future of its urban forest.

THE RELATION BETWEEN LAND-COVER AND THE URBAN HEAT ISLAND IN NORTHEASTERN PUERTO RICO

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Population movements, growth and industrialization are causing rapid urbanization throughout the tropics, resulting in elevated temperatures within urban areas when compared to surrounding rural areas, a phenomenon known as the Urban Heat Island (UHI). Our objective in this study is to quantify the UHI created by the San Juan Metropolitan Area, Puerto Rico, over space and time.

We collected temperature data using mobile and fixed-station measurements along several urban-rural gradients. We also examined the relation between average temperature and the relative amount of vegetation located upwind. Regression analysis was used to predict regional temperatures based on land-cover change over time.

Our data show the existence of a nocturnal UHI, with nighttime urban-rural temperature differences (ΔTU-R) of up to 3.02°C. Urban-rural temperature differences had negligible seasonal differences. Comparisons of diurnal temperature trends at urban, grassland, and forested sites indicate that canopy cover reduced daytime warming. Results from the mobile measurements show that the UHI has reached the base of the Luquillo Mountains. Temperature was predicted best (r2 = 0.94) by vegetation in upwind southeasterly directions, especially that within 180 meters of the sensor. Predictions of future development and temperatures suggest that if the present pattern of development continues, over 140 km2 of land that showed no signs of UHI in

2000 will have an average UHI between +0.4°C and +1.55°C by 2050. Furthermore, more than 130 km2 of land area with a UHI between +0.4°C and +1.4°C in 2000 will have an average UHI greater than +1.55°C by 2050.

A comparison of three methods for individual tree crown detection and delineation from high spatial resolution imagery

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Efficient forest management requires detailed, timely information on forests. High spatial resolution remotely sensed imagery provides viable sources and opportunities for automated forest interpretation at an individual tree level. Recent research aimed at providing tree-level inventory has considered automatic individual tree crown detection and delineation. A range of algorithms have been developed for different types of images, tested on different forested areas and using different methods of accuracy evaluation. However, no research exists that compares the performance of these methods using common data and the same evaluation approach.

This presentation compares the performance of three algorithms representative of the published methods for detecting and delineating tree crowns in high spatial resolution imagery. The three algorithms—watershed segmentation, region growing and valley-following—were tested on Emerge natural color vertical aerial image with 60 cm ground sampled distance (GSD) and QuickBird panchromatic satellite image with 11° looking-angle over a softwood study site and a hardwood study site. The results showed all three methods effectively delineate Norway spruce tree crowns in the softwood stand on Emerge aerial image with lower accuracies on the QuickBird panchromatic image. No algorithms proved accurate for the hardwood stand on either Emerge aerial image or QuickBird panchromatic image. The analysis suggested that each algorithm has advantages and limitations based on imaging conditions and stand characteristics. Future research is needed to explore adaptive algorithms that are capable of accurately detecting individual trees and providing crown diameter which could be comparable to ground measurements.

Session 3B Onondaga Room

A Model for Small Counties: Enterprise GIS in Genesee County

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In New York State, there are several counties that are on the cutting edge when it comes to Geographic Information Systems (GIS). Most of these cutting edge counties are large and therefore, almost expected to possess 'model' GIS programs. Often overlooked are the smaller

counties, who quietly create programs that rival those of their larger counterparts. Genesee County has done just that. Located between Buffalo and Rochester, Genesee County has steadily over the course of more than a decade built up an Enterprise GIS program that includes address points for the Sheriff's Department, allowing them to pull up aerial photography of all incoming calls to the Emergency Dispatch Center.

The County has most recently begun developing a GIS program for the Health Department that shall display locations of wells and septic systems within the County boundaries. Genesee County has not only begun to use GIS to address the needs of public health and safety, but has also developed an impressive Office of Real Property system to make the keeping and retrieving of records easier for office staff and more accessible to the general public.

The Office of Real Property also now has the ability to maintain County tax maps using GIS. Building upon the state theme of municipal cooperation, Genesee County would like to expand the use of GIS to all departments and local municipalities. The County will embark on a project to do just that utilizing the recently completed Inter-municipal GIS Needs Assessment. Genesee County is proof that great things can come in small packages.

Enhancing GIS Data for Use in a Municipal Data Sharing Environment

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This presentation describes Nassau County's efforts to enhance its GIS database for use within the Municipal Data Sharing Portal developed as part of a NYS DOS Shared Municipal Services Initiative (SMSI) Grant.

Since many GIS datasets are the result of the efforts of individuals in different departments or organizations, combining data into a single integrated dataset and getting users to understand its meaning and proper use can be challenging. The presentation describes issues confronting any organization attempting to build a multi-purpose enterprise database, including:

• Addresses and Address Points - a critical component of any municipal database, yet property address can be difficult to define. Addresses may be maintained by the Assessor, Building Department, Clerk's Office, local municipalities and utilities.

• Street Centerlines are an essential component of many government functions. Apart from the common issues of naming are the more complex problems arising from the many diverse users and uses of the data. Some of the issues to be considered include single centerline vs. roadbed model, directionality, maintaining accurate topology for routing, providing appropriate segmentation for DPW functions such as pavement management and use of the NYSDP.

• District boundaries become confusing in multi-jurisdictional systems. Boundaries may be defined by property lines, service territories (i.e.: a water district), legislation (i.e.: metes and bounds description of a village) or agreements between neighboring districts.

The database administrator must define and maintain these databases to ensure data accuracy, integrity and ease of maintenance while satisfying the diverse requirements of the user community.

Erie/Niagara County GIS Partnership

Greg Coniglio

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2 ABSTRACTS

The Erie and Niagara County GIS Inter Municipal Agreement is a joint-agreement for shared GIS Services that will permit the two counties to work in collaboration with each other. The IMA is designed to primarily leverage Erie County's existing GIS infrastructure to enable Niagara County to provide GIS services to its departments, similar to those provided to the Erie County Departments without having to incur the high start-up costs associated with establishing an enterprise-level GIS. The two counties working in collaboration under the terms of the IMA will yield a more cost effective, functional GIS program, one that will benefit both counties through shared services and revenue generation.

The following are key aspects to the IMA and subsequent partnership between the counties that have been negotiated:

• GIS Technical Assistance: Counties will provide mutual GIS advice and technical guidance, both during regular operation, and during emergency operations.

• Internet/Intranet Mapping: ArcGIS Server applications for both counties are hosted on one common server at Erie County, to share cost.

• Custom GIS Applications: The counties agree to share, whenever possible, any custom GIS applications developed.

• Off-Site data storage: Each county stores a backup copy of the other county's GIS and imagery data.

The presentation will outline the history of the GIS Programs in each county, leading up to the agreement. We will discuss the comprehensive process of crafting such a unique agreement between the counties, pitfalls and roadblocks that were successful overcome, and will briefly discuss the technical details behind implementing the programs outlined in the IMA.

Session 3C Ballroom West

GIS Based Spatial Prediction of Population Exposure to Airborne Fine Particulate Matters

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Airborne solid particle or aerosol contributes one of the major urban air pollution sources. High concentration of fine particulate matter in the air may cause increased probability of human lung cancer and cardiorespiratory mortalities. This research combines field survey, ground remote sensing, and GIS spatial analysis to visualize the spatial patterns of population exposure to the fine particles in the boundary layer atmosphere in an urban setting. Metropolitan Beijing, China was selected as the area of study. Remote sensing test of coarse particle concentrations (greater than PM10) was conducted by a ground LiDAR. Fine particles (PM0.5 to 5) were surveyed using a laser particle counter. Universal Kriging of geo-statistic tools in GIS was applied to interpolate the spatial distribution of airborne particles.

The spatial patterns were overlaid to population distribution map to forecast the human exposure to various fine particles. The results indicated that high concentrations of fine particles less or equal to 1.0 μm are located either in the north central or southwest part of the city. The highest risk of human population exposure to fine particle concentrations occurs in the northwest part of the city.

Using Network Analysis to Compare Water Quality Tests to Disease Rates

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Public water suppliers are required to perform water quality sampling at the tap at spatially distributed locations throughout their water supply system, testing for coliform as an indicator for the presence of other pathogens. We present the results of a study that examines the relationship between these water quality test results and the incidence of water-borne disease in Onondaga and Madison counties. Network analysis of roads in the study areas was used to determine the likely travel distance between water quality monitoring stations and incidences of disease. These data were then used as input in a conditional regression analysis that evaluated the association between the occurrence of an illness and the occurrence of a recent positive or negative sample obtained at a nearby water quality monitoring station.

In a second analysis comparing background risk of disease with risk of disease after a positive sample, the likelihood of disease was adjusted for population using census data. A second network analysis was used to create multiple clip coverages for each of several distance zones, with distance again measured along roads. These clip coverages were overlaid with census block polygons with calculated population densities, to create a population estimate for each distance from a given water quality monitoring station. These values were used to create weights that were applied to the likelihood of disease incidence for areas near each station. Weighted and unweighted disease likelihood was compared to times when a positive test was obtained, and times when no positive test was obtained.

Developing a spatiotemporal model of Dengue Fever transmission in Ecuador

Anna M. Stewart

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Mercy J. Borbor-Cordova

Post doctoral Fellow

National Center for Atmospheric Research

Dengue fever (DF), a virus transmitted to humans by the Aedes aegypti mosquito, has been identified as one of the most significant emerging vector-borne diseases. The spread of dengue is poorly understood but has been attributed tentatively to unstructured urbanization, increased human migration, lack of effective mosquito control, and climate change.

The objective of this research is to develop a fine-scale, spatial model of climate in Ecuador to identify populations at risk of DF. Monthly meteorological data (1982 – 1999) was provided by the National Meteorological and Hydrological Institute of Ecuador, and annual cases of dengue per canton (2001 – 2006) were provided by the Ecuadorian National Institute of Census and Statistics. I developed an index of dengue transmission per canton by examining the presence or absence of dengue over a six year period. I then determined the relation between the dependent climate variables (monthly mean temperature and monthly total precipitation from weather stations with ten or more years of data) and the independent geographic variables (latitude, longitude, elevation, distance from the coast, and these terms squared) using a multiple regression analysis. Multiple regression analysis was then used to determine the relation between the independent climatic variables (monthly temperature and precipitation) and the dependent index of dengue transmission per canton.

Preliminary results suggest that dengue may be correlated with February and March precipitation. Ultimately, this critical research will aid in the development of a geographical model of disease transmission that will provide guidance for public health policy makers in developing countries to anticipate and mitigate future epidemics.

2 ABSTRACTS

Session 3D Convention Center A

Crime Analysis Mapping for City of Troy, NY

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Bowne developed a Crime Analysis Mapping (CAM) application utilizing ESRI's ArcGIS Server product for the City of Troy, NY. The goal of the project was to design and implement crime analysis capabilities for the City's Police Department Crime Analysts. This presentation will explain the data extraction, transformation, and loading process using MS SQL Server (2005) Integration Services from the City's Emergitech system, and design and implementation of the Enterprise GIS using ArcGIS Server.

The session will include a demonstration of the web-based CAM application used by the Police Department. The application includes PART I Crimes, Quality of Life incidents, and Call Center data along with functionality specifically designed for the City's Crime Analysts. Using the CAM application, the Analysts are able to easily search and locate all incidents by Police Zones, Date Ranges, and Incident Types and analyze the incidents' nature in order to respond to future incidents more effectively. CAM also includes pre-canned spatial reports for the Police Chief and Patrol Captains for specific time frames such as prior work shifts.

American and Global Perspectives of Infrastructure Needs and Expenditures

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The American Society of Civil Engineers issues a periodical Report Card on the state of America's infrastructure. The subjects evaluated in 2005 are Aviation, Bridges, Dams, Drinking Water, Energy, Hazardous waste, Navigable Waterways, Public Parks, Rail, Roads, Schools, Solid Waste, Transit, Wastewater, and the cumulative grade is D. This represents a Poor condition. The criteria used in grading are condition, capacity, and funding available for repair versus actual need. The estimated present total investment needs to maintain America's infrastructure is $1.6 trillion.

The United States budgets 0.93% of its gross domestic product (GDP) on infrastructure projects whereas China spends 9% and India spends 3.5% and is aiming to increase its allocation to 8%. It is predicted that if the United States fails to allocate the capital required for replacing aging infrastructure, it will be forced to spend almost 60% of the $1.6 trillion on the patch-and-pray approach currently adopted to shore-up disintegrating facilities. The present study uses maps to show the distribution of infrastructure needs and expenditures in individual states. More maps are used to show a global perspective of infrastructure expenditures in some developed and developing countries. As infrastructure being the backbone of economic development, this study aims at illustrating that recent failure of bridges, inundation of communities, and destruction of cities in the US are manifestation of the expiring endurance of the existing, overburdened facilities. This paper also demonstrates that the lack of funds appropriated for the nation's infrastructure will continue to haunt the already crumbling facilities.

Valuing Agricultural and Vacant Parcels--A Geographical Weighted Regression Approach

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Traditionally, spatial modelers and analysts have constructed predictive models using statistical procedures that assume spatial homogeneity or constancy of spatial processes across the extent of the geographical area under study. One alternative to this approach is methodology known as Geographically Weighted Regression (GWR), which directly tests for and recognizes such heterogeneity and spatial autocorrelation. While GWR has been under development for over a decade, ESRI has incorporated these routines into their Spatial Statistics Toolbox in the upcoming ArcGIS 9.3. This paper will provide one illustration of how this methodology can be employed for valuing land in New York State and highlight the benefits from employing it.

5:00 pm – 6:30 pm

Reception and Poster session in Exhibitor area - Convention Center B

6:30 pm

Banquet Dinner in Grand Ballroom

Joseph Chamie, Director of Research at the Center for Migration Studies, Approaching 7 Billion: Humanity in Transition

Tuesday, October 7, 2008

8:30 am – 10:00 am

Session 4A Ballroom East

The Re-design of Mapping Westchester County

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Westchester County's GIS Program is well established and the Program's flagship website - Mapping Westchester County (MWC) - has been available on the internet for almost a decade. A year ago the County GIS Program re-designed MWC in order to improve the user experience, but also to incorporate new functionality and data. The effort also involved integrating the four historically separate 'Finder' applications into the MWC framework:

- Community Facility Locator
- Find Indian Point Zone
- Find Elected Officials
- Hurricane Flooding Finder

As a follow-up to this work, this summer the County went further to:

- Integrate existing Green Map functionality and Web mapping services

• Allow the user to integrate third party Web mapping services.

The Regional Knowledge Network: Using ArcIMS to Offer Dynamic, Thematic Maps over the Internet

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The Regional Knowledge Network (rkn.buffalo.edu) was developed by the University at Buffalo Regional Institute to provide government officials, regional leaders, community activists, researchers and citizens with access to up-to-date data on the region, with the goal of building regional understanding and informing decision making. To meet these goals RKN provides data, maps and resources for 9 key topics for Western New York and Southern Ontario, at scales ranging from the binational region to census tracts, with information accessible by various dynamic tools. Included in these tools are three ArcIMS driven applications: two dynamic map viewers and the Address Analyzer.

One map viewer allows the user to visualize any one of the hundreds of data variables on RKN as a dynamic choropleth map. The other map viewer allows the user to view multiple environmental datasets overlaid on base data such as aerial photography or a DEM. The Address Analyzer allows a user to enter an address anywhere in Western New York and the site will return an aerial photo close-up of the address along with an overview of political representation, demographic, and school information for that address' community.

This presentation will discuss the challenges and solutions that were discovered creating the dynamic ArcIMS applications for RKN, possibilities for future expansion, and the broader concepts behind public participatory geographic information systems.

Tompkins County/City of Ithaca Collaborative Web GIS- Successful Interactive Mapping for Staff and Public

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Tompkins County has developed and managed a successful web GIS application using ARCIMS. The application is unique in that it delivers multiple map services which are created and managed using a custom management tool written inside the application. County staff has developed many such services: Natural Resources Inventory Map, Board of Elections Service, Emergency Response and Gorge Rescue sites, as well as general property and facility viewers. The public has access to viewers such as the BicycleMap, a Facility Locator, Scenic Resources inventory, Property Map and more.

The City of Ithaca has collaborated with Tompkins County to co-develop the application and create map services such that City and County users are

all served by the same application deployment. The City/County collaboration, which includes the hosting and maintenance of ARCIMS on County servers and the City's contributions in staff time and cost sharing for development, is saving the tax payers the cost of developing ARCIMSin two organizations. The County and City are now looking to leverage new capacities in ARCGIS Server 9.2. New development on the 9.2 platform includes an address management system for municipalities and agencies in the County to use.

Session 4B Onondaga Room

Municipal Infrastructure GIS in the Town of Bethlehem

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A presentation on the methods and tools used to build a GIS of the water and sewer systems in the Town of Bethlehem. The Town of Bethlehem was incorporated in 1793, has a population of about 13,000 households and covers 42 square miles along the Hudson River South of Albany. The water and sewer systems were incorporated in the early 1900's, and have grown to 180 miles and 150 miles of pipe respectively. The infrastructure information exists in a collection of several thousand engineering record drawing from the origin of the system to the present.

The presentation covers transferring these data to a high accuracy GIS and the applications of the system. Topics covered will include gaining organizational buy-in and commitment, using an LGRMI to conserve, scan and share engineering drawings, field work and use of a high accuracy GPS, the ESRI water utilities data model, and applications of the system such as modeling and referencing video inspections.

Sidewalk and Ramp Management Applications

This will be demonstration of 2 custom GIS Applications developed by City of Ithaca GIS Program.

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GIS specialist

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Lynne Yost

Asst. Civil Engineer

City of Ithaca

The City of Ithaca has approximately 90 miles of sidewalks and about 2000 handicap accessible ramps. The City replaces or builds approximately one mile of sidewalk every year and more than 100 ramps. Owners of the parcel next to sidewalk are responsible for pavement repairs and replacement of their part of sidewalk. The City of Ithaca Department of Engineering notifies them to do it. Owners have the option to do it themselves following City Code or to ask the City to do it for them and be billed for the cost. Owners are not responsible for ramp repair.

Management of the sidewalk and ramps is a coordinated effort between the Division of Streets and Facilities, The Building Department, and the Department of Engineering and the Chamberlain's Office. To manage this work they used

spreadsheets with more than 1000 records; each record contained about 100 fields of information with regard to sidewalk inspection status, work site status, cost and many more. They also used printed paper maps of the City every day where they put notes with pen or pencil.

The City of Ithaca Engineering Department asked GIS Program to create customized GIS Application to help them to manage the City sidewalk and ramp construction and repair.

The Engineering Department now using a Geographic Information System to document all the work done to City of Ithaca sidewalks and ramps. The Sidewalk and Ramp Applications are customized ArcGIS desktop interfaces using VBA and MS Access for reports. The applications provide visual and geographic tracking and management for complex data. Each of the Applications has 15-20 reports designed in MS Access which is accessible through the ArcView environment. Reports include letters to owners, mailing labels, reports to the Board of Public Works, field crew, assessment of the job cost and many more.

Using GIS for Municipal Pavement Management

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This presentation describes an approach to using GIS as a base for a municipal pavement management system for small to midsized municipalities. The presentation describes some of the key aspects of implementing a pavement management system, including:

• Building the Basemap - the pavement management system is dependent on an accurate centerline file of the local municipality. In addition to obvious characteristics such as name, road length and width and pavement type, factors such as proper segmentation, jurisdictional changes and unique operating characteristics of the local highway agency must be considered. If the centerline is also part of a multi-user GIS care must be exercised so as to avoid negatively impacting other uses and users.

• Data Collection – is accomplished by melding hardware (HP iPAQ, Trimble GPS Receivers), software (ArcPAD, ArcGIS and Microsoft Access) and recognized pavement management procedures (NYS DOT Pavement Rating Manual) into an integrated system.

• Reporting– Results of the process are reported in the form of thematic maps showing roadway conditions throughout the municipality and associated reports containing detailed tabulations of road conditions along with recommendations and required funding estimates for a specified level of maintenance.

This approach blends low cost, commercially available hardware and software with industry accepted management practices in an easy to use tool that allows local municipalities to assess road conditions, prioritize and budget rehabilitation and maintenance projects and attain GASB34 compliance.

Session 4C Ballroom West

Going Mobile - Overview, Advantages and Applications of Mobile GIS

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Mobile GIS technology has become an important tool and application for automating business processes and improving work flows in a variety of disciplines. This presentation will provide an overview of mobile GIS, discuss advantages and

benefits of implementing mobile GIS technology and show several examples of how mobile GIS is successfully being used in public works operations (sign, water/sewer, hydrant, pavement ratings), brownfields data management, septic and public well data management, rail right-of-way data maintenance, culvert inspections and water/sewer operations.

Geospatial Adventure in Kosovo and How It Contributed to the Country's Independence

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In November of 2007, Fountains Spatial and Waypoint Technology were contracted to provide GIS and GPS training in the former Serbian province of Kosovo. This presentation will cover the background behind this project, work performed, challenges encountered, and experiences gained. Plenty of slides will be shown, along with a limited amount of instruction on the local language (Albanian).

So did this really have an impact on Kosovo's recent declaration of independence? Come to the presentation and find out.

Lessons from the Field: Using GIS and GPS to Follow the Trail of Lewis and Clark on the Missouri River

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This presentation describes the integration of GIS and GPS technology for the production of a paddler's guidebook to the Missouri River. Following the trail of Lewis and Clark, the author paddled his kayak solo down the river over the course of three summers.

The odyssey began at headwaters in Southwestern Montana and ended some 2,300 miles later at the St. Louis Arch. Fieldwork along the trip was assisted by a satellite-up linked GPS data logger and text messenger with backup provided by handheld Garmin GPS units. The author discusses issues associated with the marriage of high speed technology with low speed propulsion, focusing on lessons learned about device performance under extreme conditions in remote areas. Field-based maps will be displayed, and a GIS-based flythrough simulating Lewis and Clark's passage through Montana's Gates of the Mountains will be displayed. This will be a lively presentation.

Session 4D Convention Center A

Nutrient Loading, Agriculture, Forest Cover and Impervious Surfaces Now and in the Future: How Long Can Filtration Be Avoided in the New York City Watershed?

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2 ABSTRACTS

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Recently granted a 10-year extension of their filtration avoidance by the US Environmental Protection Agency, the City of New York continues to engage in numerous efforts to avoid building a 6-8 billion dollar filtration plant, estimated to cost $3 million annually to operate. However, development, especially since September 11th, 2001, has increased dramatically in the watersheds, threatening water quality, while at the same time forest cover is reestablishing on abandoned farm land, thus enhancing water quality.

We have built a statistical model of water quality impacts due to a variety of spatially-distributed landscape factors, and we have quantified the trends in land cover change using remote sensing, on the ground measurement, and parcel data evaluation from 1975 to the present. Projecting these trends forward under three different growth scenarios we estimate future water quality impacts and assess whether reforestation can offset development pressure.

Monroe County Land Cover Model for Impervious Surface Estimation

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An impervious surface model was created to comply with the stormwater initiatives in Monroe. The base of this data was from the New York State Digital Orthoimagery Program. The entire project was run from January to June of 2008. The project covered all of the areas in Monroe County for which we had near infrared imagery. Another project is being done to get the remaining portion of the county mapped.

Results of the entire study were quite good in that we have approximately 90% confidence in the results. We found that there were some issues in the analysis in that we had most of the error in similar types in the larger groups. We used a custom classification system which took into account the different material types of the image area. Other goals of this project included being able to come up with estimates for different impervious surface coverage areas. Overall, the results of the project found about 11.67%(.17149.81Ha) of the totalarea studied to be impervious. This area while not significant does constitute a number, which before had only been an estimate. This information will allow for the proper evaluation and planning of the Monroe County Stormwater Coalition.

GIS in Riparian Buffer Analysis: A Practical Approach to using the Riparian Buffer Delineation Equation

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Attempts to use the Riparian Buffer Delineation Equation (RBDE) for supporting practical land use programs in the Finger Lakes Region of New York have been frustrated by an over emphasis on the use of the equation to calculate specific variable width buffer distances along stream segments. The RBDE is designed to evaluate the effectiveness of a particular zone at reducing pollutant and

sediment loading, and uses ratios of different variables in comparing a specific stream segment against a reference condition across an entire watershed unit. The reference condition is often referred to as the "pre-settlement" or "pre-development" condition. All variables with the exception of the calculated buffer distance are determined objectively from existing GIS datasets. Instead of presenting results in terms of calculated distances or effectiveness, the methods developed here present results in the form of a sensitivity index and a current risk ratio.

The sensitivity index effectively removes current land cover as a variable by setting (nb/nr) =1. With the buffer effectiveness ratio B set to 1, the equation is solved for Lb/Lr as a measure of sensitivity to erosion and nutrient loading based on factors not influenced by human activity.

The current risk ratio uses actual land cover conditions derived from either Federal or local GIS data for individual stream segments while keeping the effectiveness ratio equal to one. The result is a view of current individual stream segment conditions compared against the average reference, or "pre-settlement" condition.

This kind of strategy has important implications for objectively evaluating the value of riparian buffers in particular stream reaches, and for guiding management strategies for improving riparian buffer conditions as a technique for improving environmental water quality.

Tuesday, October 7, 2008

10:00 am – 10:30 pm

Refreshment Break in Exhibitor area – Convention Center B

10:30 am – 12:00 pm

Session 5A Ballroom East

The New York Ocean and Great Lakes Atlas: The Real Thing

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Article 14 - the New York Ocean and Great Lakes Ecosystem Conservation Act (Act), Section 14-0111, part 4 calls for creation of "...an ocean and coastal resources atlas…". The New York State Department of State, Division of Coastal Resources (DCR), in coordination with GIS representatives of New York Ocean and Great Lakes Ecosystem Conservation Council member agencies, has been working on developing the Oceans and Great Lakes Atlas (Atlas) since September 2006, including data collection efforts, application development and infrastructure. Application development started from code for the NYS Digital Orthophoto Application donated to DCR by the NYS Office of Cyber Security and Critical Infrastructure Coordination (CSCIC).

Currently the Atlas has over 1000 datasets for viewing and download including: biota, boundaries, elevation (and bathymetry), environment, geology, imagery, planning, social, structure, and transportation. Data available through the Atlas covers all of New York State with an emphasis on data related to or connected with influences on New York's Ocean and Great Lakes Ecosystems. Functionalities such as vector data download, user defined searches, book marking views, and attaching images to e-mails, were built into donated code. To maximize use of

the data by the public and decision makers, publicly available data is formatted so it can be downloaded directly into Google Earth, used with ESRI and MapInfo products.

Progress on development of Atlas v2.0, a web application built on ArcIMS with Google-like data search capabilities and data published to and ingested from Web Mapping Services and Web Feature Services, will be covered.

Web-based Geospatial solutions for non-GIS businesses

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Incorporating a geographic component into an existing website adds unique experience and benefits to both users and service providers. More and more non-GIS professionals are taking advantage of web mapping technology and finding new ways to present their business solutions in a spatial content.

Development in geospatial technologies, especially publicly available tools such as Google Maps and Google Earth, makes geographic tools more accessible to the public and enables integration between GIS technology and non-spatially focused Web applications. This presentation is dedicated to non-GIS-centric web solutions and their evolution.

We are going to follow "GIS evolution" of existing websites and take a look at them "before" and "after" they started utilizing geospatial technology. The examples will cover both non-for-profit and private business and two different approaches to implementing web-based GIS solutions: ArcGIS Server and Google Maps/Earth. We are going to talk about costs and effects of such evolutions, new developments and see more examples of non-GIS-centric web applications.

Expanding GIS Capacity Across Governments with Map Services: The New Data Sharing Paradigm

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The expansion and growth of web map services provides a new and exciting means for government to share and publish large amounts of geospatial data which in previous years may have been difficult or resource intensive for end users. Earlier data sharing approaches required users to access and download individual datasets from clearinghouses and data warehouses, or equivalent sites offering similar functionality. Current technology offers users a wide range of options to "consume" data rich map services (commonly offering dozens of data layers) in a variety of map service formats including Web Map Services (WMS) and ArcImage Service among others. Map services can be consumed on either the desktop or fused with other web map services.

This paper will provide an overview of ongoing efforts within the U. S. Geological Survey (Reston, VA) to establish key map services and framework data layers which will be incorporated into The National Map (TNM) and Geospatial One Stop (GOS). It will provide an overview of how local governments supporting map services can contribute to the TNM and GOS. It is widely recognized that the increased availability of local datasets and web mapping services contributes significantly to supporting many government functions. Examples of several U.S. metropolitan area web mapping services, as well as selected statewide programs to inventory local map services will be highlighted and discussed.

Session 5B Onondaga Room

Hydrologic Information Systems: A Web Services Based Approach to Environmental Monitoring Data Management

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Access to data is a primary barrier to improving analysis, research, and decision making. Broad efforts have been underway to develop standard protocols for managing both remotely sensed monitoring data and historic environmental monitoring data in such away that facilitates exploration, discovery, and collaboration. Based on the CUAHSI HIS architecture, this paper discusses how a regional system was built to consume remotely sensed monitoring data from regionally managed buoys, stream gages, and precipitation stations and integrate that data with State and Federal programs and existing CUAHSI based services. The system provides mechanisms to consume data directly from locally managed sensors in the field as well as local historical environmental monitoring data, and translate that information into a common data model for warehousing and distribution. Data is published through standardized web services architecture.

A prototype web based viewer for data exploration and discovery offers potential data users the opportunity to evaluate specific data elements both spatially and graphically (time series) from a range of sources and warehouses, and offers options for either direct data extraction or web service connectivity. The system offers promise for local data collection and management programs to both access data directly from a range of external sources through a single interface, and to streamline the process and resources required to publish data to other users. By standardizing the architecture it becomes possible to decentralize data management while leveraging web services to facilitate collaboration and data sharing. The program has offered great potential to help integrate environmental monitoring programs being managed by local non-profit research organizations, local government watershed management programs, watershed citizens groups, university based research programs, as well as data being collected and maintained in the private sector.

The Nightmare of Addressing: Preparation for the 2010 Census

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The most important avenue of local input into the Census process is participation in the Census Bureau's Local Update of Census Address (LUCA) program. New York State began preparing for this effort in 2007 by training local government officials throughout the state. Their task was to review the Census Bureau's Master Address File against their own local data sources to identify errors in addressing, new addresses that the Census Bureau did not have, and addresses of "hidden" units which is one of the most perplexing and difficult aspects of the Census process. For the first time, state level government entities were able to participate in the program and conduct a statewide independent review.

This paper will briefly describe the LUCA program and review the participation level of local governments in New York. New York's address review encompassed the analysis and merging of various statewide and regional address files. This presented a variety of challenges ranging from hardware and software capability to the quality of address coding across the source data. The paper will describe this process and illustrate the need for improved addressing standards.

Large Scale Planimetric, Topographic and Orthophoto Base Maps

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Municipalities, campuses and other entities require accurate base maps with a great variety of vector-based features (e.g. buildings, other structures, utilities, roads, sidewalks, driveways, fences, hydro, etc.). They also require accurate elevation data and orthophotography. The cost of these projects has fallen dramatically in the past several years.

This presentation gives an overview of the process required to create such a base map and includes technical specifications, detailed geodatabase design, accuracy goals, and general cost estimates. The advantages of digital aerial cameras will be discussed, and examples will be shown of base maps created at 40-scale and 100-scale.

Session 5C Ballroom West

Low Cost, High Value, Secure GIS Data Deployment for Field Crews at OCWA - Central New York's Water Authority

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In the early 1990's OCWA began working on computerized mapping. Water mains took on color and hydrants now had linked information. Management envisioned the day when these digital maps would replace the myriad books, maps, and notes in the field. At the time, computers were still very specialized, bulky, and expensive. The prospect of a sub $1000 solution for the truck was years away. Still, OCWA continued towards the goal of providing digital information where it was needed, when it was needed, and at an affordable cost.

The sub $1000 truck computer has arrived - along with many other issues facing GIS professionals - what interface to use, how to keep data current, secure, and reliable. This presentation will address the questions as well as the solutions to providing information needed for timely service while making OCWA more efficient in an increasingly energy conscious environment.

Mobile GIS for Septic Inspection

Eric Brady

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Chautauqua County's Environmental Health Department is implementing a mobile GIS to support septic inspections. This presentation will review the technical and human processes implemented to develop the data, applications and workflows for the project. The project's technical architecture relies on ArcGIS Mobile and ArcGIS Server (9.3). This architecture allows the County to leverage advanced data synchronization technologies to support three County offices. The GIS centric nature of the project streamlines document and record management for Department users and allows new analysis capabilities for Managers.

Taking it to the Streets - The Mohawk Valley Water Authority goes Mobile

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The Mohawk Valley Water Authority (MVWA) is nearing completion of a multi-year process to update base mapping, create an all-pipe hydraulic

model, and provide map and document access to field personnel via ruggedized tablet computers.

When this project began, the MVWA did not have any digital mapping. Approximately 15,000 hydrants and valves were GPS located and thousands of record drawing were scanned and referenced to create our new ArcGIS-based system.

In 2007, the MVWA began deployment of ruggedized tablet computers that provide 24/7 access to system mapping to field personnel. Aside from map access, the ArcEngine-based field GIS allows for better communication, asset management, and redlining. This presentation focuses on the lessons learned during the deployment of our mobile system.

The Mohawk Valley Water Authority (MVWA), based in Utica, delivers potable water to over 125,000 residents in Central New York.

Session 5D Convention Center A

Canopy Cover Change Model - A model for the simulation of canopy cover change in the greater Baltimore area.

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Trees and forests play a significant role in the urban environment. Environmental effects such as; pollution removal, carbon sequestration and temperature reductions justify the need to maintain and enhance the forest cover in urban areas. Spatial modeling tools provide a valuable means for foresters and land managers to predict and visualize change in the arrangement and extent urban forests, and the subsequent environmental impacts of these changes. The goal of this project was to develop a model using Python 2.4.1 and ArcGIS 9.2 to illustrate user-defined canopy cover change in the greater Baltimore, MD area. Input data included all of the 2001 National Land Cover datasets (NLCD); land cover classification, percent tree cover, and percent impervious surface, each at a 30m resolution, clipped the greater Baltimore region, and in ArcGrid format. For each of 5 local land cover classes: developed, barren, forest, agricultural and wetland, projected tree cover values (%) were entered into the model. Maximum allowable tree cover was regulated such that the sum of the impervious surface and tree cover in each land cover class did not exceed 100%. The model proportionally allocated or removed tree cover from each pixel relative to the available space (no impervious or tree cover) in each pixel. The model produced an ArcGrid dataset depicting the newly defined canopy cover. The new tree cover layer was fed into temperature and carbon sequestration models to illustrate the utility of this tool for predicting environmental impact. Finally, the model was packaged so that it could be applied to any city or region in United States.

Potential Climate Change Impacts on Long-term Viability of Red Spruce (Picea rubens) for Proposed Forest Reconstruction on the Tug Hill Plateau, NY

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Environmental and Forest Biology

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The Nature Conservancy (TNC) owns approximately 14,000 acres of land on the Tug Hill plateau in northern New York. This Conservation Area has been heavily disturbed by logging over the last century, and TNC's long-term goal is to foster the development of mature forest characteristics, and to restore formerly abundant native species such as red spruce (Picea rubens). Because the successional trajectory of the forest will likely be influenced by global climate change,

a preliminary analysis was conducted to determine the magnitude of climatic changes over the past century for the Conservation Area. Using PRISM climate data for mean minimum and maximum January and July temperature, approximate annual growing degree days were calculated for the period 1895to 2007. Growing degree days have increased by 263 to just over 2,800, an increase of more than 10 percent over late 19th century levels. Based on a linear extrapolation of the dataset, it is predicted that growing degree days will increase to 3,300 by 2200 and to approximately 4,000 by 2500. This increase in growing degree days may threaten the survival of red spruce, which has a maximum tolerance of 3,700 growing degree days. Results of an assessment of the potential long-term viability of red spruce in the Conservation Area, applying a spatially-explicit environmental gradient analysis of the USDA Forest Service's Forest Inventory and Analysis red spruce distribution and abundance data versus growing degree days calculated using PRISM climate data will be reported.

GWLF-based Run-off Modeling: A case study at the Trout Creek in the Cannonsville

Ning Sun

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Myrna Hall

Professor

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This effort is the first in a two-step process to test the land use associated nutrient loading coefficients currently used by the New York City Department of Environmental Protection to estimate changes in water quality as a function of changing land use. The model I have developed for C-7 (Trout Creek, Cannonsville Basin in the New York City Watershed) is based on the Generalized Watershed Loading Function (GWLF) model, a lumped parameter rainfall-runoff model.

The ultimate goal of this work is to develop a distributed runoff model that will allow us to test different nutrient loading coefficients based on land use and compare to current estimates derived using the Generalized Watershed Loading Functions (GWLF) model. The runoff model includes sub-models, 1) a DEM-based D8 (eight flow directions) model and 2) an accumulated flow model. Except for derivation of the curve number using ArcGIS, the other models are built with FORTRAN. Based on poor fit between the original model output (daily, monthly and annually average streamflow) predicted values and recorded observations, I recalibrated and modified Kb (baseflow recession constant), Kc (crop cover coefficient) and precipitation parameter k, which are all constants in the original GWLF model. It turned out that the revised model parameters produce more reasonable estimates of streamflow, with improved RMSE from 54.63(previous) to 9.889 (latter). Using locally calibrated coefficients can be important to deriving realistic estimates of future water quality impacts from growing development in the region.

Tuesday, October 7, 2008

Lunch with a raffle in Grand Ballroom

12:00 pm – 1:15 pm

Walk About
1:15 pm – 1:30 pm

1:30 pm – 3:00 pm

Session 6A Ballroom East

Workshop – Cartography Critique

Lee Herrington, Professor, SUNY-ESF

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Session 6B Onondaga Room

Privacy Panel: Privacy and the importance of public access to spatial data

Steven Romalewski

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Access to spatial information provides the general public -- including nonprofit organizations, the media, academic researchers, as well individual citizens -- with a powerful way of evaluating government activities. Therefore there should be a high bar for restricting access to this data. Too often public agencies raise spurious issues to control access to spatial data, when the real reasons for preventing public access are more mundane -- they are poor excuses for blocking the public's right to know. But the impact on public discourse is nonetheless substantial and unfortunate. I will present several examples from my spatial analysis work in fields as diverse as environmental protection, workforce development, and land use planning to illustrate these points.

Privacy Panel: Privacy Issues and GIS in County Government

Richard Reichert

Senior GIS Analyst

Planning

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GIS is becoming more and more common in local and county government applications. As it is utilized in more facets of government decision making and in providing public services; issues that involve privacy become much more important to look at. In my experience as a Senior GIS Analyst in a county government planning department, real property information is one of the most prevalent types of data that I work with that incorporates personal information that can be used with spatial applications. Additionally, local and county governments maintain data for water and sewer accounts, 911 emergency data, agricultural districts, as well as large amounts of information stored through county clerk offices as just a few examples. My intent is to share my experiences with regard to this information and seek further discussion and insight with regards to providing services while protecting personal information of the public.

Privacy Panel

Robert J. Freeman

Executive Director

NYS Department of State

Rights of access to records constantly come into conflict with an interest in protecting personal privacy. In an imperfect way that may result in a diversity of points of view, the provisions of the Freedom of Information Law, often in conjunction with other provisions, offers guidance. Advances in information technology have created new issues and questions, and in some instances, answers that accommodate both the public's right to know and the need to protect privacy. These issues will be discussed, and participation by the audience will be encouraged.

Session 6C Ballroom West

Satellite-derived impervious surface detection with spatially-explicit uncertainty metrics

Lori Li Luo

Ph.D. Student

2 ABSTRACTS

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Accurate estimation of impervious surface areas (buildings, roads, parking lots) is of great importance in urban growth monitoring and human activity understanding. Several attempts exist to estimate impervious surfaces using satellite images. Existing impervious surface estimation approaches use a single-thread classification process where only one classification algorithm is adopted. In doing so, uncertainty metrics are constrained to a spatial summary metrics, for example percentage accuracy for each identified class. Instead of using typical single-thread classification process, our approach introduces a hierarchical context-specific multi-process system. This hierarchical context-specific multi-process classification approach divides the original classification problem into different parts and then deals with each subset by using different algorithms and different inputs to address the specific characteristics of each problem subset. By doing so, we support arbitrarily mixes of different classification algorithms and accuracy for each subset is calculated separately leading to spatially-explicit uncertainty metrics. To evaluate this hierarchical context-specific multi-process classification approach, we use Landsat Enhanced Thematic Mapper Plus (ETM+) imagery from Syracuse, New York. Inputs are derived from calculation of 6 bands of Landsat ETM+ imagery. High spatial resolution digital color-infrared aerial Emerge imagery with spatial resolution of 0.69m is used to train algorithms and assess the accuracy estimation of the impervious surfaces.

Spatiotemporal analyses of moose-vehicle collisions in Vermont

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Kari Gunson

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Wildlife-vehicle collisions (WVCs), especially with moose, are becoming a serious safety and environmental concern. For example, in Vermont moose-vehicle collisions (MVCs) have increased from two in 1982 to 164 in 2002. We used a MVC dataset with the spatial extent covering the Northeastern Highlands of Vermont (four major roads) and a temporal extent from 1983 to 1999. A kernel intensity estimator was used for exploratory analyses while an adapted Ripley's K-function was used for multi-scale statistical analyses on all roads. After varying kernel search distances and cell centers we obtained 6 major intensity peaks in space, while in time we identified an increasing trend with annual periodicity and a seasonal cyclic component (May to October). Kernel space-time analyses showed discontinuous peaks of MVCs when moose abundance was low and continuous peaks showed a shift in moose movement across a road. Our adjusted Ripley's K-function showed significant clustering in space at varying scales and magnitudes on each road. Significant time clustering occurred from 3 to 5 years on three out of the four roads, and peaked in the summer months in most years. Positive space-time clustering was evident at small space and time scales indicating that where MVCs occur is also influenced by when they occur. These spatiotemporal analyses indicate the necessity to include temporal information in spatial analysis to compensate for a multitude of dynamic, interacting factors such as weather and traffic volume. They are a valuable component for a

comprehensive WVC mitigation strategy along roads.

Investigating spatiotemporal interactions between female and male white tailed deer

Mi Yan

Graduate Student

SUNY ESF

Tian Zhou

Graduate Student

SUNY ESF

Yue Zuo

Graduate Student

SUNY ESF

Movement of the White-tailed deer (Odocoileus virginianus) is an expression of the deer behavior. In the case study of white-tailed deer movement in Adirondack Mountains, two spatial analysis approaches were employed to explore the movement and spatial distribution patterns of White-tailed deer: 1) Kernel density analysis method is used to derive different patterns of movement between female and male deer; 2) In addition to the determination of spatial patterns (clustering, regular, or random) of the deer movement in different months across different years, spatial statistics (Ripley's K-function) were used to analyze spatiotemporal interactions between the two genders.

1:30 pm - 2:30 pm

Session 6D Convention Center A

GIS Association Meeting

3:00 pm - 3:30 pm

Session 7A Ballroom East

ArcGIS 9.3 – How to Maximize the Potential

Paul Rooney

State Government Account Manager

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Mark Scott

Technical Marketing Representative

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Join ESRI representatives as we demonstrate the new capabilities delivered in our latest release: ArcGIS 9.3.

ArcGIS 9.3 continues to expand the use of GIS throughout the enterprise. From GIS professionals to decision makers, clients, and the public, GIS information and analysis can be made available wherever it is needed. As a complete geographic information system (GIS), ArcGIS allows you to easily author data, maps, globes, and models on the desktop; serve them through a GIS server; and use them via Web, desktop, and mobile clients.

Our demonstration will focus on enhancements available in the key components of the ArcGIS 9.3 suite: ArcGIS Desktop 9.3 (improved cartography, modeling & analysis, and 3D visualization tools), ArcGIS Server 9.3 (new map caching tools, new tools for building mashups, new JavaScript API's, and improvements to the WebADF), and more. The ArcGIS family of products includes desktop, server, mobile, and online GIS as well as ESRI data.

Session 7B Onondaga Room

Maintaining Data Integrity - Using Topology Related Tools in ArcView

2 ABSTRACTS

Craig Cleveland

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Creating and maintaining GIS data is a daily task for many GIS professionals. A vast majority of people performing these tasks are editing data using the ArcView license level of ArcGIS Desktop. There is a common misconception that many of the tools needed to maintain high quality data are not available at this license level. Although certain functionality may not be available, such as the ability to create and edit geodatabase topology, there are a handful of tools and tasks that can be utilized to help maintain data integrity. Knowing that these tools exist and how they can be utilized can greatly increase an editor's ability to maintain topologically correct data. An added benefit is that many of these tools will also drastically increase the speed and ease of editing. Ultimately, the use of these tools can help you to create and maintain higher quality data while at the same time making your job a little easier.

Session 7C Ballroom West

Manifold IMS: a tour of three internet mapping applications

Linda Rockwood,

Consultant

Mohawk Valley GIS

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This presentation will first show what a Manifold GIS Internet Map Server municipality application looks like "out-of-the-box". It will be followed by a look at two customized applications: 1) a chamber of commerce interactive membership map with pop-up ad capability, and 2) a feature-rich municipality application. Dreamweaver and Javascript will be used to view and customize the underlying code.

This overview is appropriate for any level GIS end user or developer.

2:30 pm – 3:30 pm

Session 7D Convention Center A

Writing a Successful GIS RFP!

Bruce Oswald, PMP

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Ever struggle to develop an RFP? Ever go through the entire process only to have the RFP rejected by your legal department or your control agency? Well, you're not alone. Writing a good RFP can be difficult, time consuming and, ultimately, frustrating. It's even worse if you're a private consultant trying to understand what the client is actually trying to contract for.

The first part of the session will provide an overview of the RFP process and provide each member of the audience with checklist entitled: Considerations and Resources When Contracting for GIS Services' developed by the NYS GIS Coordination Program's Private Sector Advisory Group to assist organizations in developing successful RFP's. It will be presented by Austin Fisher of Fountains Spatial, a private consultant has on the contracting process.

The second part of the session will take you through the A, B, C's of preparing a successful RFP. It will include cover what are your options when you go to bid a project, the best approaches to developing scopes, cost estimates and the importance of clear time frames for the work. The part will be presented by Bruce Oswald of Oswald Associates, with the perspective of having bid projects at the state level for over 30years.

The third part of the session will discuss the reality of preparing an RFP at the County/municipal government level. It will include what works best at that level and explain how an experienced county GIS manager is successful in bidding outwork and obtaining the product or services that are needed. The audience will gain the perspective and observations from Dale Morris of Erie County, one of the most respected County GIS managers in New York.

The final part of the session will be open to the audience to allow them to ask questions on 'their own'¨ RFP's and get advice on how to best solve their issues in putting successful RFP's together.

Presentation of the Annual Partnership Award

24th Annual New York State GIS Conference

The New York State GIS Coordination Program's Standards and Data Coordination Work Group promotes formation of GIS partnerships in New York State. Through their efforts, a Partnership Summaries page is posted on the GIS Clearinghouse: http://www.nysgis.state.ny.us/coordinationprogram/reports/partnerships/index.htm and an Annual GIS Partnership Award is presented at the NYS GIS Conference Banquet.

The Annual GIS Partnership Award recognizes a GIS partnership involving government agencies, academia, private business, and/or not-for-profit organizations. The Award is presented in hope that by recognizing these partnerships, existing GIS partnerships will grow, additional resource sharing will occur, duplication of efforts will decrease, and perhaps others will see the benefits provided and initiate similar unique partnerships.

Who is eligible ?

Any partnership that does not have an existing summary on the GIS Partnership Summary page AND partnerships that are on the Summary page but have expanded or significantly modified their original partnership (you will need to update your summary by resubmitting a Partnership Summary Form). Previous winners of the last two partnership awards include: Anne Wilbiralskie, Karen Edelstein & Jim Hall of The Old Forest Preservation Partnership, 2006, and the Honorable Scott Burto of the West Carthage Volunteer Fire Department Partnership are not eligible.

Partnerships considered for the award will be judged on the following criteria:

"Entries will be judged on their originality, innovation, and the scope

of the partnership, such as number and diversity of participants or

dollar savings of the partnership."

Partnerships may be submitted using the Partnership Summary Form by going to http://www.nysgis.state.ny.us/coordinationprogram/reports/partnerships/index.htm which takes you to the GIS Partnership Summary page (scroll down and review some of the previously submitted partnership summaries). From this page click on Òdownloadable document in rich text format (rtf)Ó (http://www.nysgis.state.ny.us/coordinationprogram/reports/partnerships/partner.rtf) to take you to the actual form. It's a very

Deadline for new and updated award applications/summary pages is 12 September.

State University of New York College of Environmental Science and Forestry
SUNY-ESF | 1 Forestry Drive | Syracuse, NY 13210 | 315-470-6500

ESRI is offering the two day instructor-led training class, "Introduction to ArcGIS Server", October 8-9 in Liverpool, NY immediately following the 24th Annual New York State GIS Conference.

Introduction to ArcGIS Server (click here for detailed course outline)

- Understand the client and server components of the ArcGIS Server architecture.
- Describe the types of services available and the options related to each.
- Publish GIS services.
- Publish and use geoprocessing tasks.
- Publish a geodata service for data replication and extraction.
- Access services using a variety of clients (ArcMap, ArcGIS Explorer, and Web applications).
- Build Web mapping applications that use GIS services.
- Administer and optimize GIS services.

Date: Wednesday and Thursday, October 8-9, 2008
Time: 8:30 am to 4:30 pm
Location: Holiday Inn Syracuse/Liverpool, 441 Electronics Parkway, Liverpool, NY 13088. This is the same hotel at which the NYS GIS Conference is being held. To receive a reduced room rate, please ask for Rachael Block, Sales Manager, when making your reservations.

Each student will receive a Lecture Book with printed class lecture slides, an Exercise Book with step-by-step exercise directions, and a Course Data CD with all data required to perform course exercises. A Class Completion Certificate, signed by the ESRI Instructor, will also be provided to each student at the end of class.

*Note: This class is not listed on ESRI's on-line course schedule. To register, please print out and complete the registration form found on-line here. Fax the completed form, along with payment information, to the fax number on the registration form. Class space is limited to 12 students, so please register early to reserve your seat.

Standard commercial price is $980 per student. NY State, County, and Local government employees qualify for NYS Contract pricing of $898 per student. Please contact the ESRI Boston Office with any questions regarding registration or pricing at training-bst@esri.com or 978-777-4543.

ESRI

CITIZENS AS SENSORS: THE WORLD OF VOLUNTEERED GEOGRAPHY

Michael F. Goodchild[1]

ABSTRACT

In recent months there has been an explosion of interest in using the Web to create, assemble, and disseminate geographic information provided voluntarily by individuals. Sites such as Wikimapia and OpenStreetMap are empowering citizens to create a global patchwork of geographic information, while Google Earth and other virtual globes are encouraging volunteers to develop interesting applications using their own data. I review this phenomenon, and examine associated issues: what drives people to do this, how accurate are the results, will they threaten individual privacy, and how can they augment more conventional sources? I compare this new phenomenon to more traditional citizen science and the role of the amateur in geographic observation.

INTRODUCTION

In 1507 in St Dié-des-Vosges, Martin Waldseemüller drew an outline of a new continent and labeled it *America* (Figure 1). It appears that he was influenced by new books being circulated in Europe at the time, and particularly by the Soderini Letter and its purported author Amerigo Vespucci, and the latter's claims to the continent's discovery. Although Waldseemüller withdrew the name on a later map, and although many scholars and a new biography by Felipe Fernández-Armesto (2006) cast doubt on the authenticity of the Letter, the feminine form of Vespucci's first name stuck, and was eventually adopted as the authoritative name of not one but two continents.

By today's standards this act of naming by an obscure cartographer would attract little or no attention. Modern naming in developed countries is closely regulated by a hierarchy of committees that in the U.S. extend from the local to the national level (Monmonier, 2006). The Board on Geographic Names was established in

Figure 1. An extract from the Waldseemüller map of 1507.

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1890 for the purpose of standardizing the use of names within the federal government, and thus within the national mapping agencies. In English the term *gazetteer*, the common term for a placename index, is itself rooted in official authority, and renaming of geographic features requires a lengthy process of review, and is virtually impossible except in special circumstances. Geographic naming has been centralized and standardized, and assigns no role to obscure individuals like Waldseemüller, who would certainly be amazed to learn that his map was recently acquired by the U.S. Library of Congress for $10 million.

Nevertheless, the events of 1507 provide an early echo of a remarkable phenomenon that has become evident in recent months: the widespread engagement of large numbers of private citizens, often with little in the way of formal qualifications, in the creation of geographic information, a function that for centuries has been reserved to official agencies. They are largely untrained and their actions are almost always voluntary, and the results may or may not be accurate. But collectively, they represent a dramatic innovation that will certainly have profound impacts on geographic information systems (GIS) and more generally on the discipline of geography and its relationship to the general public. I term this *volunteered geographic information* (VGI), a special case of the more general Web phenomenon of *user-generated content*, and it is the subject of this paper.

THE EVOLVING WORLD OF VGI

One of the more compelling examples of VGI is Wikimapia, which adapts some of the procedures that have been so successful in the creation of the Wikipedia encyclopedia and applies them to the creation of a gazetteer. Anyone with an Internet connection can select an area on the Earth's surface and provide it with a description, including links to other sources. Anyone can edit entries, and volunteer reviewers monitor the results, checking for accuracy and significance. At time of writing Wikimapia had 4.8 million entries compared to Wikipedia's 7 million, describing features ranging in size from entire cities to individual buildings (each entry's geographic extent is defined by ranges of latitude and longitude). Some descriptions are extensive and include hyperlinks; for example, the entry for Madinah (Saudi Arabia) includes a picture of the Masjid-e-Nabawi and a link to the city's Wikipedia entry. Other entries describe features within the city (Figure 2) or in the surrounding area.

Similar in some respects is the Flickr site, which allows users to upload and locate photographs on the Earth's surface by latitude and longitude. At time of writing roughly 2.8 million photographs were being contributed each month to the site. Figure 3 shows one of the more than 2,500 volunteered photographs of Uluru (Ayer's Rock) in central Australia.

Figure 2 Information from the Flickr site for the area of Uluru (Ayer's Rock) in central Australia. Each symbol denotes the availability of a photograph; at time of writing there were more than 2,500 available for the area shown. Descriptive information

At a rather different level of sophistication is MissPronouncer, a site created by Jackie Johnson to help people pronounce some of the more distinctive Wisconsin placenames. A full-time radio broadcaster, Ms Johnson developed the site in her spare time, and offers audio recordings of the correct pronunciation of almost 2,000 places in the state. Phonic representations of placenames have the advantage that they are not subject to problems over differences of alphabet (Beijing versus 北京, Baghdad versus بغداد), though the phonic rendering of common placenames may vary from one language to another (*e.g*, Paris, Moscow).

Other VGI activities focus on the creation of more elaborate representations of the Earth's surface. OpenStreetMap is an international effort to create a free source of map data through volunteer effort. Figure 4 shows the map for part of Dublin at time of writing. Note the incomplete nature of the map, with major streets, railways, and parks shown but with minor street detail in some areas but not others, and some streets named but not others. Dublin famously lacks a cheap, readily available digital street map, as do many other cities around the world, so this volunteer effort can potentially fill a yawning gap in the availability of digital geographic information.

Figure 3. The Wikimapia coverage of Madinah, Saudi Arabia. Each box denotes the availability of information describing the feature outlined by the box.

When Google acquired the software previously known as Earthviewer, rebranded it, redesigned the user interface, and published an application program interface, it created a service that had immediate appeal to millions. I have described the Google Earth phenomenon as the "democratization of GIS" (Butler, 2006), because it has opened some of the more straightforward capabilities of GIS to the general public. Whereas the creation of a "fly-by" was previously one of the more sophisticated GIS tasks, it is now possible for a child of ten to create one in ten minutes. Google Earth and Google Maps popularized the term *mash-up*, the ability to superimpose geographic information from sources distributed over the Web, many of them created by amateurs. For example, Figure 5 shows a Google Earth mash-up of the Soho area of London during the 1854 cholera outbreak made famous by Dr John Snow (Johnson, 2006). It combines a street map of London from 1843 (from the on-line private collection of David Rumsey, a San Francisco map collector) with on-line data on the water sources and cholera deaths from my own Web site. Readily available software makes this kind of mash-up remarkably easy (see, for example, Brown, 2006) and well within the capabilities of the general public. As a result, the number of available mash-ups has reportedly reached the hundreds of thousands, and the number of downloads of the Google Earth software exceeds a hundred million.

These are just a few examples of a phenomenon that has taken the world of geographic information by storm and has the potential to redefine the traditional roles of mapping agencies and companies. In the next section I examine some of the technologies that have

combined to make this possible. This is then followed by a discussion of relevant concepts and issues, and then by an analysis of the usefulness of VGI.

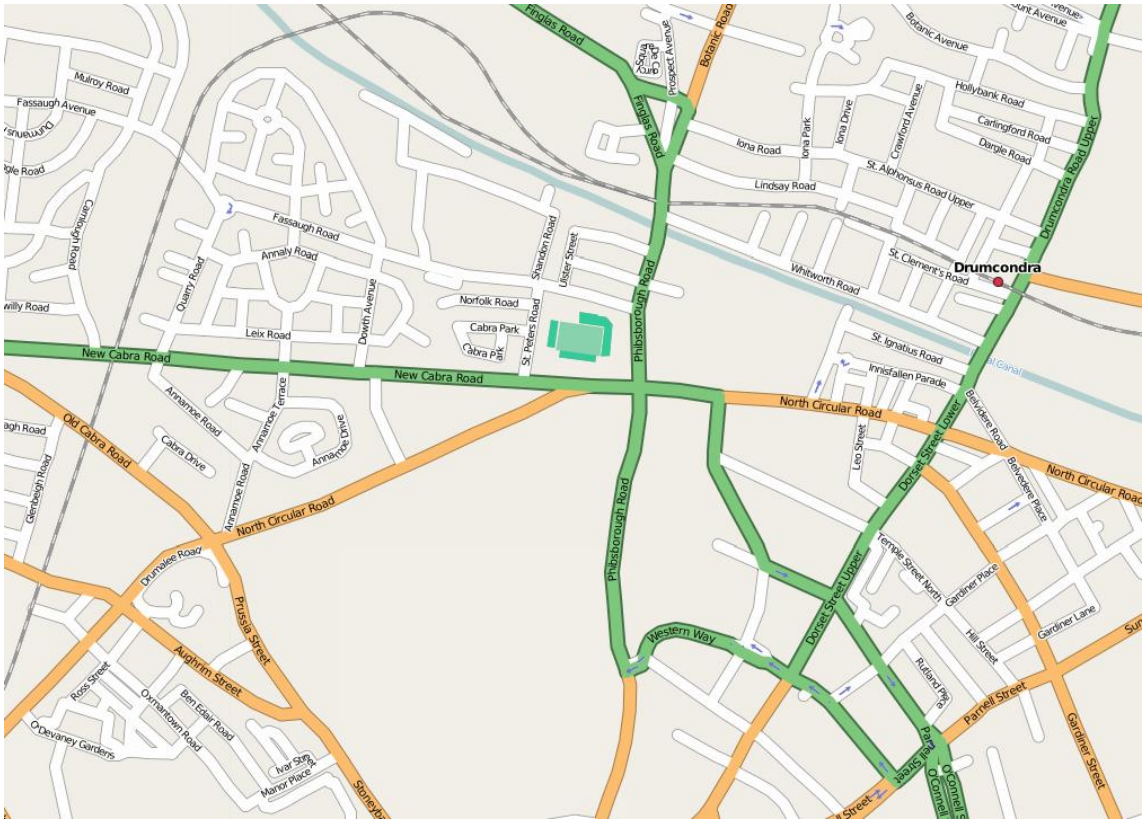

Figure 4. Part of the OpenStreetMap coverage of Dublin, Ireland. Note the missing street names and areas where no coverage is available.

ENABLING TECHNOLOGIES

Web 2.0

To understand VGI, we must first ask about the technologies that make it possible. Early concepts of the Web stressed the ability of users to access remote sites through simple interfaces known as *browsers* (Mosaic, launched in 1992, was the first widely available browser). One could *surf* the Web by following *hyperlinks*, typically highlighted words that when *clicked* would initiate a download from another page or site. Web pages consisted primarily of text, but graphic images could also be included, taking advantage of the recently expanded graphics capabilities of personal computers. In all of this, however, the relationship between user (*client*) and Web page (located on a *server*) was essentially one-way; the user's only role was to initiate the downloading of content.

In time it became possible for the user's role to extend somewhat. Protocols were developed that allowed users to access information stored in a server's databases, and even to add records to such databases by completing forms. Airline reservation sites (e.g.,

Expedia), eBay, and Craig's List all exploit this capability. By the early 2000s this ability of users to supply content to Web sites had grown in sophistication to the point where it became possible to construct sites that were almost entirely populated by user-generated content, with very little moderation or control by the site's owners and very little restriction on the nature of content. In some cases users could even edit the content created by others. *Blogs* and *Wikis* fall into this category, as do the sites reviewed in the previous section. Collectively, they have been termed *Web 2.0*. First and foremost, then, VGI is a result of the growing range of interactions enabled by the evolving Web.

Figure 5. A Google Earth mash-up of the area of Soho, London. The contemporary imagery base has been obscured by an 1843 map from the David Rumsey collection. Superimposed on this are the deaths (green) from cholera in the outbreak of 1854, and the water sources

Georeferencing

GIS relies on the ability to specify location on the Earth's surface using a small number of well-defined and interoperable systems, of which latitude and longitude is by far the most universal. Most countries have some form of national grid that provides an alternative local coordinate system, and the Universal Transverse Mercator (UTM) system has been adopted for the geographic coordinates needed by many military agencies. All of these are specialized, however, and in normal human discourse it is place-names that provide the basis of geographic referencing. Very few people know the latitude and longitude of their home, let alone its UTM coordinates. To enable the creation of geographic data by the general public, therefore, it is necessary to have a range of readily available tools for identifying the coordinates of locations on the Earth's surface.

Several tools now supply this need, and collectively enable VGI. The Global Positioning System (GPS) can be accessed by a wide range of consumer products, allowing location to be measured in many standard coordinate systems. Cameras can be enabled with GPS, so that digital photographs can be automatically tagged with coordinates. Some GPS receivers store entire tracks that can later be uploaded in digital form, and similar capabilities can be built into mobile phones. Coordinates can also be obtained through a process known as *geocoding*. Any recognized street address can be matched to a digital street file in a service available in most GIS software as well as on the Web.

A technically simpler option is to use the imagery available through Google Earth, Google Maps or similar services to select a location visually, and to record its coordinates by clicking. Several services allow this approach to be used to create digital records of entire streets and other features by following (*digitizing*) the features on the screen; the results are then uploaded and compiled into composite digital maps. OpenStreetMap has already been cited as an example of this approach.

Geotags

A *geotag* is a standardized code that can be inserted into information in order to note its appropriate geographic location. Geotags have been inserted into many Wikipedia entries, when the contents relate to a specific location on the Earth's surface, and several sites allow such entries to be accessed from maps. For example, Figure 6 shows the result of searching the Geonames site for Wikipedia entries in French in the region of Alsace-Lorraine; clicking on the symbol beside St Dié-des-Vosges brings up the town's Wikipedia description. At time of writing there were over 60,000 geotagged entries in the Wikipedia French-language resource alone.

GPS

The Global Positioning System is arguably the first system in human history to allow direct measurement of position on the Earth's surface. GPS receivers are easy to use, and provide virtually instantaneous estimates of location, often to better than 10m accuracy.

Incorporated in in-car navigation systems, GPS allows the current location of the vehicle to be compared to the contents of a digital street map. As a stand-alone device, a receiver is the basis of the popular sport of *geocaching*, which engages participants in finding hidden destinations based only on their coordinates. GPS has sparked a number of interesting VGI activities, such as the creation of maps by walking, cycling, or driving. Figure 7 shows the interesting map created by my colleague Val Noronha, who has installed a GPS in his car to keep track of his daily travels around his neighborhood in Goleta, California. The colors denote his average speed.

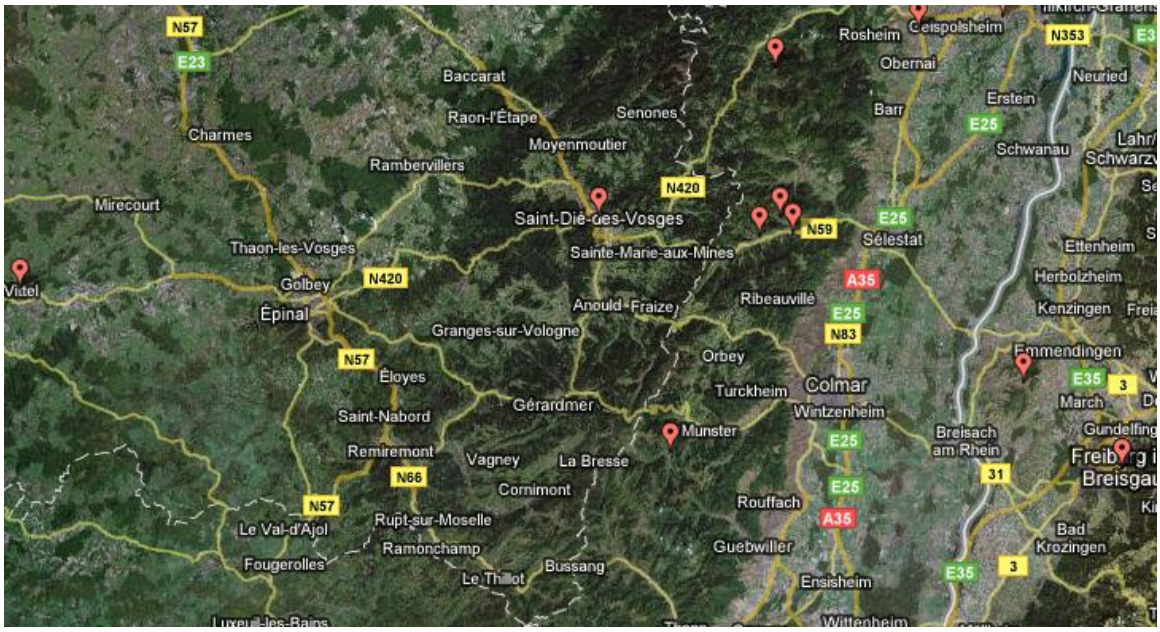

Figure 6. The Geonames site shows the geographic location geotagged in Wikipedia entries, allowing the encyclopedia to be accessed via maps.

Graphics

It is easy to forget that high-quality graphics are a comparatively recent innovation in the history of computing. Dynamic visualization of three-dimensional objects, such as occurs with Google Earth, required a highly sophisticated and expensive computer as recently as 1995, and when Earthviewer appeared in 2000 only a few personal computers had the powerful graphics hardware needed to run it. Today, of course, lowly household computers have sufficient power, though devices built for video games, such as Wii, often have even greater power.

Broadband communication

Finally, VGI would be impossible without widespread access to the Internet, preferably via a high-capacity connection. Many households in developed countries now have such broadband connections, using a range of satellite, cable, and phone-line technologies.

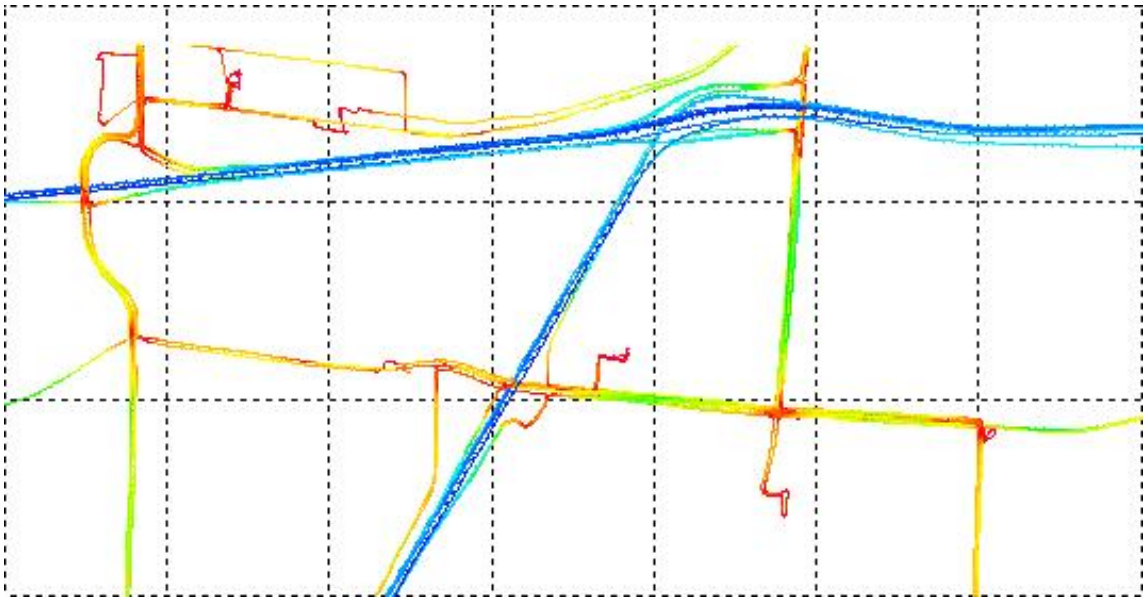

Figure 7. Average driving speed logged by one car over an extended period around an area of Goleta, California.

CONCEPTS

Spatial data infrastructure patchworks

It is easy to believe that the world is well mapped. Most countries have national mapping agencies that produce and update cartographic representations of their surfaces, and remote-sensing satellites provide regularly updated images. But in reality world mapping has been in decline for several decades (Estes and Mooneyhan, 1994). The U.S. Geological Survey no longer attempts to update its maps on a regular basis, and many developing countries no longer sustain national mapping enterprises.

The decline of mapping has many causes (Goodchild, Fu, and Rich, 2007). Governments are no longer willing to pay the increasing costs of mapping, and often look to map users as sources of income. Remote sensing has replaced mapping for many purposes, but satellites are unable to sense many of the phenomena traditionally represented on maps, including the names of places. In the early 1990s the Mapping Science Committee of the U.S. National Research Council issued a report describing the concept of spatial data infrastructure (NRC, 1993), which it defined as the aggregate of agencies, technologies, people, and data that together constituted a nation's mapping enterprise.

Among the many concepts introduced in the report was that of *patchwork*, the notion that national mapping agencies should no longer attempt to provide uniform coverage of the entire extent of the country, but instead should provide the standards and protocols under which numerous groups and individuals might create a composite coverage that would vary in scale and currency depending on need. The creation of the National Spatial Data Infrastructure (NSDI) was authorized by President Clinton under Executive Order 12906

in 1994, and has provided the policy umbrella for geographic information in the U.S. for the past 13 years.

VGI clearly fits the model of NSDI. A collection of individuals acting independently, and responding to the needs of local communities, can together create a patchwork coverage. Given a server with appropriate tools, the various pieces of the patchwork can be fitted together, removing any obvious inconsistencies, and distributed over the Web. The accuracy of each piece of the patchwork, and the frequency with which it is updated, can be determined by local need.

Humans as sensors

Recently a great deal of attention has been devoted to the concept of sensor networks. The observational objectives of Earth science, as well as the objectives of security and surveillance, can be addressed at least in part by the installation of networks of sensors across the geographic landscape. Commonly cited examples include the network of vidoe monitors in many major cities, proposals to instrument the ocean and seabed with sensors in the interests of science and early warning of tsunamis, and networks of traffic sensors that can provide useful information to planners, as well as real-time pictures of congestion.

It is useful to distinguish three types of sensor networks. Most examples fit the first, a network of static, inert sensors designed to capture specific measurements of their local environments. Less commonly cited are sensors carried by humans, vehicles, or animals. For example, much useful research is emerging from projects that have equipped children with sensors of air pollution, in an effort to understand the factors affecting asthma. A third type of sensor network, and in many ways the most interesting, consists of humans themselves, each equipped with some working subset of the five senses and with the intelligence to compile and interpret what they sense, and each free to rove the surface of the planet.

This network of human sensors has over 6 billion components, each an intelligent synthesizer and interpreter of local information. One can see VGI as an effective use of this network, enabled by Web 2.0 and the technology of broadband communication.

Citizen science

The term *citizen science* is often used to describe communities or networks of citizens who act as observers in some domain of science. A perfect U.S. example is the Christmas Bird Count, an effort to enlist amateur ornithologists in conducting a mid-winter census of bird populations. Participants require a fairly high level of skill, and over the years a number of protocols have been established to ensure that the resulting data have high quality. An international example is Project GLOBE, an effort to enlist school-children and their teachers in providing a world-wide source of high-quality atmospheric observations. As with the Christmas Bird Count, a number of protocols and training

programs have been established to ensure quality, and to collect, synthesize, and re-distribute the results.

Both of these projects require a fair degree of training and expertise. This need for expertise would be a limiting factor in any effort to extend VGI to such comparatively sophisticated mapping themes as land use, land cover, or soil class. Other forms of VGI are much less demanding, however, particularly those associated with place-names, streets, and other well-defined geographic features.

Participant populations

Sites such as Wikimapia are open to all, as are many other VGI efforts. The Christmas Bird Count and Project GLOBE, on the other hand, place restrictions on participation in order to ensure adequate expertise. The question of *who* may volunteer has much to do with the quality of the resulting information, and a range of possibilities exist. For many years companies producing digital street maps have relied on networks of local observers to provide rapid notice of new streets, changes of street names, *etc*., paying them as part-time workers. Inrix is collecting tracks from hundreds of thousands of trucks and other fleets, processing and compiling the results as a source of real-time information on the state of congestion and other short-term factors affecting travel on road networks. Military personnel are important potential sources of geographic information about local battlefield conditions that can be used to augment what is available from central mapping and imagery sources. Many farmers now have elaborate systems for mapping and monitoring their fields and crops (*precision agriculture*), and constitute a potential source of data that is in many cases much more detailed and current than that available from central agricultural agencies. In essence, such developments contribute to a growing reversal of the traditional *top-down* approach to the creation and dissemination of geographic information.

Early warning

Recent events such as the Indian Ocean tsunami or Hurricane Katrina have drawn attention to the importance of geographic information in all aspects of emergency management, and to the problems that arise in the immediate aftermath of the event before adequate overhead imagery becomes available for damage assessment and response planning (NRC, 2007). Earth-observing satellites may not pass over the affected area for several days. Images from satellites and aircraft may be obscured by clouds and smoke. Conditions on the ground may prevent the rapid downloading of digital imagery because of a lack of power, Internet connections, or computer hardware and software.

On the other hand the human population in the affected area is intelligent, familiar with the area, and increasingly able to report conditions through mobile phones, using voice, text, or pictures. To date there has been very little use of VGI in these situations, in part because of an almost complete lack of the tools needed to collect, synthesize, verify, and redistribute the information. However the potential to obtain almost immediate reports

from geographically distributed observers on the ground will surely drive increased efforts to overcome these problems in the next few years.

ISSUES

Why do people do this?

In the mid 1990s the U.S. Federal Geographic Data Committee published its Content Standards for Digital Geospatial Metadata, a format for the description of geographic data sets. The project was very timely, given the rapid increase in the availability of geographic information via the Internet that occurred at that time. Metadata were seen as the key to effective processes of search, evaluation, and use of geographic information. Nevertheless, and despite numerous efforts and inducements, it remains very difficult to persuade those responsible for creating geographic data sets to provide adequate documentation. Even such a popular service as Google Earth has no way of informing its users of the quality of its various data layers, and it is virtually impossible to determine the date when any part of its image base was obtained. A recent news report concerned the apparent replacement of its coverage of New Orleans with pre-Katrina imagery, though its coverage of the Darfur region is updated almost daily.

Given this evident reluctance to provide documentation, it is perhaps surprising that the opportunity to create and publish VGI has engaged the interests of so many individuals. Why is it that citizens who have no obvious incentive are nevertheless willing to spend large amounts of time creating the content of VGI sites? What kinds of people are more likely to participate, and what drives them to be accurate (or inaccurate)?

Self-promotion is clearly an important motivator of Internet activity, and in its extreme form can lead to the exhibitionism of personal web-cams. Despite the vast resources of the Web, it is still possible to believe that *someone* will be interested in ones personal site. The popularity of some blogs can be misread as suggesting that an audience exists for *any* blog.

At a different level many users volunteer information to Web 2.0 sites as a convenient way of making it available to friends and relations, irrespective of the fact that it becomes available to all. This may underlie the popularity of sites such as Picasa, which allow contributors of personal photographs to point others to them, but it scarcely explains the popularity of Flickr or Wikimapia, where content is comparatively anonymous. Contributors to OpenStreetMap may derive a certain personal satisfaction from seeing their own contributions appear in the patchwork, and from watching the patchwork grow in coverage and detail, but there can be no question of self-promotion in this essentially anonymous project.

Authority and assertion

The traditional mapping agencies have elaborate standards and specifications to govern the production of geographic information, and employ cartographers with documented

qualifications. Over the years their products have acquired an authority that derives from each agency's reputation for quality. Google, on the other hand, has no such reputation in the geographic domain. Nevertheless users appear willing to ascribe authority to its products, perhaps because computerization carries authority *per se*, and perhaps because of the company's success in other areas, particularly its search engine.

At time of writing Google Earth's imagery over the campus of the University of California, Santa Barbara was mis-registered by approximately 20m east-west. Further to the east in the City of Santa Barbara the mis-registration was approximately 40m east-west in the opposite direction, and a swath approximately 60m wide running north-south was missing from the coverage (Figure 8). Any locations georeferenced from this imagery and incorporated into VGI will inherit these positional errors, and if Google re-registers the imagery at a future date that VGI will be clearly misplaced. In essence, Google has created a new *datum* or horizontal reference system that is substantially different from the current North American datum, but which is widely accepted because of the authority of Google. The shift is comparable in magnitude to that created when North American mapping agencies replaced the North American Datum of 1927 (NAD27) with the current NAD83.

VGI is sometimes termed *asserted* geographic information, in that its content is asserted by its creator without citation, reference, or other authority. The early days of the Internet were characterized by a certain altruism, a belief in the essential goodness of users, and there was little anticipation of the subversive phenomena of spam, viruses, and denial-of-service attacks that now pervade the network. Similarly many VGI efforts are driven by the kinds of altruism inherent in any kind of voluntary community effort. Can we expect, then, a similar pattern of disillusionment as antisocial elements recognize and exploit the inevitable vulnerabilities? Will there be efforts to create fictitious landscapes, or to attack and bring down VGI servers? VGI is currently a somewhat exotic domain, but if and when users begin to rely on its services a growing pattern of efforts to undermine it seems inevitable.

The digital divide

Despite the apparent openness of VGI, it remains largely the preserve of those fortunate to have access to the Internet—and broadband access in particular. While a growing fraction of citizens in developed countries have such access, it is largely unavailable to the majority of the world's population who live in developing countries. Moreover issues of language and alphabet also affect access even for those with broadband connections, since many VGI servers support only the Roman alphabet and English. In principle, much could be achieved through mobile phones, which often have the ability to connect to the Internet and to capture images, but the tools needed to exploit this limited environment as a source for VGI do not yet exist. So while I argued above that such limited tools were potentially significant in early warning and emergency management, significant work still needs to be done to realize the potential.

Figure 8. A swath of Santa Barbara approximately 60m wide has disappeared because of misregistration of imagery in Google Earth. Note the blurring down the center of the image, and the break in Highway 101, one of the few features to cross the swath diagonally.

THE VALUE OF VGI

As I hope the examples in this paper illustrate, VGI has the potential to be a significant source of geographers' understanding of the surface of the Earth. It can be timely, a property that was particularly stressed in the discussion of early warning. By motivating individuals to act voluntarily, it is far cheaper than any alternative, and its products are almost invariably available to all (but see the earlier discussion of the digital divide).

In earlier sections I discussed why people might be motivated to create VGI, but not to use it. With sites such as Wikimapia one can learn a great deal about remote places, acquiring the kinds of information needed for planned tourist visits, or to provide background to travelogs. Sites such as OpenStreetMap often provide the cheapest source

of geographic information, and sometimes the *only* source, particularly in areas where access to geographic information is regarded as an issue of national security.

It is already clear in many fields that such informal sources as blogs and VGI can act as very useful sources of military and commercial intelligence. The tools already exist to scan Web text searching for references to geographic places, and to geocode the results. Thus the most important value of VGI may lie in what it can tell about local activities in various geographic locations that go unnoticed by the world's media, and about life at a local level. It is in that area that VGI may offer the most interesting, lasting, and compelling value to geographers.

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Biographical Sketch

Joseph Chamie

Joseph Chamie is currently Director of Research at the Center for Migration Studies, New York and Editor of the *International Migration Review*. Formerly, he was the Director of the United Nations Population Division. He had been with the United Nations in the field of population and development both overseas and in New York for more than a quarter century. Among other major duties, he was the deputy secretary-general for the 1994 United Nations International Conference for Population and Development. In addition to completing numerous population studies issued under United Nations authorship, he has also written many studies in his own name in such areas as fertility, population estimates and projections, international migration and population and development policy.

Biographical Sketch

Joseph Chamie

Joseph Chamie, former Director of the United Nations Population Division, is currently Director of Research at the Center for Migration Studies, New York.

Dr. Chamie received his doctoral degree in sociology, majoring in the field of population, from the University of Michigan. He has worked in various regions of the world, specializing primarily in Asia and Africa. He has worked in national programs dealing with health and family planning issues. He has first-hand experience with the diverse problems of less developed countries as well as the more developed nations. For example, he lived for several years in a rural Indian village working in health and family planning; he also lived in areas of civil conflict, having spent six years with the United Nations in Beirut, Lebanon. He has also conducted research and taught at universities in the United States and abroad.

He worked with the United Nations in the field of population and development both overseas and in New York for more than a quarter century. Among other major duties, he was the deputy secretary-general for the 1994 United Nations International Conference for Population and Development.

During his career with the United Nations, he has been responsible for a variety of activities, including (a) estimates and projections of population; (b) assessing national population policies; (c) determinants and consequences of population trends; (d) population and development inter-relationships; and (e) international conferences on population and development. In addition to completing numerous studies issued under United Nations authorship, he has also written many studies in his own name in such areas as fertility, marriage, family planning, population estimates and projections, ageing, urbanization, international migration and population and development policy.

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Joseph Chamie

Joseph Chamie is director of the population division, department for economic and social affairs, United Nations Secretariat in New York He has spent nearly 25 years with the U.N., both overseas and at its headquarters in New York, where he has been responsible for a variety of activities, including: estimates and projections of population; assessing national population policies; analysis of demographic trends; population and development issues; and contributing to international conferences on population and development. He also served as deputy secretary-general for the 1994 International Conference for Population and Development.

Armed with a Ph.D. in sociology (population) from the University of Michigan, Joe has worked in various regions of the world, specializing primarily in South and Western Asia. He has worked in national programs dealing with health and family planning issues and has first-hand experience with the diverse problems of less developed countries as well as the more developed nations. He lived for several years in a rural Indian village working in health and family planning and has also lived in areas of civil conflict, having spent six years with the U.N. in Beirut, Lebanon. Joe has conducted research and taught at universities in the United States and abroad, has completing many studies issued under the United Nations authorship, and publishes numerous studies in his own name in such areas as fertility, marriage, family planning, population estimates and projections, international migration, and population policy. Joe also speaks Arabic, French, and Hindi.

Gigs

- Director, population division, United Nations (since 1993); previously held various positions in the U.N. Population Division in New York and Lebanon (since 1977)
- Deputy secretary-general, U.N. International Conference on Population and Development, Cairo, 1994
- Peace Corps, Bihar, India (1967-1970)

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Education

- Ph.D., Sociology, University of Michigan, 1976
- M.A., Sociology, University of Michigan, 1973
- M.S., Population Planning, University of Michigan, 1971
- B.S., Mathematics, University of Michigan, 1966

Affiliations

- International Union for the Scientific Study of Population

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- International Family Planning Perspectives, Advisory Board
- International Migration Review, Editorial Board