

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.

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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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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

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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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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

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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

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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,

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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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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

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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 and optimized 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

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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

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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

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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 ($r^2 = 0.94$) 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

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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

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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 (PM_{0.5} 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

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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.

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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

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- 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 ARCIMS in 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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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

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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

David Miller

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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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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 total area 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

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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

Anya Rozanova

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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

David Weaver

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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

Lisa Giencke

graduate student

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,

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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 1895 to 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

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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

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Session 6B Onondaga Room

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

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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

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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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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

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Graduate Student

SUNY ESF

Tian Zhou

Graduate Student

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Yue Zuo

Graduate Student

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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

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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

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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.