

ABSTRACTS for NYS GIS 2006 conference

Monday, October 23, 2006

9:00 am – 10:00 am

Session 1A

First Name: David
Last Name: Maidment
Title: Engineering Foundation Professor of Civil Engineering
Director
Organization: Center for Research in Water Resources
University of Texas at Austin
Email: maidment@mail.utexas.edu

Presentation Title: GIS in Water Resources

Abstract: GIS has traditionally been viewed as a static, 2-D mapping environment, but to be applied fully to water resources, the extension to time varying data and to 3-D is necessary. Time varying data can be attached to an ArcGIS geodatabase as tables, or in version 9.2 in a new format called netCDF which has been developed in the weather and climate community to describe time varying coverages of weather variables that are continuously spatially over the nation. In the new ArcGIS Groundwater data model, the 3D aspects of ArcGIS are exploited to produce 3D borelines, geosections and geovolumes, in order to describe hydrogeologic units. A geodatabase design has been prepared for the FEMA Map Modernization program that will allow submission of flood plain maps in geodatabase format and linkage of FEMA flood mapping data with the National Hydrography Dataset. Advances in the application of GIS in Water Resources are reviewed in this paper, and a perspective provided as to the expected direction of evolution of this technology in the future.

Session 1B

First Name: Stephen
Last Name: Signell
Title: Research Support Specialist
Organization: SUNY-ESF Adirondack Ecological Center
Email: ssignell@esf.edu

First Name: Stacy
Last Name: McNulty
Title: Research Associate
Organization: SUNY-ESF Adirondack Ecological Center
Email: smcnulty@esf.edu

Presentation Title: GIS in recreation planning: using ArcGIS Model Builder to locate new trail sections in Adirondack Park for the Unit Management Planning process.

Abstract: Adirondack Park land managers are faced with complex stewardship decisions that require consideration of many user groups' desires in conjunction with maintenance of the ecological integrity and wild character of the park. For example, when building or relocating hiking or snowmobile trails, DEC planners must select a route that not only satisfies the recreational needs of the public, but also minimizes the cost of trail reconstruction and avoids unsuitable terrain and sensitive ecological features such as wetlands, natural heritage areas or deer wintering areas. The Adirondack Ecological Center of SUNY-ESF has been working with Adirondack Park planners and numerous other partners to solve

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these complex management challenges using the model builder feature of ArcGIS 9.1. Using digital maps of wetlands, potential deer winter yards, elevation, slope, or old roads, the GIS model can locate an optimal path between two points, or the “least cost path.” We will give an overview of our least-cost path model and demonstrate how it can be readily modified to explore different management scenarios.

First Name: Seth
Last Name: Myers
Title: Research Assistant
Organization: State University of New York - College of Environmental Science and Forestry
Email: sjmyers@syr.edu

First Name: William
Last Name: Porter
Title: Professor
Organization: State University of New York - College of Environmental Science and Forestry
Email: wfporter@esf.edu

Presentation Title: Integrated Land-Use Change and Ecosystem Modeling of the Adirondack Park, NY

Abstract: Understanding the causes and consequences of land-use change is central to sound ecosystem management. Spatially-explicit models can help to understand development dynamics and project future land-use trends. Natural resource models linked to projections of land-use change can be used to assess future impacts from development under different management scenarios. Currently, a need exists in the Adirondack Park for this type of integrated modeling approach. A growing population of residents and over 1 million annual visitors to the Park create demand for land development that has the potential to greatly influence the integrity of sensitive ecosystems. We are in the initial stages of building a computer simulation that will project the extent and location of future land development for a portion of the Park and surrounding area over the next 25 years. We will link this simulation to several indicators of ecosystem integrity including: ecological land units, potential habitat of terrestrial vertebrates, and a bird community index. The resulting linked land-use and natural resource submodels will be used to estimate the magnitude, direction, and location of future changes in ecosystem integrity caused by development. The integrated model will be presented as an ArcGIS extension to stakeholders within the area of interest. Its use will allow managers and others to identify areas at risk and experiment with different management scenarios represented in the models to find solutions to current and future conflicts between development and environmental objectives.

Session 1C

First Name: Twyla
Last Name: McDermott
Title: GIS Manager and Corporate Strategic Technology Planner
Organization: City of Charlotte
Email: tmcdermott@ci.charlotte.nc.us

Presentation Title: TBA

Abstract: TBA

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Name, Address, and Organization:

Title: Software Engineer

First Name: Brian

Last Name: O'Malley

Organization: PAR Government Systems Corporation

Email: brian_omalley@partech.com

Title: Software Engineer

First Name: Keith

Last Name: Smith

Organization: PAR Government Systems Corporation

Email: keith_smith@partech.com

Presentation Title: Google Maps "Mashups" - An Introduction to Integrating Standard GIS Datasets and Databases Using the Google Maps API and Google Earth

Abstract: This will be an introductory discussion on how to create a free or low-cost Internet mapping site using the Google Maps application programming interface (API). In addition, parallels between Google Maps and Google Earth will be demonstrated where applicable. The presentation will be of interest to both technical (developers) and non-technical individuals.

At the broadest level, this presentation will cover the steps required for the integration and display of standard GIS datasets and tabular data (RDBMS) on top of a customized Google Maps website (i.e., a mashup).

Topics include: methods for setting up your Google Maps website, a basic introduction to the Keyhole Markup Language (KML), and tips and techniques for processing geographic data for display on both Google Maps and Google Earth. By the end of the session, all major elements involved in the development of a customized Google Maps website will be employed to create our very own 2006 NYSGIS Conference Attendee Location Website.

Session 1D

First Name: Sid

Last Name: Cuff

Title: GIS Technician

Organization: IAGT

Email: scuff@iagt.org

First Name: Dana

Last Name: Piwinski

Title: Director of Program Development

Organization: IAGT

Email: dpiwinski@iagt.org

Presentation Title: Advanced Visualization in a WMD Community Exercise

Abstract: Community emergency response exercises traditionally employ tabletop models which are only generally representative of the actual geographic area under consideration. IAGT has developed an interactive software tool which integrates geospatial data and advanced visualization technologies to provide community agencies with a unique tool to conduct emergency response exercises using the actual characteristics of their

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local area. The tool was used recently by the Cayuga County Emergency Management Office to conduct a multi-agency emergency response exercise, replacing the traditional tabletop model approach. An overview of the tool and a demonstration of the technology will be provided.

First Name: Paul
Last Name: Pawelzik
Title: ERFEG Undergrad
Organization: SUNY ESF
Email: pfpawelz@syr.edu

First Name: Giorgos
Last Name: Mountrakis
Title: Assistant Professor
Organization: SUNY ESF
Email: gm@esf.edu

Presentation Title: Identification of least cost pathways for emergency responders using data fusion and the fast marching algorithm

Abstract: Emergency response services are designed to take action in critical situations such as fires, accidents, and other threatening conditions. There are multiple factors that limit the effectiveness of an emergency response system. With our work we target two essential components of such system, namely: i) ability to efficiently perform real-time adjustments, and ii) support for multiple scenarios investigation.

We have developed an optimization model, which will decrease the response time of emergency vehicles. The model incorporates different physical and environmental factors, such as road type, slope, terrain, habitat, and others to develop a more realistic model of the challenges that a rescue operation might encounter.

Each geospatial dataset is converted into a cost function by assigning specific weights to the different physical characteristics within each layer. The developed cost functions are individualized to different rescue vehicle and personal physical capabilities in order to more accurately simulate real conditions. Examples of vehicle types are fire truck/ambulance, helicopter, and boat. Personal capabilities are also used for a rescuer (e.g. walking, skiing).

Once all the layers are combined to a final cost layer, the fastest path between two points is determined by using a fast marching algorithm. To increase the realism of the model different scenarios are developed by combining vehicles and rescuer capabilities. The GIS data used is from the Central New York region, but our method can be easily extended to other regions. It can also incorporate other real-time unexpected cost layers (e.g. resulting from flood, terrorist attack).

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Session 1E – Workshop

First Name: C. Craig
Last Name: Cleveland
Title: Senior GIS Analyst
Organization: Bergmann Associates
Email: ccleveland@bergmannpc.com

Workshop Presentation Title: Geodatabase Modeling 101

Abstract Type: Application

Abstract: Geodatabase design can often be a difficult and time consuming task. Adding to the frustrations are poor "out of the box" tools to perform the work. This technical session will take an in depth look at what additional tools are available to help make this process more streamlined and efficient. Specifically, the use of Microsoft Visio as a development aid will be discussed. The session will provide an honest, technical look at the positives and negatives of geodatabase design and how it may or may not integrate into your organization.

Monday, October 23, 2006

10:30 am – 12:00 pm

Session 2A

First Name: Horace
Last Name: Shaw
Title: Research Project Assistant
Organization: SUNY-ESF
Email: hbshaw@esf.edu

First Name: Lee
Last Name: Herrington
Title: Distinguished Teaching Professor
Organization: SUNY-ESF
Email: lherrin@esf.edu

Presentation Title: Modeling Nonpoint Pollution Impacts on the Carmans River

Abstract: The NYS Department of State is sponsoring a project at SUNY-ESF to develop a dynamic nonpoint pollution model to project nonpoint pollution impacts for the Carmans River watershed on Long Island.

Using ArcGIS's ArcHydro extension, we delineated the Carmans River watershed and developed the database of hydrologic data, including the stream network within the watershed. The stream network allows a model to be built which will accumulate stream flow and nonpoint pollutants as they enter the river and flow downstream to the estuary.

ArcGIS's model builder is used to implement the model based on the Natural Resource Conservation Service's watershed modeling process. The NRCS curve number methodology provides coefficients to estimate the proportion

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of rainfall which will become runoff from particular combinations of soils and land use. Similarly, event mean concentration coefficients can be used to estimate the volume of various pollutants which would be picked up by runoff flowing off areas of varying land uses. The model accumulates these values by catchment within the Carmans watershed. The runoff quantities and pollutant loads can then be accumulated along the river network from its headwaters to its mouth. As these quantities are accumulated, they can also be subject to in-stream process which may diminish the loads, such as first order decay of fecal coliform.

By changing land use within the watershed, impacts, whether negative or positive may be modeled. Mitigation strategies and best management practices may be applied at points within the watershed, with the impacts of the practice included in the processing of stream flow and pollutant load as part of the network accumulation/diminution algorithms.

One of the requirements of the project is to develop a model which can be used with readily available data. Accordingly, data for the model include surface water information from the National Hydrography Dataset; digital elevation models; NRCS soils; land cover from satellite imagery, the national land use classification data or other available sources; land use from tax maps; build out data such as local zoning classifications; topographic maps; and NYS orthophotos.

First Name: Tao
Last Name: Tang
Title: Associate Professor
Organization: Buffalo State College
Email: tangt@buffalostate.edu

First Name: Ian
Last Name: Bruce
Title:
Organization: Buffalo State College
Email: ibbruice@usa.net

Additional Authors: Maria Dolce, Buffalo State College

Presentation Title: Land Use analysis and distributed watershed modeling
apply Arc-Hydro

Abstract Type: Research

Abstract: Natural and human activity created features are distributed in watershed systems. Therefore, the approach of spatial distributed modeling is necessary in approximation of real world drainage systems in order to predict flood and pollutant discharge. This study presents the spatial modeling of effects of ecosystem and watershed factors, such as human land use activities, slope, and soil type on potential pollution generation and accumulations in a watershed. GIS spatial analytical tools and distributed model were applied for data integration and visualization. The lower Buffalo River watershed with mixed urban and agricultural land use activities, was used as a study area. US Geological Survey 10 meter resolution DEMs and ArcGIS - ArcHydro module were applied to delineate the sub-watersheds and simulate runoff and pollutant accumulation in the study area incorporating the field water sampling data. Land use classification scheme was developed using Land-Based Classification Standards (LBCS) by American Planning Association (APA). Impervious land uses were computed by relating land use categories to the impervious cover scheme from previous

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studies. Topological connectivity of factor map layers was established. Weighted effects of influential factors of human land use were computed.

First Name: Timothy
Last Name: Daly
Title: GIS Analyst
Organization: NYS DEC and IAGT
Email: tmdaly@gw.dec.state.ny.us

First Name: Cheryl
Last Name: Rose
Title: GIS Analyst
Organization: NYS DEC and IAGT
Email: cdrose@gw.dec.state.ny.us

Additional Authors: Ricardo Lopez-Torrijos, NYS DEC and IAGT,
rxlopez@dec.state.ny.us

Presentation Title: A Comprehensive Water Resources GIS Framework for NYS:
ArcHydro Implementation in DEC

Abstract: USGS's National Hydrography Dataset (NHD) is designed as a spatial index for all surface water related data. FEMA's Flood Insurance Studies, producing the Flood Insurance Rate Maps (DFIRM), is an example of a numerical modeling process, occurring in a GIS environment and producing a wealth of information about the studied water bodies. By populating the ArcHydro framework with basin-wide NHD and adopting a linked spatial data base model for the DFIRM product, the New York State Department of Environmental Conservation is establishing communication between the creation and update processes for each dataset. The publication of the resulting information in the common data model allows leveraging of each program for the other's benefit, and positions this water resources framework as a vessel to hold all surface waters related information.

Session 2B

First Name: Cathy
Last Name: Keenan
Title: State GIS Specialist
Organization: USDA-NRCS
Email: cathy.keenan@ny.usda.gov

Presentation Title: Acquisition and Status of Certified Digital Soil Survey Databases (SSURGO) for New York State

Abstract: This presentation will provide an update to the National Cooperative Soil Survey which is an effort of Federal and State agencies, universities and professional societies to deliver scientifically-based soil information. Soil surveys contain interpretations needed to provide researchers, educators, government agencies and private land owners information related to soil use and conservation.

The Soil Data Mart website provides certified digital soils from the U.S. Department of Agriculture, Natural Resources Conservation Service. This

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site allows for download of all spatial and tabular data available for each SSURGO certified soil survey area. Also available at this site is a report generation capability for these soil survey areas. All update and re-certifications are posted directly to this site.

Soil Data Mart will supply over 90% of New York Soil Surveys by end of 2007.

Target Audience: Researchers, Educators, Government Agencies, Engineers, Natural Resource Organizations

First Name: Steve
Last Name: Carlisle
Title: Soil Research Specialist
Organization: USDA-NRCS
Email: steven.carlisle@ny.usda.gov

Presentation Title: Web Soil Survey

Abstract: A demonstration of Web Soil Survey will show how to access USDA-NRCS soil survey information in a Web based application. All spatial and tabular soil information along with report generation capabilities relate to the map symbols and the areas delineated on user customized maps.

The Soil Data Explorer portion of the web site allows access to soil data interpretations specific to the identified area, helping to determine suitability of management practices and use of soils.

Target audience: GIS Managers, Real Estate Appraisers, Private Land Owners, Natural Resource Managers, personnel needing a 'quick look' at what soil types and conditions that exist 24/7 (no GIS software needed; only internet access).

First Name: Olga
Last Name: Vargas
Title: Soil Research Specialist
Organization: USDA-NRCS
Email: olga.vargas@ny.usda.gov

Presentation Title: Soil Data Viewer

Abstract: Soil Data Viewer is a GIS based tool that associates USDA-NRCS digital soil survey information with more than fifty tables of soil interpretations and soil properties in ArcMap, or as a separate tabular report outside of GIS. The user is given access to quick geospatial analysis of soil data for use in resource management and assessment.

A demonstration of the Soil Data Viewer interface will show how the user can create soil-based thematic maps with this easy to use GIS interface that allows evaluations of multiple soil components that contain different use and management elements. This GIS tool provides streamlined directions and definitions while following the processing rules to ensure appropriate use of the data.

Target Audience: GIS Professionals, ESRI ArcMap users, Scientists and

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students with an interest in soils, engineering and natural resource management and research.

Session 2C

First Name: Eric
Last Name: Herman
Title: GIS Program Manager
Organization: NY State Thruway Authority
Email: eric_herman@thruway.state.ny.us

Presentation Title: Building a Integrated Web-Based GIS Infrastructure

Abstract: In recent years, many organizations have greatly benefited from web-based GIS tools and applications. Oftentimes, although these applications serve very useful specific purposes, they act as islands unto themselves, each addressing only a particular use. Needs vary widely, however, and the key to accomplishing specific tasks is in the unique manner in which individuals combine the variety of available tools. With this in mind, in late 2002, the New York State Thruway Authority released its first set of Intranet-based GIS applications for employees. Since that time, this interface has become a significant part of the Thruway's infrastructure, expanding into a web portal that hosts two dozen GIS applications. Although different at first glance, together they make up a powerful suite of highly integrated tools. With an upfront design that allows for future growth, a focus on consistency, simple transitions, and ease of use, these applications work in concert to provide a rich toolset for the organization. This presentation will outline key components to this customer-focused approach, and highlight how multiple, dissimilar applications can work together cohesively.

First Name: Jeff
Last Name: Albee
Title: Technology Department Manager
Organization: AMEC Earth & Environmental
Email: jeff.albee@amec.com

Additional Authors: Contact Info: Stewart.galloway@ny.ngb.army.mil , GIS Analyst, Amec Earth and Environment, 518-786-4550.

Presentation Title: Countywide Web-GIS Integration – A Multi-Faceted Approach

Abstract: Title: Countywide Web-GIS Integration – A Multi-Faceted Approach
Amec, Inc.

Abstract: Gwinnett County, Georgia, is implementing a comprehensive Web-GIS solution for County staff. The County is located 30 miles northeast of Atlanta, Georgia and has a population of approximately 700,000. The County's website is <http://www.gwinnettcounty.com>.

Eight departments in Gwinnett County are making use of the Web-GIS solution, which is powered by Orion's OnPoint. They include Transportation, Public Utilities, Financial Services, Support Services, Police Services, Fire and Emergency Services, Planning and Development,

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and Community Services.

Gwinnett County's GIS team, with the assistance of their integration consultant AMEC, conducted detailed interviews with each department. Key components of these interviews will be discussed in the paper.

Gwinnett County has undertaken a systematic and detailed approach to Web-GIS implementation. Web-GIS will be used in many different ways, from printing basemaps to selecting buffers, to connecting to spatial and non-spatial data sources. In this way, Gwinnett County will leverage the full power of Web-GIS.

First Name: Lawrence
Last Name: Brooks
Title: Manager of e-Channels
Organization: NYS Tax and Finance
Email: Lawrence_Brooks@Tax.state.ny.us

First Name: William
Last Name: Ryan
Title: Principal Fiscal Policy Analyst
Organization: NYS Tax and Finance
Email: William_Ryan@Tax.state.ny.us

Presentation Title: Sales Tax Collections using GIS Technology

Abstract: The Department of Taxation and Finance needed to supply businesses more accurate information to determine the correct local sales tax jurisdiction and sales tax rate to apply to sales transactions. A customer's mailing address is not indicative of the actual local taxing jurisdiction where the individual resides.

The Department created an electronic service that allows businesses anywhere to determine the correct local taxing jurisdiction, the combined State and local sales tax rate, and the local jurisdiction reporting code for use in filing New York State sales tax returns. This service is now available on the Department's website.

With guidance from the New York State Office of Cyber Security and Critical Infrastructure Coordination, the Department created an online Sales Tax Jurisdiction and Rate Lookup Function that utilizes Geographic Information Systems (GIS) technology. The new application allows the user to enter a street address and ZIP code which can then be spatially located using GIS technology.

Session 2D

First Name: James
Last Name: Gilmer
Title: Asst. Chief, Crime Reduction Strategies
Organization: NYS Division of Criminal Justice Services
Email: jim.gilmer@dcjs.state.ny.us

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Presentation Title: Crime Mapping Comes of Age in New York State

Abstract: The visual and interpretive power of GIS has been available to law enforcement for over a decade. But only recently in New York is the crime mapping movement taking root in local law enforcement agencies across the state. Today, crime mapping is at a critical juncture, perhaps a “tipping point.”

Widespread acceptance of major technological advances often depends on an unambiguous governmental response to specific issues of social policy. DNA technology, for instance, is now commonplace in criminal investigations largely because states established official DNA databanks as repositories of genetic reference samples from convicted offenders.

In crime mapping, a statewide, government initiative to reduce violent crime, known as Operation IMPACT, has significantly advanced the adoption of GIS by a police departments in urban areas outside of New York City with the highest levels of serious crime. This program funds strategic action plans which must be data-driven and collaboratively developed by criminal justice agencies within a county, have measurable objectives, and coordinated across all levels of law enforcement.

Reviewing the progress of crime mapping in the context of Operation IMPACT, this paper addresses the following questions. What aspects of crime reduction established the need for crime mapping? What impediments to its acceptance had to be overcome? How is crime mapping actually used by police, particularly in crime reduction efforts? Finally, where is crime mapping headed, and what help can the larger GIS community provide so the movement will flourish not only in policing but also in other areas of criminal justice?

First Name: Peter W.

Last Name: Meade

Title: Asst. Fire Marshal for Fire & Rescue Services

Organization: Nassau County - Office of the Fire Marshal

Email: pmeade@nassaucountyny.gov

Presentation Title: Enhancing GIS to Support Public Safety and Emergency Preparedness Requirements

Abstract: The Nassau County GIS has been in production for over ten years during which time street centerline and building address data has been maintained by personnel from the Fire Marshal's Communication Center (FireCom).

FireCom is responsible for dispatching fire calls for approximately half of the County's 71 fire departments and uses a 20 year old, home grown, mainframe application (“Street Locator”) as the basis for its dispatch operations. In addition to supporting FireCom's dispatching needs, the Street Locator data is used by the County's Police dispatchers to resolve questions and problems.

The County's Police Department is currently negotiating with Intergraph for a new dispatch system which will require a highly accurate street centerline file and building address ranges.

To accommodate these needs, the County's GIS Technical Committee, FireCom, and the Police Department have teamed together to upgrade the GIS database to enable it to support these public safety requirements. Specific activities that will be described include:

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- Validate street names and aliases from the FireCom file to the GIS centerline file;
- Incorporate Fire Department map sheet boundaries, address ranges, and responder information;
- Validate address data using local utility company service point data;
- Develop a new geocoding service within the GIS that produces the same results as the legacy street locator system;
- Develop interfaces to allow real time (or near real time) updating of information between the three systems (GIS, FireCom and Police)

First Name: Donald
Last Name: Irwin
Title: Public Health Sanitarian III
Organization: Nassau County Department of Health
Email: Donald.Irwin@hhsnassaucountyny.us

First Name: Paul
Last Name: Young
Title: Public Health Sanitarian II
Organization: Nassau County Department of Health
Email: Paul.Young@hhsnassaucountyny.us

Presentation Title: GIS Applications in Environmental Health – Protecting Public Health Through Healthy Environments

Abstract: The Division of Environmental Health was an initial partner in the development of Nassau County's GIS. GIS has become a critical component of the Division's routine and emergency response activities. The data and mapping that continues to be developed through the use of this system increases our efficiency and ability to function in an environment of escalating demands and diminishing resources.

The Division of Environmental Health currently uses GIS in several programs including:

- Day Care Center Site Reviews (2003 NACCHO Model Practice) - Mapping and identifying potential hazards that would render a site unsuitable for a day care center. Maps also identify the center's public water system, sewer district and any NCPHO Article XI (toxic and hazardous material storage) sites within the area.
- Mosquito Vectors - Maps identify traps used in the surveillance of mosquitoes carrying potentially harmful viruses, including West Nile and Eastern Equine Encephalitis. Positive mosquitoes, birds and human cases are mapped to identify infected areas.
- Public Water Supply - Mapping infrastructure, capacities and service areas. Used when conducting routine inspections, sanitary surveys and responding to water system emergencies.
- Raccoon Rabies - Used in response to the onset of raccoon rabies on Long Island in August 2004. Activities include mapping suspect and positive cases, baiting areas and densities, affected communities and identification of probable raccoon habitat. Parcels used for trapping are identified and mapped as well as trapping areas that are used to measure serum antibody and vaccine biomarker results.

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Session 2E – Workshop

Bruce Oswald, Vice President
Public Sector Geospatial Solutions
James W. Sewall Company
(518) 786-1189
(646) 808-4070 (Cell)
bruce.oswald@jws.com

Keys for Successful GIS Projects

Have you ever experienced problems:

- completing your GIS projects on time?
- staying within your budget on GIS projects?
- keeping upper management support of your GIS projects?
- managing consultant contracts?

Whether you're a GIS professional or a person administering a GIS contract, you need to understand and implement good project management practices to be successful with your work. This workshop, first presented at last year's conference, has been updated and will be presented again this year due to the number of requests for its return. The workshop will introduce you to a practical approach to using project management principles to improve the delivery of your most important projects and start you on the right road to making them successful.

The workshop will be presented by Bruce Oswald, Vice President, James W. Sewall Company. Bruce has over 25 years' working in the field of project management and has been certified as a Project Management Professional by the Project Management Institute. Bruce chaired the NYS GIS Coordination Program for 8 years and was the former Director of the NYS Center for Geographic Information. Prior to that he ran the Office of Project Management for the NYS Office of General Services and managed its \$1.75 billion prison construction program.

Lunch

12:00 pm – 1:00 pm

Plenary

1:00 pm – 1:10 pm

Welcome and Introductions from Dr. Lee Herrington, Conference Chair and SUNY ESF Faculty of Forest and Natural Resources Management

1:10 pm – 1:20 pm

Overview of NYS GIS Association from Jeff Volpe, Bergman Associates

1:20 pm – 1:45 pm

State of the State by Bill Johnson, NYS Office of Cyber Security and Critical Infrastructure Coordination (CSCIC)

1:45 pm – 1:50 pm

Introduction of Keynote speakers by Maureen Wakefield, Continuing Education Coordinator, SUNY College of Environmental Science and Forestry

1:50 pm – 3:00 pm

Keynote address

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Geospatial Disaster Response: the Hurricane Katrina Experience by Talbot Brooks and Twyla McDermott

First Name: Twyla
Last Name: McDermott
Title: GIS Manager and Corporate Strategic Technology Planner
Organization: City of Charlotte
Email: tmcdermott@ci.charlotte.nc.us

First Name: Talbot
Last Name: Brooks
Title: Director
Organization: Center for Interdisciplinary Geospatial Information Technologies at Delta State University
Email: tbrooks@deltastate.edu

Presentation Title: Geospatial Disaster Response: the Hurricane Katrina Experience

Abstract: The Hurricane Katrina event along the Gulf of Mexico was the first large-scale natural disaster in the United States for which geospatial information technologies played a significant role. The use of geospatial technologies for emergency response and recovery in the state of Mississippi was unique because it a) was not an original part of any hazard mitigation or response plan; b) was implemented using nearly 100% volunteer resources and services; and c) it was present at nearly all operational levels. This presentation will build awareness about emergency management and the types of geospatial products and services needed within the context of key lessons learned during Hurricane Katrina response efforts.

Monday, October 23, 2006

3:00 pm – 5:00 pm

Session 3A

First Name: Alimatou
Last Name: Seck
Title: Student
Organization: University of Nice
Email: seckalima@yahoo.fr

First Name: Michael
Last Name: McHale
Title: Hydrologist
Organization: U.S. Geological Survey
Email: mmchale@usgs.gov

Additional Authors:

Presentation Title: Evaluation of the New York City Department of Environmental Protection Water-Quality Assessment Program in the Catskill Mountains of New York

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Abstract: New York City's West-of-Hudson reservoir system is unfiltered and comprises about 85 percent of the city's water supply. Land use management in this region has strong implications for water quality affecting 9 million people. The city needs information on the effects of current and future land use on water quality. The city's Water Quality Assessment Program is operated by the U.S. Geological Survey to collect water quality and stream flow data at 13 sites within the West-of-Hudson Reservoir system. The gages are arranged in a nested watershed design with one or more forested "upper-nodes" and a "lower node" located at some distance downstream. The two principal land uses within the region are forest and agriculture. We used a combination of GIS tools and water quality analyses to evaluate whether the program met one of its principal objectives to quantify the effect of land use on water quality within the NYCDEP Delaware and Hudson water supply. The type of agriculture was an important factor in determining the effect that agriculture had on stream water phosphorus (P) concentrations. Although stream water P concentrations were significantly higher during high flow conditions the effect that flow had on P concentrations was only a fraction of the effect that agricultural land use had on stream water P concentrations. The correlation between percent agricultural land use and stream water P concentrations and the differences in median stream water P concentrations between "upper nodes" and "lower nodes" were greatest during high flow.

First Name: David
Last Name: Carr
Title: Project Manager
Organization: IAGT
Email: dcarr@iagt.org

First Name: Nate
Last Name: Krause
Title: GIS Analyst
Organization: IAGT
Email: nkrause@iagt.org

Presentation Title: The Finger Lakes Decision Support System (FLDSS)

Abstract: This effort, which began in 2003, is focused on the deployment of a network enabled decision support system (DSS) with a robust geospatial base, integrating traditional web based mapping with 3D interactive visualization. The goal was to develop a multi-jurisdictional set of tools to enhance decision making for water resource managers (and others) in the Finger Lakes region. The system prototype was installed for use by a stakeholder group and feedback was delivered directly to IAGT and through external review by the Cayuga Lake Watershed Network, an organization dedicated to the long term protection of one of the largest Finger Lakes and its watershed. The original stakeholder group included a range of agencies and organizations such as NYSDEC, the Finger Lakes Institute, the Central New York Regional Planning and Development Board, Tomkins County Planning, and the City of Auburn, and the Village of Seneca Falls. Revisions were made in the system and deployment model as a result of the review and the second generation deployment began in the summer of 2006.

The presentation will cover the history of the effort, the underlying

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philosophy, system architecture, and the future of the effort. The current generation Finger Lakes DSS will be demonstrated as a part of the effort.

First Name: Prajjwal
Last Name: Panday
Title: Graduate Student
Organization: SUNY ESF
Email: pkpanday@syr.edu

First Name: Myrna
Last Name: Hall
Title: Assistant Professor
Organization: SUNY ESF
Email: mhhall@esf.edu

Additional Authors: Charles Hall, Professor, SUNY ESF

Presentation Title: Predicting Future Water Quality from Land Use Change Projections in the Catskill-Delaware Watersheds

Abstract: Understanding the impacts of land use and land cover (LULC) on water quality can contribute important information to understanding and predicting water quality and quantity, especially when linked to hydrological, land use change projection, and/or non-point source pollution models. The objective of this study was to project future expected concentrations of seven chemical analytes (TP, TDP, SRP, NO₃NO₂, TKN, NH₄, and TSS) as a function of our empirically-based land use change projections in the Catskill-Delaware water supply region for New York City. We compared the median 2001-2002 concentrations from the New York City Department of Environmental Protection (DEP) 75-site water quality monitoring data set to 2002 satellite-derived LULC, DEP-provided percent impervious surface, road, population, and parcel density, distance from waste water treatment plants, soil, and topographic factors. Although our study indicates that one-third of the region's 1975 agricultural areas reverted to forest cover by 2002, there is also a significant "urbanization" trend revealed both by analysis of time-series imagery and "on-site" visits to land that has been parcelized (divided into smaller ownerships) since 1984. In the less forested Delaware basins, where the average 2002 percent forested equals 71.28%, stepwise regression (R² ranges between 0.51 and 0.73) reveals that percent agricultural land and urban use explain most of the variation in four of the species analyzed except NH₃ where percent wetlands is the most significant. In fact, wetlands appear to be releasing both NH₃ and TP to the surface water. In the Catskill basins, where the average 2002 percent forested equals 85.65, factors related to urbanization (impervious surface, road ratio, road density and percent urbanized) are more important in explaining nutrient concentrations. The soil k-factor (soil erodibility), is also important due to the different geomorphology of the eastern basins. Wetlands in these watersheds, contrary to our Delaware findings, appear to be enhancing surface water quality. Model coefficients of determination vary between 0.51 and 0.65. We will also explore constructing our model through principle component regression and compare the results of both models prior to selecting a final predictor of future water quality. For each species we will present the two models, model validation statistics, and future expected concentrations, based on our land use change projections to 2016.

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Session 3B

First Name: John
Last Name: Schmid
Title: GIS Specialist
Organization: NY Natural Heritage Program
Email: jjschmid@gw.dec.state.ny.us

Presentation Title: GIS - A Tool for Enabling and Enhancing New York's Extraordinary Biodiversity

Abstract: The New York Natural Heritage Program (NYNHP) is a partnership between the New York State Department of Environmental Conservation, and the non-profit environmental organization, The Nature Conservancy. Our mission is to enable and enhance conservation of rare animals, rare plants, and significant natural communities (which are basically different types of forests, wetlands, grasslands, etc.). GIS is one of the most important tools we use in accomplishing this mission. We have more than twenty staff members that utilize GIS as part of their daily tasks, which at the core revolves around developing and maintaining the most comprehensive spatial and tabular database of rare species and natural communities in New York State. Aside from inventorying known locations, however, we apply these data to GIS-based models that can help our partners to protect New York's biodiversity. One such GIS-based model, funded by the Hudson River Estuary Program, is an analysis that takes into consideration the surrounding landscape, and buffers the species and community occurrences accordingly. These buffers serve as "important areas" around the occurrences, and are designed to be used as a tool in local land-use planning. Another set of important GIS-based models developed by our Program are the Element Distribution Models (EDM). Species and community specific, EDMs identify areas throughout the state that are most similar to locations known to have rare species and significant communities, and therefore assists our biologists in determining new places to focus their field inventories.

First Name: Warren F.
Last Name: Broderick
Title: Archival and Records Management Specialist II
Organization: New York State Archives
Email: wbroderi@mail.nysed.gov

Presentation Title: 200 Years of Forest Types and Coverage at Grafton Lakes State Park

Abstract: In 1785, Stephen Van Rensselaer became the sixth "Patroon" of Rensselaerwyck, lord of the manor of a private land holding of over 850,000 acres granted 100 years before by the New York Colonial government, and comprising much of the present Albany and Rensselaer counties. The Patroon engaged two teams of surveyors to undertake the five-year-plus task of mapping and surveying his extensive land holdings, all of which he intended to lease to settlers in the feudal "manorial" system. In the process, detailed and highly accurate maps and surveys were drawn, and information on the land itself was collected for use by its owner. These maps and surveys survive today in the New York State

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Library. Lot boundaries from a section of one of these maps were digitized, and non-spatial information on corresponding survey lots was data-entered, then mapped and analyzed in the G.I.S. The study area covers Grafton Lakes State Park, totaling nearly 2,400 acres. As a result, information from over 200 years ago on settlement, forest, soils, terrain and hydrology has been studied in conjunction with modern G.I.S. data layers and 20th century maps. Comparisons between forest types and forest coverage in this study area have been conducted, and as a result the reforestation that has taken place in the past century can be compared to the original old growth forest that existed prior to settlement and extensive land clearing that took place in the 19th Century.

First Name: Benjamin
Last Name: Zuckerberg
Title: Doctoral Candidate
Organization: College of Environmental Science and Forestry
Email: bzuckerb@syr.edu

First Name: William
Last Name: Porter
Title: Professor of Wildlife Ecology
Organization: College of Environmental Science and Forestry
Email: wfporter@syr.edu

Additional Authors: Kimberley Corwin
Co-editor NYSDEC
Breeding Bird Atlas Publication

Presentation Title: CAN ATLAS DATA BE USED TO MONITOR AVIAN POPULATION CHANGE?

Abstract: Ecological processes, such as extinction and invasion, are often the culmination of years and decades of population change. Agencies involved in monitoring often collect distributional data, however, little is known about whether these data accurately reflect changes in abundance. New York is the first state to have completed two statewide Breeding Bird Atlases. Our objective was to determine if distributional changes are correlated with changes in relative abundance using two independent data sets: the Breeding Bird Atlas (BBA) and the Breeding Birds Survey (BBS). The BBA is a comprehensive, state-wide survey documenting the distribution of breeding birds in New York. The 1980 BBA was conducted between 1980-1985 and the 2000 BBA was conducted between 2000-2005. Over the same time period, the BBS has collected bird abundance data on 198 roadside routes randomly distributed throughout the state. We found that there is a positive interspecific relationship between statewide abundance and distribution in the two independent sampling periods of 1980-1985 ($R^2 = 0.57$, $p < 0.001$) and 2000-2005 ($R^2 = 0.54$, $p < 0.001$). Of 110 species, 52.7% demonstrated a decline and 33.6% demonstrated an increase in distribution and abundance. For those species demonstrating significant changes in abundance ($n = 72$), we found that distributional changes were highly correlated, in both direction and magnitude, with changes in state-wide abundance ($R^2 = 0.84$, $p < 0.001$). These findings suggest that changes in Atlas data accurately reflect changes in relative abundance, and that distributional surveys offer a powerful tool for measuring avian population change.

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Session 3C

First Name: Garry
Last Name: Pecak
Title: Information Technology Engineer
Organization: Erie County DEP/DSM
Email: pecakg@erie.gov

Presentation Title: The Leap from "Paper & Pencil" to Mobile GIS

Abstract: After decades of unchanged standard operating procedures, the Erie County Division of Sewerage Management (DSM) realized it could no longer sit and watch the river of technology flow past. In 2002 the DSM dove in head first and undertook a three pronged initiative; using GPS to map all collection system assets, establishing an enterprise GIS, and developing mobile GIS applications for field crews. Four years and 30,000 points later the division's GIS is approaching maturity and mobile GIS applications are forging the way for paperless field operations.

This paper will discuss the DSM's mobile GIS initiatives but focus mainly on the unexpected pitfalls and unforeseen benefits that were encountered along the way. It is intended to be a "lessons learned" and a way to share our experiences in hopes of smoothing the path of anyone considering undertaking a similar endeavor.

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First Name: Liz
Last Name: Arabadjis
Title: Senior Project Manager
Organization: Fountains Spatial, Inc.
Email: liz.arabadjis@fountainsamerica.com

Presentation Title: Making Maps Real: Updating Features in the Field

Abstract: As with many municipalities, several departments can benefit from utilizing electronic data while completing work in the field. The Water, Wastewater, Engineering and Highway Departments of the Town of Colonie, NY utilize an ArcEngine Application on laptop computers for viewing and querying various GIS layers from land parcels and related assessment information, to streets, water mains, manholes, hydrants, valves, and treatment plants.

A challenge that was overcome in the town was bridging the gap between the employees in the field and the GIS data in the office. The employees need up-to-date infrastructure records (GIS layers, hard copies, scanned files, etc.) in the field. They also need a method of updating these features without becoming GIS technicians.

The ArcEngine application created for the town contains a method for creating field markup drawings. Drawings are created by utilizing basic drawing tools (points, lines, text) to note a change to a specified layer. Once the user has noted the change (i.e. completed the edit), a PDF file is created. These drawings are then copied to the town's server where the GIS staff edits the official GIS layers. The custom app also contains easy-to-use tools that aid in copying these markup files to the town server and copying GIS layers and hyperlinked scanned images to the employee's laptop.

First Name: Eric
Last Name: Shyer
Title: Mineral Resource Specialist 3
Organization: NYS DEC, Div. of Information Services, GIS Unit
Email: ebshyer@gw.dec.state.ny.us

First Name: Karin
Last Name: Verschoor
Title: Mineral Resource Specialist 2
Organization: NYS DEC, Div. of Lands and Forests
Email: kxversch@gw.dec.state.ny.us

Presentation Title: Mapping NYS Invasive Plants with ArcPad7

Abstract: Using North American Weed Management Association (NAWMA) mapping standards as a starting point, an ArcPad 7 customized mobile mapping application was developed as a pilot project by the NYS Dept. of Environmental Conservation's Division of Information Services GIS Unit, for use by the Division of Lands and Forest's Forest Health section. The intent was to provide a simple-to-use GIS application to collect invasive plant information which could then be integrated into the Agency's Environmental GIS system to begin mapping invasive plants and facilitate sharing of information for decision making and remediation.

Additional background information that is collected along with the invasive plant information includes bedrock geology, slope, aspect,
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elevation, soil type, forest type and hydrologic Unit. By using a customized ArcPad 7 form, invasive plant data can be collected with both accuracy and consistency.

The application was placed on an Itronix Duo-Touch ruggedized tablet PC, and integrated with a Ricoh Pro G3 digital camera and GPSPPhoto Link to augment documentation. A tablet's larger screen area enabled better use of digital ortho quarter quads and a larger editing form size than is available on the standard Window CE handheld devices.

Session 3D

First Name: JoAnn
Last Name: Whalen
Title: Strategic Information Officer and Grant Project Manager
Organization: New York State Archives, New York State Office of Real Property Services

Email: joann.whalen@orps.state.ny.us

Presentation title: The NYS Office of Real Property Services' Real Property Tax Administration Technology Improvement Grant Program

Description: The New York State Office of Real Property Services (ORPS) has established the Real Property Tax Administration Technology Improvement grant program for local governments. An important component to this grant program is to enable taxpayers, both current and potential, to gain access to parcel level data and sales information with greater ease and efficiency. This session will include a discussion of the requirements of this grant program.

First Name: Karen
Last Name: Cannell
Title: Archive and Records Management Specialist
Organization: New York State Archives
Email: aprzybyl@mail.nysed.gov

Presentation title: The New York State Archives' Local Government Records Management Improvement Fund (LGRMIF) Grant Program Presentation, NYS Archives

Description: The New York State Archives' Local Government Records Management Improvement Fund (LGRMIF) helps local governments establish records management programs or develop new program components. One category of funding available is GIS. This session will include a discussion of the requirements of this grant program.

First Name: Sheri
Last Name: Norton
Title: GIS Administrator Warren County
Organization: Warren County
Email: nortons@co.warren.ny.us

Presentation title: Warren County and the LGRMIF Grant Program, Warren County

Warren County has benefited from the Archives' LGRMIF grant program in 2002 and 2006. Funding from the first grant was used to develop two primary applications – a custom public ArcIMS website, and a suite of pavement management tools as an extension within ArcGIS. The latter grant for a cooperative

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partnership between nine towns and two County departments provided implementation of three custom applications and modification of two existing programs.

Session 3E – Workshop

Cartography Workshop

Lee Herrington and Bill Johnson

6:30 pm Banquet Dinner

Where Dreams Are Dreamed and Dreams Are Won

Chris Ortloff, Invited Banquet speaker served as Chief of Ceremonies and Awards for the XIII Olympic Winter Games at Lake Placid and was inducted into the Lake Placid Hall of Fame in 1998

“Where Dreams Are Dreamed and Dreams Are Won” is the title of the song sung by 200 voices accompanied by a symphony at the 1980 Olympic Winter Games closing ceremonies. Composed by Elliot Del Borgo, faculty of the Crane School of Music, Chris Ortloff wrote the lyrics, as a hymn to the essence of Lake Placid. The people of Lake Placid have dared to dream audacious dreams for more than 100 years. Some athletes of note include, Charles Jewtraw, the winner of the first gold medal ever awarded in the Olympic Winter Games, in 1924 (for 500-meter speedskating); Jack Shea, who won two gold medals before his hometown crowd in 1932; his grandson Jimmy Shea, who won gold in skeleton at Salt Lake City in 2002; Craig Wood, who won the Masters and the U.S. Open in 1941, after finishing second in four majors. The Lake Placid community dared to believe it could host the Olympics a second time, and did so in 1980 ... and now believes it is possible to do what no community anywhere has yet done (London will do it in 2012) - host the Olympic Games THREE times.

Tuesday, October 24, 2006

8:30 am – 10:00 am

Session 4A

First Name: Scott
Last Name: Stoodley
Title: Senior Program Manager of Water Resources
Organization: AMEC Earth & Environmental
Email: scott.stoodley@amec.com

First Name: Brenda
Last Name: Berasi
Title: Remote Sensing/GIS Analyst
Organization: AMEC Earth & Environmental
Email: brenda.berasi@amec.com

Additional Authors: Robert McGregor, Senior Associate Engineer, AMEC Earth & Environmental
Carrie Thompson, GIS Analyst, AMEC Earth & Environmental

Presentation Title: Utilization of Remotely Sensed Data for Mapping Impervious Surfaces within Arapahoe County, Colorado

Abstract: AMEC Earth & Environmental is utilizing remote sensing to

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delineate and update areas of pervious and impervious surfaces for many municipalities to comply with regulations of the National Pollutant Discharge Elimination System (NPDES). This information allows for effective stormwater management, improved hydrological runoff models and the determination of appropriate stormwater user fees for residential and commercial properties.

AMEC Earth & Environmental used QuickBird multispectral satellite imagery acquired in July 2005 to map impervious surfaces for the County of Arapahoe, Colorado. This imagery is available from DigitalGlobe and is particularly well-suited for mapping impervious surfaces. It has 2.5 meter spatial resolution for its 4-band multispectral data and 0.70 meter spatial resolution for its panchromatic data. An iterative unsupervised classification technique was used to map impervious surfaces within a pilot area encompassing approximately 125 sq km. Field data was collected upon completion of the image classification to assess its accuracy. The results of this remote sensing exercise will be presented and the utility of this application will be demonstrated.

Advantages of remotely sensed data include synoptic views that allow for simultaneous regional-scale assessments as well as frequent and repeated coverage that allows for easy updating. For large areas, use of satellite imagery and digital image processing techniques is less expensive and less time consuming than hand digitization.

First Name: Margaret
Last Name: Shyer
Title: Forest Health GIS Planner
Organization: NYS DEC
Email: mlshyer@gw.dec.state.ny.us

First Name: Eric
Last Name: Shyer
Title:
Organization: NYS DEC
Email: ebshyer@gw.dec.state.ny.us

Presentation Title: Mapping on the Fly - Aerial Surveying with ArcPad7

Abstract: The NYS Dept. of Environmental Conservation's Bureau of Forest Health and Protection (FHP) within the Division of Lands and Forests is responsible for protecting New York State's forests. This is accomplished through the monitoring of it's environs via ground and aerial surveys and extensive use of GIS.

FHP in collaboration with the DIS GIS unit developed a customized ArcPad7 application for use with a ruggedized Itronix laptop to accommodate the rigors of recording information while flying in a plane. The focus of this presentation will be the aerial mapping form, which has a unique design, due to it's use in a plane. This will include the first draft of the form, the latest versions, and ideas for improvement.

This presentation will engage the audience in thinking about data collection and specialized forms for use other than on the ground and how to accommodate those unqie circumstances. The purpose of this presentation will be to showcase the forest health aerial surveying application, champion the importance of remote data collection and serve as an example of innovation in the government sector.

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First Name: Yinghai
Last Name: Ke
Title: Student
Organization: SUNY- College of Environmental Science and Forestry
Email: yke@syr.edu

First Name: Lindi
Last Name: Quackenbush
Title: Assistant Professor
Organization: SUNY - College of Environmental Science and Forestry
Email: ljquack@esf.edu

Additional Authors: Charles N. Kroll
Associate Professor
SUNY - College of Environmental Science and Forestry

Presentation Title: Forest Species Classification and Tree Crown
Delineation using Quickbird Imagery

Abstract: Efficient forest management requires detailed knowledge of forest stands, including species information and individual tree parameters. Remote sensing data are increasingly being used to investigate forest classification at both coarse and fine levels. This paper describes an algorithm for tree crown delineation and species level forest classification developed using eCognition software. The project used Quickbird multispectral imagery acquired over Heiberg Memorial Forest in Tully, New York.

The algorithm is composed of four parts: 1) Object-based species level classification using eCognition; 2) Derivation of individual treetop locations; 3) Tree boundary delineation; and 4) Refinement of preliminary delineation results.

The accuracy assessment of the final results includes evaluation of both species classification and tree crown delineation. Accuracy of species classification is determined by comparing stand composition with available ground inventory data. The automated tree crown delineation results are primarily evaluated through comparison with manual delineation.

Session 4B

First Name: Bongghi
Last Name: Hong
Title: Post-Doctoral Associate
Organization: SUNY College of Environmental Science and Forestry
Email: bohong@syr.edu

First Name: Karin
Last Name: Limburg
Title: Associate Professor
Organization: SUNY College of Environmental Science and Forestry
Email: klimburg@esf.edu

Additional Authors: Jon Erickson, Associate Professor, University of Vermont, John Gowdy, Professor, Rensselaer Polytechnic Institute

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Presentation Title: An interdisciplinary modeling framework assessing how human socio-economic activities on the landscape affect stream ecosystem condition

Abstract: Humans alter the landscape through urbanization processes, affecting ecosystems within the landscape. We present an interdisciplinary modeling framework evaluating how human socio-economic activities influence the spatial pattern of urbanization, and how consequent changes in land use affect water quality and stream ecosystem condition. The framework is composed of three "building blocks" simulating (1) the social and economic structures based upon a social accounting matrix (socio-economic submodel), (2) land use change and urban sprawl based upon a binary logit regression (land use submodel), and (3) stream ecosystem condition in the catchment area using a model based on the NAWQA (National Water Quality Assessment) dataset (ecosystem assessment submodel). The integrated model was applied to Dutchess County, New York, using an economic impact scenario of 1,000 new jobs in the semiconductor industry as a case study. The model predicted that an additional 1,292 jobs would be created in various economic sectors, 20 km² of watershed area would be converted into urban use, and there would be general degradation of stream water quality (e.g., increased sodium and chloride concentrations), as well as slight decreases in invertebrate and fish diversities and fish index of biotic integrity. We present additional simulation results obtained under several alternative management scenarios.

First Name: Seth

Last Name: Myers

Title:

Organization: State University of New York - College of Environmental Science and Forestry

Email: sjmyers@syr.edu

First Name: William

Last Name: Porter

Title: Professor

Organization: State University of New York - College of Environmental Science and Forestry

Email: wfporter@esf.edu

Presentation Title: Application of an Evolutionary Algorithm to a Spatial Optimization Problem

Abstract: Finding approximate solutions to optimization problems in spatial analysis is difficult if the size or complexity of the solution space precludes a manual or exhaustive computerized search. The genetic algorithm is a search technique useful in finding approximate solutions to such spatial optimization problems. Mimicking evolution, processes analogous to genetic recombination and mutation introduce variability into an initial population of problem solutions. The selection of best solutions (offspring) for propagation causes an evolution toward better solutions over successive generations. Separating a road network into contiguous sub-networks that vehicles cannot enter or exit without passing a traffic counter is an example of a spatial optimization problem which can be handled by a genetic algorithm. The optimization objective is to adjust the location of traffic counters within a road network in search of

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the optimal trade-off between spatial resolution of the data and implementation cost. The huge number of possible solutions makes any manual or non-strategic, computer-driven search relatively unproductive. We present here a genetic algorithm composed of ArcGIS components and geographic information handling in a separate programming language that splits the road network within the Adirondack Park into sub-networks by placement of traffic counters. Information supplied by a strategically-placed array of traffic counters will supply information of the number of vehicles within areas over time. As vehicles and human occupants are key drivers of economic and ecological change, this information is helpful for further modeling of the fine-scale dynamics of ecological and economic systems, especially those with a substantial tourism component.

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First Name: DURGA
Last Name: PEDDADA
Title: GRADUATE STUDENT
Organization: SUNY-ESF
Email: dpeddada@syr.edu

First Name: LINDI
Last Name: QUACKENBUSH
Title: PROFESSOR
Organization: GRADUATE STUDENT
Email: lquack@esf.edu

Additional Authors: Dr. Thomas Amidon, Chair of Paper Science Engineering Department, Professor. SUNY-ESF.

Presentation Title: A GIS-based model for Least Cost Path Assessment of Biomass.

Abstract: Biomass is renewable organic matter from trees, agricultural crop residues and wood residues. In recent years, environmental and economic concerns have created many opportunities for using biomass energy. Biorefineries convert biomass into energy related products such as electricity, biofuels and chemicals. Locating a biorefinery close to biomass resources reduces transportation costs. A bio-diesel supplying company seeks to develop a GIS-based method to define the available biomass within 50 miles of potential refinery sites.

The objective of this research is to develop a methodology for evaluating the available biomass within a defined travel distance from the potential biorefinery site and calculating the cost to transport biomass to the facility. Travel distance is based on the road distance from the biorefinery to the location where the biomass resources are situated. Biomass resources considered in this project include hardwoods and willows within a two-mile buffer of each road. These land cover types will be defined using the National Land Cover Dataset (NLCD) of 1992. Factors considered by the GIS model in determining transportation costs include travel distance, speed limit of the road and slope. This model will develop a general strategy, which will be suitable for assessing biomass resources within any specified distance of any point location.

Session 4C

First Name: Verne
Last Name: LaClair
Title: Project Manager
Organization: PAR Government Systems Corporation
Email: verne_laclair@partech.com

First Name: Brian
Last Name: O'Malley
Title: Software Engineer
Organization: PAR Government Systems Corporation
Email: brian_omalley@partech.com

Presentation Title: Agricultural Lands Assessment Modeling using ESRI's ArcGIS Server

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Abstract: Advances in Internet based GIS tools are enabling agribusiness in Cayuga County, NY (the largest industry in the County) to efficiently and accurately conduct farmland assessment modeling using tax parcels, soils mineral group polygons and crop field delineations. Historically, land owners and County Assessors have manually developed soils worksheets and farm value assessments using traditional tools including paper maps, soils databases and more recently, desktop GIS tools. Cayuga County Real Property staff invest a great deal of time and resources while assisting landowners and Assessors on a walk-in basis. As a result, the ability to conduct geospatial analysis via the Internet will greatly benefit agricultural land owners by giving them the ability to analyze their soil groups and land values. This presentation will examine the steps required to build, deploy, and train the public in the use an advanced ArcGIS Server web modeling tool.

First Name: Ricardo

Last Name: Lopez-Torrijos

Title: watershed Geographic Information Technologies Support Group, Chief

Organization: NYS DEC and IAGT

Email: rxlopez@dec.state.ny.us

First Name: Mary Theresa

Last Name: Julien

Title:

Organization: NYS DEC and University at Albany, State University of New York

Email: mbjulien@gw.dec.state.ny.us

Presentation Title: Integration of Metadata in the Enterprise GIS Business Process

Abstract: As the New York State Department of Environmental Conservation (NYS DEC) updates its GIS capabilities, metadata has been given a central role. From such perspective metadata should:

- * Support the integration of its records into the overall DEC Enterprise Database, so as to promote consistency and ensure mining of data across the Agency;
- * Support the integration GIS with the rest of the Agency's business enterprise solutions;
- * Support the data distribution agreements between each data layer steward and DEC's GIS; and
- * Support data distribution and documentation agreements between DEC and its partners at the Local Government, other State Agency and Federal levels.

The Elevation Data Development Program, part of the DEC's Floodplain Mapping Program, is developing these goals by instituting best-practices for metadata creation and maintenance at all stages of data development: scoping, contracting, acquisition, processing, QA/QC, acceptance review and publication. Integration is achieved by embedding the metadata in the business process and workflow, with defined roles at each stage and enforcement at contract level. The outcome is better coordination between data development efforts and delivery to users of a comprehensive, up-to-date record of all data parameters and characteristics.

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First Name: Susan
Last Name: Knauss
Title: Intern, MSIS U Pittsburgh, GIS Certificate UAlbany
Organization: DEC
Email: mknauus@gw.dec.state.ny.us

Additional Authors: Larry Alber of the DEC DIS GIS Unit has approved of this effort. There is a collaborative team working on the FGDC metadata creation and this presentation will review this effort.

Presentation Title: Metadata Matters

Abstract: The promise of geographical information systems as aids in decision making relies increasingly the availability of spatial data aggregated from multiple sources. The metadata of the geospatial data sets are the means for searching out and retrieving the components needed in an analysis. It also documents the nature and quality of the data that is necessary for determining the data set's appropriate use. The current best practice in support of GIS enabled decision making is to create metadata according to the Content Standards for Digital Geospatial Metadata (CSDGM) of the Federal Geographic Data Committee.

As part of the NYS Department of Environmental Conservation's commitment to create a state of the art ARCSDE based Environmental Information System, they have committed to using only FGDC compliant metadata. Currently the department uses over seven hundred datasets. Some are custodial and others come from outside of the agency. This presentation will describe the project that was devised to support the creation and management of those records. Issues and solutions will be reviewed. The topics will include, creation of FGDC metadata for non-custodial data if none exists, metadata conversion from HTML to XML, training and administrative needs, and legal concerns about distribution and use.

Session 4D

First Name: Joseph T.
Last Name: Jones
Title: GIS Coordinator
Organization: Nassau County NY
Email: jjones1@nassaucountyny.gov

Presentation Title: Integration of GIS and IT – 2006 Nassau County GIS Architecture

Abstract: In the summer of 2006, the County GIS Technical Committee and Department of Information Technology (DoIT) will have completed a year long initiative to enhance the County's GIS architecture. This effort has been spurred by three factors: 1) the explosive use of GIS based content on the County's portal, 2) the need to support the County's enhanced Public Safety and emergency preparedness requirements, and 3) the core GIS architecture is 10 years old.

As part of this initiative, the County's Department of Information Technology has declared the GIS to be a Class A application. The Class A applications are deemed critical to the operation of the County and must support a constantly growing number of users and applications in a secure, redundant environment. This Class A designation implies a return to

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operation (RTO) in 5 minutes. To accomplish this, DoIT and the GIS Technical Committee have undertaken a comprehensive design of a new GIS architecture that includes all new hardware and upgrades to the latest versions of all appropriate software.

The revised 2006 GIS Architecture takes advantage of the latest IT technologies and concepts, including blade servers, database clustering and network load balancing, scalability, and high availability. The product mix includes Red Hat Linux Enterprise Server, Oracle 10g Real Application Cluster (RAC), ESRI's ArcSDE spatial database, and Windows 2003 Enterprise Server.

First Name: Moshe

Last Name: Binyamin

Title: Senior Product Manager

Organization: MapInfo Corporation

Email: moshe.binyamin@mapinfo.com

Presentation Title: Improving Emergency Response through Service Oriented Architecture Based Applications

Abstract: Emergency response personnel rely on having access to the "complete picture" of the impacted area. An accurate Emergency Response Map enables first responders to make more informed decisions with regards to their critical responsibilities such as choosing the right evacuation routes, deployment of resources where most needed, contacting the right civilian organizations for assistance and more.

On-going challenge has been that data formats and sources are diverse and often reside in different physical locations. Emergency responders need access to the latest data including, street networks, parcel maps, electric and utility lines, and imagery and elevation data. In addition, the ability to overlay dynamic data such as weather data, traffic feeds and GPS information allows emergency personnel to get the real-time view of the area.

Until now the ability to create "real-time" maps that most accurately represented the true picture has not been considered practical, possible or affordable. The latest trends in Service Oriented Architecture (SOA), adoption of Open Geospatial Consortium (OGC) standards by software vendors, use of Open LS, popularity of GeoRSS and other web services are changing the picture and bringing Real-Time Maps closer to emergency response managers of all levels.

During the presentation we will explore some of the key standards and technologies that are the drivers of this change. We will also see how the new advances in technology are being used in emergency situations.

The session will include a presentation, a live demonstration (if internet access is available) and a Q&A session.

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First name: Sid
Last name: Cuff
Title: GIS Technician
Organization: IAGT
e-mail: scuff@iagt.org

First name: Dana
Last name: Piwinski
Title: Director of Program Development
Organization: IAGT
e-mail: dpiwinski@iagt.org

Presentation title: Supporting the First Responder in the Field with Advanced Visualization Technology

Abstract: First responders typically have limited mapping resources available to support situational awareness. Knowledge of the incident area through review of geospatial data prior to arrival on scene helps in the placement of command centers and deployment of resources. IAGT has developed a field deployable software tool to support First Responders. The technology has been used by county sheriff deputies and detectives to support both patrol operations and crime scene investigations. An overview of the tool and a demonstration of the technology will be provided.

Session 4E – Workshop

First Name: David
Last Name: Maidment
Title: Engineering Foundation Professor of Civil Engineering
Director
Organization: Center for Research in Water Resources
University of Texas at Austin
Email: maidment@mail.utexas.edu

Workshop Title: Arc Hydro and its evolution

Abstract: The Arc Hydro data model for customization of the application of ArcGIS in surface water resources was published in 2002, and a number of technological changes have occurred since then which make an update to Arc Hydro useful. Among them, are new techniques for representing geodatabase designs in XML which permit more flexibility in admitting data structures such as grids or the new net CDF files into a standardized data model. An important development in recent years has been a much deeper appreciation for the variation of data through time. As part of the Consortium of Universities for the Advancement of Hydrologic Science, Inc (CUAHSI) Hydrologic Information System (HIS) project, an HIS server is being created which provides a map front end to tabular databases of water observations (streamflow, water quality, groundwater levels and climate). This provides a common data window on water observations data from USGS, EPA, the National Climatic Data Center, and regional and local data sources. By integrating water observations data with GIS, weather and climate grids, and remote sensing, a digital watershed for a region can be created. This presentation reviews the evolution of Arc Hydro, and the development and use of HIS Server using examples from the CUAHSI research program and its applications in Texas.

ABSTRACTS for NYS GIS 2006 conference

Tuesday, October 24, 2006

10:30 am – 12:00 pm

Session 5A

First Name: James
Last Name: Cannistra, CP
Title: Vice President Strategic Accounts
Organization: Sanborn Map Company
Email: Jcannistra@sanborn.com

Title: Updating Planimetric and Topographic Datasets

Abstract: Local government agencies and utilities are increasingly faced with questions on how to update and maintain their planimetric/topographic and digital orthophoto base map data. The update process includes change detection techniques. Update programs may be comprehensive, or may focus on selected areas of change.

This paper will provide the author's perspective on best practices being employed for landbase update projects. It will use an update program recently completed for Westchester County, NY as a case study of an organization that has successfully completed a landbase update project, and will describe specific technical approaches and technologies utilized.

First Name: Mehmet
Last Name: Yavuz
Title: Student
Organization: SUNY-ESF
Email: myavuz@syr.edu

Presentation Title: Assessing the Accuracy of Wetland Delineations

Abstract: An accuracy assessment of geospatial data should be a standard for every application that deals with land cover / land use classification, extraction of linear features from remotely sensed data, and survey line features (e.g. roads, gas lines, wetland boundaries and power lines). Many accuracy assessment methods have been proposed and proven to be useful for thematic data, but few for linear vector features. In this paper methods to measure the accuracy of linear features are reviewed based on: 1. Presence/Absence (thematic), 2. Points (points to points), 3. Line to reference points, 4. Line to line, and 5. Polygon to polygon categories. A new method, Points in the Buffer Analysis (PIBA), for assessing accuracy of linear features is proposed. PIBA uses the spatial resolution of source data and sets buffer size based on the Federal Geographic Data Committee Standards (FGDC) for assessing the accuracy of the wetland boundaries. It uses Ground Control Points (GCP) from the GPS units to determine accuracy of the data. User's, Producer's, Overall accuracy and Kappa Statistics are used to report the measure of the accuracy assessment of the wetland boundary delineation. The results on the experimental data show that 95 percent of the sampled points fell into 1-m RMSE of the true wetland boundary whereas 3.92-m RMSE for the nearest distance method.

First Name: Yvonne
Last Name: Paul

ABSTRACTS for NYS GIS 2006 conference

Title: Graduate Student, Environmental and Resource Engineering
Organization: SUNY-ESF
Email: yepaul@syr.edu

First Name: Lindi
Last Name: Quackenbush
Title: Assistant Professor, Environmental Resources and Forest Engineering
Faculty
Organization: SUNY-ESF
Email: lquack@esf.edu

Presentation Title: Estimation of Accuracy – A Comparison of Lidar and
Survey-Based Digital Terrain Models

Abstract: Accuracy of light detection and ranging (lidar) sensors, in both horizontal and vertical directions, varies depending upon the nature of the terrain being imaged. The vertical accuracy of lidar is commonly published based on ideal conditions, e.g. pavement or low grass with relatively low slope. This is problematic when analysis is conducted under varying topographic and land cover conditions. This project compares digital terrain models (DTMs) over differing slope and land cover conditions derived from lidar and traditional field survey methods. This comparison will provide a means to evaluate vertical accuracy of the lidar sensor. Study sites throughout Heiberg Memorial Forest, in Tully, NY, will be located based upon their proximity to established monumentation, terrain slope, and land cover conditions. Six study sites will be selected to represent conditions including three land cover types – deciduous and coniferous forest, and open grassy fields – and two slope classes – low (<3%) and steep slopes (>7%). The accuracy of the lidar DTMs will be assessed using a comparison with the survey DTMs. The lidar DTMs will be interpolated to produce data points that correspond to the point data on the survey DTMs. The elevations across each study site will be compared to provide a quantitative measure of the differences between the two DTMs based on variable land cover and terrain.

Session 5B

First Name: Paul
Last Name: Rooney
Title: Upstate New York Accounts Manager
Organization: ESRI
Email: prooney@esri.com

First Name: Patrick
Last Name: Demer
Title: Technical Sales Support
Organization: ESRI
Email: pdemer@esri.com

Presentation Title: Water Utility GIS- Building A Base for Growth

Abstract: High-quality base level data is important for all GIS operations, especially so for organizations like water utilities, where an accurate base of spatial data can enable a thorough analysis of distribution networks. This session will look at techniques for building a base of water utility data from a variety of data types and offer strategies for integrating and analyzing data to achieve many utility-related tasks.

First Name: Jason
Last Name: Baum
Title: GIS Specialist
Organization: Town of Bethlehem
Email: gis@townofbethlehem.org

ABSTRACTS for NYS GIS 2006 conference

First Name: Mike
Last Name: Kaulfuss
Title: Senior Engineering Technician
Organization: Town of Bethlehem
Email: mkaulfuss@townofbethlehem.org

Presentation Title: MS4 Outfall Inventory and Mapping in the Town of Bethlehem

Abstract: The Town of Bethlehem in Albany County has a population of over 31,000 and total area of 52 square miles. Much of the Town lies in an MS4. Municipal Separate Storm Sewer Systems (MS4s) are required by the EPA and DEC to develop and implement a stormwater pollution prevention program (SWPPP) to reduce the discharge of pollutants from their storm sewer system to the maximum extent practicable. The SWPPP must cover six minimum control measures, including illicit discharge, detection and elimination (IDDE).

Guidance from the DEC is to use the 'Illicit Discharge Detection and Elimination Guidance Manual' from the Center for Watershed Protection (CWP) and University of Alabama as a reference on how to conduct the stormwater outfall investigation. The requested format for submitting to DEC is a digital GIS file of outfall locations and a database of field observations. The CWP Guidance Manual includes forms to be filled out with field observations for each outfall. The CWP website contains a MS Access database version of the same forms. We have modified the database to accept GPS coordinates from a Bluetooth GPS Unit, photos from a digital camera and to use only dropdown boxes, and use the database on a ruggedized Tablet PC in the field. The observations and measurements of the outfall are made, photos taken, and coordinates at the outfall are stored in the tablet database, and backed up to the network back at the office. The workshop will cover the customization and programming of the database, use of a Bluetooth GPS unit and Tablet PC, field methodology, and lessons learned.

First Name: Elena
Last Name: Borbat
Title: GIS Database Programmer
Organization: City of Ithaca DPW - Water & Sewer Division
Email: elenab@cityofithaca.org

First Name: Susan
Last Name: Nixon
Title: GIS Data Development Specialist
Organization: City of Ithaca DPW - Water & Sewer Division
Email: snixon@cityofithaca.org

Additional Authors: Scott Gibson, Environmental Engineer, City of Ithaca DPW - Water & Sewer Division

Presentation Title: Stormwater Management with GIS

Abstract: The City of Ithaca, as an operator of a small municipal separate storm sewer system (MS4), has implemented a Stormwater Management Program to fulfill the minimum requirements of their SPDES (State Pollutant Discharge Elimination System) permit with New York State. Part of the
10/4/2006

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Program requirement is the “development and maintenance of a map of all of the outfalls”. The City determined that a map would prove to be most advantageous if created with GIS, allowing for the maintenance and management of the entire storm system including the outfalls. The objective of the project was to fulfill the SPDES mapping requirements while simultaneously laying the groundwork for future system management and modeling.

A GIS database of the Stormwater System (3200+ pipelines and 2500+ structures) was produced from a physical inventory, which included multiple field data books and an extensive GPS survey. Over 200 outfalls were added to the database after they were GPS-located during a complete walk-through of the MS4.

In this presentation we will offer our methodology and tips for creating a successful stormwater system GIS.

Session 5C

First Name: Sherman
Last Name: VanDermark
Title: Eastern Region Sales Manager
Organization: Leica Geosystems Geospatial Imaging, LLC
Email: svandermark@lggi.com

Presentation Title: Blue Roof Mapping

Abstract: Blue Roof Mapping

How well would your GIS support a massive rapid change to your community?
Are you prepared and sure that your GIS will be useful and powerful in an unexpected situation?

The use of geospatial technologies can encompass a large number of uses in a single organization. After Katrina slammed into the Gulf Coast, there were multiple situations and techniques that highlighted the importance of preparedness for emergency disaster situations.

One example of this is Blue Roof Mapping; the process is called Blue Roof Mapping because of the blue tarps given out by FEMA that people draped over their ruined houses. The blue tarps caused the affected homes' roofs to immediately stand out in the overhead imagery flown post-Katrina.

Processing imagery using ERDAS IMAGINE provides an overview of the affected area, which in turn allows for timelier evaluation and assistance to the disaster area. More specifically, things such as change detection, image classification, road “passability” and flooding models can be produced to quickly respond to applicable scenarios.

ERDAS IMAGINE provides users with the capabilities to quickly and accurately process imagery in order to map the extent of damage throughout their jurisdictions. The ability to plan quickly and adjust to changing emergency needs saves time, money and quite possibly, lives.

Blue Roof mapping is not about devastation; it is about change. Change is

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a part of all communities and your GIS will be evaluated by how well responds to those change.

First Name: Aaron
Last Name: Pulaski
Title: Environmental Program Specialist I
Organization: NYSDEC, DAR, BMSTD
Email: aapulask@gw.dec.state.ny.us

First Name: Eric
Last Name: Shyer
Title: Mineral Resource Specialist 3
Organization: NYSDEC, DIS, GIS
Email: ebshyer@gw.dec.state.ny.us

Presentation Title: Use of Mobile Mapping to Compare Real Time In-Use Emissions from 2 and 4 Stroke Snowmobile Engines

Abstract: Emissions from snowmobiles have been a concern at Yellowstone National Park over the past years. In particular, two stroke engines have been the target of several investigations. Due to this concern, New York State residents have wondered whether regulators should address this situation in the Adirondacks and Catskills.

Staff from the New York State Department of Environmental Conservation (NYSDEC), Division of Air Resources, Bureau of Mobile Sources and Technology Development traveled to Belleayre alpine ski resort in the Catskills and tested a two and four stroke snowmobile. A Portable Emissions Measurement System (PEMS) was installed on the snowmobiles and data was logged at one hertz as the snowmobiles were driven up and down a beginner level ski trail.

A Trimble Pathfinder receiver connected to a Hewlett-Packard (HP) Pocket PC running Environmental Systems Research Institute (ESRI) ArcPad was used to collect and process the positioning data in the field. ESRI ArcMap was used to merge the emissions data with the global positioning (GPS) data and then to better represent the data. ESRI ArcScene was utilized to enhance the visual effect. This allows one to conceptualize how the topographical features and operator behavior affect the emissions produced by the snowmobiles.

First Name: Jason
Last Name: Wawro
Title: GIS Specialist
Organization: LaBella Associates P.C.
Email: jwawro@labellapc.com

First Name: Joseph
Last Name: Biondolillo
Title: Senior Environmental Specialist
Organization: City of Rochester NY, Division of Environmental Quality
Email: biondj@cityofrochester.gov

Presentation Title: GIS: An Essential Tool for Project Management

Abstract: The City of Rochester, NY along with LaBella Associates P.C. used GIS / GPS procedures to improve the efficiency of a large scale

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petroleum cleanup. They were able to cut costs on the remediation of a site with multiple contaminant sources that served as the City's Department of Public works for over a century. This presentation shows GIS and GPS field techniques and data management routines that cut costs and improve efficiency on environmental excavation and demolition projects.

Session 5D

First Name: Tim
Last Name: Ruhren
Title: NYSDOP Manager, Mapping Technologist 4
Organization: NYS CSCIC
Email: tim.ruhren@cscic.state.ny.us

First Name: Ray
Last Name: Faught
Title: Mapping Technologist 3
Organization: NYS CSCIC
Email: Ray.faught@cscic.state.ny.us

Presentation Title: Status and Future of the New York Statewide Digital Orthoimagery Program

Abstract: The sixth year of the New York Statewide Orthoimagery Program (NYSDOP) makes the program truly statewide: a partnership between the State and New York City means the five boroughs of NYC are included for the first time. Other regions of the state are being covered for the second time as the second cycle continues. While updated NYSDOP imagery has become a constant each year, the program continues to evolve. A new contract has brought new specifications and technology which offer new opportunities for the coming years. Constant effort is invested in improving the distribution of the NYSDOP imagery, including a partnership with USGS to make the imagery available through a web map service.

First Name: Cheryl
Last Name: Benjamin
Title: GIS Project Manager
Organization: NYS Office of Cyber Security & Critical Infrastructure Coordination
Email: cheryl.benjamin@cscic.state.ny.us

First Name: Rodger
Last Name: Coryell
Title: Information Technology Specialist
Organization: NYS Office of Cyber Security & Critical Infrastructure Coordination
Email: rodger.coryell@cscic.state.ny.us

Presentation Title: Maintaining the NYS GIS Streets & Addressing Data Sets

Abstract: Since the release of the NYS GIS Streets & Addressing Data Sets in July 2005, the New York State Office of Cyber Security & Critical Infrastructure Coordination (CSCIC) has been busy updating and maintaining these important data sets. Access to the updated data has been made possible through frequent data maintenance releases. In this presentation we'll take a detailed look at the new Street Change logs and how data

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users can easily determine what updates have been made in each data maintenance release.

Also in this presentation you will learn more about how CSCIC is working in partnership with their data maintenance contractor and NYS local governments to add new streets, correct street names, and refine address ranges. Successful data maintenance requires input from those organizations responsible for assigning street names and addresses, typically NYS county and local government emergency response organizations. An overview of the various data maintenance partnership programs available to these organizations will be provided. We'll also take a look at the new Map Maintenance, Notification and Tracking Application that has just been put into production. This Internet browser-based application allows authorized users to view the most recent streets and addressing data and provide updates utilizing simple mark-up tools.

First Name: John

Last Name: Trimber

Title: President

Organization: Weiler Mapping, a division of James W. Sewall Co.

Email: jtrimber@jws.com

Presentation Title: The proposed NYS GIS tax parcel model

Abstract: Several years ago, the NYS GIS Coordinating Body identified three framework data sets that they believed were necessary for governments to effectively use and benefit from GIS technology. Those framework data sets are:

- An accurate base map layer that can be used as a spatial reference for all other GIS layers
- An accurate road centerline layer with address information
- An accurate and consistent tax parcel layer with land ownership information

Since that time, the State has been able to plan and implement a statewide digital orthophotography program to meet the accurate base map requirement. More recently, the State completed the ALIS project, providing statewide road centerlines with address information to provide that framework data set for all New York governments.

In early 2004, the GIS Coordinating Body established a Cadastral Data Work Group (CDWG) to address the need for a consistent statewide parcel layer. The CDWG has been charged with the development a digital tax parcel standard that meets the needs of GIS users in the State and can be recommended to the counties as a model for possible adoption. The CDWG has developed a proposed standard that is currently under review by NYS ORPS.

The presentation will include background information on current digital parcel mapping in NY, the make up of the work group, input received from agencies such as FGDC, key issues that arose, and a discussion of the proposed standard.

Session 5E – Technical Session

How to make the grid, Talbot Brooks

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This technical session will explain the FGDC US National Grid and its use in disaster/emergency response. FGDC created the US National Grid and FEMA has adopted it as the standard coordinate system for use in times of crisis. This technical session will illuminate the definition of the standard and its application by explaining the grid, teaching participants how to read a map military style so you will know what folks in the field are experiencing and trying to do, and will show you how to make the grid in ArcGIS.

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Lunch

12:00 pm – 1:30 pm

Invited Speaker at the Tuesday Luncheon

First Name: Ron
Last Name: Langhelm
Title: GIS and Remote Sensing Coordinator
Organization: FEMA Region X
Email: ron.langhelm@dhs.gov

Presentation Title: GIS and disasters

Abstract: The emergency response environment is anything but peaceful. Providing geospatial products in this austere setting is always a challenge. When your temporary office space is outfitted with folding furniture, cell phones, and a web of network cable and extension cords strewn about the floor, the simplest tasks can be nearly impossible to tackle. Add to this a diverse workforce pulled from their jobs across the country and we have a strange potential to accomplish some rather unreasonable tasks. This talk will provide a vision into the emergency management/geospatial support setting, looking at the work area, staffing issues, unique customer base, urgent product requirements, and sample products.

Tuesday, October 24, 2006

1:30 pm – 3:00 pm

Session 6A

First Name: Emily
Last Name: Constantine Mercurio
Title: Remote Sensing Analyst
Organization: IAGT
Email: emercurio@iagt.org

First Name: Clifford
Last Name: Callinan
Title: Professional Engineer
Organization: NYS DEC
Email: cwcallin@gw.dec.state.ny.us

Additional Authors: Benjamin Houston, Program Manager, IAGT
Leif Olmanson, Assistant Research Scientist, University of Minnesota
Marvin Bauer, Professor, University of Minnesota

Presentation Title: Assessing Lake Water Quality of Water Bodies in New York State Using Landsat Imagery

Abstract: A protocol to use Landsat Thematic Mapper satellite imagery and in-situ lake water clarity measurements to estimate lake water quality has been established for inland lakes in the upper Midwest United States (Olmanson et al., 2001). This protocol was applied to inland lakes in a portion of New York State to determine how the methodology applies to this

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region and how comparable outcomes are to Midwestern inland lakes. Using Landsat imagery as the basis for the analysis and secchi disk and turbidity measurements from buoys as in-situ reference data, a linear regression equation was applied across the Landsat scene to estimate the lake water clarity for all lakes in the image. The methods from this study can be used to expand the lake water clarity mapping efforts to the entire state and Northeast region. In addition, historical lake water clarity may also be assessed using archived Landsat scenes and historic records of in-situ secchi disk measurements. The methodology to use Landsat and in-situ measurements to estimate lake water clarity and quality may also be of interest to the Environmental Protection Agency's National Lake Survey and Nutrient Criteria Survey.

First Name: Theodore
Last Name: Endreny
Title: Associate Professor
Organization: SUNY ESF
Email: te@esf.edu

Presentation Title: Improving transportation area estimates in the National Land Cover Database using vector road networks

Abstract: Water quality models require estimates of watershed impervious cover, such as that in transportation networks, to generate pollutant runoff concentrations and loads. This research presents data for New York that shows road network impervious cover was underestimated by the raster National Land Cover Data (NLCD) in its transportation class number 23. Further, this research presents a method where Tiger 95 Road Centerline vector data was used to update and improve NLCD class 23 areal estimates. Updated class 23 estimates were compared with NY High Resolution Digital Orthoimagery estimates of road cover, using metrics such as presence or absence, area extent, and congruence. Improvements to watershed transportation estimates increased with distance from major highways and commercial centers, and made significant impacts on water quality runoff concentrations.

First Name: Myrna
Last Name: Hall
Title: Assistant Professor
Organization: SUNY ESF
Email: mhall@esf.edu

First Name: Mehmet
Last Name: Yavuz
Title: PhD Candidate
Organization: SUNY ESF
Email: myavuz@syr.edu

Additional Authors:

Presentation Title: LAND USE / LAND COVER CLASSIFICATION AND CHANGE DETECTION OF THE CATSKILL/DELAWARE WATERSHEDS FROM 1975 TO 2002

Abstract: Land use and water quality are inextricably linked. To date we have shown in the Catskill Delaware watersheds that forest cover provides more optimal land cover for protecting water quality than many of the potential uses to which that land may be converted. Being able to project

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the future of forests in the Catskill/Delaware watersheds and at what point forest conversion to other uses will affect water quality in the area's streams and reservoirs should provide important information in the ongoing effort to balance water quality protection for the 8 million residents of New York City with the economic concerns of both city water users and the residents of the Catskill-Delaware watersheds. Determining and detecting detailed historic land use/land cover (LULC) changes can provide essential information for projecting future LULC transitions. However, this has been difficult using existing data sets due to both inaccuracy and conflict between classifications, and the inconsistency of classification category definitions that exist among the various satellite-derived LULC maps that have been done for the region. The objective of this study was, therefore, to create a detailed time-series of land use/land cover data done by one person in order to eliminate as much error as possible that is attributable to application of different techniques and different classifiers. We developed a classification algorithm that reflects the real land use/land change characteristics of the watershed as accurately as possible. We began with a detailed 15-category classification for year 2002 using a variety of techniques, including the haze optimized technique (HOT) for removing water vapor, chromaticity for separating water from shadows, square root radiometric enhancement for revealing vegetation under the cloud shadows, feature space images for near-perfect delineating of water body boundaries, and the Wallis Adapter Filter for agricultural and pasture lands, in addition to the traditional image classification techniques. We then applied Cross-Correlation Analysis (CCA), which measures the degree of change between images of different time frames in order to classify the 1975, 1987 and 1991 images. Our results reveal a net conversion of 1975 agricultural land to 738,000 acres of forest by 2002, while over 37,700 acres were converted to rural residential. Forest cover is being converted to observable rural residential at 2200 acres/year. If this same rate were to continue, an additional 47,000 acres of forest and agricultural land could be converted to rural residential use by 2016, with associated impacts to water quality. We will compare our results and accuracy assessment to other classifications that are currently in use.

Session 6B

First Name: Sean
Last Name: Myers
Title: GIS Specialist
Organization: CDM
Email: myerssd@cdm.com

Presentation Title: GIS for Small Water Utilities

Abstract: Water utilities are continuously faced with the pressure to conduct capital improvement planning and routine and emergency repairs with increased efficiency. The ability to do this relies on immediate and easy access to information that describes the location, characteristics, condition, and behavior of the utility system assets. Increasingly, water utilities are relying on information technologies such as Geographic Information Systems (GIS) as a means to store and analyze information about their water utility assets.

This presentation will discuss how smaller water utilities can get a GIS

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system up and running without having to make large, significant investments in hardware and software. The presentation will show how small water utilities can take advantage of existing GIS data models to design their GIS database, use simple conversion techniques to quickly build a GIS database, and implement comparatively inexpensive GIS applications to visualize and query the GIS database. The presentation will present several case studies of GIS implementations at smaller water utilities in the Northeast.

First Name: Elisabetta
Last Name: DeGironimo
Title: Watershed / GIS Coordinator
Organization: Mohawk Valley Water Authority
Email: edegironimo@mvwa.us

Presentation Title: Pipes, Hydrants, & Valves: Implementing GIS at a Medium-sized Water Utility

Abstract: The Mohawk Valley Water Authority (MVWA), based in Utica, delivers potable water to over 125,000 residents in Central New York. The MVWA is in the midst of a multi-year project to modernize its antiquated paper mapping, create a detailed hydraulic model, and find out exactly how much pipe is in service.

First Name: Gregory
Last Name: Keyser
Title: Engineer/Planner
Organization: CRA Infrastructure & Engineering
Email: gkeyser@croworld.com

First Name: Tao
Last Name: Tang
Title: Associate Professor
Organization: Buffalo State College
Email: tangt@buffalostate.edu

Presentation Title: Using GIS to analyze water distribution system demand

Abstract: Most infrastructure planning has been limited to isolated areas and/or communities. Consequently, waterlines have most often been designed to serve a community's immediate needs with little thought for future needs. This study analyzed the impact of the house hold water demand that is generated by population distribution on a water supply network system. The municipal water distribution system was built to serve a community's needs prior to present day conditions in the suburban towns of Amherst and Clarence. Apply US Census block group population data and the utility network analyst extension in ArcGIS, a study in comparison and contrast of water main pipeline supply discharge to demand in the Towns of Amherst and Clarence was conducted. Geographically distributed network model in ArcGIS shows that several "hot spots" on the network that the demands exceeded the supply discharges.

Session 6C

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First Name: Jim
Last Name: MaKinster
Title: Assistant Professor of Science Education
Organization: Hobart and William Smith Colleges
Email: makinster@hws.edu

First Name: Nancy
Last Name: Trautmann
Title: Senior Extension Associate
Organization: Cornell University
Email: nmt2@cornell.edu

Presentation Title: The Finger Lakes GIT Ahead Project: Creating Career Paths for Geospatial Technology Professionals

Abstract: Funded by the National Science Foundation, the GIT Ahead Project is a collaborative effort among the Finger Lakes Institute at Hobart and William Smith Colleges, Cornell University, Cayuga Community College, and the Institute for the Application of Geospatial Technology. Our overall goals are to help rural and urban high school students see geospatial technologies as a viable career option, and to create higher education pathways for students who might not otherwise pursue such goals. Launched in the summer of 2006, the project began with a 2-week professional development workshop for high school teachers, providing time and support necessary for them to learn to use GPS and GIS and to develop inquiry-based lessons applying these technologies to relevant local environmental issues. Participating students experience geospatial technology-enhanced units in their high school classes, have opportunities to participate in summer internships at either the Finger Lakes Institute (FLI) or the Institute for the Application of Geospatial Technology (IAGT), have opportunities to participate in academic year internships or job shadowing through a partnership with the NYS GIS Association, and enter the Geospatial Information and Technologies Associates Degree program at Cayuga Community College. Additionally, the Finger Lakes GIS Explorer is web-based software being developed by GIT Ahead, based on a professional-level decision support system designed by IAGT. The Finger Lakes GIS Explorer will provide the integration of traditional 2D GIS data, 3D interactive visualization, access to near real-time monitoring resources, links to textual or tabular data sources, and a fully interactive user interface.

First Name: Anne
Last Name: Wibiralske
Title: Assistant Professor of Environmental Studies
Organization: Hobart and William Smith Colleges
Email: wibiralske@hws.edu

First Name: James
Last Name: Hall
Title: Consultant
Organization:
Email: eskerca@aol.com

Additional Authors: Karen Edelstein
GIT Extension Specialist and CORSE Coordinator
Institute for the Application of Geospatial Technology (IAGT)
kedelstein@iagt.org

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Presentation Title: GIS education: a dynamic tool for multi-party collaboration

Abstract: Concern over how to preserve tracts of old forest in the Finger Lakes National Forest (FLNF) has been a key issue in the recent revisions to the FLNF's management plan. This lengthy revision process involved considerable discussion and debate among Forest Service staff and numerous stakeholder groups. The FLNF's 16,032 acres in Schuyler and Seneca Counties, NY contain a rich diversity of grassland and forest ecosystems and a rich diversity of stakeholders, including grazing associations, recreational hunters, loggers, hikers, nature enthusiasts, educators, and others. A number of stakeholders have advocated strongly for the preservation of forest stands containing old trees, but a current map of old trees on FLNF and adjacent lands did not exist. This presented an ideal focus for a collaborative community-based learning project using GIS. While participating in the annual summer Conference on Remote Sensing Education in Auburn, NY, in June 2005, a team consisting of a college professor and student, a not-for-profit agency staff member, and a community volunteer developed a community service, GIS-mapping project for a college environmental studies seminar. They further refined the project in discussions with FLNF staff. Working with their collaborators, the seminar students analyzed historic aerial photographs spanning more than sixty years to identify areas continually forested since the mid-1940s. The resulting GIS map was shared with regional land conservation organizations and FLNF staff. This project has built a strong foundation for continued collaboration among planners, managers, students, and stakeholders who have not previously worked together.

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First Name: Jonnell
Last Name: Allen
Title: Community Geographer
Organization: Syracuse University Geography Department
Email: jdallen@maxwell.syr.edu

Presentation Title: "Doing" Community-integrated GIS in Syracuse, New York

Abstract: The concept of community-integrated or public participatory GIS has been steadily gaining popularity over the past few years but the process of public involvement and community participation often remain elusive. Recently, a unique position was created within Syracuse University's Geography Department for the purpose of using GIS and other spatial analytical tools to address, in a participatory manner, important community challenges. The Community Geographer (CG) position is in response to the work of the Hunger Project, a collaborative effort among community service agencies, food pantries, and others interested in food security in Syracuse, NY to map the geography of hunger in the city. The results proved so telling that funds were secured from a local charitable organization to hire a full-time geographer, charged with using GIS technology to map key community problems in partnership with a variety of community organizations.

The CG has been well received among community groups, service agencies, and also among members of the academic community. In its first year, the CG and its volunteer advisory board have had to quickly establish mechanisms for balancing demand for the community geographer's time, working with community groups to define the nature of collaborative mapping projects, and balancing the wider Syracuse City's needs with the University community's needs. This talk will highlight the CG's many roles in working with community members, academics, and students to develop community-integrated GIS projects, provide examples of the types of questions community members are interested to investigate using GIS, and share insight into making Community-integrated GIS truly 'community-integrated.'

Session 6D

First Name: Paul
Last Name: Rooney
Title: Account Mgr
Organization: ESRI
Email: prooney@esri.com

First Name: Mark
Last Name: Scott
Title: Technical Marketing Representative
Organization: ESRI
Email: mscott@esri.com

Presentation Title: What's New in ArcGIS 9.2

Abstract: ESRI will provide an overview of the key features and enhancements of the ArcGIS 9.2 platform. We will mix product information with demonstrations.

ABSTRACTS for NYS GIS 2006 conference

First Name: Arthur
Last Name: Lembo, Ph.D.
Title: Senior Research Associate
Organization: Cornell University, Department of Crop and Soil Science
Email: ajl53@cornell.edu

Presentation Title: Modern geographic information system technologies at affordable prices

Abstract: Typically, placing the word "affordable" in front of GIS means "not very powerful or innovative". Therefore, most GIS users have ignored affordable GIS packages, and those who have used them are usually disappointed when confronted with the significant limitations. This presentation will attempt to remove the myth that an affordable GIS cannot also be an easy to use, powerful tool, that integrates the latest technology in computing. The session will focus on the latest innovations provided by Manifold GIS, including on-the-fly coordinate system integration and projection, spatial SQL processing, advanced topological overlay, internet map server capability, enterprise level integration with Oracle Spatial, IBM DB2, and SQLServer, multi-user concurrent editing, integration with image web servers (like Google Earth and Microsoft Virtual Earth) and Microsoft Office tools, and numerous other innovative features. While Manifold GIS is the focus of this presentation, the primary thrust will be to challenge participants to consider the importance of innovative technologies in any GIS software product they use.

First Name: Paul
Last Name: Culligan
Title: Manager, State and Local Government
Organization: MapInfo Corporation
Email: paul.culligan@mapinfo.com

Title: "Access Data where it lives"
with MapInfo Professional v8.5

Abstract: MapInfo Professional®, the industry's leading business mapping solution, let's you perform sophisticated and detailed data analysis to drive insightful decisions.

With the new features in MapInfo Professional v8.5, you have unprecedented access to powerful capabilities. Combined with new and enhanced analysis and visualization tools, version 8.5 is a dramatic leap in desktop location intelligence technology.

This presentation will focus on MapInfo Professional v8.5 Data access via industry standard services with the focus on WEB SERVICES.

The discussion and demonstration cover:

- Connectivity to MapInfo Envinsa and MapMarker for street level Geocoding (location enablement)
- Instantly generate Drive Regions and perform analysis
- Review MapInfo's new offering of hosted Envinsa Online Services (EOLS) for Geocoding, Find Address and Drive Region generation
- Access to other Web Services through MapBasic Programmability – i.e. GeoRSS and FTP and Image Connect
- Dedicated web Services toolbar for quick access to capabilities including WMS and WFS
- Interface to configure Web Services preferences include Proxy and HTTPS protocols.