Geographic Information Systems Technology News

The Newsletter of the New York State GIS Coordination Program

Eliot Spitzer
Governor

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Director

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NYS GIS Clearinghouse: http://www.nysgis.state.ny.us/

Youths, Planning and GIS Partner for Community Mapping Project in the Adirondacks

By Sheri Norton

In the small rural community of Warrensburg, located in the southern Adirondack Park in upstate New York, "There's nothing to do!" is a familiar refrain by kids. Although seemingly thriving from an outsider perspective, response from a survey in May to residents of the town deepens this perception that few opportunities exist for youths.

The town is currently developing a comprehensive plan spearheaded by Laura Moore of the Warren County Planning and Community Development Department. A key component of this plan will examine how to identify and promote opportunities for kids, particularly teenagers. With this goal in mind, a fruitful partnership developed with the Warren County Youth Bureau and the Warrensburg branch of the Cornell Cooperative Extension to implement a Community Mapping Project through the ACT (Assets Coming Together) for Youth program. The Warren County GIS Administrator, Sheri Norton, was approached by the group to provide technical assistance with the project.

Student mappers Alex Szabo and Kristin Combs prepare for an interview at the First Presbyterian Church in Warrensburg while Margaret Smith-Sing of Warren County Youth Services looks on.

A group of eleven local high school students volunteered to participate in the project, learning interviewing skills and how to use Garmin GPS units. Over the course of several days in November (starting on GIS Day!), the students interviewed approximately fifty organizations in the town, recording the locations when possible with the GPS units. The survey results will be entered into a database in the near future, to be joined to the physical locations of opportunities identified by the project.

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How do I Become a Cooperative Member?

To learn more about benefits of participating in the NYS GIS Data Sharing Cooperative, visit **http://www.nysgis/gis/datacoop.htm** or contact Sharon Oskam at the NYS Office of Cyber Security and Critical Infrastructure Coordination at (518) 474-5212 or via e-mail at **nysgis@cscic.state.ny.us.**

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Seven of the students visited the GIS Administrator at Warren County, and were given a demonstration of how the GPS and address data they collected is converted and used within a GIS system, and a practical accuracy comparison of the two field data location methods. Final maps of each organization interviewed will be prepared by Ms. Norton and used by the students developing a Community Mapping website and hardcopy resource book.

Submitted by Sheri Norton, GISP, Warren County GIS Administrator, **nortons@co.warren.ny.us**.
(Photo credit: with permission from Nancy O'Brien, *Adirondack Journal*)

NYS GIS Help Desk

The New York State GIS Help Desk, http://www.gishost.com/gishelpdesk/ is administered by the NYS Office of Cyber Security & Critical Infrastructure Coordination and sponsored by the New York State GIS Coordination Program. This web-based help desk is intended to provide support for both general GIS questions and specific questions regarding the technical use of the following GIS software products:

ArcGIS Desktop: ArcView
ArcGIS Desktop: ArcEditor
ArcGIS Desktop: ArcInfo
ArcInfo Workstation
ArcView GIS 3.x
ArcIMS (v 9.1 and later)
MapInfo Professional
MapXtreme (2005 and Windows)

Visitors can search the **Knowledge Base** to view previously submitted questions and answers or view the most **Frequently Asked Questions**. Residents of New York State may **Submit** GIS technical questions which will be answered within one (1) business day. All questions and answers will also be included in the searchable knowledge base.

Town of Dover Advocates Use of GIS

By Rosalind Cimino

I stumbled into the world of GIS in 2004 working as a clerk in the Building Department and Planning Board member volunteer in the Town of Dover, New York. GIS at that time was in the form of Arc Map 8.3 residing on the Building Inspector's computer. The Building Inspector was using the program along with the 10 base layers created by a local engineering company to primarily review ortho imagery and wetlands for building projects. My life took a drastic change in the Spring of 2004 when, at a Town Board meeting, I asked one question: "What is this GIS program and can't it do more than just print aerial photos?"

The Town of Dover Town Board led by Supervisor Jill Way then made a decision that would change the way I looked at my community forever. With the Town Boards full support, I enrolled in the Penn State's World Campus Department of Geography's GIS Certification Program. This program threw me head first into a world of geography and cartography that I had never known before. As each course was completed, I was able to apply the knowledge and skills I learned from the Penn State program to situations and problems both the Town & Planning Boards and Building & Code Enforcement department's were facing. I began collecting base layers from other Government agencies like FEMA, NYS DEC, NYS GIS Clearinghouse and the Dutchess County GIS Department and created new layers by joining existing data acquired with the Town's zoning regulations.

After my Certification was complete the Town Board created a full GIS Department, one of only a few highly functioning Municipal GIS Departments in Dutchess County. So today, my work life is spent georeferencing site plans to parcel data, fact checking applicant's Environmental Assessment Forms and using GPS to locate storm drains, catch basins and road signs for the Highway department. My Penn State Certification produced an enormous return on investment when, after georeferencing an illustrated map to redevelop a parcel in Town, GIS showed that the developer was building right through State owned property! The knowledge I have acquired from Penn State's online classes and exercises have pointed out countless "mistakes" on land use applications, from leaving wetlands and floodplains off maps to building on neighboring properties and pointing out discrepancies in total acreage.
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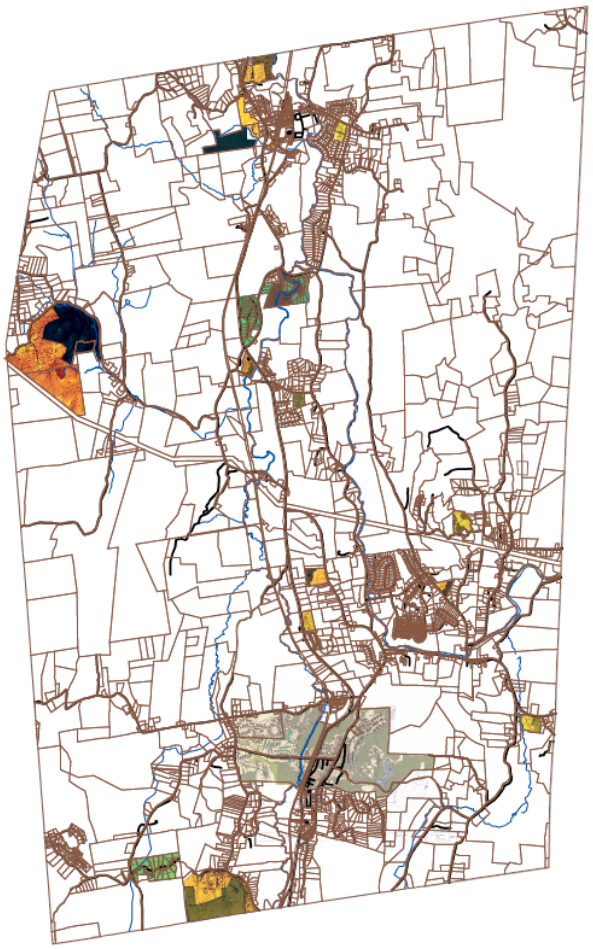
GIS is currently used "on the fly" at every Planning Board meeting and workshop creating a much more interactive environment between Board members and applicants and their consultants. The quality of land use applications has improved due to having subdivision and site plan errors reviewed in a public setting using Arc Map. GIS is assisting the public to
understand the cumulative impact of over 50 land use projects in Town and is helping all of us understand in a visual way the environmental constraints and the beauty that living in this section of the Hudson Valley means.

Geographic Information System uses for local communities seem endless. Future GIS projects for my community include working with the Town Historian to further archive valuable historical treasures, expand our GPS capabilities both in our Highway
and Building Departments and if authorized, bring the GIS world into our school system to enlighten future GIS students.

Submitted by Rosalind Cimino, Principal Clerk in charge of GIS at the Town of Dover, Dutchess County, **GIS@TownofDover.us.**



Gold Areas - Proposed Subdivisions
Light Green Areas - Approved Subdivisions
Dark Green Areas - Proposed and Approved Conservation Easements

Sample GIS output of the Town of Dover's use of GIS

Who's Who in GIS

The "Who's Who in GIS directory" is a listing of GIS professionals and their contact information. It is the intent of the "Who's Who in GIS" directory to promote coordination and professional development for GIS activities in New York State. If you would like to be added to this directory, or if you are currently listed in this directory and wish to update your contact information, please visit the following URL: **http://www.nysgis.state.ny.us/outreach/whoswho/**

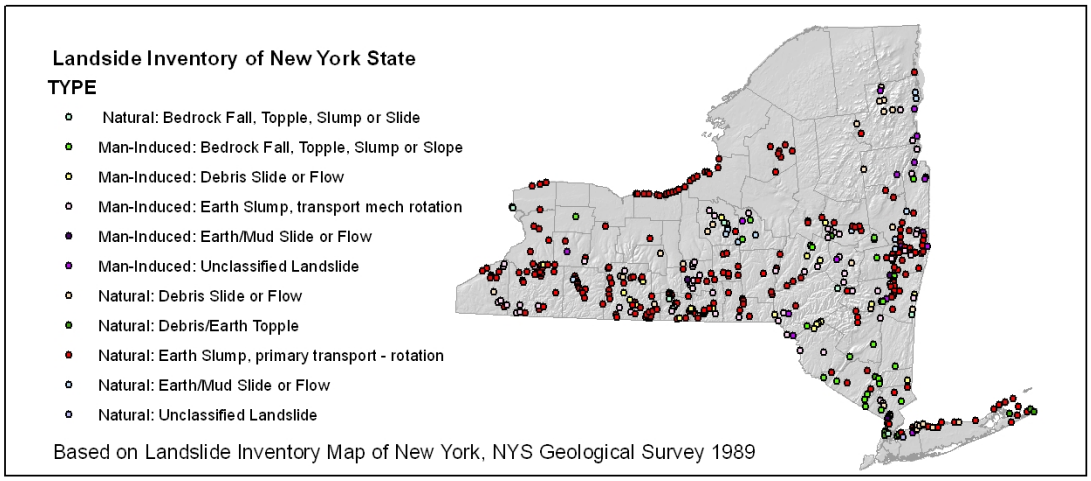
Landslide Susceptibility
– A Pilot Study of Schenectady County –

By Dan O'Brien

A major impediment in developing an effective mitigation strategy for landslides has been the lack of mapping that delineates, with the necessary degree of geographic specificity, the slopes that are most susceptible to landslide. Consequently, there is a great deal of uncertainty about this hazard in respect to where to target mitigative actions and how to factor this hazard into local land use planning. A contrasting analogy can be made with flood hazard where extensive floodplain mapping has been undertaken through the National Flood Insurance Program (NFIP). Based on the delineation of the floodplain, mitigation measures and policies have been adopted as well as providing for the ability to make more informed decisions about the need for insurance. In the case of landslides, no such map products exist.

With only a limited understanding of the areas that are most susceptible to landslides, communities often make land use decisions and approve site plans that do not factor this hazard. Opportunities to take mitigative action such as slope stabilization are missed as hazardous areas go unidentified. Exacerbating conditions such as leaking water lines that drain into vulnerable slopes fail to get the appropriate maintenance priority or drainage discharges that need to be rerouted go unchecked. Best practices, such as avoiding additional loading on vulnerable slopes with debris or other materials or not to excavate from the bottom of these slopes, are rarely presented in clear and consistent messages to the public. In a state of lack of awareness, property owners are often taken by surprise and find themselves uninsured when damaging events occur.

The reasons for limited areas where landslide studies and hazard maps are available has much to do with an analysis that has been manually intensive, time consuming and cost prohibitive. This situation is further magnified by the number and widespread areas in New York State that have experienced landslides (see NYS Landslide Inventory Figure below). The studies that have been done focused primarily on a manual comparison of slope and the presence of soils prone to sliding, such as 1982 NYS Geological Survey's "Geologic Hazards and Thickness of Overburden of the Albany, New York 15 Minute Quadrangle" by Robert H. Fickies and Peter T. Regan, New York State Museum and Science Service Map and Chart Series 36.



Since this 1982 study there have been key developments in the area of Geographic Information Systems (GIS) that has provided an opportunity to use the power of the computer to analyze and map what was previously done by hand. In addition there has been the conversion of key datasets critical to landside analysis into digital formats – particularly slope and soils. These datasets can be overlaid on a GIS with the ability to map locations of areas that have the coinciding soil properties and slope conditions that are most susceptible to sliding.

The recognition that significant progress in the area of landslide hazard mapping may be within reach given both GIS technology and the expanding availability of key digital datasets was previously noted in the 2004 New York State Hazard Mitigation Plan. This was also the agenda topic of a June 2006 meeting of federal and state scientists and emergency management officials that was hosted by the USGS New York Water Science Center, Troy, NY. At this meeting a proposal entitled "Evaluation of

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Landslide Potential in New York State" drafted by the USGS, New York Water Science Center, Ithaca, NY was circulated. The proposal outlined an approach to generating a "Landslide Susceptibility Map for New York State" and the development of a landslide "Fact Sheet" targeted at local government officials. While the USGS proposal was well received, funding for the proposal remained elusive during the following year.

Pilot Study Purpose

While the June 2006 USGS proposal was supported in concept by the attending officials, there was no example product available that could be used to help convey what was being proposed that could be used to educate and generate additional support from a wider audience. In efforts to move the proposal forward, a "proof of concept" pilot study was discussed in July 2007 between the New York State Emergency Management Office, USGS and the New York State Geological Survey. At this time, the updating of the New York State Multi-Hazard Mitigation Plan was underway. This plan lays out a strategic direction to mitigating the impacts of natural disasters, including indentifying specific activities that are needed to advance our understanding of risk – the framework of mitigation. The plan update provided an important opportunity to highlight the potentials to advance the landslide hazard risk assessment.

Pilot Study Organized

With a consensus between SEMO, USGS and NYSGS that a pilot study would be useful and timely, a recommendation was made by the SEMO Planning Section to inquire if Schenectady County would be interested in participating in as well as serving as the focal study region of a pilot study. This recommendation was based on the county's landslide history; landslides focus within their Local Hazard Mitigation Plan; and interest in mitigating landslides through applications to Hazard Mitigation Grant Program (HMGP).

Based on an initial inquiry to Schenectady County and their expressed interest to learn more about what a pilot study would entail, a preliminary meeting was held with the county on August 13, 2007. In addition to representatives from SEMO, NYSGS, USGS and Schenectady County, representatives from the New York State Department of Transportation and the New York State Office of Cyber Security and Critical Infrastructure Coordination (CSCIC) were also in attendance.

This August 2007 meeting resulted in Schenectady County expressing tentative interest in participating in the pilot study with their final approval requiring further review by the County's legal staff. There was a concern that the study not places the county into a situation of liability, which is understandable given the uncertainty with a project with no precedence. The liability concern was heightened by the initial pilot scope that was to include the risk to water, sewer and storm water infrastructure as well as these systems potential contribution to the landslide hazard due to potential leaking or run-off onto vulnerable slopes.

The county's need to take time to conduct a more thorough legal assessment on whether to participate would require time that was in short supply considering that the final submission date for the State Hazard Mitigation Plan was December 31, 2007 and the need for the study to be completed prior to that date. With a potential delay that threatened the ability to complete a project on time, a decision was made by the core pilot study agencies NYSEMO, NYSGS and USGS, to proceed irrespective of the county's decision to participate. The pilot would focus only on the natural factors contributing to landslide susceptibility, a "Phase I" of sorts, leaving the integration of infrastructure as a potential "Phase II" effort. This decision was based on an opinion from SEMO management that the correct course of government is to do its best to understand the hazards it faces even if the knowledge that is gained from studying these hazards exposes previously unseen risks that call for remedies not factored in budgets as well as expose actions or inactions of government that may have compounded that risk.

This "Phase I" with an optional "Phase II" follow-up approach not only freed the group from the necessity of the county's participation, but also may provide a future model as this would enable state and federal work to proceed according to its priorities, delivering initial useful products to local government that in-turn could be advanced to a "Phase II" study in collaboration with the local government who is often the owner of the infrastructure in question.

Fortunately, shortly after the decision was reached by the core agencies to proceed, Schenectady County made a decision to participate in the study. Given time constraints it was agreed that the project would focus on the geologic factors – a "Phase I" study, with the county's role focusing primarily on developing a GIS database of past landslide events. This information would be critical for model validation.

While a "Phase I" study does not necessarily require participation from local government it is most advantageous if a

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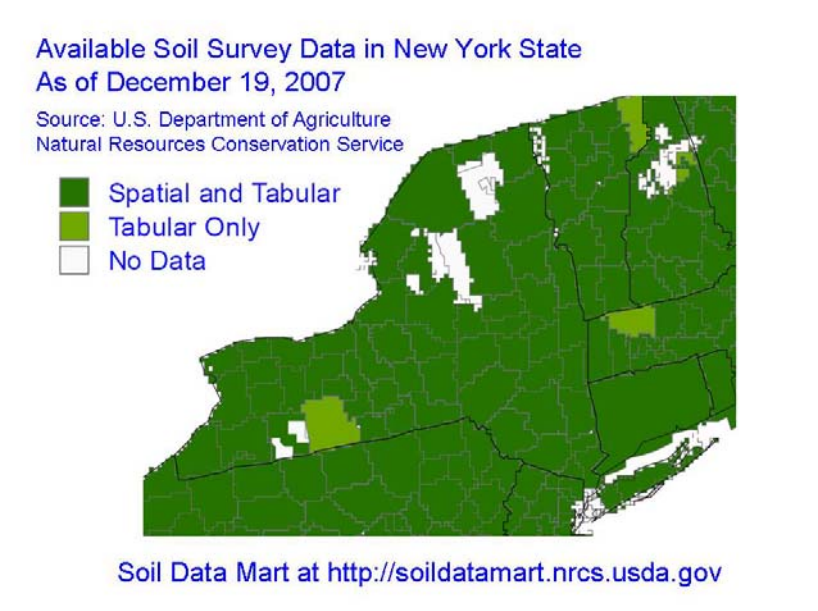
collaborative effort can be established. This was made most evident by the contribution the Schenectady County has made to this pilot study. The knowledge that local officials have of their geography, history of events, much of which is first hand, is of great value to understanding the landslide hazard. It is also important to recognize that it is local government that is in the best position to mitigate the landslide hazard through land use regulation and other practices.

Pilot Study Methodology

An important aspect of the methodology used in this pilot study is that 5 of the 6 variables used to determine landslide susceptibility are derived from one source - the U.S. Department of Agriculture Natural Resource Conservation Service's SSURGO Digital Soil Survey, accessible for download at: http://soildatamart.nrcs.usda.gov.

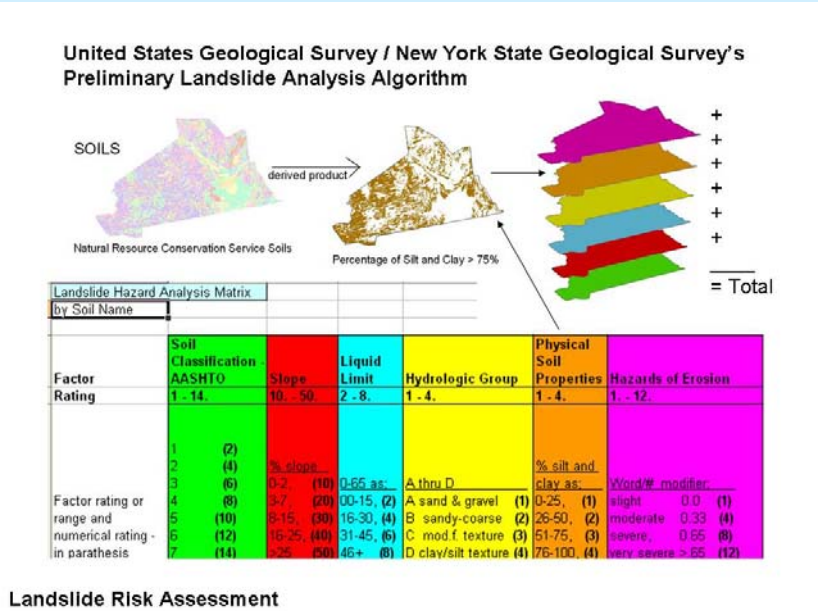
The NRCS web site provides for the ability to select a county of one's choosing and download the SSURGO soil survey database, including information in tabular and spatial (GIS) format. The spatial GIS data includes a GIS shapefile (polygon) of soil units attributed with the soil unit's letter key (field named "MUSYM"), while the tabular data includes a Microsoft Office Access Application with the ability to generate soil reports that provide a great number of data on each soil unit.



Included in the tabular data are soil properties that factor into calculating landslide susceptibility. The soil unit properties contained in the soil survey that were identified by the pilot study geologists Kappel, Kelly, and Kozlowski as landslide susceptibility indicators include: 1) American Association of State Highway and Transportation Officials (ASSHTO) Soil Classification; 2) Liquid Limit; 3) Hydrologic Group; 4) Physical Soil Properties (%silt and %clay); and 5) Hazard of Erosion. In this pilot study methodology, each of these soil unit properties was assigned a weighted value relative to their contributing factor in predicting landslide susceptibility (see Landslide Risk Assessment Figure below where relative weights are shown in parentheses).

To access the identified soil unit properties, the Microsoft Office Access Application is used to generate soil reports that can be exported to an Excel format. With some database preparation, including deletion of cells containing long sentences, text descriptions and deletion of blank records and cells, this file can be linked to the GIS soil unit shapefile. Using the (MUSYM) field as database link, the pertinent attribute information for landslide susceptibility is established within the GIS layer.

The landslide susceptibility variable that receives the highest weighted value in this methodology is slope. While the SSURGO soil units contain information on slope (indicated by the letters "A", "B" or "C" that are appended to soil text abbreviation (MUSYM)), the slope values that were used in this study were based on a



Landslide Risk Assessment

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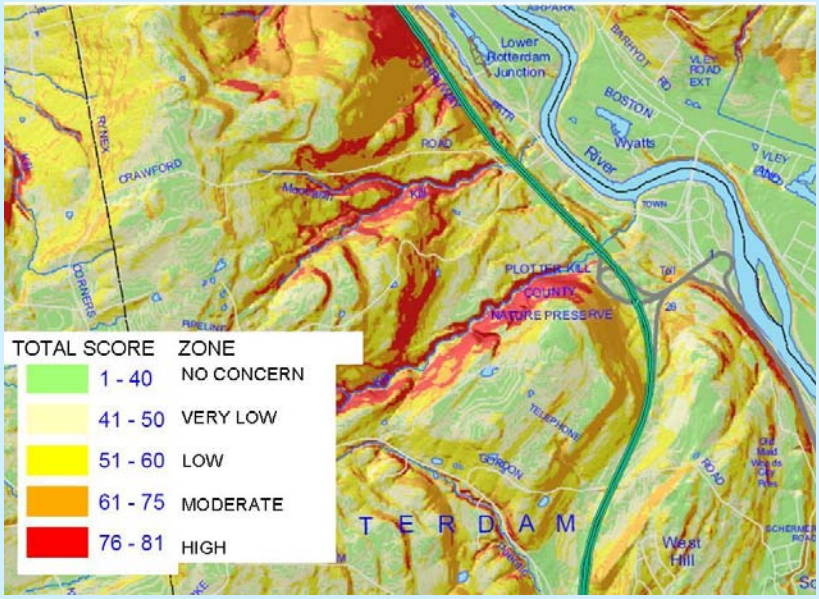
slope analysis derived from a countywide Digital Elevation Model (DEM) compiled from the NYS Department of Environmental Conservation's 7.5 Minute Quadrangle DEMS. It was believed this would provide a more accurate indicator of slope that the SSURGO source.

The slope map generated from the NYS Department of Environmental Conservation's 7.5 Minute Quadrangle DEMS was combined (ESRI "Union" command) with the SSURGO Soil Survey GIS layer that was previously attributed with the landslide susceptibility variables. At this point each discrete soil unit had all six variable values and the corresponding weighted values as individual fields in the attribute table. The six fields containing the weighted values of the six variables were then summed to establish a landslide susceptibility "total score". The "total score" ranged from areas with numbers as low as 4 to as high as 81. Range groupings were established from "total score" values to assign landslide susceptibility descriptive zones as "HIGH", "MODERATE", "LOW", "VERY LOW" and "NO CONCERN."



Model Limitation in NRCS Soil Survey Areas Classified as "Urban"

As the NRCS Soil Surveys were developed primarily for agricultural purposes, portions of the Schenectady County that are highly developed, primarily in the City of Schenectady, have soil units that are classified as "Urban". The SSURGO database does not include soil properties for the "Urban" soils. Consequently, while slope values for these areas can be calculated from the DEMs, the remaining 5 variables and their associated weighted values were not able to be derived from the Soil Survey. As a result, the "total score" values in these areas do not reflect the appropriate level of hazard and have been excluded from the study.

Pilot Study Validation

A validation of the model was performed by comparing the locations of past landslide events to the landslide susceptibility map. Schenectady County Economic Development and Planning Department provided a GIS point file of 15 landslide events. These landslides are larger events taken from recent memory and historical records where a general location was easily supplied. There have been many others, usually of lesser magnitude, which have not been geographically located (latitude / longitude) and therefore were not used in this initial assessment.

A GIS file of landslide events was overlaid on the landslide susceptibility map with each landslide event tagged with the "total score" value at the respective point location. On first inspection, only 5 of the 15 landslide events fall within a "HIGH" landslide susceptibility zone. On further inspection, however, using an orthoimagery backdrop, it becomes apparent that a slight adjustment in the point location of the landslide to fall more directly on the visible slide area would result in 10 of the 15 landslide events in a "HIGH" landslide susceptibility area. In addition, several of the locations where the landslide score was low, appear to be related to road construction embankments. Since the model is based on natural soils characteristics and slope, these changes are not accounted for in this model. With these landslide events eliminated from the validation, 10 of 13 landslide events fall within a "HIGH" landslide susceptible zone. The "HIGH" landslide susceptibility zone comprises only 2% of the total area of Schenectady County. Given that only a limited area of the county is classified as "HIGH" susceptibility and that 10 of 13 landslide events fall within this zone, the model has shown, in this instance, to be an excellent predictor of the landslide hazard.

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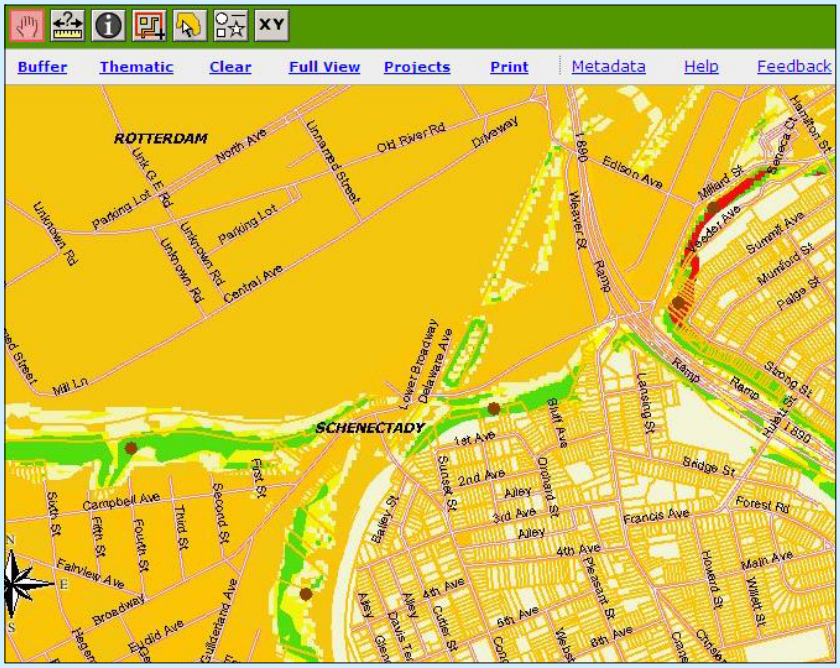
Model Refinements

As a pilot study, the methodology used can be considered preliminary. It would likely be refined through additional studies. Approaches that address the lack of data for "Urban" soils will need to be devised as well as other shortcomings such as the limited information of soil depths. A "Phase II" study that looks at the inclusion of infrastructure would also be of benefit in furthering the identified hazardous areas.

While the NYSDEC DEM provides an acceptable slope resolution, the use of Light Imaging Detection and Ranging (LIDAR) terrain data that is becoming more widely available through FEMA Flood Map Modernization Program will provide better slope input as well as may be useful in identifying previous undocumented landslides. An effort should be made to ensure when collecting LIDAR data for a floodplain mapping, the surrounding slopes are also included. FEMA should consider the multi-hazard utility of LIDAR into its data collection plan.

Conclusion

The Landslide Susceptibility Pilot Study of Schenectady County provides a "proof of concept" example, reinforcing previous statements by the USGS and New York State Multi-Hazard Mitigation Plan, that significant advancements can be made in mapping the landslide hazard in New York State. Given existing widely available data, GIS technology, and knowledge of landslide mechanisms, landslide susceptibility maps can be generated in a cost effective manner. The geographic resolution of these maps is sufficient for land use planning and would provide a foundation for mitigation. Importantly, as a digital product, these landslide susceptibility maps can be easily integrated into systems that make the data widely available to the general public or for internal government review as is demonstrated by the integration of the landslide susceptibility GIS map layer into Schenectady County's online GIS mapping system (see Figure to the right).



While this pilot demonstrates that landslide susceptibility maps can be generated in a more cost effective manner than was previously possible, it does not imply that resources will not be needed to expand this work to other counties and eventually statewide. Of particular need is staffing. The New York State Geological Survey has traditionally been the lead agency on landslide hazard analysis and for many years had staff supporting this responsibility. This staff position has remained unfilled following a retirement several years ago. In addition the agency no longer has its own in-house GIS staff and now relies on limited shared NYS Museum GIS staff.

The enhancement of staffing and resources at the NYS Geological Survey would enable this agency to better serve its traditional role and responsibilities with landslides as well as serve as lead agency for a multi-agency program focusing on landslide evaluation and susceptibility mapping. This program should include, but not be limited to NYSDOT, NYSEMO and possibly NYSCSCIC, which may be in the best position to serve as an interactive clearinghouse for reporting and mapping landslide occurrences.

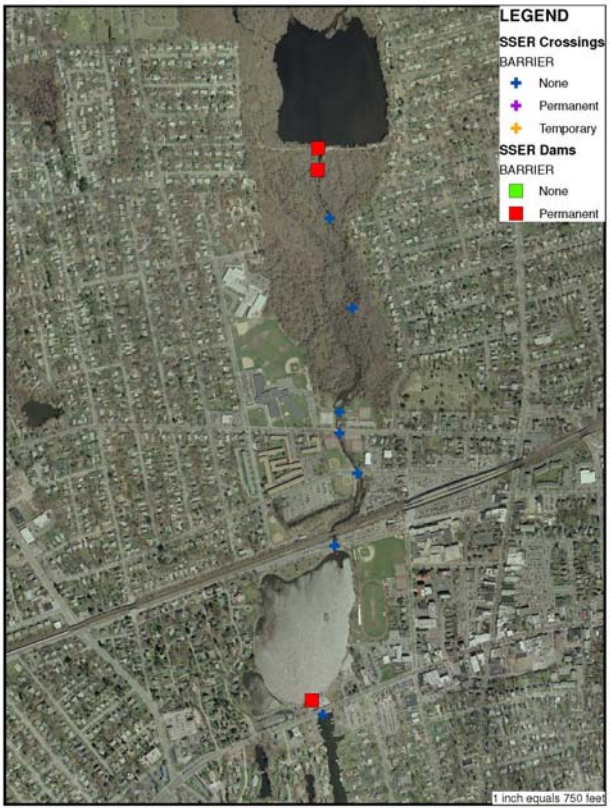
Irrespective of how the state may organize itself in the future to better map landslide susceptibility as well as support landslide hazard mitigation in general, coordination with the USGS and with local government, an important end user of this information, will be critical to a successful program. The theme of federal-state-local partnership that is demonstrated with the Landside Susceptibility Pilot Study of Schenectady County should be carried forward in future efforts. This theme of partnership is also consistent with recommendations made by the National Research Council of the National Academies in its report "Partnerships for Reducing Landslide Risk – Assessment of the National Landslide Hazards Mitigation Strategy", available at: http://www.nap.edu/catelog/10946.html.

Submitted by Dan O'Brien, GIS Program Manager, NY SEMO, **Daniel.OBrien@semo.state.ny.us**.

Inventorying and Assessing Fish Barriers Using GIS

By Sara N. da Silva and Lara Pomi-Urbat

Waders and bug repellent - two very essential tools when working your way up the meandering channels of coastal streams along the south shore of Long Island in mid-summer. Also useful, a Trimble GeoXT GPS, camera, and the field size maps we created to inventory and assess potential barriers to fish passage as part a study funded by the NYS Department of State and South Shore Estuary Reserve (SSER) through the Environmental Protection Fund. Diadromous fish such as alewife, American eel and sea-run trout used to be abundant throughout these streams before humans started installing impediments to their annual migration between the ocean and freshwater spawning habitats. In an effort to restore the historic habitats of diadromous fish in the tributaries of Great South Bay, the project goal is to inventory barriers such as dams and then develop a prioritization strategy for the removal or modification of these structures.



By first using ArcGIS to overlay the orthophotography with the NYSDEC dam database, roads, parklands, and tax parcel information, we were able to target areas and potential obstructions which would need to be verified and assessed in the field. Orthophotos from the NYS Digital Orthophotography Program's on-line database were invaluable to both our field and office work. With field maps of our target areas in hand, we were able to save time by reducing the amount of stream length which had to be field investigated. Exact points for each stream crossing and barrier encountered were field located and detailed information regarding the structure's size, condition, setting, as well as ecological information in the vicinity of the structure were recorded. Sometimes unexpected barriers, such as large snapping turtles, also presented themselves and we made note of these also. The gathered information was compiled into a GIS database developed for the project. The New York State Historic Preservation Office's (SHPO) on-line GIS database was also utilized to identify barriers which were located within the vicinity of State and National Register-listed Historic Places or archaeologically sensitive areas. Using the newly developed stream inventory database, we were able to analyze and prioritize which barriers should be targeted for removal or modification.

This inventory is a classic example of how GIS is an excellent tool for assessing and depicting large amounts of spatially-related data. The fish barrier database can be easily expanded to include inventories of additional streams within the region, as well as to track the progress of habitat restoration initiatives, including dam removals and installation of fish ladders. The final report containing the inventory results and prioritization strategy will be available later this year.

Submitted by Sara N. da Silva (**sdasilva@nelsonpope.com**) and Lara Pomi-Urbat (**lpomi@nelsonpope.com**), Nelson, Pope & Voorhis.

GIS Communications and Outreach

Looking to find a local GIS Users Group? Interested in contributing to GIS-related electronic discussion lists? Then the NYS GIS Clearinghouse Communications webpage has the information that you are looking for. Here, you will find links to many different electronic discussion email lists, as well as links to and contact information for the many GIS user groups across New York State.

http://www.nysgis.state.ny.us/comm.htm

Web Based GIS Helps Buffalo Recover From Surprise Snow Storm

By Jake Needle

On October 13, 2007 a historic lake effect snow storm surprised the city of Buffalo, New York dumping more than two feet of snow overnight. Two days later, President Bush issued a major disaster declaration for the city and surrounding areas. Federal aid was made available to assist in recovery efforts.

Located on the northeast shore of Lake Erie, Buffalo sees on average more than 93 inches of snow each year. This particular storm event was unique in the fact that it occurred in early October, most major snow fall does not occur until late November or early December. As a result of this snow storm, there was wide spread damage to roughly 85 percent of the areas trees. The damage to the trees was a result of vertical snow loading on fully canopied trees causing limbs to structurally fail. The falling branches caused excessive damage to cars, houses and powerlines, leaving nearly 400,000 residents in over 100,000 homes without power for several days.

Once known as the "City of Trees", the City of Buffalo has maintained a complete urban forest inventory since 2001. This inventory includes all City owned trees that reside in the public right of ways between the curb and sidewalk and also all trees in the City parks. There are a total of 68,000 trees and 108,000 inventory locations included in the tree inventory. WENDEL, an engineering and architectural firm with headquarters in Amherst, New York, has been the residing Urban Forest Manager since 2005 responsible for day-to-day maintenance and management of the tree inventory. This includes the issuance and management of annual trimming, planting and removal contracts, handling citizen complaints regarding street trees, inspecting contractor work, and inspecting and updating information on each individual street tree in the inventory.

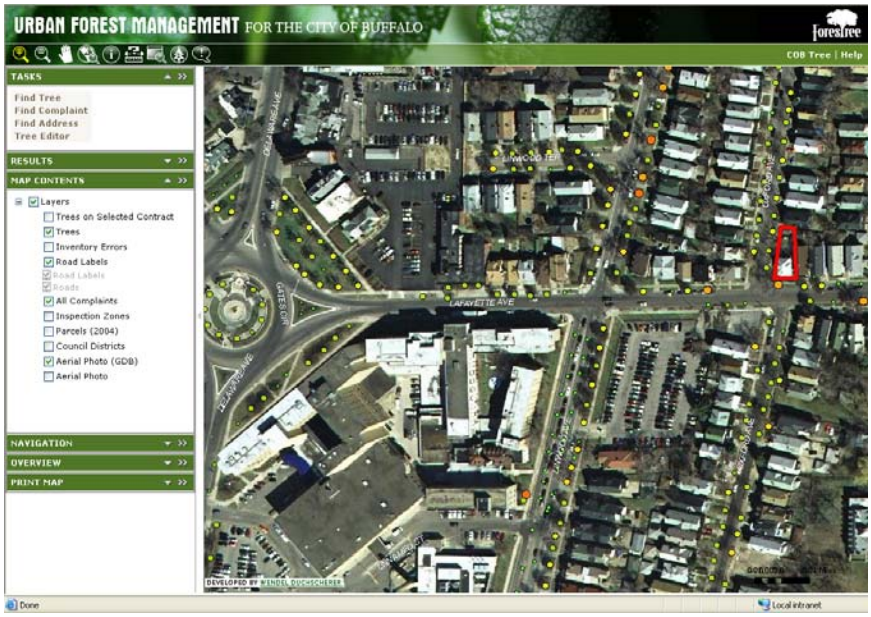
After the October storm, and after the initial clearing of fallen trees and tree branches from the roadways, the City started assessing the condition of the urban forest. Within the first few days after the storm, the City realized that a new system would have to be implemented in order to assess and inventory all damaged trees throughout the city. The existing tree inventory management system in place at the time of the storm, was not capable of supporting the effort needed to assess and update the inventory on such a large scale. Before the October storm, many of the tasks needed to manage the tree inventory were completed using a paper based system involving the use of paper tickets. Hours of data entry into a central database was necessary after information was recorded on paper forms out in the field. Another consideration for the development of a new system was to improve the City's chances to qualify and receive maximum funding from FEMA for the several month long post storm cleanup effort.

Urban ForesTREE Management

WENDEL's urban forest specialists and GIS professionals collaborated to develop a GIS based tree management program to answer the urgent and comprehensive needs of the City resulting from the weather disaster. *Urban ForesTREE Management* was developed utilizing a combination of ArcGIS Server and ArcIMS technologies. When the initial development started two weeks after the storm, four separate groups were identified as primary users of the program—contractors, inspectors, city officials, and the urban forest manager. Each group had a customized web based GIS site developed to fit the particular needs and requirements of the work that was completed. By having each site use the same central database, work that was completed on one group's site instantly updated the information on the other two sites. This prevented errors caused by lack of information or delaying communication to the decision makers.

(Continued on page 11)

(Buffalo...Continued from page 10)



The first task after the storm clean-up was to inventory all of the damaged trees out of the 68,000 existing trees owned by the City. An ArcIMS application was developed by WENDEL to run on a pocket PC which inspectors used out in the field. One of the main considerations when development started was the elimination of using paper forms. These forms were recreated as editable asp forms and integrated into the IMS site. This not only helps the field workers with organization, it eliminates the manpower required to enter the data into the central database by office personnel at a later time. General reference layers (e.g., parcels, aerial photography, roads) were added to the application to help inspectors reference their location when out in the field. Through this application inspectors were able to select a tree on the map and enter updated information directly into the central database. There were up to ten inspectors in the field at one time after the storm, but before inspectors could be deployed WENDEL hosted training sessions instructing inspectors on the use of the developed pocket PC field application. Another benefit of this system was the real-time display of completed work. Project decision makers and city officials were able to view daily progress and all detailed field information.

Once the damaged trees were assessed, they were added to either trimming or removal contracts. WENDEL developed another ArcIMS application to help contractors mobilize their crews, track and locate the trees on each particular contract. Organization of the individual contractor information was critical as over 100 field crews were working throughout the City at any one time. The IMS site provided the contractors with a map and list of the trees for each of their individual contracts. When work on a tree was complete, the contractor was able to request inspection of the tree through the website. When an inspection was requested by a contractor it was instantly added to the inspector's web application allowing inspectors already mobilized in the field to visit and inspect completed work sites on a more timely basis. This not only automated the scheduling and work assignments for the inspectors but it also expedited the verification and payment process for the contractors.

The most complex parts of managing the City of Buffalo's urban forest is editing tree locations and attributes, along with handling complaints submitted by the public. WENDEL developed an ArcGIS Web Mapping Application (WMA) designed to efficiently meet these challenges. The urban forest manager needs the ability to edit the location and associated attributes of every tree in the inventory. A tree info tool allows viewing and editing of each tree simply by selecting the tree through the mapping interface. Individual trees can also be added to selected contracts while in the field eliminating the need to create the contract information at a later time.

The City's website has a citizen Call and Resolution Center where residents can submit complaints related to City services. Any complaints about city trees are entered into the system by geocoding the address entered on the web complaint form. These geocoded locations are populated on to the WMA site through a nightly automation process. A custom tool was developed which allows the urban forest manager to select an individual complaint and enter the various attributes recorded for response to the complaint.

The October storm caused unprecedented damage to the City of Buffalo's tree population and at the same time changed the management of its urban forest. The GIS based *Urban ForesTREE Management* program developed as an outcome of the storm provides the City with an innovative system to manage and maintain their urban forest more effectively and efficiently than ever before—and saves the city money which is being reallocated to repopulate the trees that were lost as a result of the storm.

Submitted by Jake Needle, GIS Manager, Wendel Duchscherer **jneedle@wd-ae.com**.

Two NYS GIS/GPS Professionals Provide Geospatial Training in Kosovo

By John "JB" Borst, Jonathan Cobb & Austin Fisher

From Nov. 13, 2007 to Nov. 15, 2007 the American University in Kosovo (AUK) Center for Energy and Natural Resources (CENR) organized professional training on GPS and GIS held by Jonathan Cobb from Waypoint Technology Group (WP) and Austin Fisher from fountains spatial, inc. (FSI). The training was an introduction to geospatial technologies, GPS/GIS applications, GPS hardware/software and GIS related technologies and fundamental concepts offered to employees of a regional energy company as well as AUK students. For three days the attendees learned the fundamentals of GPS and GIS technology through both theoretical lectures on the uses and capabilities of GIS as well as hands-on activities where participants gained practical skills by mapping parts of the AUK campus. Participants also learned functional uses for GPS/GIS technology that they can take back to their workplace, such as how to map electric power lines, houses, roads and even one's personal position.

Geographic Information Systems Technology (GIST) Newsletter recently interviewed Jonathan and Austin regarding their training experiences in Kosovo.

GIST: Describe this opportunity and how it came about?
JC/AF: WP already had an existing relationship with RIT (Rochester Institute of Technology) which has partnered with the American University in Kosovo and administers its curricula. When Jonathan was following up with RIT they asked if he knew any one who could provide GPS training. As part of this discussion RIT told Jonathan that this would be in support of work they were doing at the American University in Kosovo. It then became clear that there was value in expanding this training to include GIS in addition to GPS. Jonathan Cobb thought FSI would be well-suited for conducting the GIS portion of the training and he contacted Austin Fisher to gauge his interest. Austin was very interested in the opportunity, as expected; and, after preparing and submitting a joint proposal, both WP and FSI were contracted by RIT to perform a week of GIS/GPS training in Kosovo. Given the scope of the project and logistical considerations, the timeline from concept to completion was remarkably short – a matter of several weeks.

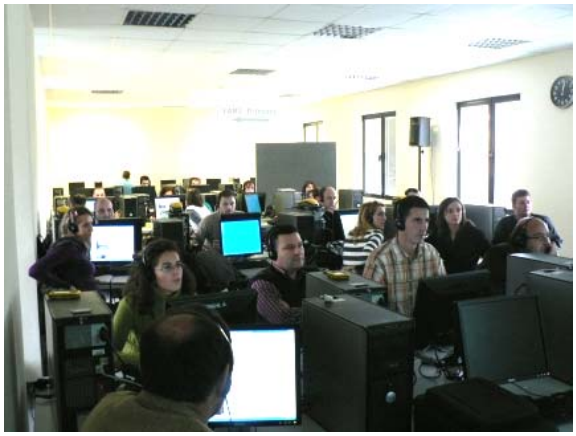
GIST: Who attended this training?
JC/AF: Students at AUK, engineers from the regional energy transmission company (KOSTT) and engineers from the regional energy distribution company (KEK)

GIST: What did the audience expect to get from this training and how do they plan on using GIT?
JC/AF: In addition to introducing the concept of geospatial technology and illustrating its potential for improving business analysis and operations, the overall goal of the training was to provide students with introductory level training on the use of GPS and GIS technologies, specifically Trimble GPS equipment and ArcView 9.x. For the students at AUK, there was no additional objective. However, for the engineers from KOSTT and KEK, the intent was to use this technology to develop and inventory for their electric utility assets and infrastructure and use geospatial technology to update, manage, and analyze this information.

GIST: What type of feedback did you get from the students? From those that put on this training?
JC/AF: We received very positive feedback from the students as well as the AUK and RIT staff involved in this project. They were very receptive to the training and seemed to enjoy the interaction that took place during this class.

GIST: Will there be any follow-up training required?
JC/AF: FSI and WP are working on several opportunities for additional training and implementation services.

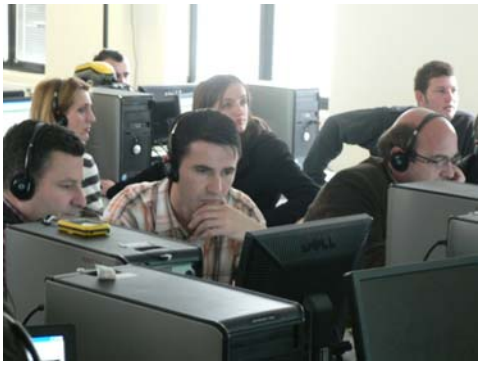
GIST: Describe trainer qualifications were specifically suited to provide training in this situation.
JC/AF: In addition to requiring trainers who were skilled with the specific GPS hardware and software as well as the GIS software, RIT required professionals with direct experience deploying geospatial solutions into the energy/utility sector. The ability to react to unexpected changes in circumstances and technical challenges was also critical, as we were called upon to assist with software installation and configuration. Flexibility was also important since the curriculum was a true work-in-progress, reflecting the changing composition of the audience and the pace of learning.



GIST: What software, standard data sets and hardware were used in your training? Did this consist of multiple platforms and operating systems?
JC/AF: Hardware included Trimble's GeoExplorer XT and Juno ST integrated handheld GPS receiver/field computers. The Juno ST devices were protected from the elements using OtterBox ruggedized PDA environmental protection cases. Trimble's Terra Sync Professional software was used as the GPS field data collection application, complemented by Trimble's GPS Pathfinder Office software for use in performing data management and processing. ArcGIS software, deployed on Dell work stations running Windows XP, was the platform for GIS training.

One of the most challenging aspects of the training was to illustrate certain techniques and functions with limited, if any, existing background data sets. An unplanned field trip to a government agency, coupled with deft lobbying on the part of representatives from the University, was required to secure a small sampling of ortho-imagery and linear datasets (i.e. electric transmission lines) for use as reference data. Further complicating the situation was the fact that the data were projected in a customized and unpublished national coordinate system

GIST: Can you describe any inconveniences (compared to doing business in NYS) while in Kosovo?
JC/AF: While many of the trainees were reasonably proficient with English, the dominant spoken language in Kosovo is Albanian and we were very fortunate to have a strong team of translators on-hand. The translation itself was relatively seamless, with trainees wearing wireless headsets and receiving translation in real-time. Periodically, it was necessary to slow our pace of instruction or repeat key phrases, but the process was reasonably smooth. We were fortunate to have one translator who had prior experience with GPS and GIS and that proved to be terrific help. Another translator had lived in Brooklyn, New York for a couple of years, so we had an immediate bond with him. Further translational assistance was provided during our field exercises (where wireless headphones could not be used) by several AUK cadets/students.



Culturally, the frequent breaks during the day served as a nice opportunity to forge strong bonds with the trainees, and to test the many strong coffee blends and rich desserts!

Finally, we were fortunate to be in on the ground, and in the capital, during a very important day in Kosovo's recent history and its future, namely, election day. Due to the significance of national elections as this time in Kosovo's existence, training was cancelled for that day, and our training schedule was compressed accordingly. This situation resulted in very long and intense training days, but afforded us a ring-side seat in the creation of what promises to be a new and independent nation.

GIST: Is there anything you would like to say to other GIS professionals in terms of how they might participate in future global GIT training efforts?
JC/AF: The most significant impact of delivering GPS/GIS training in Kosovo, is the overwhelming sense that a visit as brief as ours has the potential to leave a lasting impact on the future development of their infrastructure, and by extension, the quality of life for Kosovars. While it is up to the training participants to follow-through and deploy the solutions that were presented, there is no question that all of the participants understood the potential for geospatial technologies to transform the way business is conducted in Kosovo. We found that realization to be very rewarding.

Submitted by Jonathan Cobb, Waypoint Technology Group (**jcobb@waypointtech.com**) and Austin Fisher, fountains spatial, inc., (**austin.fisher@fountainsamerica.com).**

Are you a GIS professional interested in looking beyond the day-to-day technical issues and hear what's really shaping GIS in NYS and beyond? If so, we have good news for you!

The NYS GIS Association and the NYS Office of Cyber Security & Critical Infrastructure Coordination are pleased to announce the third annual NYS GeoSpatial Summit. This will be another great opportunity to hear the perspectives of top geospatial leaders and network with other GIS professionals.

The Summit will be held on **May 21, 2008** at the Welch-Allyn Lodge (**http://thelodge.welchallyn.com**) in Skaneateles Falls, in the heart of upstate New York's Finger Lakes and winery region. Speakers already confirmed this year include **Jack Dangermond**, founder and President of ESRI, **Allan Carroll**, Chief Cartographer for the National Geographic Society, **Ed Parsons**, Google's new Geospatial Technologist, and **Adena Schutzberg**, Executive Editor of Directions Magazine. Additional speakers will be announced soon.

The Summit is a one-day, all-plenary event with a sequence of keynote-level speakers discussing the broad context for GIS and the forces that are shaping the present and future of our discipline. Speakers will also participate in panel Q&A discussions where attendees can put them "on the spot". Breakfast, morning and afternoon breaks, and lunch are included so you can stay on-site and network with speakers, sponsors, and your peers.

Last years' pre-Summit evening reception was such a success that we are bringing it back this year.

For information on the 2006 and 2007 Summits we encourage you to read the reviews featured in Directions Magazine (see **http://www.directionsmag.com/article.php?article_id=2483&trv=1** and **http://www.directionsmag.com/article.php?article_id=2202&trv=1**).

Last years' post-event photos, agenda, and attendee comments are available at: **http://www.nysgis.org/summit/2007**.

Mark your calendar for May 20 and 21st. You don't want to miss out!

GIS Initiative In The Big Apple Aims To Increase Tree Canopy Cover

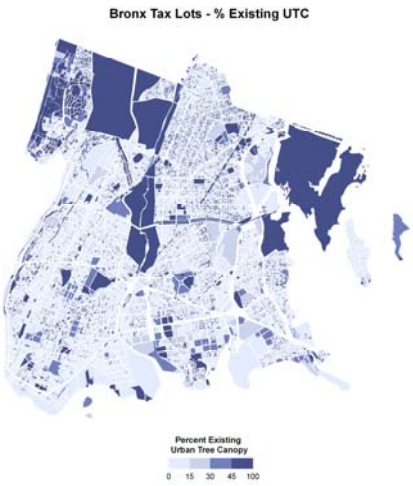
By Kasey Allen

In April 2007 New York City Mayor Michael Bloomberg announced PlaNYC, an initiative that addresses the city's long term future. The plan focuses on the physical city and its possibilities to unleash opportunity. At the plans core are 127 initiatives. One initiative aims to increase tree canopy cover by planting trees on tax lots other than parks like public and private lots, including parking lots, private housing, institutional properties such as schools and university campuses, and City-owned land. This initiative, combined with others aimed at increasing the City's tree population, has resulted in the creation of MillionTreesNYC, an initiative teaming Department of Parks & Recreation and New York Restoration Project. These organizations will be responsible for planting and caring for the City's new trees.

Traditionally the City has focused on planting and caring for trees on streets and parks. Bolstered by the ambition of PlaNYC the City has begun to look at other parts of the city to plant and care for trees.

In May 2006, at the request of Parks & Recreation, the United States Department of Agriculture Forest Service Northeastern Research Station conducted an analysis of the City's Urban Tree Canopy (UTC). Using ArcGIS Model Builder a model was built to overlay geospatial data layers and then calculate a series of statistics. The following layers were inputs to the model: geographic boundaries, tax lots, public-right-of-ways, land cover, roads and buildings.

Output tables containing existing and possible UTC acreages and percentages for various geographies were delivered to Parks & Recreation. One of those geographies was tax lot. Joining the table containing UTC for each tax lot with the original tax lot input layer resulted in the creation of a layer containing the UTC acreage and percentage and ownership information for every tax lot in the City. Below is a map showing percent existing UTC for Bronx tax lots.

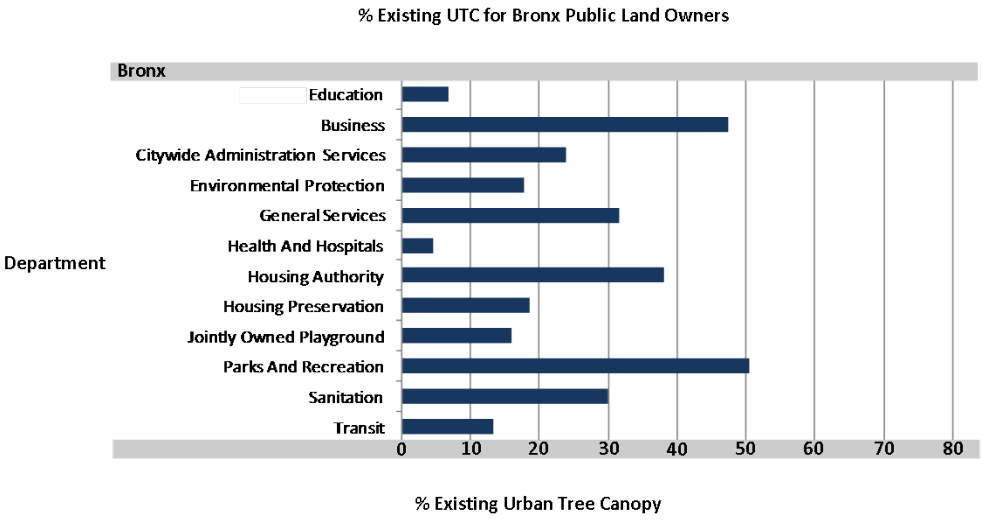


A series of queries and calculations were performed that resulted in UTC percent by tax lot owner for the entire City. The Citywide average UTC is 24%. Below is a list of 12 public land owners in Bronx and their percent existing UTC.

These data will provide a starting point for members of the MillionTreesNYC initiative to identify and work with public and private groups and their tax lots to increase the City's tree canopy cover. Tree planting can be incorporated into public open spaces surrounding public buildings and concrete and asphalt can be converted into landscapes lush with trees that encourage outdoor activity

By performing these analyses in GIS the stream of trees beginning to flow into the city will go to where they are most needed and most appropriate.

Submitted by Kasey Allen, GIS Analyst, New York City Department of Parks & Recreation (**Kasey.Allen@parks.nyc.gov**)

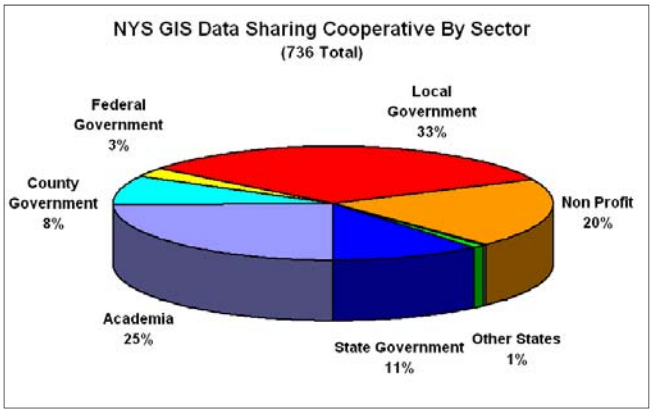


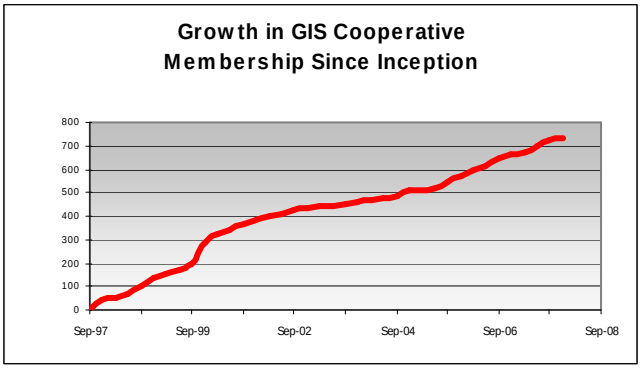
NYS GIS Conference

The New York State Geographic Information System (GIS) Conference has become a major GIS professional development opportunity for hundreds of GIS users across the State. This year, the 24th NYS GIS Conference is being held in Liverpool, NY at the Holiday Inn. The conference is a great place to discover how New York businesses, government organizations, academic institutions, and not-for-profit entities are using GIS to accomplish important objectives. Technical presentations featuring working professionals will share their GIS experiences and solutions in dealing with real world problems like yours and detailed presentations by the state's academics will provide a deeper understanding of the technology. In the exhibit area, GIS vendors and consultants will display the latest in GIS hardware, software, analytical techniques, and services. Additionally, prizes will be awarded for a Poster Contest. Winners will be decided by a panel of cartography experts from the academic, federal, state, local and private sectors. Conference attendees will also be able to vote for their favorite poster. Presentation abstracts and poster abstracts are due June 4 , 2008. Early conference registration with reduced fees will be accepted up through September 10, 2008. More information about the NYS GIS Conference can be found online at **http://nysgisconf.esf.edu**.

GIS Data Sharing Cooperative Still Growing

Membership in the NYS Data Sharing Cooperative has shown a steady increase with more and more governmental entities, not-for-profits, and academic institutions signing the Data Sharing Agreement, allowing each other to share their GIS data sets. The number of Cooperative Members is at the time of this publication an all-time high of 736. A breakdown of Cooperative members by sector is illustrated in the chart below.





A special thanks to the contributors to this issue: Kasey Allen (NYC Department of Parks & Recreation), Cheryl Benjamin (NYS CSCIC), Rosalind Cimino (Town of Dover), Jonathan Cobb (Waypoint Technology Group), Sara N. da Silva (Nelson, Pope & Voorhis), Austin Fisher (fountains spatial, inc.), Jake Needle (Wendel Duchscherer), Sheri Norton (Warren County), Dan O'Brien (NY SEMO) and Lara Pomi-Urbat (Nelson, Pope & Voorhis).

Editor: John Borst

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