ILLINOIS GIS NOTES

THE NEWSLETTER OF THE ILLINOIS GIS ASSOCIATION

Simulating Land Use Change Across Space and Time

By Dr. Brian Deal

The Land Use Evolution and Impact Assessment Model (LEAM) is a computer-based tool developed at the University of Illinois that simulates land use change across space and time. The LEAM system is designed to enhance our understanding of the connections between urban, environmental, social and economic systems. Planners, policy makers, interest groups and laypersons use LEAM to visualize and test the impact of various urban planning and policy decisions on their community.

The model helps create a dialogue on regional issues in a community by providing knowledge and information on several levels. First, LEAM enables regional planning organizations to implement a detailed, systematic and continuous regional planning process that includes public interactions and that enhances and empowers planning activities in local jurisdictions. Second, because LEAM is able to project potential future land use patterns, it can also predict the implications of these patterns on various environmental, economic and socially based systems such as transportation, agricultural systems, cultural resources, natural resources, watersheds, school districts, habitat areas and potential economic development areas.

The model uses raster-based land cover maps of the geographic region of interest in 30-square-meter cells (approximately a quarter of an acre). A dynamic model in each cell calculates the mathematical probability that the cell will evolve into a new land use at each time step (typically one year). Each cell changes in response to the internal dynamic interactions as well as spatially explicit activities around the cell and in the region.

(continued on page 4)

Inside this issue...

Vol. 8, No. 1 Spring 2007

Newberry Library's Map Collection – A Chicago Treasure

By Robert W. Karrow, Jr.

The Newberry Library holds an estimated 300,000 maps issued separately and in atlases and books. Half of these were published before 1900. The map and atlas collections are supported by very extensive holdings in the literature of the history of cartography, cartobibliography and map catalogs, and gazetteer and place name literature.

Unlike most privately endowed research libraries, the Newberry Library began not with a core of books assembled by an assiduous collector, but rather with a collection of money. Walter L. Newberry (1804-1868) came to Chicago in 1830 when it was still a muddy town of fewer than 100 people and bought 40 acres of land on the north side of the river. He became a very wealthy man; active in banking, railroads, real estate and civic life.

(continued on page 6)

Ruminations from the Desk of a Man with Three Hats

Keith Caldwell is the Editor of "Illinois GIS Notes," current President of ILGISA and GIS Applications Supervisor with Lake County GIS/Mapping Division .

In this edition of GIS Notes you'll find a variety of interesting articles, including a fascinating GIS application being developed at the University of Illinois to support regional planning.

We have an interview with Shoreh Elhami, founding member of URISA's GISCorps. She'll discuss some of the benefits and challenges of managing such a noble endeavor. As those of you who attended the Spring ILGISA conference in Springfield know, there was a silent auction to raise money for the GIS Corps. Many of the vendors supplied auction items and $464 was raised. A big thank you to all who participated.

Also in this issue, the Illinois State Water Survey is managing a multi-year project to update the Federal Emergency Management Agency flood rate maps. This is a huge undertaking that will become, when completed, a rich statewide GIS dataset.

Finally, we'll delve into the past and see what rich resources the Newberry Library has. If you're visiting Chicago this summer, be sure to make time to visit their collection in person, or see one of the special exhibits at the Field Museum. Future editions of GIS Notes will explore other mapping library collections.

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The ILGISA Board extends a warm welcome to our new Executive Director, Tracy Rogers. Tracy worked for the National Security Agency (NSA) and Central Intelligence Agency (CIA) as an Intelligence Analyst, where that led her to such far-away lands as Malawi, Africa and Brasilia, Brazil. She's also worked for a market research firm, Waste Management, and as an Event Coordinator for the Illinois Landscape Contractor's Association. Tracy is married with one teenage daughter.

While it is with deep regret that we say goodbye to Sherrie Taylor, who is taking on different responsibilities within NIU's Center for Governmental Studies, we are confident Tracy will make her own valuable impression on our organization. Please be sure introduce yourself to her at your next conference and welcome her aboard!

Where are all the ILGISA Outstanding Student Award winners?

Since 2003 ILGISA has recognized exceptional student achievement by issuing Outstanding Student Awards. The Honors Committee solicits nominations from universities and colleges in the state each summer. The committee then selects up to five winners, and they are invited to attend ILGISA's spring conference. Awardees are allowed to bring up to two guests to attend the lunch award ceremony. Many students have had their parents as guests, which is a tribute to the importance of the award to the student and a chance to show others outside of our profession what we do.

So, what ever happened to ILGISA's Outstanding Students? Here's what we have found so far:

Jordan Decker (2003) received his M.S. in Geography from San Diego State University in 2006 and is currently employed by Furgo West.

Martin Arnold (2004) will be graduating from the Northern Illinois Masters program.

Ben Kinney (2005) is the GIS/IT coordinator for the city of Palos Hills.

Patrick Joyce (2006) is now with CH2M Hill consulting engineers in Oakland, California.

If you know what any of the other winners are up to, we'd really enjoy hearing about them. To date there are eighteen winners. A full list of award winners can be viewed at **www.ilgisa.org**.

Flood Map Modernization Update

By Kingsley M. Allan

The Illinois Department of Natural Resources (IDNR), Office of Water Resources and the Illinois State Water Survey (ISWS), in partnership with the Federal Emergency Management Agency (FEMA), are modernizing flood risk maps in Illinois. The mapping is part of a five-year, $1 billion program to update and convert the nation's Flood Insurance Rate Maps to a countywide digital format. The intent of this FEMA effort is to reduce losses to property and lives.

More accurate flood risk maps are an investment. They are an instrument used to collect fair insurance premiums, regulate development and reduce repetitive claims. Counties and communities will have access to the digital files after the maps are finalized.

Product Description

The new flood risk maps are called Digital Flood Insurance Rate Maps (DFIRMs). Unlike previous versions, these maps use black and white ortho-photography as the base layer. Most often it is the 2005 Illinois Digital Orthophoto Quarter Quadrangle Data (DOQ) or the 2005 Chicago Urban Area Orthoimagery, but the community can provide imagery that can be redistributed without restriction.

Showing flood risk areas overlaid onto imagery makes it easier for users to determine the proximity of these areas to homes. Owners of properties in high risk areas are required by mortgage companies to purchase flood insurance. Areas of high flood risk are also regulated to require permits, exclude certain structure types or may exclude development altogether.

One of the compelling reasons for Congress to authorize flood map modernization is the age of map panels. At the start of the project 70% of Illinois map panels were more than 10 years old, making it difficult for local communities to use them for regulation or planning.

Digital Flood Map History

This is not the first attempt to make digital flood maps for Illinois. Many in the GIS community are aware that ISWS digitized FEMA flood maps for unincorporated areas for the entire state 15 years ago and included these on the first CD of statewide GIS datasets distributed by IDNR. Later most datasets became available on the Illinois Natural Resources Geospatial Data Clearinghouse. The effort was all the more impressive considering it was done in the day of table-size digitizers, Sun workstations and pen plotters.

Shortly after ISWS completed these, FEMA duplicated this effort somewhat. They created the Q3 and old-DFIRM products which were similar, but adhered to a different set of standards and did not offer statewide coverage. Because those products were proprietary, ISWS was not able to incorporate the updates to specific communities in the ISWS product.

Product Improvements

Flood Map Modernization may seem to be a repeat of these historical efforts. So what makes this time around different from the others? The answer is incorporating new flood study information and using newer technology and basemap data.

First, since the last publication new engineering studies have been done by various entities in many areas of Illinois that have changed the Base Flood Elevation (BFE, or elevation at which flooding will occur at a given frequency). Flood studies that have been reviewed and approved by FEMA and the State of Illinois prior to the start of the remapping project will be included in each new county map. Second, technological advances allow for more accurate flood risk maps. BFEs are determined at particular cross sections of rivers and streams, which are often described or mapped in reference to features visible on orthoimagery, so placement of these cross sections is now more accurate (see Figures 1 and 2).

Flood risk polygons are traced more accurately on the newer, higher resolution topography. Highly accurate Digital Elevation Models (DEM) allow automated processing to determine these areas by subtracting the elevation DEM from a DEM of the flood surface created from cross section information. The result of either method is meticulously revised incorporating engineering judgment.

(continued on page 10)

(continued from page 1)

'Drivers of growth' describe the forces that cause land use changes to occur, typically including the following factors:

- regional economic projections
- residential land demand
- proximity to city centers
- proximity to employment centers
- proximity to transportation networks (interstates, interstate ramps, state highways, county roads)
- the geography of the region
- slope characteristics of each cell
- social factors
- proximity to cultural centers
- proximity to healthcare centers
- proximity to water and forested areas
- proximity to mass transit systems
- no-growth zones
- neighboring development
- attractiveness factors
- availability of utilities

Based on this set of drivers, the development potential (probability) of each cell is calculated for residential, commercial or open space land uses at each time step (see Figure 1, below).

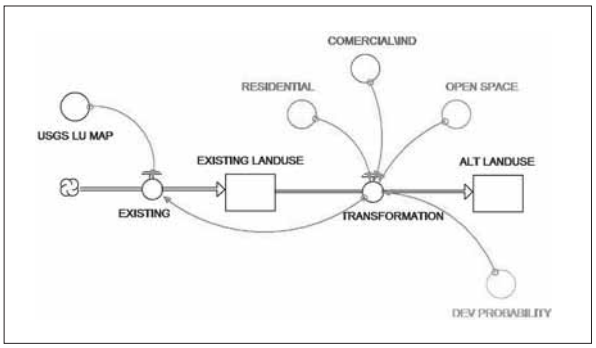


Figure 1. Land Use Transformation Model

Another important element in simulating land use change is determining how much urban growth will occur in the study region. At each time step over a specific timeframe, LEAM calculates population and employment projections and utilizes regional demographic information (household composition, vacancy rates, development densities, types of jobs and per job spatial requirements) to estimate how many acres of residential and commercial development will occur.

LEAM projects employment through the use of a regional nine-sector input/output econometric model. Using these projections with spatially explicit demographic data including household size, housing vacancy rates, intraregional mobility and residential lot size, LEAM estimates the demand for housing. Housing cells are allocated based on probability scores in competition with commercial, open space and re-developable land uses. Market-based corrections are used if the allocation differs from the demand. For example, if the allocation of residential cells exceeds the demand for new cells, the market correction factor will slow the pace of allocation the next time step. Projections of commercial and industrial land uses are based on the nine economic sectors calculated, with each sector competing for locational allocation. The commercial allocation model also uses market based correction coefficients.

LEAM simulates the spatial distribution of future land use change over time. In each year of the simulation, the land use of each cell in the region either changes to residential, commercial or open space, or remains unchanged. LEAM also creates visually appealing and easily deciphered maps and graphic information to help improve understanding and encourage participation and dialogue. By changing causal relationships or altering policy-based inputs, LEAM can simulate multiple scenarios in short periods of time to aid decision-making.

Scenario ideas are generated by input from the general public, local policymakers and stakeholders. Altering input parameters (different policies, investments, trends and unexpected events) changes the spatial outcome of the simulation. This enables "what-if" planning scenarios that can be visually examined and interpreted for each simulation exercise. Scenario results are typically displayed as maps showing new urban development for a given future date, or as GIS maps, simulation movies, in graph or chart displays, or simply as raw data that clients can use for their own analysis.

Once the simulations are run, the impacts of development on various economic, environmental and social systems in the region can be analyzed at various geographical scales. Comparing these impacts across scenarios helps to understand how futures may unfold and how they affect various stakeholders. For example, after visualizing and assessing the impacts of a scenario, stakeholders can ask: "Are we, as a community, satisfied with this possibility?" And if the answer is no: "Are there policies that we can enact or investments that we can make to address these impacts?"

The basic output from LEAM indicates how land use would change; for example, estimates of how

many acres of agriculture, forest, wetlands and grasslands would be converted to urban development. However, intriguing analysis can also be done by examining scenario results over various spatial extents. This can provide insights on direct impacts of urban growth such as change in infrastructure needs (water and sanitary facilities, schools) by comparing existing capacity with future demand. A simple impact analysis can also be done by overlaying LEAM results on other layers of information (see Figure 2, below).

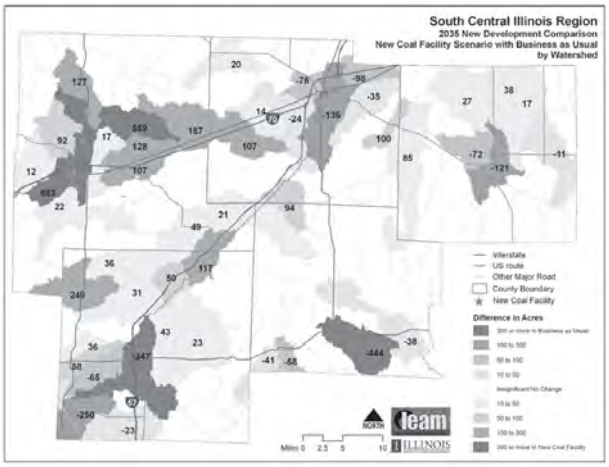


Figure 2. This map compares the results of two scenarios by watershed; how are different watersheds affected by the decisions we make?

LEAM has also developed impact sub-models to address specific issues related to urban growth. These include impacts of land use change on traffic congestion (often based on linking LEAM with a regional transportation model), environmental stress analysis, water quality and supply, economic impacts, fiscal impacts and habitat fragmentation.

All of LEAM model scenarios results and impact assessments are presented using an easy-to-navigate, web-based planning support system (see Figure 3). LEAM simulation layers can also be overlain with other relevant planning data such as administrative boundaries, infrastructure, resource data, aerial photos, existing regional and local plans, and other data deemed relevant by stakeholders.

LEAM applications are tailored to meet the specific needs of clients' communities and rely heavily on intensive interactions with multiple stakeholders across a region. LEAM typically conducts workshops with regional stakeholders to explain the model and how it can be used to support planning activities.

Figure 3. Web-based Planning Support System

The workshops provide a forum for feedback on preliminary LEAM simulations and what drivers of growth specific to the study region should be added. Additionally, stakeholders can contribute ideas for how to "localize" the model and what scenarios should be simulated.

LEAM has been successfully applied to the St. Louis Metropolitan area; Chicago Metropolitan area; Peoria, Illinois Tri-County region; McHenry County, Illinois; Will County, Illinois; South Central Illinois; Traverse City, Michigan; and several military installation regions, including Scott Air Force Base and forts Benning, Jackson, and Bragg.

LEAM development and applications are conducted and managed by a team of faculty, staff and students at the University of Illinois at Urbana-Champaign. LEAM brings together expertise in substantive issues, modeling, high-performance computing and visualization from the departments of Urban Planning, Geography, Economics, Natural Resources and Environmental Sciences, Landscape Architecture, Civil Engineering, the National Center for Supercomputing Applications, ERDC Construction Engineering Research Laboratory and private industry.

For more information on the Land Use Evolution and Impact Assessment Model, visit the website at **www.leam.uiuc.edu,** or contact Brian Deal at **deal@uiuc.edu** or Wayne Hartel at **hartel@uiuc.edu**.

Dr. Brian Deal is the Director of the LEAM Modeling Laboratory in the Department of Urban and Regional Planning at the University of Illinois.

(continued from page 1)

While returning from Europe in 1867, Walter Newberry died aboard the ship. At that time, there was a subscription library in the Chicago but no public library. Newberry had provided in his will that one-half of his estate would go to found a public library in the event his daughters left no heirs. This must have seemed an unlikely eventuality, but both of his daughters died young and unmarried. With the death of his widow in 1885, the provisions of the will were carried out, and a sum of money was set aside to establish a library on July 1, 1887.

The library's trustees made an important decision in the beginning: since the Chicago Public Library had been founded in 1872, they agreed that the Newberry Library would be a non-circulating reference library.

Along with all the other areas in which collections were being built, maps and atlases were widely purchased, particularly as they bore on central collecting interests such as history, geography and travel. Cartographic acquisitions in the first few years of the library's history set the tone: the map catalog of the New York State Library (1857); Napoleon's *Description de l'Egypte*, with its elephant-folio atlas volumes (1809-22); Champlain (1632) and Charlevoix (1744) on *Nouvelle France*; and Ptolemy's *Geographia* (1541, 1542, 1552 editions), for example.

But the real founder of the Newberry cartographic collection was still to come in the person of Edward E. Ayer, whose collection was added to the library during the tenure of librarians John Vance Cheney (1909-1919) and George B. Utley (1920-1942). As a young, unread man from rural Illinois serving in the Union Army in Arizona during the Civil War, Ayer had a chance encounter with Prescott's *History of the Conquest of Mexico*, which affected him profoundly. He began to develop an abiding interest in American history, and in particular, the early contacts between American Indians and Europeans.

Thomas Jefferson Farnham, map of the Gold Regions of California (1849)

In late life, having made his fortune in railroad ties, Ayer became the consummate collector, not only of books and maps, but also of American Indian and other artifacts now in Chicago's Field Museum. As early as 1895, Ayer, by then a Trustee of the library, had moved books, maps and atlases to the Newberry, and although the collection was formally given to the library in 1922, he continued to maintain and develop it actively until his death in 1927.

To profile the maps and atlases in the Ayer collection is to give the backbone of the Newberry's holdings. Here is one of the finest gatherings of Ptolemy's *Geographia*, acquired by Ayer in 1898. The collection includes 45 of the 51 editions printed before 1730. Renaissance astronomy, cosmography and navigation are well covered, and the French, German and Swiss centers of cartographic activity are exemplified by the works of Apian, Fine, Munster, Honter, Vopel and others.

Thanks largely to the Ayer collection, but backed up by the considered strengths of the general collection, the Newberry Library possesses all of the major 16th- and 17th-centuries atlases, often in considerable depth. Ayer's holdings of manuscript maps were very rich, and included the earliest maps now in the Newberry collection, such as the margin illustrations in a manuscript of Dati's *La Sfera* (ca. 1425).

Recent Acquisitions

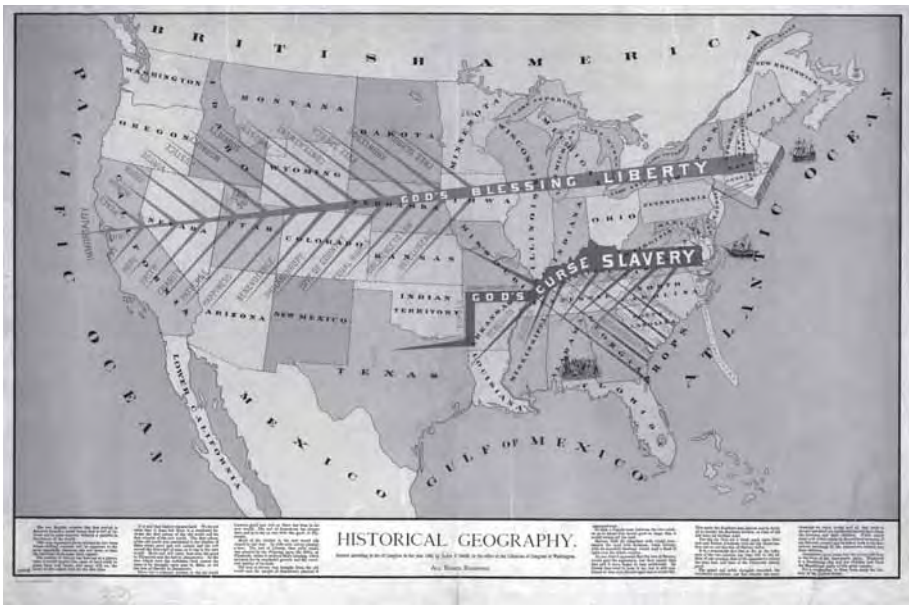
In 1964 the Newberry acquired the Graff collection. Known as one of the finest collections of Western Americana, this collection includes more than 800 maps, many in rare books. Frank Deering's collection of early Americana

(acquired in 1966) included a fine copy of Des Barres' *Atlantic Neptune*, the first in a series of important atlases from the Revolutionary War period to be added. It has since been joined by Jeffrey's *American Atlas* (1768), Faden's *North American Atlas* (editions of 1776, 1777, and 1778), and 29 of Faden's Revolutionary War battle plans.

In 1967 the library acquired the collection of Franco Novacco, which includes 15 manuscript maps and atlases, among them a portolan atlas by Francesco Ghislolfo (ca. 1580) and a map of the South Pacific by Queiros, dated 1598. But the great strength of the Novacco collection is its Italian printed maps. Its acquisition at once made the Newberry one of three outstanding collections of 16th-century Italian cartography in the world.

Many maps in the collection are known in only a few copies, and not a few are thought to be unique. Among the more unusual items in the Novacco collection is the Durer/Stabius world map of 1515 in its 1781 edition, Gastaldi's world map of 1546, Ritter's world map on gnomonic projection (1610), and the large city views of Venice (1500) and Rome (1593) by Barbari and Tempesta, respectively.

In the last 30 years the library has acquired scores of valuable antiquarian maps and atlases through gift and purchase and three major archival collections. The corporate archival collections of Rand McNally and Company, the General Drafting Company, and the H. M. Gousha Company added to the Newberry some 200,000 maps and 1,500 atlases, all produced after 1876. These collections provide a superb resource for the study of premier American map publishers, as well as a unique repository of 20th-century road maps and atlases.



John F. Smith, Historical Geography (1888)

From medieval portolan charts to the latest project from Rand McNally (and rich samplings of almost everything in between) the Newberry Library's map collection has few peers.

Join us in 2007 for a series of map-related events, seminars and exhibits. Beginning November 2007 and continuing into 2008, the Festival of Maps Chicago explores human wayfinding from ancient to modern times in a citywide celebration.

As a major partner in the festival, the Newberry Library is proud to offer the following three exhibitions: *Mapping Manifest Destiny: Chicago and the American West*; *Ptolemy's Geography and Renaissance Mapmakers*; and *Maps: Finding our Place in the World.* The third of these exhibits was organized by The Field Museum together with the Newberry Library and will be held at The Field Museum. All Newberry collections are available to readers (over the age of 16) without charge. The reading rooms are open from 10am to 6pm Tuesday through Thursday and from 9am to 5pm Friday and Saturday. Visit **www.newberry.org** for more information. Questions about the map collection may be directed to **reference@newberry.org**.

Robert W. Karrow, Jr., Curator of Maps at the Newberry Library.

Illinois GIS Notes is published by the
Illinois GIS Association
Regional Development Institute
Northern Illinois University
DeKalb, Illinois 60115
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GISCorps—Insights from the Chairwoman

Shoreh Elhami gave the keynote address at ILGISA's 2006 fall conference. She was instrumental in the creation the GISCorps, a URISA program begun in 2003 as volunteer organization that provides GIS services to underserved communities worldwide. She graciously agreed to sit down with Keith Caldwell and Mary Clement for a follow-up interview to provide more insight into the GISCorps.

In addition to her work with the GISCorps, Shoreh is also the GIS Director for Delaware County, Ohio; is on URISA's Board of Directors; is a member of the National Research Council's Mapping Science Committee and teaches part time at Ohio State University.

How did GISCorps mobilize a response to the Hurricane Katrina disaster?

Katrina was, and still is, the GISCorps' largest deployment. We recruited 33 volunteers in total. The first 20 arrived onsite at the Mississippi Emergency Operation Center within three days of the first call for volunteers. By the end of September 2005 we had received requests for more help and had sent the remaining volunteers to the region.

Due to the urgent nature of the request, our first reaction was to send an email to all the volunteers in our database (approximately 270 at the time). The email detailed the job description, the location of the mission, the timing and as much information about the conditions on the ground as we were able to obtain. We then asked that all interested volunteers email their resumes to us.

That SOS for help ended up on many websites, and as a result, within the next two days more than 500 new volunteers either signed up on the website, sent us email or called us. The total number of volunteers who responded by the end of September was 930.

We also sent a request for help to several long-time URISA members and asked them to assist us in the recruitment process. Several résumés were sent to each. They reviewed the résumés of those volunteers and sent us a list of qualified individuals. I then interviewed the short-listed group, and that is how the Mississippi team was deployed.

As the largest deployment of volunteers thus far, were there 'lessons learned' from the Katrina experience that may guide future large-scale deployments?

As a result of what we learned from the Katrina deployment, we are modifying our website in such way that each interested volunteer can link to a web page and "post" their availability. If the person is an existing volunteer, they will update their résumé, and if a new volunteer, they will be able to upload their résumé to the database. That way we won't have to devote time to responding to each and every one directly. All the Core Committee members and subcommittee members who assist with the recruitment will have equal access to that database.

As for changes to the recruitment process, prior to Katrina we always had the luxury of time, and since the number of volunteers was less than 300, we could always go to the database, search for qualified volunteers by their area of expertise and develop a shortlist. However, even then, the volunteers' database (on the back side) didn't allow us to conduct a multi-variable query (MVQ), which made our job more difficult. We are in the process of developing an MVQ, and that should help us in our future missions.

We have also created a new subcommittee called "Volunteer Development." Members of this subcommittee will take an active role in recruitment as needs arise.

With the unexpected rapid rise in the number of volunteers over the past few years in response to worldwide disasters, it appears that GISCorps now has a surplus of volunteers. What can be done to best utilize this surplus? How can current volunteers help in this process?

This is true; there is a large gap between the number of volunteers and the number of missions. However, this gap is a bit misleading since many of our volunteers joined GISCorps after the tsunami and Katrina, and we think it is very unlikely that they would be interested in non-disaster response type and overseas missions. We need to verify that with our volunteers though, and we think that will help us in many ways, including in the recruitment process.

Having said that, we are getting involved in two other projects where we are hoping to make our volunteers' expertise available to the K-12 community as well as the local emergency operation centers. We think that many of our volunteers—and especially those who joined post-disasters and/or are unable to travel—may be interested in participating in these two projects.

We do need help from volunteers to make it happen though, and a call for volunteers will be sent out in the near future. Also, volunteers are our best marketers: if they know of a project or a partner agency that could use our volunteers' expertise, we want them to contact us.

Does the Core Committee intend to form any activity committees? If so, what can volunteers do to assist in assembling and initiating these committees?

We have formed five new subcommittees in the past few months, and several volunteers are already helping in each of these subcommittees. The subcommittees are 1) website, 2) publications and public relations, 3) financial resources, 4) volunteer development, and 5) partnership. However, we are always looking for those who have experience in partnership building (those who can convey, and in a way, perhaps market GISCorps' abilities to other like-minded organizations), and also in grant writing and fundraising.

What about employing a web-net of volunteers—i.e., volunteers who collaborate online on projects, working from home (or office) as directed by an on-site project manager. What would it take to set something like this up?

We actually have implemented several projects of this nature—we call them remote projects, and they are very popular, especially for those who cannot travel and would still like to help. Once again, any assistance we can get from volunteers in finding projects of this nature is greatly needed.

I must emphasize here that in general, GISCorps only provides its volunteers' expertise to governmental and non-profit entities and primarily in developing communities oversees. We do, however, provide disaster response to communities in need throughout the world.

What volunteer resources and/or skills might be helpful to the GISCorps in widening the search and procurement of project sponsors?

We need volunteers with experience in working with international organizations and associations such as the World Bank, UN agencies and international disaster response agencies for partnership building. We also need experts in grant writing and fund raising.

What is the depth of support as an organization? If you left for instance, how would GISCorps survive?

We currently have a Core Committee of four individuals and will be adding one or two people to the Core Committee in the near future. Each of the Core Committee members leads a subcommittee, and each subcommittee includes two to five volunteers. So, roughly, GISCorps runs on 20 or so volunteers. We also receive some administrative support from URISA headquarter staff.

What is the predominate software used by volunteers? Has there been a challenge matching a volunteer's software skills to an organization?

Our volunteers use the software that is required and requested by the partner agency; therefore, the type of the software varies from one project to another. The partner agency always identifies the type of software at the beginning of the project, and that is how we know who we should recruit. For example, the Mississippi Emergency Operations Center used ESRI products, and so that's the type of software skill that we looked for in our volunteers.

In another recent remote project, the Global Spatial Data Infrastructure Association (GSDI) asked that the application be developed in open source software, and that's what our volunteers did. So far, we haven't had any difficulties matching our volunteers' software skills to an organization's request.

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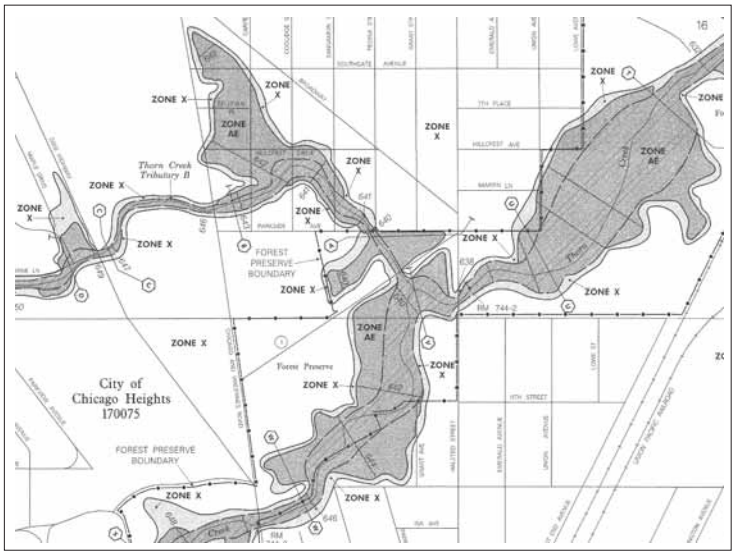

Figure 1. Old format Flood Insurance Rate Map (FIRM) of Chicago Heights (2000).

Figure 2. Flood Insurance Rate Map of the same area created as part of Flood Map Moderization (2007).

Progress

Digital flood risk map production is progressing across Illinois county by county according to a priority list that is dominated by high population areas but also includes engineering factors (see Figure 3). A map maintenance phase is planned, but it is not currently funded. The map maintenance phase would allow for new flood hazard determinations to be incorporated into existing maps shortly after acceptance.

Due largely to legal ramifications of the mapping work, the time frame from when work begins to when the maps are effective and available is surprisingly long because it allows for map creation, public input and ordinance adoption by communities. Project planning meetings, Public Open Houses of new Preliminary Maps and a 30-day comment period are instituted for each county.

Comments most often are requests regarding changes to corporate boundaries, road names and dispute of flood risk delineation. Corporate boundaries and road names are changed to reputable sources. Flood risk boundaries are changed for areas larger than a single lot when topography information supports doing so.

Individual properties are generally not excluded for scale reasons. A separate process is instituted for these property owners to prove with survey data that they are above the BFE, and they personally receive a letter from FEMA which overrides the map.

Delays in the project happen for various reasons. One that is particularly pertinent now is the post-Katrina requirement for levee accreditation. Generally this means all levees shown to hold back flooding need to prove that capability still exists and that they are adequately maintained. Without that accreditation, areas behind a particular levee will be classified as a higher risk than previously. Most Mississippi and Illinois River counties are stalled waiting for accreditation and determination to be worked out.

The DFIRM Mapping Team

Good people are critical to the success of the project. Twelve staff at Illinois Department of Natural Resources deal with the non-mapping aspects of the project such as grant administration, public meetings and due process. Thirty staff work on the project at ISWS: of these 18 are full-time GIS staff and the remainder are engineers and other support staff, including 5 part-time engineering support interns. This may be the largest concentration of GIS staff in Illinois working on a single project.

The GIS staff members have different levels of experience, but most had between one and three years of experience prior to joining this effort. Applicants were carefully screened, and interviewees were required to give a computer demonstration of

Figure 3. Production schedule for digital flood risk maps

their skills. All staff members are from the Midwest. The Illinois State Geological Survey was the most generous benefactor, providing five staff members for the project.

The work environment is different than that for normal ISWS Principal Investigator-centric research. GIS staff are split among three teams: two large teams produce the preliminary maps for the Public Open House and one small team that manages the changes thereafter.

Team members learn all parts of the production process and share both the "glory and the gory" of doing exciting tasks as well as the more mundane. A custom workflow steers production while specific task assignment and completion are managed through a web-based project collaboration and task software called Basecamp.

Conclusion

This project is good for Illinois and the Nation, and it is a real pleasure to be part of it. I welcome your inquiries about this high quality mapping effort.

For more information on the Digital Flood Insurance Rate Maps or for map downloads, visit our website at **www.illinois floodmaps.org**, or contact me at **kingsley@ uiuc.edu**.

Kingsley M. Allan is GIS Manager with the Illinois State Water Survey.

(continued from page 9)

You mentioned that those who volunteer are not allowed to "promote or sell" software or services to those they help. What were some of the reasons for implementing this policy?

Based on our policies, our volunteers must remain vendor-neutral in the recommendation of software, hardware and other related technologies. Our objective is to provide unbiased consulting assistance when asked, and promoting and selling any particular software goes against this principle. We don't allow our volunteers to accept any donations of proprietary software either. We do, however, direct all donations of hardware and software to the partner agency.

How do agencies in need find you? What about those organizations who are not as aware of the capabilities of GIS or our efforts?

Word of mouth mainly. That's why it's important that our volunteers help us get the word out to those who may benefit from our volunteers' expertise. Attending conferences and researching other organizations' websites to find out who may be in need for our services are also helpful.

You now have volunteers on retainer for FEMA for instance. Are there plans to expand this program?

A few months after Katrina, at FEMA's request, we provided 19 volunteers' resumes from which they plan to select 8 to 10 to retain as FEMA / GISCorps volunteers for a pilot project. We also prepared a Memorandum of Understanding between the two entities to provide them with a pool of volunteers on a continual basis. Both of these projects are still pending, awaiting FEMA's approval. We would love to expand the program, but we won't be able to do that until after the pilot project is implemented.

What does the future hold organizationally for GISCorps?

To further strengthen GISCorps, I see us getting more help from volunteers to secure more projects, raise more funds and further streamline recruitment. Furthermore, it is very likely that we will hire part-time help to alleviate the Core Committee's work load so that we can focus on expanding the program. We have to let the world know that we are here, full of energy and passion and ready to serve the disadvantaged communities around the world who need our expertise.

Interesting Aerial Photography

Marni Law, GIS Analyst for the FEMA Map Modernization team at the Illinois State Water Survey, discovered this image while digitizing stream centerlines within flood hazard areas for Dekalb County. The heart is 630 feet high by 610 feet wide. The aerial photo came from the 2005 USGS DOQ.

Update: The wife of the property owner, Mrs. David Buland of Earlville, Illinois, said the message was plowed in by a young man in the area. He flew over it with his girl friend, and now they are married.

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