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GIS for Health and Human Services

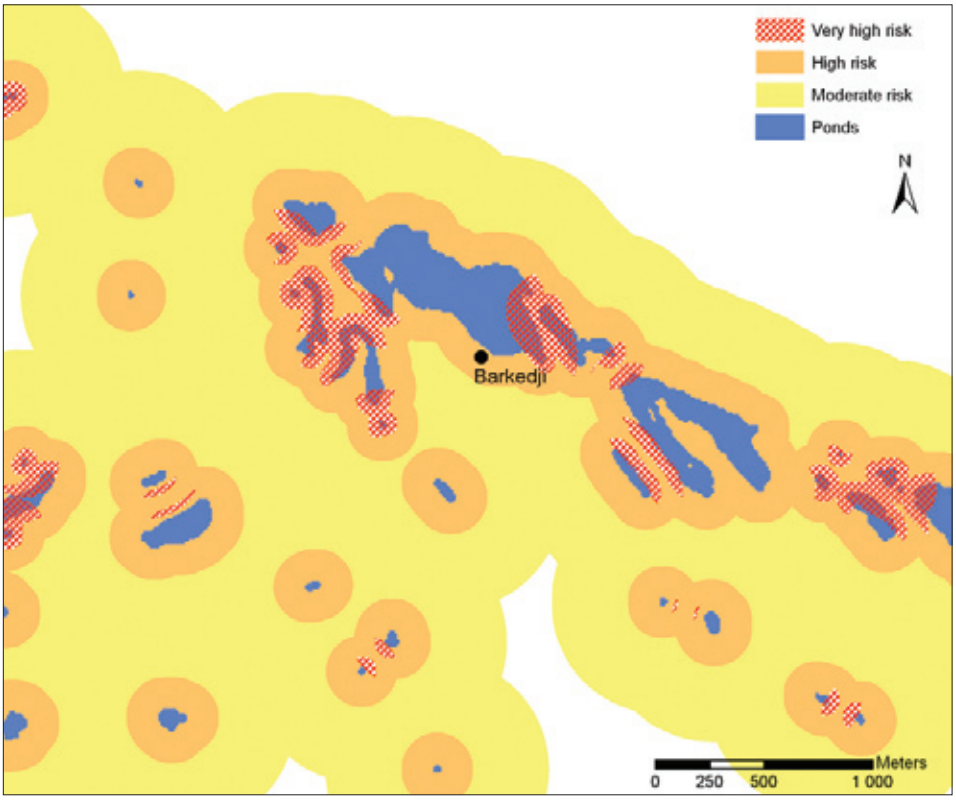
In This Issue

GIS and High-Resolution Remote Sensing Improve Early Warning Planning for Mosquito-Borne Epidemics

By Yves M. Tourre, Delphine Fontannaz, Cécile Vignolles, Jacques-André Ndione, Jean-Pierre Lacaux, and Murielle Lafaye

Fifty years of successful efforts in the prevention and control of infectious diseases and epidemics have inspired confidence and optimism in modern medicine and technology. Nevertheless, epidemics remain a conspicuous challenge to public health today. In the context of climate change and rapidly increasing population, some epidemics are even reemerging.

For example, the Ferlo region in Senegal, Africa, became Rift Valley fever (RVF) prone in the late 1980s with the appearance of virus-carrying mosquitoes *Aedes vexans* and *Culex poicilipes*. The latter species proliferate near temporary ponds and neighboring humid vegetation. RVF epizootic outbreaks in livestock cause spontaneous abortions and perinatal mortality. So far, human-related disease symptoms are often limited to flulike syndromes but can include more severe forms of encephalitis and hemorrhagic fevers. As a result, local socioeconomic resources can be seriously affected.



ArcView conversion, data management, and analysis tools enable the display of an improved, three-zone ZPOM for potential Rift Valley fever risks. The very high risk zones are red-hatched to identify underlying pond limits.

As highlighted by professor P. Sabatier (University of Grenoble), this growing threat created an urgent need for a local early warning system (EWS) for RVF epidemics in Senegal. The goal was to use specific geographic information system (GIS) tools and remote-sensing images/data to detect potential breeding ponds and evaluate RVF diffusion and areas with potential risks.

Project Description and Preliminary Methods

The RVF project in the Ferlo region was implemented by MEDIAS-France under the auspices of the French Spatial Agency (Centre National d'Etudes Spatiales). MEDIAS-France is a

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GIS and High-Resolution Remote Sensing Improve Early Warning Planning for Mosquito-Borne Epidemics

nonprofit corporation that coordinates research groups studying global environmental issues including in the Mediterranean Basin and subtropical Africa.

In the Ferlo region, mosquito population abundance is linked to rainfall, ponds and their turbidity, and the presence or absence of vegetation in ponds (e.g., water lilies, wild rice). Initially, ENVI 4.3 software was used for spectral analysis of high-resolution (~10 m) SPOT 5 images to locate the ponds.

First, image registration tools were used to warp the images to match and implement relative georeferencing for all SPOT 5 images collected, with further adjustment to minimize spatial errors. Then, new indexes were obtained by using the classic Normalized Difference Vegetation Index (NDVI) transform tool to allow the combination of different spectral bands (such as the middle infrared [MIR] and the near infrared [NIR], red and green bands). The Normalized Difference Pond Index (NDPI) allowed detection of all ponds; the Normalized Difference Turbidity Index (NDTI) allowed the evaluation of water transparency or turbidity. In situ observations by participants from the Centre de Suivi Ecologique, in nearby Dakar, validated both indexes using GPS and GIS.

Using these methods, it was possible to locate small ponds with precision, making it further possible to map RVF risks from zones potentially occupied by mosquitoes (ZPOM) following recent studies from entomologists on flying ranges and spatial distribution of mosquitoes (Bâ et al. 2005).

GIS Methods

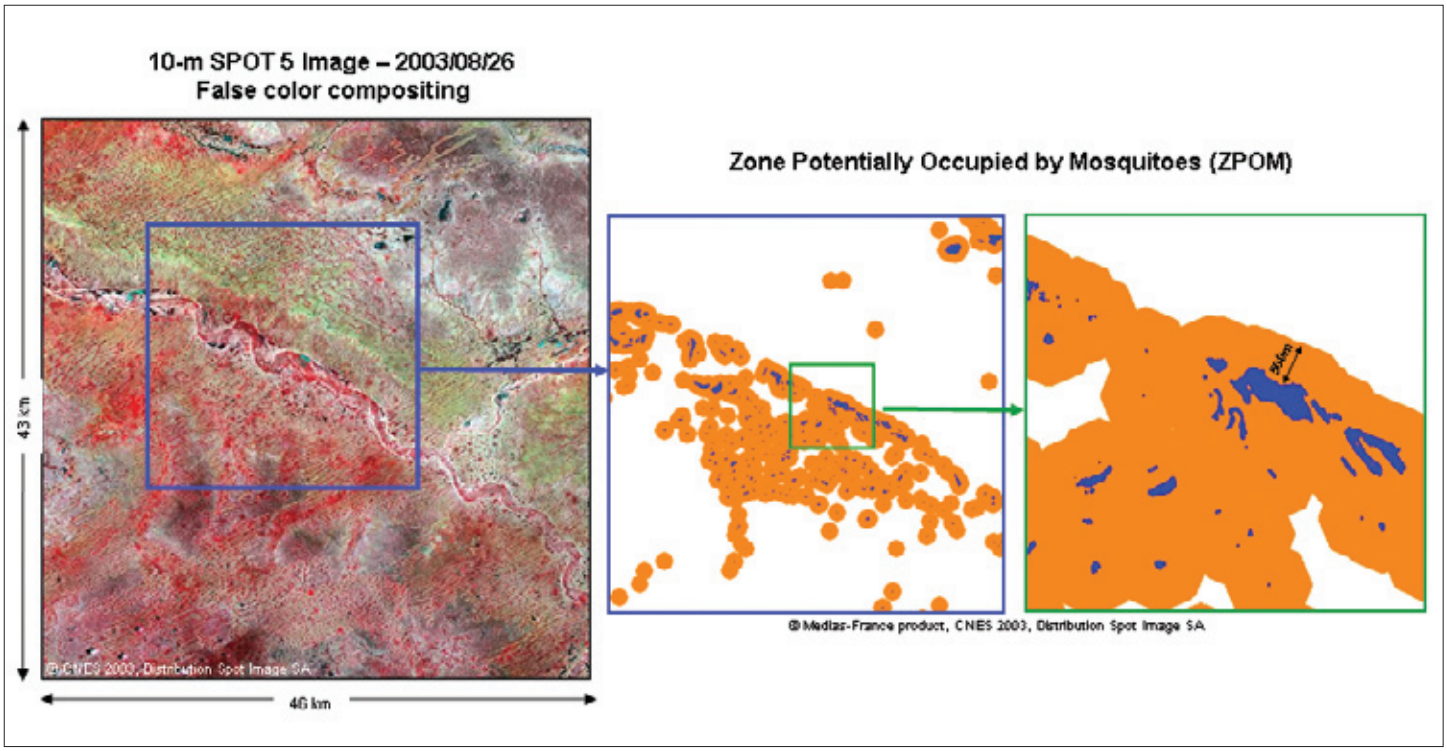
Further refinement and simplification were needed, however, because of the complexity of the pond distribution and to develop an effective usage strategy for local health information services. Researchers wanted to identify degrees of risk from isolated and/or clustered ponds, calculate the target risk coverage area, and evaluate risk by mosquito density in overlapping zones.

Because of researcher Delphine Fontannaz's GIS expertise and the availability of new detailed information in the zones, the GIS approach became an obvious solution for the team. Using ESRI ArcView software and tools (i.e., conversion and data management for spatial projection and transformation, as well as overlay and proximity vector data analyses), maps obtained from SPOT 5 10-meter multispectral resolution imagery were first transformed into appropriate formats, then converted from raster to vector formats. The georeferencing accomplished through universal transverse Mercator (UTM) WGS84 for zone 28N permitted further comparison and processing.

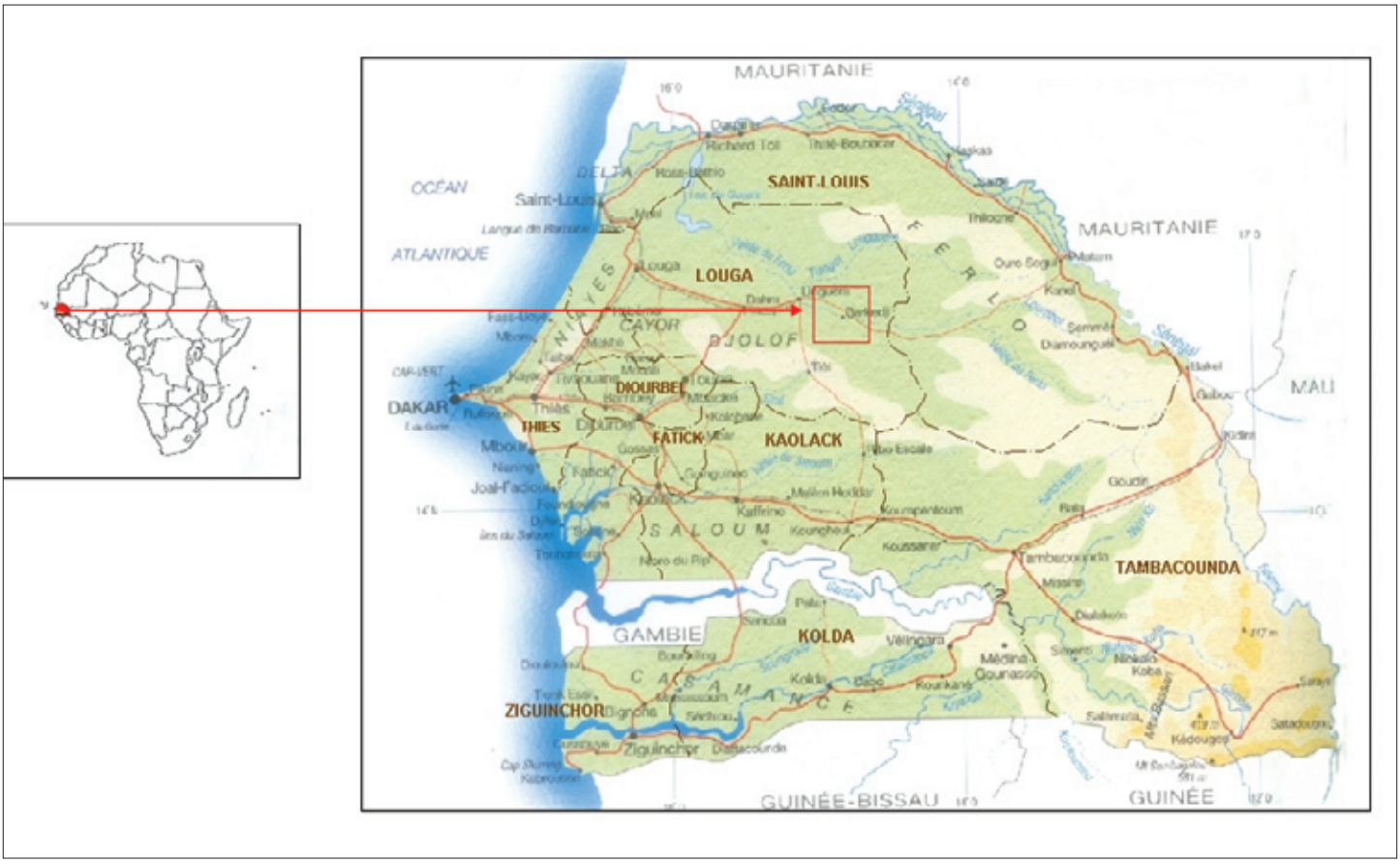
The initial ZPOM was first divided into three bands chosen for defining risk levels for potential virus transmission by *Aedes vexans:*

- 0 to 50 m
  (~18 % mosquitoes recaptured)
- 50 m to 150 m
  (~29 % mosquitoes recaptured)
- 150 m to 500 m
  (53% mosquitoes recaptured)

Then, using ArcView, researchers calculated mosquito density and evaluated cross-potential



A false-color composite of a 10 m SPOT 5 image (left) and ENVI 4.3 software were used to obtain a new pond index (NDPI). From the NDPI, ponds (in blue) were precisely located (center and right). The 500 m zone potentially occupied by mosquitoes is shown in orange.



Map of Senegal and Barkedji zone (red square) (Source: *Atlas of Africa,* Jaguar Editions)

risks. They noted that zones with very high and high risks were inhabited by potential reservoirs (snakes, frogs, and toads) for the RVF virus (following Bâ et al. 2006) and produced an improved ZPOM.

Results

The analyses using GIS technology allowed researchers to see that risks increase when ponds are close to each other. Using GIS technology, researchers created a new, more detailed, and more useful ZPOM. GIS tools provided new products and information for use by local early warning systems in the prevention of disease.

Future Applications

This technique might be improved by adding digitized ecological zone layers. Multidisciplinary users can benefit from this data by using it to choose strategic positioning of villages and parks according to RVF risks. This new methodology is also being transferred to other teams in Africa for varied types of mosquito vector research.

For more information, contact Yves M. Tourre at yves.tourre@medias.cnes.fr or visit www.redgems.org.

About the Authors

Tourre, Fontannaz, Vignolles, and Lacaux are affiliated with MEDIAS-France, Toulouse, France; Ndione is affiliated with the Centre de Suivi Ecologique (CSE), Laboratoire de Physique de l'Atmosphère et de l'Océan, Université Simon Fongang, Dakar, Sénégal; and Lafaye is affiliated with the Centre National d'Etudes Spatiales (CNES), Toulouse, France.

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ESRI on the Road

2007 ESRI Health GIS Conference
October 7–10, Scottsdale, AZ
www.esri.com/events

The World of Health IT Conference and Exhibition 2007
October 22–25, Vienna, Austria
www.worldofhealthit.org

Association of American Medical Colleges Annual Meeting
November 2–7, Washington, D.C.
www.aamc.org

American Public Health Association 2007 Annual Meeting and Exposition
November 3–7, Washington, D.C.
www.apha.org

International Hospital Federation 35th World Hospital Congress
November 6–8, Seoul, Korea
www.ihf-fih.org

American Medical Informatics Association Annual Symposium
November 10–14, Chicago, IL
www.amia.org

For registration and information about ESRI-sponsored events, visit www.esri.com/events.

Celebrate GIS Day on November 14

GIS Day provides an international forum for creating geographic awareness and inspiring others. You can participate on November 14, 2007, or the day of your choice by hosting an open house, workshop, community expo, GPS scavenger hunt, or other creative event. A wealth of GIS Day planning support—information, ideas, presentations, videos, banners, educational material, and more—is available online at www.gisday.com.

Submit Your Article to *HealthyGIS*

Share your knowledge and innovative ideas about real-world GIS solutions in health and human services research, analysis, and delivery. Submit an article to *HealthyGIS* that identifies an issue solved using GIS; mentions the entities involved, budget, key personnel, software, and hardware; and, most importantly, describes benefits or return on investment realized and lessons learned. Broaden your professional experience and stimulate discussion among your peers—submit your 800-word article today.

For more information, contact the editors, Peggy Harper (e-mail pharper@esri.com) or Susan Harp (e-mail sharp@esri.com).

Young Epidemiologist Wins Recognition for Research Using GIS

Megan M. Blewett received several top national recognitions this spring for her epidemiology research that uses GIS technology to look for hidden disease relationships. The awards—two prestigious scholarships and recognition in a national newspaper—will help her as she enters her first year at Harvard later this year. Meanwhile, Blewett continues to share with the ESRI community the results of her spatial statistics research on multiple sclerosis (MS) and other diseases. The spring 2007 *HealthyGIS* newsletter carried an article about her work, and she recently presented an update on recent findings at the 2007 ESRI International User Conference.

Blewett's awards include National First-Place Winner of the Fourth Annual Young Epidemiology Scholars, a scholarship competition sponsored by the Robert Wood Johnson Foundation and the College Board. Her submitted paper used spatial geography techniques to compare MS and amyotrophic lateral sclerosis (ALS).

Blewett also placed seventh in the Intel Science Talent Search and, as a result, received a scholarship prize and presented her work to the Congressional Biomedical Research Caucus and the Joint Steering Committee for Public Policy, a bipartisan U.S. Congress group that seeks to increase congressional support for research funding. In addition, the newspaper *USA TODAY* featured Blewett as a member of the All-USA High School Academic Team, which recognizes 20 seniors nationally for extraordinary accomplishments in and beyond the classroom.

For more information on Blewett's research, go to www.msgeographics.com.

Megan M. Blewett receives the Young Epidemiology Scholars award for 2007. From left are Jim Montoya, College Board vice president; Rear Admiral Kenneth P. Moritsugu, U.S. acting Surgeon General; Blewett; and Pamela Russo, senior program officer, the Robert Wood Johnson Foundation.

From My View . . .

By Bill Davenhall
Global Manager
Health and Human Services
ESRI

What Will GIS for Health Look Like in 2020?

Several times in my life, I have been certain about the easy and ready adoption of a particular health information technology. An example is universal adoption of the electronic health record. I predicted this would happen in the mid-1980s, then again in the mid-1990s, and then again last year! Guess what? My predictions fell short, I think largely because I failed to consider the innovation's perceived value by the very individuals the technology is intended to serve—ordinary people! On the other hand, health care IT experts claim that the slow uptake of electronic medical records is because health care organizations are late IT adopters.

Sometimes all it takes for rapid technology adoption is strong consumer value attribution. Many IT innovations such as the MRI were adopted almost in spite of high costs because patients and their families perceived a high value, fueled by hope for recovery. In the early MRI days, many hospital managers doubted the MRI's investment value. Failing to understand a technology's value or benefit to the ultimate consumer, the patient, is as dangerous as not realizing a real financial return on the investment itself. In consumer electronics, adoption of home computers, cell phones, portable music servers, and high-definition television provides clear evidence of how a strong perceived benefit or value drives technology adoption. So what about the adoption of GIS in health and human services organizations?

I will once again risk a look into my GIS crystal ball and see if I can predict where GIS in this important sector will be in 2020. Here are my top five predictions:

No. 1—GIS will be a Web service (software as a service), easily accessed from any browser, anywhere, at any time. Time-consuming activities such as geocoding health records will be a thing of the past. ArcGIS Server will be running back-office business processes that automatically geocode addresses the moment someone enters them into a health or social service registration system, either in a facility or from the field.

No. 2—Health clinicians will understand GIS because most medical schools worldwide will have a geospatial medical curriculum and fund GIS research labs. Health professionals in medicine, nursing, dentistry, allied health, and public health will enter their first professional health employment or medical practices with a rich understanding of the value of place. Physicians will insist on an analysis of a patient's "place history" before they schedule lab tests or recommend a course of treatment. GIS will become a standard of clinical practice.

No. 3—GIS will be the preferred way consumers seek medical cost and quality information. They will conduct geographic searches for the best and most cost-effective solution for their health problems—and they will search across geographies they have never visited before. GIS will be part of every health provider's Web shopping cart.

No 4—GIS will offer just-in-time preventive health information to consumers, enabling communities to become proactive about health. GIS will power an early warning system in every community to automatically discover possible environmental hazards and conditions that precede clinical signs and symptoms. GIS will become a major contributor to lowering health care costs.

No. 5—GIS will be a critical research tool for those working in the drug discovery, clinical trial, and human genomics fields. GIS will routinely help identify geographic clusters of people with high probability of benefiting from targeted treatment interventions. GIS will help drug manufacturers sample populations more effectively for testing new drugs and delivery mechanisms.

Ultimately, where GIS for health and human services will be in 2020 is largely in your hands, since the value of GIS will always be in the eye of the beholder, and its ultimate value will always be measured by those who should benefit—ordinary people trying to be healthy every day.

I look forward to seeing everyone in Scottsdale, Arizona, October 7–10, at the 2007 ESRI Health GIS Conference.

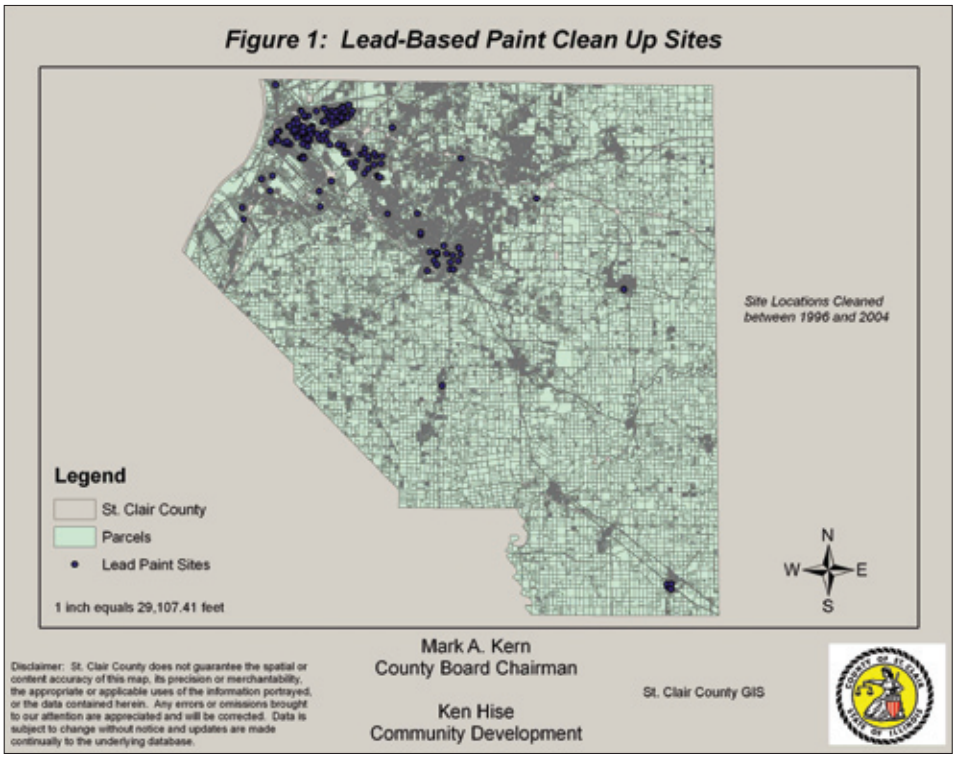
As always, I invite a second opinion.

Bill

GIS Helps Define Problem Areas and Build Plan for Residential Lead Paint Remediation

By Julia Popolizio, Coro Foundation Fellow; Charles Kofron, Ph.D., St. Clair County GIS Coordinator; and Kenneth Hise, St. Clair County Community Development Division Manager

The St. Clair County Intergovernmental Grants Department (IGD) and the City of East St. Louis, Illinois, Community Development office are the primary local entities assisting low- and moderate-income residents with housing rehabilitation, which includes lead paint hazard reduction. In November 2006, IGD undertook a collaborative project with the county's Data Processing Department to utilize the county's enterprise GIS to target homes at risk for lead hazards. The study results provided IGD with a visual and numerical representation of both past lead paint hazard reduction work in the county over a 10-year period as well as the current situation and information for identifying future remediation target areas. The project is an example of how GIS can integrate various kinds of spatial and administrative data to create meaningful information and useful directions for future action.

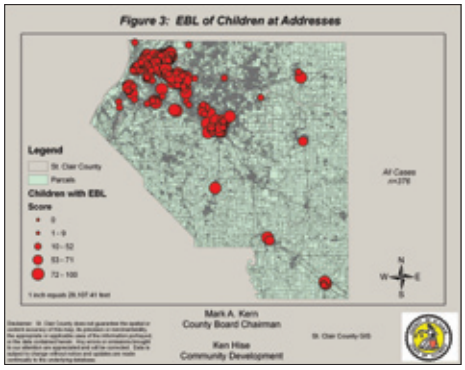


The points in this map represent the locations of 345 lead-safe houses cleaned between September 1996 and June 2004 in St. Clair County, Illinois.

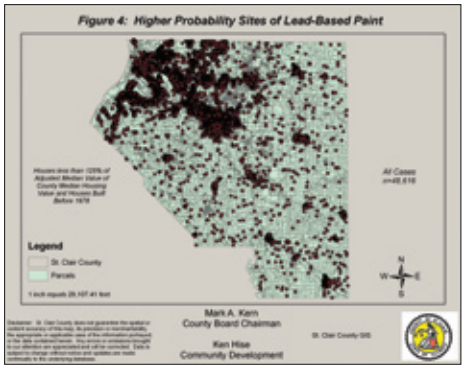
Background

The President's Task Force on Environmental Health Risks and Safety Risks to Children released, in 2000, a government-wide strategy for resolving lead paint hazards in the United States and helping eliminate childhood lead poisoning by the year 2010. While residential-use lead paint was banned in the United States in 1978, nearly one million children have lead poisoning. The children most at risk are those under the age of six and low-income children living in older housing containing remnants of lead-based paint. The plan recommends that the Housing and Urban Development grant program, the primary source of funds for lead hazard control work, should emphasize pre-1960 low-income privately owned housing units where young children are expected to reside. In addition, it recommends concentrating on housing with a history of lead-poisoned children.

Using these two directives as a guide, the St. Clair County IGD Community Development Division teamed with the county's Data Processing Department to integrate and analyze historical and current data and use it to guide a plan for future action. Data Processing currently maintains an enterprise geodatabase in SQL Server and provides access for county departments to the tools available in ArcGIS at all licensing levels (ArcInfo, ArcEditor, and ArcView). It also coordinates and supports the use of GIS tools among all county departments including access and use of ArcGIS Spatial Analyst, 3D Analyst, Production Line Tool Set (PLTS) for ArcGIS, and ArcGIS Publisher extensions. The tools used in this study required ArcView licensing for geocoding and buffer generation.



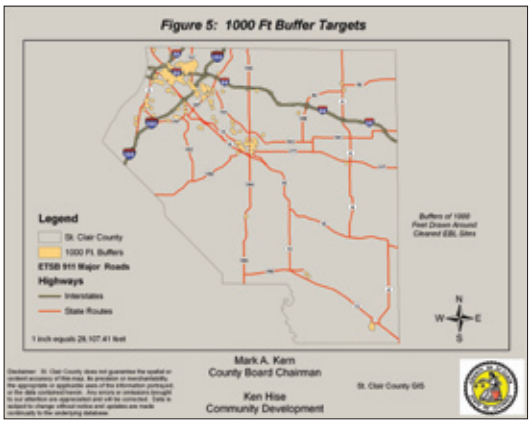
Mapped blood-lead levels of children according to address are used to prioritize the locations for future action in St. Clair County.



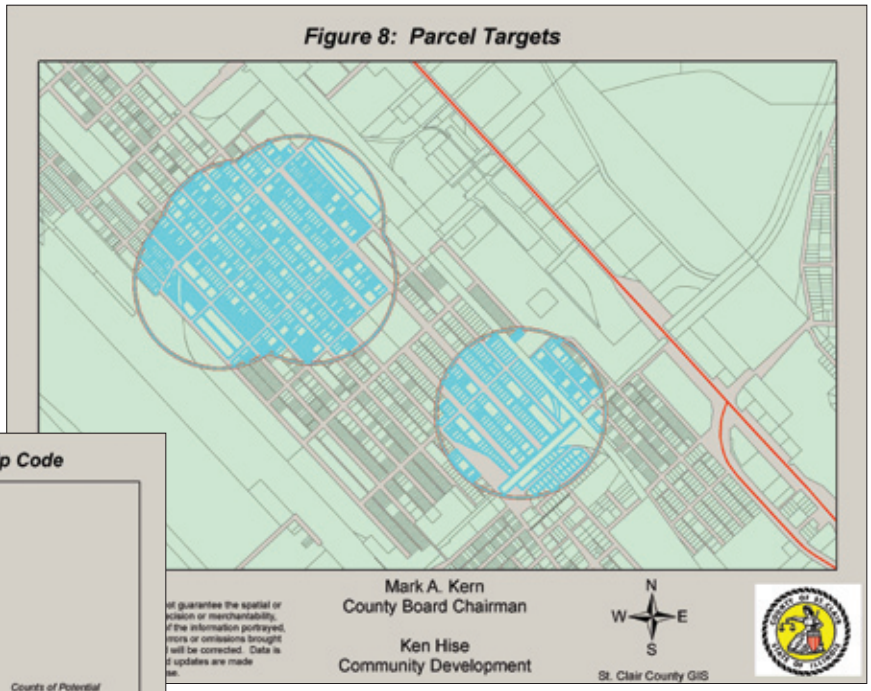
Mapped distribution of current properties with high probability of containing lead-based paint in St. Clair County

GIS Methods and Results

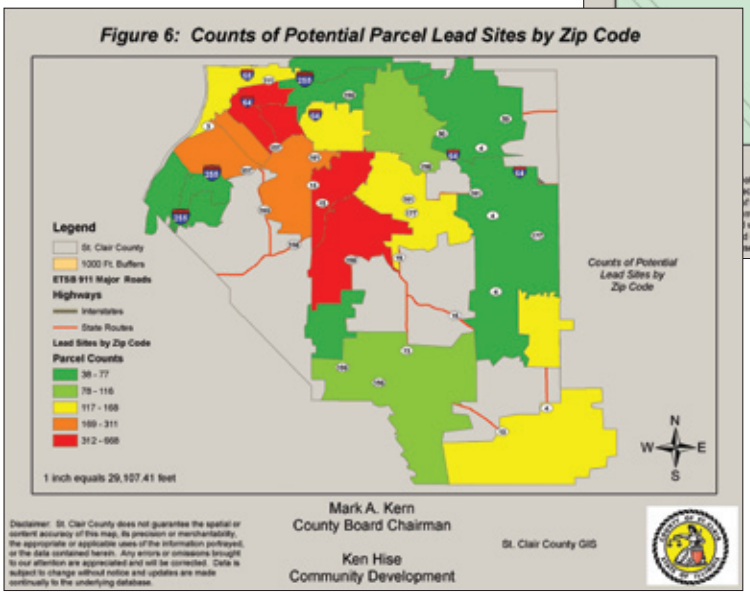
The project chose the parameters of pre-1978



Mapped distribution of previously cleaned residential sites with added 1,000-foot buffers, St. Clair County



Selected targeted residential parcels located within buffers, drawn on top of St. Clair County's parcel map



Summary of the counts of current potential parcels with lead-based paint in St. Clair County according to ZIP Code

housing valued at no more than 125 percent of the area's median assessed value and located within neighborhoods where IGD had already performed lead hazard control work. First, IGD address matched (geocoded) houses that were cleared of lead-based paint to the county's parcel map base. The county's computer-aided mass appraisal (CAMA) system provided addresses and parcels of all housing units that fit the chosen parameters. This produced a SQL table that was joined back to parcels using ArcGIS with the advanced "Keep elevated blood-lead (EBL) levels only matching records" option, resulting in a selected set of parcels.

To identify priority areas for remediation, the known addresses of children with EBL were used to create neighborhood or proximity buffers using the buffer wizard in ArcGIS toolbox. The size of these buffers was determined interactively by varying the buffer size to include as many of the known lead-based paint address points as possible. It was concluded that a buffer size of 1,000 feet enclosed the optimal number of known addresses that previously had lead-based paint.

In effect, the buffers represent targets for inspection and lead-based paint remediation. A listing of all addresses within the buffers accompanied parcel selection. This list was further refined by filtering out parcels with class (land-use) codes that were not residential, providing the final list for future remediation consideration.

Conclusion

The information helps IGD work in a targeted way toward the federal goal of eliminating childhood lead poisoning by 2010. Results are shared with other involved agencies including the St. Clair County Health Department. The study assists local officials, health administrators, and community development staff with a means of better utilizing scarce resources to educate citizens, increase inspections, and reduce lead paint hazards in at-risk residential housing units.

The results of this IGD study should help educate local officials and building inspectors that lead paint hazards are not confined to the older urban housing stock alone and also serve to illustrate the importance of routine lead paint hazard inspections. Most importantly, by demonstrating need and by providing targeted at-risk areas for future action plans, it helps strengthen the case for informing the public and attracting additional funding to end childhood lead poisoning.

For more information, see *Eliminating Childhood Lead Poisoning: A Federal Strategy Targeting Lead Paint Hazards* in Homes and Communities: U.S. Department of Housing and Urban Development, Healthy Homes and Lead Hazard Control, published in January 2007 (available at www.hud.gov/offices/lead/reports/fedstrategy2000.pdf). You may also contact Charles Kofron (phone: 618-277-6600, ext. 2284, or e-mail: ckofron@co.st-clair.il.us).

Plenary Puts Spotlight on Health GIS

Delegates Discuss Applications and Trends

Attendees at the 2007 ESRI International User Conference (ESRI UC) saw a wide variety of GIS applications in the health and human services fields this June in San Diego, California. Software demonstrations, workshops, and presentations brought to light several cutting-edge applications and stimulated discussion about the future of health GIS.

"GIS provides the connectivity required to understand and visualize the geographical scope of global health," said Bill Davenhall, ESRI global marketing manager, during one of the workshops. "Health GIS applications are increasingly Web accessible and developing into critical technology for early detection, medical diagnostic protocols, and linking drug trials and human genomics."

During the plenary, ESRI president Jack Dangermond highlighted how GIS contributes to health studies and planning in revealing patterns of epidemics, cancer, social indicators, and the relationship or influence of animals on human disease. Also during the plenary, Mickey Jones, scientist for the New York City Department of Health and Mental Hygiene, demonstrated an enterprise application based on ArcGIS Server that enables better monitoring and management of potential environmental public health hazards.

"We needed the ability to accurately map our environmental readings indoors using building floor plans to locate sampling points," said Jones, explaining that the organization worked with Penbay Media to develop an enterprise server application that allows them to georeference a building's floor plan, download it to a mobile device, and then go into the field to collect environmental readings that are geolocated to the floor plan.

The conference also included 10 presentation sessions exploring environmental health, hospital service analysis, information access and collaboration, statistical methods, and spatial analysis of disease and community health. Targeted workshops presented spatial statistics applications in health and explored current and future contributions of GIS to human health.

Mike Sweeney, ESRI technical sales manager, uses a TouchTable screen in the 2007 ESRI UC Health Showcase to demonstrate a model for predicting the spread of disease.

Health Showcase

ESRI technical experts demonstrated the use of ESRI technology in various health applications at the Health Showcase in the Exhibit Hall. Other exhibits highlighted GIS in the following programs:

- Kristen Kurland, coauthor of *GIS Tutorial for Health* (www.esri.com/esripress)
- Health Landscape interactive Web atlas (www.healthlandscape.org)
- Ada County Weed, Pest, and Mosquito Abatement Program (www.adaweb.net)
- Loma Linda University School of Public Health (www.llu.edu/llu/sph)
- Community GeoMatics Centre, Sault Ste. Marie Innovation Centre (www.ssmic.com)
- Health Geographics Program, Baystate Medical Center (http://academics.bhs.org/research/health_geographics_program)
- Nebraska Health and Human Services (www.hhs.state.ne.us/gis)

Health User Group Luncheon

Attendees filled the room during the Health User Group (HUG) luncheon, and Bill Davenhall kicked off the meeting with recognition of Megan Blewett, GIS user and winner of the Young Epidemiology Scholarship award (see related article on page 4). Subsequently, several speakers reviewed the following activities:

- Kristen Kurland, coauthor of *GIS Tutorial for Health,* spoke about developing new GIS courses and workshops that use the publication as a textbook. She announced that a new edition updated for ArcGIS 9.2 will be released soon. (www.esri.com/esripress)
- Kim Hedrick, ESRI grants program coordinator, reported on changes to the ESRI Grant Assistance Program (see related article on page 10).
- Paul Beach, manager, Community Geomatics Centre, Sault Ste. Marie Innova-

tion Centre, Canada, gave an overview of the integrated municipal GIS that serves the entire Sault Ste. Marie community to provide information and analyses for agencies that range from health care and social services to the water utility. (www.ssmic.com)

- Susan Resnick, New York City Department of Health and Mental Hygiene, and Chris Chalmers, Nebraska Health and Human Services, discussed their respective efforts and best practices for building local and state health GIS networking groups. (www.nyc.gov/html/doh) and (www.hhs.state.ne.us/gis)
- Devon Williford, Colorado Department of Public Health and Environment, reviewed the 2006 Health GIS Conference site visit during which members of the Colorado Public Health/GIS Users Group gave poster presentations on a wide range of GIS health applications used around the state. (http://emaps.dphe.state.co.us/gis/public_health_user_group.html)

Sponsors

Finally, thanks go out to Netsmart Technologies and Scientific Technologies Corporation (STC), sponsors of the HUG lunch and meeting.

Netsmart is a software company that provides health management solutions including GIS-based applications for public health programs as well as disease, patient, and immunization tracking. Visit www.ntst.com.

STC is a public health informatics company with a specialty in GIS solutions in community health planning, emergency preparedness, needs assessments, event management, and integrated public services and health care. Visit http://stchome.com.

Call for Presentations ESRI UC 2008

Deadline Is November 2, 2007

The Twenty-eighth Annual ESRI International User Conference will take place on August 4–8, 2008, at the San Diego Convention Center in San Diego, California. The deadline for submitting abstracts for presentations is November 2, 2007. More information will be available online at www.esri.com/ucpapers.

Health Organizations Win Special Achievement Awards

Congratulations to the 2007 Special Achievement in GIS (SAG) Award winners in the Hospitals and Health Systems and the Public Health and Human Services industries. Each year during the ESRI International User Conference, ESRI president Jack Dangermond recognizes the accomplishments of organizations that use GIS technology to make a difference in the world. This year's winners include

Bureau of Environmental Sciences and Engineering, New York City Department of Health and Mental Hygiene (New York), for developing a GIS that supports environmental health monitoring. **www.nyc.gov/html/doh**

Kentucky Department for Public Health, Public Safety Branch (Kentucky), for integrating the use of GIS into public health departments and disaster response plans and developing a GIS model for identifying potential lead contamination in housing. **www.chfs.ky.gov/dph/info**

Pacific Emergency Management, Preparedness and Response Information Network and Training Services (Hawaii), for developing GIS mapping and spatial analysis training for health professionals involved in management, preparedness, and response to public health emergencies, as part of the Pacific EMPRINTS consortium curriculum. **www.emprints.hawaii.edu/classroom/gis.html**

Sault Ste. Marie Innovation Centre (Canada), a not-for-profit organization whose Integrated Geomatics Service team is delivering a shared GIS solution for the Sault Ste. Marie community and developing spatial analysis tools that support local health and social services organizations. **www.ssmic.com**

See the complete Special Achievement in GIS Award list at www.esri.com/sag.

Notable Links

www.publichealthadvocacy.org
California Center for Health Advocacy used GIS and commercial data sources to examine the distribution of retail food outlets in California communities. The site describes construction of an index of the relative abundance of different types of retail food outlets. Click Research, then California's Food Landscape, to read about The Food Landscape in California Cities and Counties.

http://library.silentspring.org/heis/quickstart.asp
Silent Spring Institute's Massachusetts Health and Environment Information System (MassHEIS) is a Web-based mapping tool that gives access to health and environmental information about Massachusetts communities and underlying datasets. Users can view maps, explore data relationships, and see FAQs and links to outside information helpful for interpreting the maps. Users may also download geographic information and metadata through ArcIMS Web services.

www.healthlandscape.org/
HealthLandscape is an interactive Web atlas that lets you combine, analyze, and display information in maps to promote the understanding and improvement of health and health care. The site provides useful mapping tools for health professionals, policy makers, academic researchers, and planners.

Understanding the Power of Place 2007 ESRI Health GIS Conference

October 7–10, 2007, Scottsdale, Arizona

Be part of the ESRI Health GIS Conference and explore how GIS analysis can help us understand the science of health and improve how we deliver it to society. See demonstrations of the newest technology and applications, network with your peers, and consider the road map ahead for geospatial technology and related trends.

Invited speakers include Stephanie Bailey, M.D., M.S.H.S.A., chief, Public Health Practice, U.S. Centers for Disease Control and Prevention; Raymond D. Aller, M.D., director, Bioterrorism Preparedness and Surveillance Section, Los Angeles County Department of Health; Gerard Rushton, Ph.D., professor, Department of Geography, University of Iowa; and Evangeline Franklin, M.D., director, Healthcare Clinical Services, New Orleans, Louisiana.

When you register, remember to sign up for the site visit to the Arizona Department of Health Services. Register now at www.esri.com/healthgis.

ESRI Grant Assistance Program Provides Free Support to Customers

New Information and Services Available at www.esri.com/grants

ESRI's Grant Assistance Program (GAP) is rolling out some exciting changes that will help GIS users find funding for projects. GAP is a free program that helps you find the best grants to suit your needs and assists with grant applications.

GAP will now help people with customized grant searches. (In the past, GAP primarily worked as a grant notification service sending GIS users e-mail notices about grants available for their interest areas.) Now you can request information on grants that most suit your organization and its needs. You will receive personalized attention and obtain a customized funding solutions report that includes information on grants that are most appropriate for your organization's projects and details about free services to help you apply for grants.

The updated Web site also features many helpful resources about the process of finding funding and applying for grants including tips and links to various federal grant program Web sites and tutorials. You can browse through information about the free services ESRI provides with this program, how to get started in the grant process, and key factors in finding the right grant and writing a successful application.

Once visitors to the site have chosen a grant for which they will apply, they can gain additional assistance from ESRI during the application process. GAP can help tailor a project to grant requirements, giving you the best chance for success.

You can request assistance, including a customized funding solutions report, via the online Assistance Request form. Visit www.esri.com/grants.

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