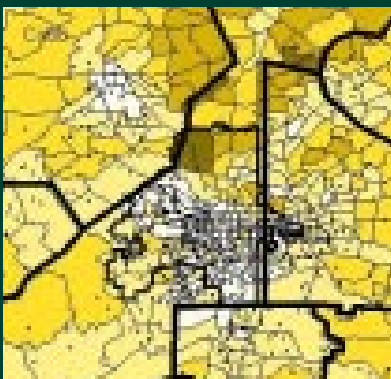
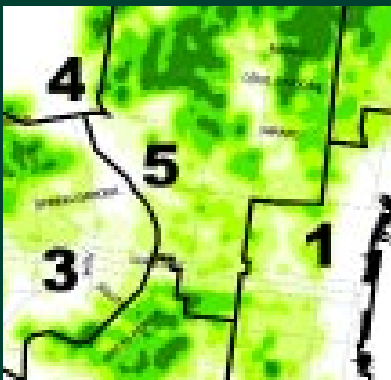
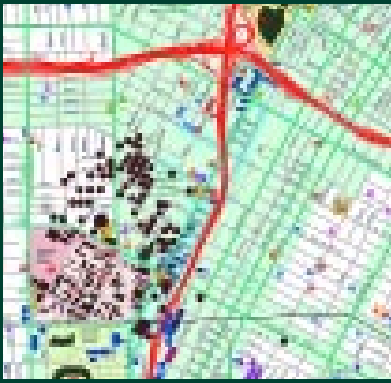




Mapping for Change

Using Geographic Information Systems for Community Development





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for Community
Development

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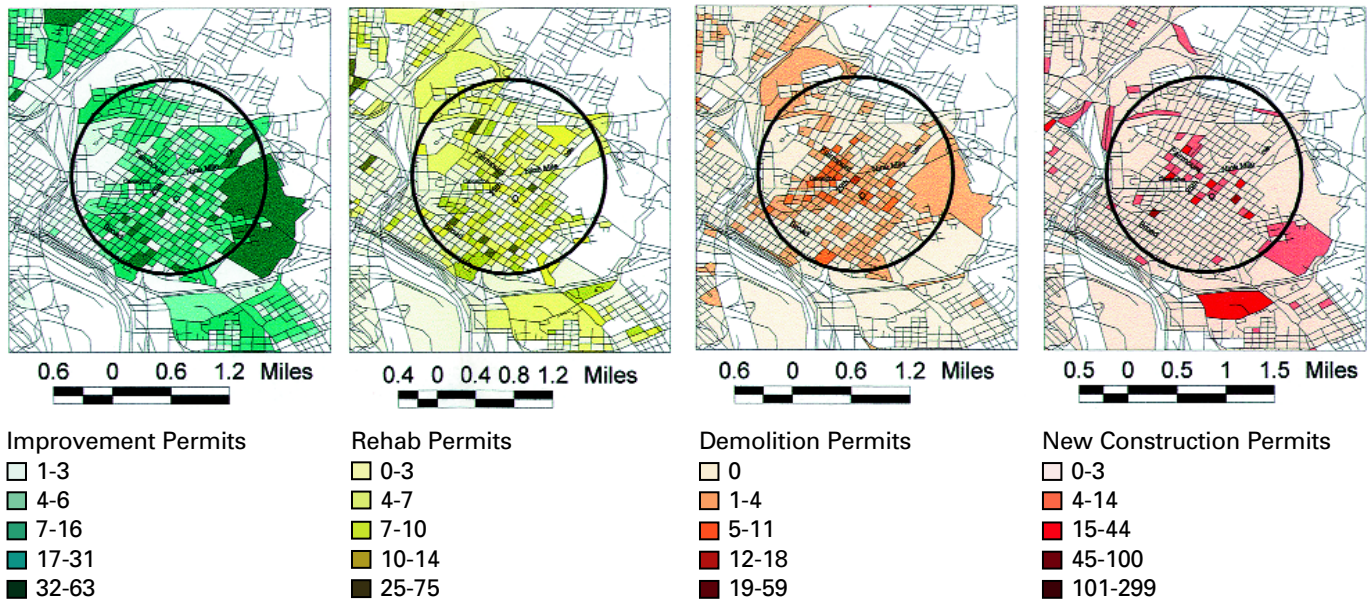
Acknowledgements

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“GIS can bolster a community development organization’s efforts by enhancing decision-making, resource allocation, and strategic planning functions. In an age when knowledge is power, GIS can offer distinctive tools that enable an organization to gain an edge, provided the organization is willing to make the necessary investment of time and resources to develop a foundation in the GIS basics.”¹



**Development Activity—25th Street and Nine Mile Road
Richmond, Virginia**

Source: Richmond Neighborhood
Indicators Project

1. Carnahan, Brian.
September/October
2000. “Geographic
Information Systems,”
Shelterforce.

Executive Summary



Increasingly, the Local Initiatives Support Corporation (LISC) and our partners have been tapping into the power of Geographic Information Systems (GIS) to convey information in a concise and compelling manner through maps and to analyze data geographically. Although academics and professionals in the fields of environmental science, geography and cartography have been using GIS for decades, it is relatively new to the community development field. Our experience to date has convinced us that GIS is a powerful tool for community development planning, advocacy, organizing, fundraising, and evaluation. However, we have also learned that the barriers to effectively using GIS—including access to technology, data, skilled users, and resources—are significant, and frequently underestimated by new users.

LISC has prepared this publication to document the many ways in which GIS is furthering community development efforts and to share the hard-won lessons of those who have pioneered the use of this technology in our field. LISC hired PolicyLink—a national nonprofit research, communi-

cations, capacity building, and advocacy organization—to research and help write and produce this report.

PolicyLink's research included a brief literature review and detailed interviews with 30 community development practitioners, LISC staff, GIS data intermediaries, and University faculty and staff.²

Section I of the paper provides a brief background of GIS and describes the spectrum of GIS functions, which range from simply displaying data to analyzing it. In Section II, we provide models and sample maps to illustrate how GIS is currently being used for:

Planning

Organizing and Advocacy

Partnership Building

Evaluation and Marketing

Based on these examples, in Section III, we offer the following broad conclusions:

GIS is a powerful resource for community development;

GIS should be used as an analytical as well as a data display tool;

Careful planning and partnerships are crucial for building GIS, due to the complexity of GIS applications.

There are also more detailed recommendations in Section III regarding specific steps and considerations involved in planning for feasibility, data needs and sustainability, and for building appropriate partnerships. Following the conclusions, we offer detailed case studies of GIS partnerships in Richmond, Virginia and Minneapolis, Minnesota. This paper focuses on how the community development field can use GIS applications to promote neighborhood development, rather than how practitioners can become experts in producing GIS applications. More information about the examples included in this paper and about GIS technology can be found on the LISC Online Resource Library at www.liscnet.org/resources and in PolicyLink's Community Mapping tool at www.policylink.org/EquitableDevelopment/. Additional sources of information on GIS and community development are included in the Appendix of this paper.

2. Over 30 interviews were conducted with representatives from 13 GIS projects in the following cities: Richmond, VA; Buffalo, NY; New York, NY; Camden, NJ; Minneapolis, MN; St. Paul, MN; Milwaukee, WI; Oakland, CA; Los Angeles, CA; Philadelphia, PA; Kansas City, MO; Providence, RI; and Chicago, IL. In addition, PolicyLink reviewed materials provided by local GIS projects to better understand context and details about the goals, strategies, and desired outcomes for each location.

Introduction to Geographic Information Systems



In 1996, Anita Landecker, then a Vice President at the Local Initiatives Support Corporation (LISC), made a \$10,000 grant to a nonprofit organization called Neighborhood Knowledge Los Angeles (NKLA) to help launch a pilot Geographic Information System (GIS) project. This was one of the first efforts to use GIS to support revitalization of low-income neighborhoods. Since that time, NKLA has broadened its work to include a statewide GIS repository and LISC has become involved in a variety of GIS projects across the country. This section provides a brief overview of what GIS is and how it has evolved.

In the strictest sense, the US Geological Survey defines GIS as “a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information—data identified according to their locations.”³ GIS applications map information and data relative to geography or location and are tools to analyze data in a spatial context. GIS is not just about making maps or visually displaying data; GIS is a tool for layering and analyzing data that allows users to see information in new ways. GIS is unique in its capacity to perform complicated functions, which often include combining information from different sources to derive meaningful relationships.

Table 1 illustrates combinations of possible data sets and geographies relevant to community developers that can be mapped by GIS. The resulting computerized maps can show several layers of information simultaneously by a given geography, illustrating the relationship between variables like vacancy rates and crime or check cashing facilities and household income. GIS maps are searchable (since they are linked to databases)

HUD 2020

Before GIS started to become a popular tool for community planning, the U.S. Department of Housing and Urban Development (HUD) introduced its own GIS application in 1997. Known as HUD Community 2020, this desktop mapping application is a multi-faceted planning, mapping, and communication package. Not only does Community 2020 provide geographic information that allows citizens to see where their tax dollars are being spent locally, it provides users with HUD program information in a format that facilitates greater citizen participation. Despite these unique features, many users have begun using newer and more flexible GIS applications, such as those by MapInfo and Environmental Systems Research Institute (ESRI). HUD has been working with ESRI to develop a more powerful version of the Community 2020 software which will be Internet based. Its expected release date is early 2003.

Table 1

Data x Graphic = GIS

Data	Geography	GIS
Property Ownership	Property Parcels	Computer applications to analyze and view data/information relative to geography
Land Use	Census Tracts	
Housing Characteristics	Zip Codes	
Vacancy Indicators	Neighborhoods	
Tax Information	Council/School Districts	
Demographics/Census	Cities	
Environmental Conditions	Counties	
	States	

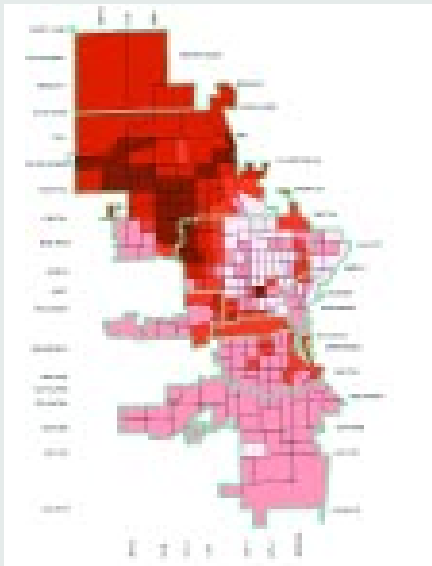
GIS maps and overlays combinations of data sets and geographies that are relevant to community developers. The computerized maps can show several layers of information simultaneously by a given geography, illustrating the relationship between variables like vacancy rates and crime or check cashing facilities and household income.

3. U.S. Geological Survey Web site: www.usgs.gov.

Continuum of GIS Functions

Context Maps

Maps that display information by a broad geography.



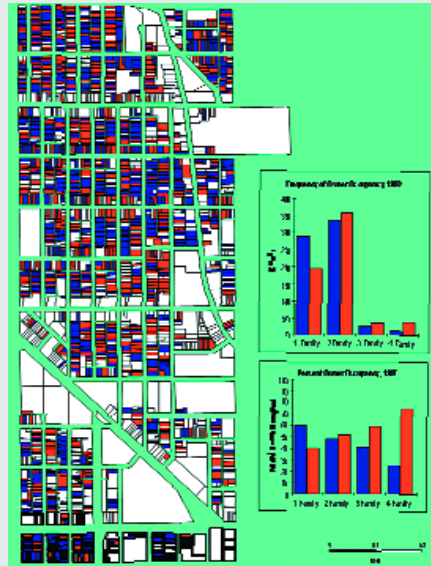
Percentage Point Change in African-American Population, Milwaukee, Wisconsin, 1990-2000

Source: U.S. Census Bureau, 1990-2000

- (20)%-0%
- 0%-5%
- 5%-15%
- 15%-30%
- 30%-45%

Display Maps

Maps that display single or multiple variables by a small geography.



Owner Occupancy, Residential Properties, Lindsay Heights, 1997

- Owner Occupied
- Non-owner Occupied
- Non-residential, No Data

Analytical Maps

Maps that layer and analyze multiple variables by a small and broad geography.



Property Parcels with Tax Delinquencies and Concentration of Latino Population by Census Tract, Los Angeles, California

Source: Neighborhood Knowledge

- Los Angeles
- 0-389
- 389-920
- 920-2149
- 2149 or more

and the variables or geographical areas shown can be adjusted relatively easily.

GIS applications typically fall into one of three main categories—context, display and analytical. Context maps use broad geographical information, such as census poverty data, to illustrate the socio-economic context for community development projects. Display maps show single or multiple variables, such as property conditions, across a limited geography. The most powerful GIS applications involve using the software to view and analyze multiple

data sets in relation to place or geography. By analyzing multiple data sets by geography, community groups are able to see their neighborhoods in new ways, improve the forecasting of revitalization efforts and demonstrate outcomes of successful projects.

The scale of GIS projects can range considerably. For example, a non-profit may be able to contract with a mapping specialist to create several static GIS maps for less than \$1,000. Creating a searchable online system will likely cost more than \$100,000 to initiate and \$50,000 per year to maintain. This disparity is due to the

variation in types of information to be mapped, as well as processes of creating maps. The primary variables are whether data is being displayed in a static or dynamic (Internet-based) manner, and the type of geographic area used in the mapping effort. While the introduction of the Internet has allowed users to produce maps from their desktop computers, dynamic or searchable maps that rely on the Internet are significantly more complicated to create and require a much larger investment for community development practitioners.

Models of GIS in Community Development



Academics and professionals in the fields of environmental science, geography, and cartography have been using GIS for decades. Recent technological advancements that support GIS applications on desktop computers and increased access to relevant data sets have assisted in bringing GIS technology to the community development field.⁴ Over the last decade, innovative community development practitioners have tailored computer mapping and analysis systems to promote and support neighborhood revitalization strategies. GIS offers these community development practitioners a new method of communicating the impact of neighborhood improvements and involving a wide range of stakeholders in neighborhood planning activities. GIS accomplishes this by providing accurate and unique information, effective visual tools, and the ability to understand their own experience in the context of their changing environment.

These early adopters of GIS applications and the local partnerships formed to manage these systems serve as a foundation for understanding how GIS can be used as a tool to support neighborhood revitalization strategies. In this section we explore

examples in which community development organizations are using GIS to support their work. The examples illustrate four categories of GIS' effectiveness for community developers:

1. Planning
2. Organizing and advocacy
3. Partnership building
4. Evaluation and marketing

1. Planning

The following examples illustrate how maps can be used to understand and communicate detailed information about neighborhood conditions, as part of neighborhood and project planning efforts. Several of the projects described monitor property data (i.e. tax delinquency and code violations), while others have added layers of demographic data. By providing information on key indicators—and in some cases illustrating change over time—the practitioners described are able to identify key problems and assets to help them most effectively target their activities.

Consolidated Planning

Many local governments have used GIS applications to conduct planning, particularly in the creation and presentation of their consolidated plans. For example, the Executive Summary of Richmond, Virginia's Consolidated Plan describes how the city used overlapping maps of the following indicators to help develop its plan: income levels; concentration of minorities; unemployment levels; and proposed HUD projects. In New York, the city used maps in its 2001 Consolidated Plan Annual Performance Report to show levels of city funding related to indicators of need (income, race, education) in its Areas for Directed Assistance in each borough. In Philadelphia, the 2003 consolidated plan relies on GIS maps to depict proposed projects (city-wide and broken down by neighborhood) and CDBG eligible tracts, which are overlaid with other data and used for planning purposes.

Monitoring property parcel change: early warning systems (Map #1, page 6)

Some of the most advanced analytical GIS applications track and display detailed property information at the parcel level. These systems, built on massive databases, allow users to identify properties that are vacant, not code compliant, and/or in danger of foreclosure as part of early warning systems to detect neighborhood decline. These systems provide current information from city tax records, building departments, census data, public utilities, and other municipal data sources. Neighborhood Knowledge Los Angeles, Chicago NEWS, MAP Milwaukee, and the Philadelphia Neighborhood Information System are some leading examples of early warning systems that are accessible to the public through the Internet.

Targeting resources for maximum impact

Displaying housing and real estate data by geography is a powerful way to target resources for maximizing revitalization efforts. In St. Paul, MN, a GIS application revealed that at-risk properties were not only concentrated in a small area of one neighborhood, but were actually dispersed throughout the entire neighborhood. By sharing maps documenting at-risk properties with funders and the city, a local CDC was able to target its housing assistance program to rehabilitation needs throughout the neighborhood, instead of directing all housing resources to a select group of properties in one section.

4. 2001. Ghose, R. and W.E. Huxhold. "Role of Local Contextual Factors in Building Public Participation GIS: The Milwaukee Experience," *Cartography and Geographic Information Science Journal*, vol. 28, no. 3, 195-208.

By looking at the maps we created, people got a sense of the connections. They could see why certain areas were targeted [through a community planning process] as places to build housing, playgrounds, or community gardens. They could see the big picture and why certain things made sense. They also saw that there were nonprofits in the neighborhood 10 blocks from where they live that have after school programs for their kids.

Michael Clarke, Buffalo LISC

Building a shared understanding of current conditions

(Map #2, page 6)

GIS can play a key role in establishing a baseline understanding of neighborhood conditions for community planning. In Buffalo's West Side neighborhood, a resident planning process used GIS maps to provide residents with information on demographics, land use, and housing conditions to help build consensus around revitalization priorities. Based on a shared understanding of neighborhood conditions, participants were able to come to agreement about where to focus revitalization efforts and to create a comprehensive neighborhood plan.

Identifying and reusing vacant land

As infill development and brownfield reuse rise to the top of many community development agendas, GIS will continue to play a key role in identifying vacant and developable properties. In Philadelphia, the New Kensington CDC was faced with over 1,000 vacant and blighted lots in its target area. Using an in-house GIS system (supported by the Philadelphia Association of Community Development Corporations), in addition to the comprehensive citywide system (offered by the University of Pennsylvania), the CDC was able to identify and reclaim 60 percent of the vacant parcels over five years.

Displaying neighborhood boundaries

Many cities loosely define the boundaries of different neighborhoods, which can be an obstacle to targeting resources and programs to revitalize specific areas. The Oregon Hill neighborhood in Richmond, Virginia is six blocks by three blocks and before the Richmond Neighborhood Indicators Project, it was very difficult to access data about this distinct area. Using GIS mapping, the Oregon Hill Home Improvement Council has identified neighborhood boundaries, and can better target resources and evaluate impacts of targeted revitalization efforts.

2. Organizing and Advocacy

Maps are effective organizing and advocacy tools because they engage residents in the process of gathering, analyzing, and presenting information about their neighborhoods. GIS provides a way for stakeholders to spec-

ify what exists in a community and what they would like to see, and can provide a vehicle for discussions with broader groups of stakeholders. Several nonprofits reported that after creating and sharing maps, they were taken more seriously and included in processes that were not open to them before. Using maps to communicate with decision makers allows users to illustrate a large amount of information in a relatively simple and compelling format, to convey that the users are savvy about data and technology, and that they have important information about their neighborhood. Some of the ways maps can be used as organizing and advocacy tools include:

Obtaining public benefits from development subsidies

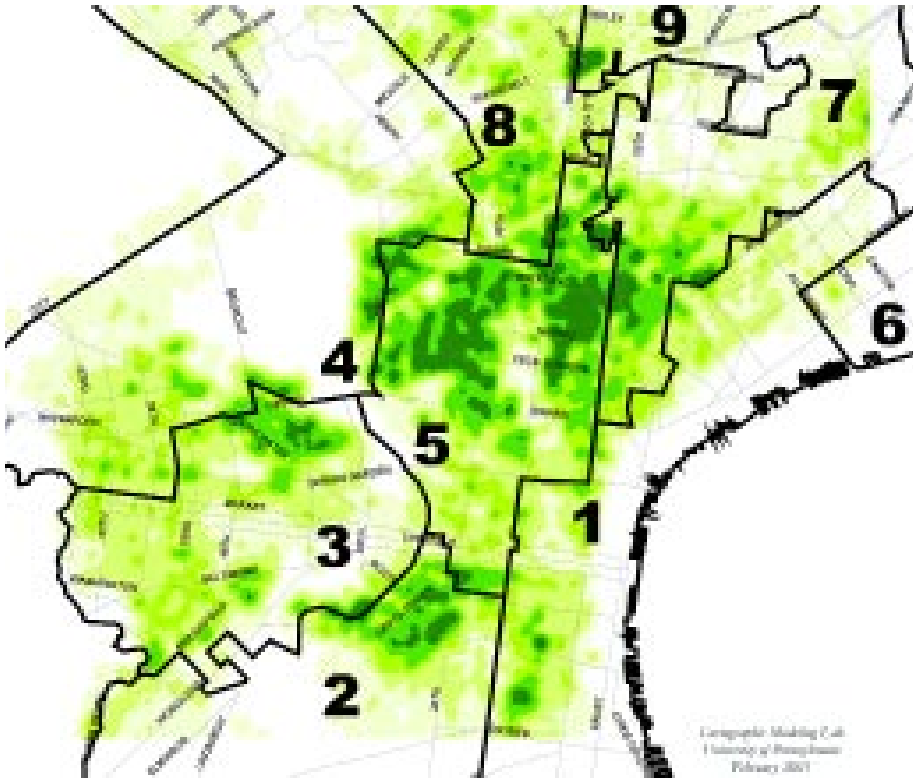
(Map #3, page 8)

By communicating land use and economic information in a simple map, advocacy coalitions can be constructed to secure public benefits from developers or government agencies. The Figueroa Corridor Coalition for Economic Justice needed an effective education and organizing tool to respond to the proposed development of an enormous entertainment, hotel, and retail complex adjacent to the Staples Center in downtown Los Angeles. Organizers created a poster-sized map of the neighborhood surrounding the proposed project, illustrating ownership patterns and development "hot spots." Using the map, community groups successfully negotiated with the developer a landmark community benefits package that

We use our map every day. We use it when we talk to residents, students, community organizations, the Redevelopment Agency, and private developers.

We can tell the history of our organization, we can talk about the different neighborhoods that we are organizing in, about who owns what, and what's at stake now.

Gilda Haas, Figueroa Corridor Coalition for Economic Justice, Los Angeles



included investments in affordable housing and parks, a local hiring requirement, and parking provisions for residents. This kind of package was a first for a low-income neighborhood in Los Angeles.

Reforming policy around neighborhood instability (Map #4, page 8)

Many low-income communities experience high rates of property turnover, absentee landlords, and land banking by speculators. In Providence, RI, the Providence Plan (a planning and community development intermediary with an advanced GIS system) teamed up with The Rhode Island Organizing Project (a state-wide organizing effort comprised of congregations, labor unions, and community groups) to enact legislative changes to promote neighborhood stability. The project team used a parcel-based GIS system to map properties that were sold through tax sales and identify properties that had multiple owners and frequent turnovers. The maps helped community members identify a key root cause: speculators were buying tax delinquent properties through auctions and allowing them to remain vacant. By quantifying the problem through maps and data, new state legislation was passed that supported the following:

- Municipalities may turn titles over to local CDCs for \$1;
- Individuals owing taxes cannot purchase titles;
- The tax title purchaser is responsible for the condition of property.

Linking development opportunities to transportation systems (Map #5, page 9)

GIS is often used to connect physical revitalization efforts to transportation systems. In New York City, the Metropolitan Waterfront Alliance used the mapping services of NYPIRG's Community Mapping Assistance Project (CMAP) to demonstrate the importance of New York City's waterfront for environmental, economic, and political purposes. A series of maps were prepared to illustrate how ferry service routes are connected to economic development and social service activities. These maps were featured in *New York* magazine and helped to secure \$300,000 from the City Council.

Preserving existing and creating new affordable housing opportunities

Using GIS to highlight the jobs/housing imbalance within a city or region is a powerful application for locating new housing near employment opportunities. In Atlanta, the Atlanta Neighborhood Development Partnership developed a GIS program to map income and salary data relative to the cost and affordability of housing as an index to advocate for more affordable housing. The Mixed Income Communities Initiative in Atlanta uses GIS to identify development opportunities suitable for housing, commercial, and social services that are compatible with neighborhood infrastructure needs for mixed income communities.

Connecting CDCs and residents to elected officials

Legislative decisions at the local, state, and federal levels impact community development activities. One essential component of GIS mapping is the ability to display information and data relative to legislative or administrative

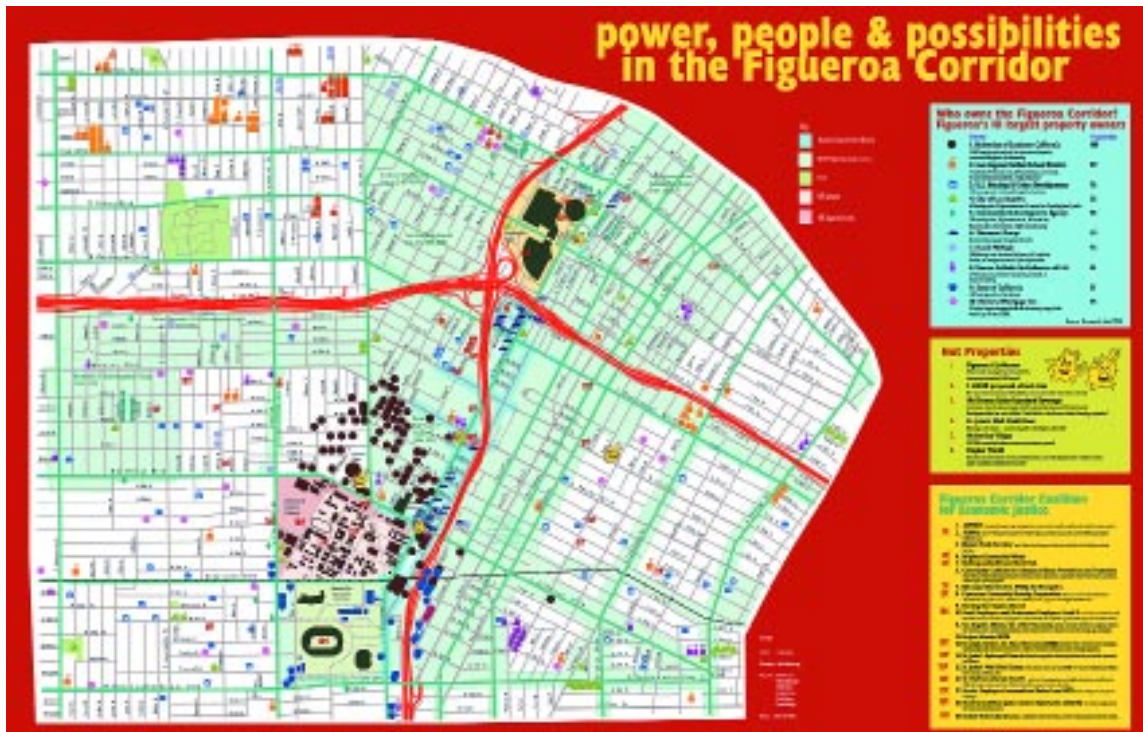
districts. In 2000, NYPIRG's Community Mapping Assistance Project launched the Who Represents Me web application that enables anyone with a New York City address to easily find and contact the public officials who represent them at all levels of government—from City Council to State Legislature to Congress, as well as Borough President, Mayor, Governor and President. This site enables community groups, activists, the media, and any concerned citizen to easily find and contact their representatives on environmental, consumer, good government, and transit issues.

3. Partnership Building

In addition to directly supporting community development initiatives, GIS projects have strengthened community development support systems by fostering the formation of new partnerships and providing increased opportunities to acquire data.

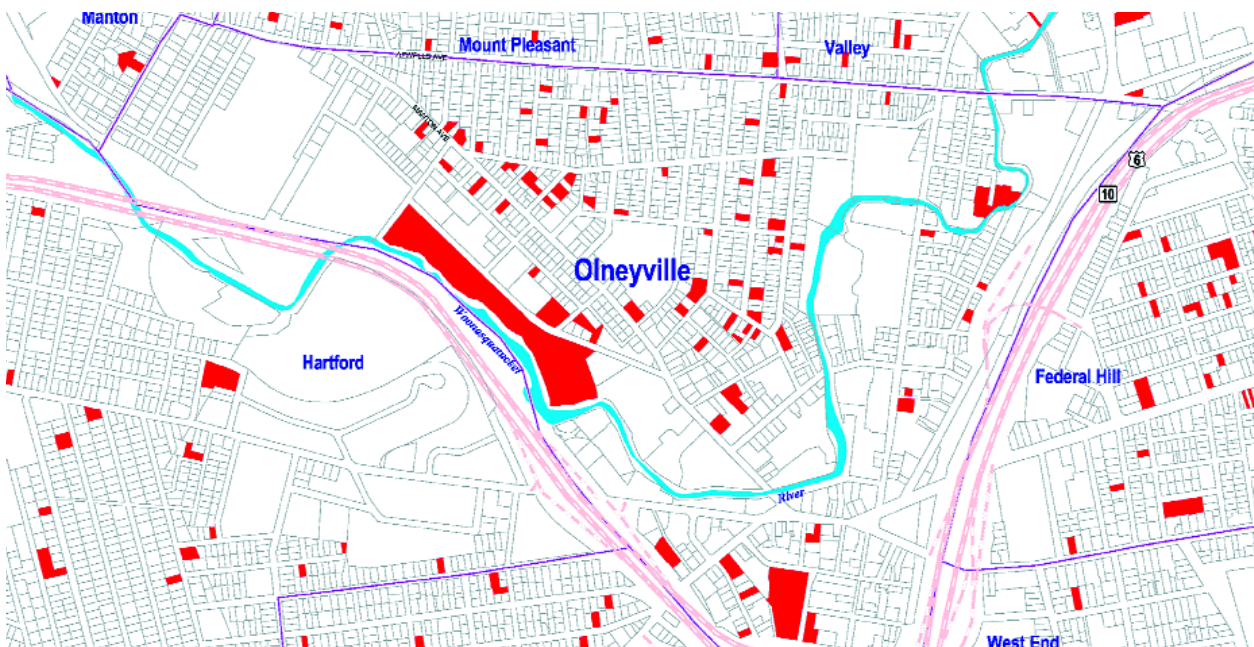
Catalyzing new community partnerships

Due to the technology and data expertise needed to develop GIS systems, new partnerships have been formed to use and collect data for community development purposes. In cities such as Milwaukee, Oakland, Richmond, and Minneapolis, community-based GIS applications have influenced the ways in which city and municipal agencies track and share data. In Oakland, the Urban Strategies Council developed a GIS system that brought together 19 agencies for the first time to develop integrated approaches for education and health service delivery. This network of organizations with shared values and a vision for systems change in Oakland was able to utilize data to advocate for solutions based on highly specific information about children, youth, and families.



Map #3
Land Ownership and At-Risk Property, Los Angeles, California

Source: Figueroa Corridor Coalition for Economic Justice



Map #4
Location of Tax-Sale Property by Parcel, Providence, Rhode Island

Source: Providence Plan

■ Property Sold by Tax Sale

Obtaining previously unavailable data

Developing GIS applications often helps groups access data that was previously unavailable by creating a larger market for this data and encouraging collaboration among users. In St. Paul, Minnesota, several community-based organizations and CDCs were developing GIS systems and were independently requesting data from the county assessor's office. The county was unable to service all of the data requests and resources were being wasted at the community level, since multiple groups were seeking the same information from the city and county. By forming a data collaborative, the community groups were able to acquire timely, relevant, and affordable data from the county.

4. Evaluation and Marketing

Mapping can help communities hold themselves and others accountable by comparing predicted outcomes with actual outcomes, and providing mechanisms to monitor development. This level of assessment can strengthen nonprofits' ability to effectively market their neighborhoods and initiatives as a basis for building political support, attracting residents and businesses, and raising funds. The following examples illustrate ways in which GIS has assisted CDCs with critical evaluation and marketing activities.

We can keep track of and be more evaluative of our own activities. When we complete a new conditions survey, we will cross-reference the addresses of properties we served [with assistance for home repair] with their new condition. Did 50 percent of our clients go up one level in the condition of their houses? Was our investment able to improve the overall condition of the block? I can't wait to be able to say that.

Beth Hyser, St. Paul Community GIS Consortium

Raising and maintaining funding and resources

The ability to display neighborhood indicator data by geography has played a significant role in maintaining project accountability and tracking foundation investments. In Philadelphia, local funders wanted to evaluate the outcomes and successes of community development activities as part of a strategic planning process to determine future funding. The Philadelphia Association of Community Development Corporations relied on GIS to provide the funders with outcomes information by displaying the location of community development projects and their impact in terms of physical, as well as quality of life, improvements in specific neighborhoods.

Expanding the awareness and reach of community development (Maps #6 & #7, page 12)

In Kansas City, LISC, a network of 19 CDCs, and the University of Missouri at Kansas City are using GIS as the foundation of a neighborhood preservation initiative. As part of this initiative, the partners are conducting an original house-by-house inventory of housing conditions in the core of Kansas City. The primary goal of the initiative is to strengthen and preserve affordable housing in Kansas City's low-income communities by attracting resources and evaluating current community development programs.

Displaying project outcomes in a meaningful way

GIS maps and accompanying data are useful for tracking outcomes, improving the perception of the neighborhood and reporting to funders. The Oregon Hill neighborhood in Richmond, Virginia, was facing rapid gentrification and required an additional \$20,000-\$30,000 subsidy per housing unit for a rehabilitation project. Oregon Hill Home Improvement Council used maps of changing demographic information (increasing numbers of residents with college degrees, increase in household income), home prices, and rates of sale to convey to funders and public officials the level of displacement and the need to increase subsidies.

Determining market share for commercial real estate ventures: attracting new development

GIS applications permit community development practitioners to understand market share and aggregate income by geography in order to identify locations for commercial development. In Milwaukee CDCs used GIS to demonstrate aggregate income within a three-mile radius of a proposed new development for a Kmart, which enabled them to demonstrate the strong buying power of central city neighborhoods to attract new commercial development. They also displayed the relationships between concentrations of residents and basic amenities in an effort to attract more commercial developers into previously underserved neighborhoods.

Conclusions and Recommendations



LISC offers three primary conclusions based on our initial exploration of GIS as a tool for community development.

First, GIS is a powerful resource for community development. Increasingly, community development practitioners rely on GIS to obtain high quality data to facilitate a wide range of neighborhood revitalization activities.

Second, GIS should be used as an analytical as well as a data display tool. Computerized maps can show several layers of information simultaneously by a given geography, illustrating the relationship between variables like vacancy rates and crime. By analyzing multiple data sets by geography, community groups are able to see their neighborhoods in new ways, improve the forecasting of revitalization efforts, and demonstrate outcomes of successful projects.

Third, because GIS systems are complex, careful planning and partnerships are crucial. Most effective GIS ventures in the community development context include broad partnerships of technology intermediaries, municipal governments and community groups.

In the remainder of this section, we offer community development practitioners a set of recommendations regarding planning for effective GIS use and building appropriate partnerships.

1. Conduct thorough planning to determine feasibility, data needs, and sustainability

Before undertaking a GIS project, it is important to be clear about project goals and budget, which will inform key decisions about technology, partners, data sources and how results will be used. Starting with a quick cost-benefit analysis, some research into the latest developments in GIS technology (which change quickly) and building the right partnerships can save a lot of money and headaches down the road.

Determine the appropriate level of technology

The most common pitfall in implementing a GIS program is for the technology to overwhelm the effort and consume more time, money, and energy than planned. The key to avoiding this is to ensure that GIS technology is used as a tool for neighborhood revitalization, rather than letting the technology drive the effort. An up-front cost-benefit analysis can help determine whether it is worthwhile to use GIS technology. Many nonprofits find that it does not make sense to set up their own GIS applications, but they can obtain the benefits of GIS by partnering with others.

Determine the type of GIS output best suited for the project

Simply defined, GIS projects can be cataloged by three types of output or maps: context, display, and analytical. Context maps use broad geographical information, such as census poverty data, to illustrate the socio-economic context for community development projects. Display maps show single or multiple variables, such as property conditions, across a limited geography. Analytical maps that layer and analyze multiple variables by a small and broad geography are the most advanced outputs of GIS systems. The costs associated with these various GIS outputs can vary tremendously.

Determine the appropriate dissemination mechanism

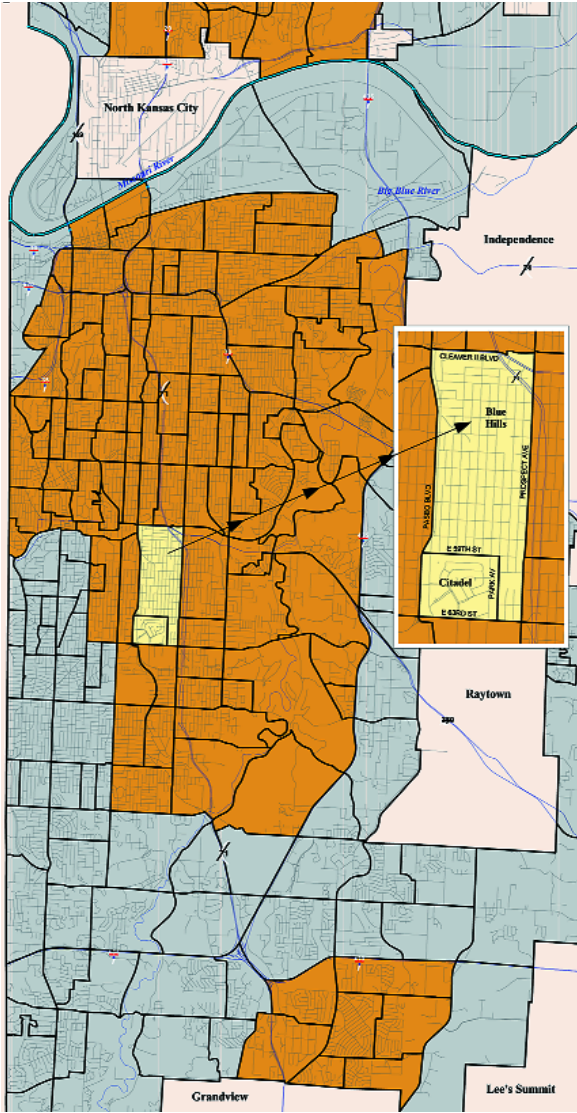
Once a type of GIS output is selected, community development practitioners need to decide how maps are produced and shared. Several mapping projects use the Internet as a primary vehicle for users to create and produce maps. The advantage of using the Internet is that maps can be developed by anyone with Internet access. However, most online mapping systems have limited data input/output modules and do not permit new data to be mapped. Therefore, offline desktop systems that offer more output options for community development needs can be more useful and flexible.



Map #6
Property Condition by Parcel,
Kansas City, Missouri

Source: Kansas City LISC

- Neighborhood Boundaries
- No Structure
- Non-residential
- Outside Area
- Structural—Single Family
 - 4.5-5.0 Excellent
 - 3.5-4.5 Good
 - 2.5-3.5 Sub-standard
 - 1.5-2.5 Seriously Deteriorated
 - 1.0-1.5 Severely Deteriorated
- Structural—Multi Family
 - 4.5-5.0 Excellent
 - 3.5-4.5 Good
 - 2.5-3.5 Sub-standard
 - 1.5-2.5 Seriously Deteriorated
 - 1.0-1.5 Severely Deteriorated



Map #7
Property Community Development Initiative,
Blue Hills Area Report, Kansas City, Missouri

Source: UMKC Center for Economic Information

- Neighborhood Boundaries
- Urban Core Areas

Acquire data in a timely manner and invest in high quality data up-front

Mapping data from different sources can be challenging due to the variety of means required to collect it and varying data quality. For example, in addition to state and federal data that is available online, mapping efforts rely on administrative data collected by the city agencies and departments, including the tax assessor's office, building inspection department, and planning department. It is often difficult to gain access to this data as administrators have concerns about sharing their departmental information and, in many cases, departments are using incompatible data collection formats. It is important to allow ample time for gaining access to good data, building alliances with government agencies to obtain data, and thinking strategically about how the data will be maintained.

Be prepared to address data privacy and sensitivity concerns

As data is becoming more widely available and accessible (via the Internet and other digital formats), and as GIS becomes more popular, issues are arising around data privacy. These concerns can be summarized by noting that most of the data mapped is public information, and that map makers should use discretion when deciding whether to display data at the parcel, block, block group, census tract, or neighborhood level. A good rule of thumb is that the smaller the level of geography, the greater the data privacy concerns will be.

Residents may be concerned about the mapping of parcel level data, whether mapping subjective data like surveyors' descriptions of conditions as "acceptable" or "unacceptable," or objective data like tax delinquency. GIS efforts have resolved this in different ways, including requiring a password for accessing parcel level data on the Internet, making some data available only via CD-ROMs or at a centralized location, and only sharing summary data.

Create plans for sustainability

While GIS projects require a great deal of planning to set up, it is also necessary to focus on long-term implementation and sustainability in the initial planning stages. GIS applications are complex and costly to build for most community development organizations. The few organizations that have taken on these projects in-house struggle to find resources and staff to maintain these systems. In the words of Sandy Salzman of New Kensington CDC in Philadelphia, which maintains an in-house GIS system, "GIS is last when it comes to crunch. It is nice to have and we all love using it, but we are so busy with housing development, economic development, and land management that we do not always have time to manage our GIS application."

Invest in human infrastructure and training

Training staff in GIS requires a significant investment of time and energy; retention is often a challenge. It is important to plan GIS efforts so that there is always more than one person capable of understanding the technology. An investment in GIS is best

thought of not as the addition of a project, but rather adding a layer of technology in the organization that staff at all levels should be familiar with. As Elena Gaarder, Chair of the MNIS collaborative said, "The goal is to make GIS part of how we look at our work, not as a distinct tool. We want organizations to make collecting and using data well a fundamental part of the way they do their work."

2. Build strong data and GIS collaboratives that involve community organizations, local government agencies, and universities or other data intermediaries

Because advanced GIS applications usually require inputs beyond the means of a single organization or entity, most GIS ventures include broad partnerships among three types of stakeholders: community organizations, municipal governments, and data intermediaries (such as institutions of higher education and nonprofit organizations). Community development organizations, in partnership with residents, shape the GIS process from the outset with their understanding of community assets and needs, and are the primary end users utilizing GIS output for neighborhood revitalization purposes. This role as *map shaper* and *map user*, rather than *map developer* seems to best suit community development organizations. Municipal agencies are critical

partners because they can provide administrative data from multiple sources, often in compatible formats. Finally, data intermediaries—organizations with the technical capacity to map data and indicators relative to geography—often serve as partners that can display and analyze the data. Without the participation of each of these key stakeholders, developing complex GIS applications is challenging, if not impossible.

Community organizations

Many community organizations and community groups are better positioned (closer to residents and neighborhoods) than data intermediaries and municipal administrative agencies to understand and address complex community issues such as crime patterns, health needs, housing, and job training. By taking leadership roles in data and GIS collaboratives, community groups can bring their knowledge and expertise to the forefront of data mapping projects. Data intermediaries are excellent at assembling and managing large data sets, but without community input these data sets might not track indicators of change necessary for community development purposes. By participating in the data development and collection activities, community organizations can more easily use and design data outputs that target their local concerns.

Local government agencies

Because local governments have much of the data necessary to understand neighborhood conditions, as well as GIS capabilities in some cases, local government officials should be central partners in GIS efforts. To build GIS systems that can remain useful to a wide variety of stakeholders over time, it is important that data collaboratives work to assure compatibility of government data with other sources used in GIS mapping, and to gain access to a wide variety of government data.

Universities or other data intermediaries

Partnerships where the values of the university or data intermediary are congruent with those of the communi-

ty development organizations offer the best chances for success. Many of the community-university partnerships highlighted in this report are led by staff or faculty who are deeply committed to the principle of participatory research: projects should engage and serve the needs of the community. Successful nonprofit data intermediaries like the Community Mapping Action Partnerships (CMAP), Metropolitan Area Research Corporation (MARC), and GreenInfo have been developed out of organizations that began using data and mapping in their own work and saw the potential for sharing this technology with community development groups.

Roles and Responsibilities of Partners in the Richmond Neighborhood Indicators Project (RNIP)

Nonprofits	<i>CDCs guided both the development of the indicators that target their needs, and the design of the GIS system to map them; are the priority end users of RNIP.</i>
Local Government	<i>The city and county shared important municipal data and developed compliant data management systems to facilitate accurate data collection and mapping.</i>
Intermediary	<i>LISC facilitated the partnership of local stakeholders interested in RNIP and has provided significant financial and human resources to support the project.</i>
University	<i>Virginia Commonwealth University managed the technical aspects of building a GIS program and provides ongoing maintenance to the system.</i>

Richmond, Virginia



In response to the challenges associated with developing in-house GIS applications, most community groups are members of data and GIS collaboratives. This section of the report reviews the growing importance of data and GIS collaboratives through two case studies: Richmond, Virginia and Minneapolis, Minnesota.

Richmond Neighborhood Indicators Project

Overview

In 1998, Dan McCormick, a program officer at Richmond Local Initiatives Support Corporation (LISC) had an “ah-ha!” moment: he had just read an article on GIS. Knowing little about GIS himself, but excited by the promise of it, he brought together a group of stakeholders from Richmond CDCs, Virginia

Commonwealth University (VCU) and the City of Richmond to explore the possibility of bringing GIS to Richmond’s community development industry. The idea easily could have died there, but it didn’t. The Richmond Neighborhood Indicators Project (RNIP) is now a highly valued asset to Greater Richmond’s community development industry due to a number of factors, including: a collaborative spirit among CDCs; the willingness of the City of Richmond to share data; a high level of expertise in GIS and neighborhood indicators at VCU; and a strong financial and institutional commitment from Richmond LISC.

Laying a Strong Foundation

“Your maps are only as good as your data,” seems to be the mantra of everyone involved in RNIP. It’s not surprising, then, that RNIP has focused so much energy on identifying indicators that provide a broad-based picture of neigh-

borhood health. The RNIP team wanted to develop indicators that would be useful to the variety of partners in the project, rather than focusing them very narrowly. Based on this planning, RNIP indicators can now be mapped on the project’s GIS system to help CDCs plan and market their work, city officials evaluate the strength of current programs, and Richmond LISC inform public policy decisions and increase understanding of community development.

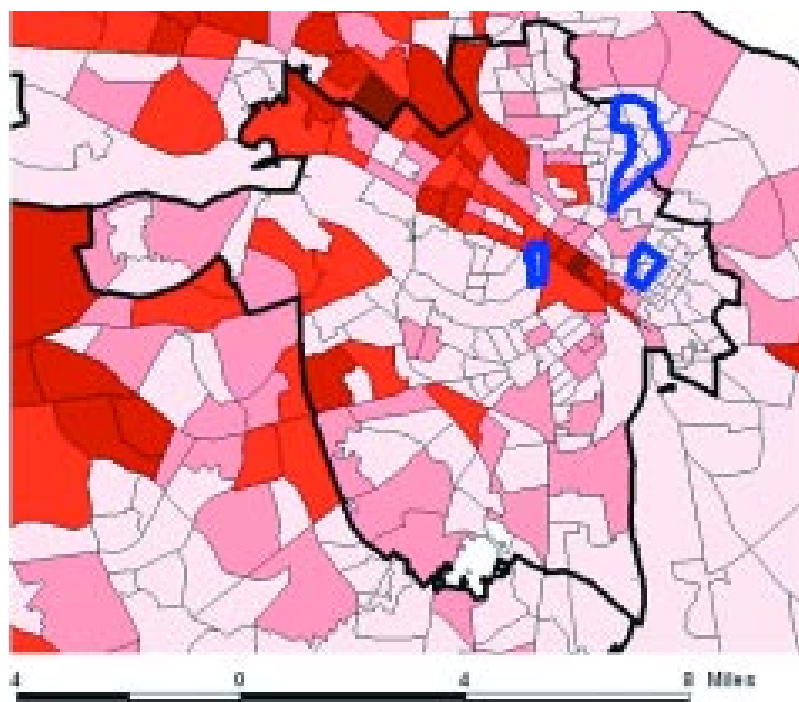
The original list of indicators used in RNIP was developed by an advisory committee of neighborhood-based CDCs, city staff, Richmond LISC, and VCU personnel. While the project currently tracks over 100 specific pieces of datum on the economic and social well-being in neighborhoods, RNIP has also worked to identify a small group of key indicators to be used as a

Map #8

Boundary of the Oregon Hill Neighborhood and Density of Businesses, Richmond, Virginia

Source: Richmond Neighborhood Indicators Project

- Featured Neighborhoods
- Number of Businesses
- 0-16
 - 17-44
 - 45-95
 - 96-213
 - 314-423



standard for gauging neighborhood health. As such, an initial list of over eighty indicators was condensed by the VCU team using factor analysis to yield a list of fourteen key indicators.⁵ These fourteen key indicators are viewed as a starting point, and will be modified over time. More research is needed to determine which indicators are the most sensitive measures of neighborhood change, which ones are most closely tied to change factors, and which ones best reflect the objectives of neighborhood improvement programs. Dr. Robert Rugg, one of the drivers of RNIP at VCU explains, “Ultimately, we want to be able to measure factors that cause change. We want to be able to predict: if you do this kind of improvement in a particular neighborhood, here’s how it is likely to impact the neighborhood’s health.”

Partnership is Critical Success Factor

Each member of RNIP brings a unique set of experiences, skills, and resources to the project that has been vital to its success. According to McCormick, “Forming an advisory committee of stakeholders who recognize the importance of indicators and GIS to our community development efforts has been key to the success of this project. We’ve had a lot of technical challenges to deal with, but without buy-in and commitment from the City, neighborhoods, and CDC practitioners, they would have been non-issues, because we never would have gotten off the ground.”

CDCs

CDC staff, defined as the “priority end-user” for RNIP, strongly guided both the development of the indicators and the design of the GIS system to map them. Prior to RNIP, neighborhood boundaries were only generally defined by the City, and information was often unavailable in a neighborhood-specific manner. As part of RNIP, CDCs and community groups helped develop neighborhood boundaries and target areas for the GIS system. Stephanie Gist of the Oregon Hill Home Improvement Council (OHHIC) explains: “Our neighborhood comprises a six-by-three block area. Before the GIS system was developed, we had census data, police, city assessor, and community development information, but none of these resources could give us any information on our specific neighborhood. With a 2.5-person staff, it was impossible for our organization to compile this information alone.”

Local government

As the main source of administrative data, some of the richest available for mapping and indicators projects, the commitment of the City of Richmond to RNIP has been vital to its success. The initial willingness of the city to share data, its current effort to develop compliant data management systems, as well as its recent shift on privacy restrictions, (RNIP data was initially limited to the block-level), is indicative of the collaborative nature of the community

development industry in Richmond.

According to Connie Bawcum, former deputy city manager and currently a private consultant with the city, “We recognized that developing the neighborhood indicators was going to be highly useful to the city. As we went along and saw the potential for our work, we grew more committed. Recently, we have made a 180-degree turn on confidentiality. There was a fear of letting data become public, but we have gotten past that. Aren’t we better off just putting all of this out there? People will help us by correcting errors, fighting crimes and making changes that help the city.” The city now plans to make its comprehensive database available to the public via the Internet and has developed a web-based mapping program.

Building on the work in the City of Richmond, the RNIP team is now developing relationships with officials from two neighboring counties to include county administrative data in RNIP. They hope to develop a unique region-wide mapping program to support the efforts of the CDCs working in all three jurisdictions in the region, as well as to provide a tool to assist officials in measuring the health of targeted areas that fall on both sides of city/county borders.

LISC and VCU

As a trusted partner to the various entities that make up the local community development industry, Richmond LISC

5. List of Fourteen Key Indicators

1. Percent of population aged 25 and over with less than a high school education
2. Percent of housing units built
3. Percent of population with some education beyond high school
4. Percent of persons living in families
5. Percent of householders who are single parents with children
6. Percent of persons aged 45 to 64
7. Per capita income
8. Percent of persons aged 65 and over
9. Average assessed value of land and improvements by parcel
10. Number of medicaid recipients per block
11. Percent change in assessed value per acre
12. Number of employers per block
13. Number of demolition permits per block
14. Number of new construction permits per block

has been able to facilitate and maintain the partnership that makes RNIP possible. Additionally, Richmond LISC has taken on the responsibility of securing funding for RNIP, dedicating staff time to oversee the project, and creating a GIS center in their office where nonprofits can access the system to create maps. Critical to the success of RNIP has been the technical expertise and ongoing staffing provided by the VCU's Department of Urban Studies and Planning, through a contract with Richmond LISC. Students in the department's graduate program provide both back-end support in preparing the data for integration in the system, as well as customer support in working with CDC staff to create and analyze maps.

Close to \$100,000 has been invested in the project to date, including initial seed capital provided by LISC and a grant from The Community Foundation of Richmond. This is a moderate amount compared to that invested in other indicators and GIS projects across the nation; the progress made on RNIP is a reflection of the commitment and effort of all partners involved, as much as the amount of resources dedicated to it. In addition to providing CDCs access to the GIS system in her office, Greta Harris, senior program director at Richmond LISC, develops GIS maps to help current and potential funders understand how Richmond LISC targets its investments. Harris explains, "Many of our donors are not familiar with the geography of the neighborhoods where we work. They just can't picture where their money is going. Once they see our map, which highlights targeted neighborhoods, total dollar investments, and projects developed, it's like a light bulb clicks on. It's

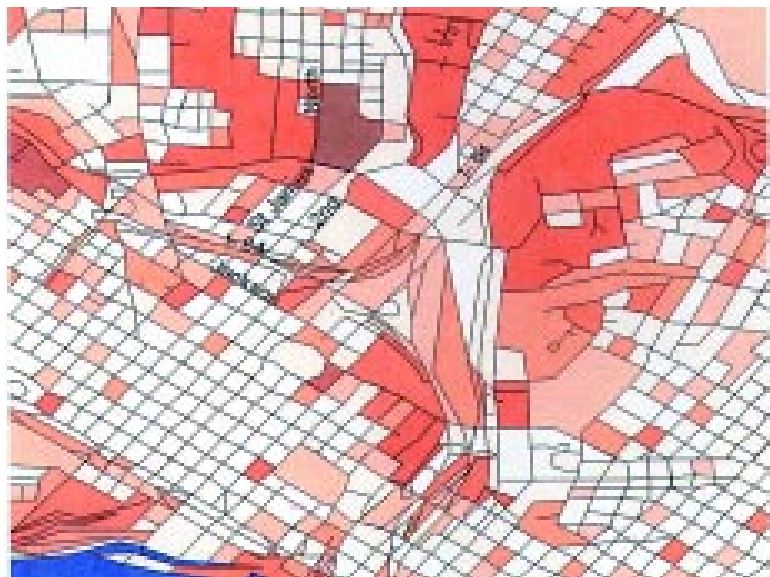
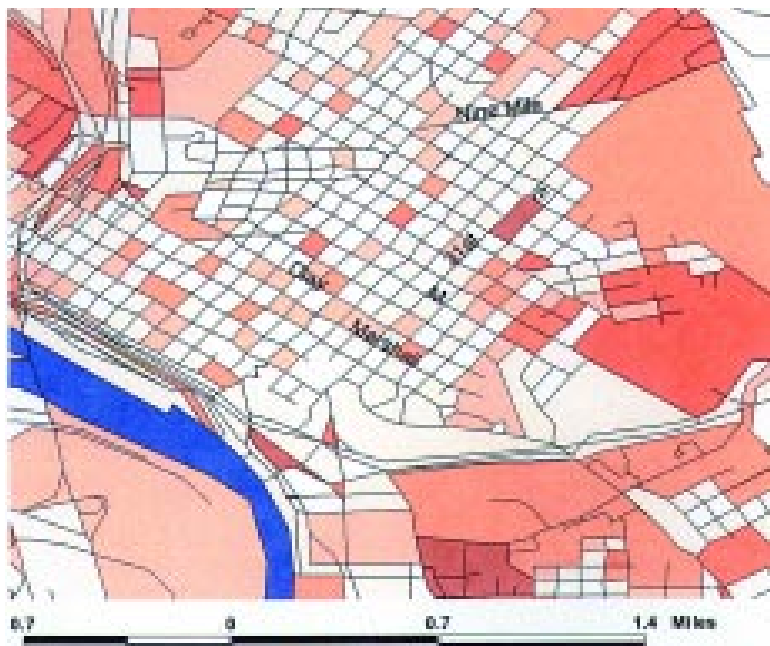
Better Housing Coalition

Minming Wu, Director of Commercial Development at the Better Housing Coalition (BHC), used RNIP to design maps that show potential investors the pace of revitalization in a targeted neighborhood. Because much of the investment is not yet visible, the maps help show what the neighborhood is likely to look like over the next several years. "We used a number of indicators, including the number of building permits, rehabilitation and demolition permits, and new construction within a one mile radius of the neighborhood where we're are trying to attract investment. It was very clear that this is a neighborhood that is growing."

so important for us to visually communicate the focused nature of our efforts and the outcomes these investments provide; GIS enables us to do that."

Harris explains why Richmond LISC, as well as other project partners, continually dedicate human and financial resources to RNIP. "To be honest, at the outset, we had no idea what this project would entail, financially or in terms of staff time. But we always find a way to keep it going and make it better, because it is exactly what our industry needs. We all want to know that the

resources invested are realizing our hopes for the region's neighborhoods. RNIP allows everyone—private investors, local government, LISC, CDCs, and neighborhood residents—to see the benefits community development brings, not just to targeted neighborhoods, but to the region overall."



Maps #9 & #10
Number of Police Calls by Block
in Two Richmond, Virginia
Neighborhoods

- Number of Police Calls
Reported
- 1-9
 - 10-21
 - 22-39
 - 40-66
 - 67-104
 - 105-159
 - 160-404



Virginia Supportive Housing

As Housing Development Director at Virginia Supportive Housing, Candice Streett identifies and develops properties for Single Room Occupancy (SRO), transitional, and homeownership housing. Ms. Streett uses GIS to create maps to evaluate the level of crime around potential properties, and to research the tax delinquency of vacant or “problem” properties. Ms. Streett has also used such maps to “sell” community groups on her projects. She explains, “I used one map to help a group understand that the source of crime in their neighborhood was the transient population moving from the hotel we wanted to develop, and the local bus station. The map helped me show how converting this property to transitional housing for working folks would decrease, not increase, crime in the area. Without the map, they just would not have been able to see that.”

Minneapolis, Minnesota



Minneapolis Neighborhood Information Systems: Collaboration in Action

Overview

The Minneapolis Neighborhood Information Systems (MNIS) is a data and GIS collaborative that models participation by community organizations, city government agencies, and a university as a data intermediary.

The system is based on a 1998 University of Minnesota student project to identify properties at risk of being abandoned. This early warning system caught the attention of neighborhood associations, the City of Minneapolis, and the Neighborhood Revitalization Program (a program that distributes Tax Increment Financing funds to Minneapolis' low-income neighborhoods). Neighborhood associations saw the value of using data to identify at-risk properties, as well as how GIS could be expanded and used more broadly. The initial group of six neighborhood associations believed so strongly in the potential of GIS to advance their work that they each invested about \$6,000 to begin building a GIS collaborative.

Less than three years later, MNIS has been able to make substantial progress. First, the core group of neighborhood associations who helped found MNIS are actively using GIS in their work. Second, the collaborative has hired a staff person to maintain the GIS applications through the University of Minnesota. Third, the collaborative has gained access to administrative data and has engaged the city as a partner in this effort. Finally, the initiative received a large, multi-year grant from the Department of Commerce.

Success Factors

Community connection

Neighborhood organizations were strong proponents of GIS and were hungry for access to more data and committed to improving their abilities to use GIS in their work. Supported by the MNIS program staff, groups have been innovative and ambitious in their use of GIS. Examples have included the creation of asset maps to attract new residents and investment, maps for analyzing how residential properties are impacted by proximity to commercial and industrial land use, a lead paint risk assessment, and an evaluation of a targeted home improvement loan program.

University as a partner

Support from the University of Minnesota is extremely strong and is consistent with the values of neighborhood organizations. Neighborhood Planning for Community Revitalization (NPCR), a program of the Center for Urban and Regional Affairs at the University of Minnesota, sees its goal as supporting and building from the work already happening in neighborhoods. Kris Nelson, Program Director of NPCR said, "The neighborhoods know what kind of research they are looking for. We leave it to them to guide the university, rather than the other direction." NPCR has demonstrated a commitment over time to let the community lead and to support it with fundraising, technical assistance, and research.

MNIS was able to hire a full-time program coordinator in October 2000. The program coordinator, who is supported by the university and based in the community, plays a crucial role in building upon neighborhood associations' enthusiasm and providing technical support that helps groups be successful. The coordinator assists groups in organizing their own data, determining hardware and software needs, and provides one-on-one support to get them up and running. More than individual

support, monthly trainings where groups share projects they are working on, followed by skill building workshops (making maps of land use, census, etc.), provide a learning environment where groups are encouraged by each other's successes.

Barb Jeanetta of the Twin Cities LISC office attributes this enthusiasm for data to NPCR's style of working with communities. "Because of the way NPCR works, neighborhoods identify their own research projects. As groups were working with researchers, they got interested in data and mapping. I think that's why it is so pragmatic and grassroots—GIS has been generated out of what the neighborhoods were already working on."

Funding secured

After two unsuccessful attempts, MNIS received a Technology Opportunities Program (TOP) grant from the U.S. Department of Commerce in fall 2001. The grant for \$500,000 over three years is shared between the city and the community/university partnership. Receipt of this grant has impacted MNIS in several ways, including that the city has increased its commitment to facilitating neighborhood access to data and that resources are available to further develop and support community GIS.

City cooperation

Community enthusiasm for data and the receipt of the TOP grant supported the city in making a commitment to creating a neighborhood-friendly data platform. At the outset of this project, the City of Minneapolis's administrative data was extremely difficult to access. It was in multiple formats, departments were not sharing information with each other, and there was little incentive to share data with the public. MNIS has helped make data cleaning and sharing a public issue, and the City of Minneapolis has invested significant resources in converting data and creating a central data file that will be made available on the Internet.



Map #11
Minneapolis Neighborhood Map
At-Risk Properties
 ■ High risk
 ■ Moderate risk
 ■ Low risk
 ■ Monitor
 ■ Non-Residential Parcels
 ■ Powderhorn Lake



Map #12
Minneapolis Neighborhood Map
Residential Building Condition
 ■ Above average
 ■ Average
 ■ Below average
 ■ Non-residential parcels



Map #13
Minneapolis Neighborhood Map
Estimated Residential Market Values
 ■ 27,500-69,500
 ■ 69,501-98,500
 ■ 98,501-137,000
 ■ 137,001-225,000
 ■ 225,001-457,000
 ■ 457,001-1,162,000
 ■ Non residential parcels

Powderhorn Park

Working with MNIS, the Powderhorn Park Neighborhood Association developed a set of criteria to identify properties in the neighborhood that were at risk of abandonment. Indicators included building condition, estimated market value, tax delinquency, and "intent to condemn" notice. MNIS used GIS to map the properties and create a list of contact information. They produced a map of Powderhorn Park illustrating the location of at-risk properties. In addition, MNIS compiled a list of contact information, including owner name, address and homestead status. The neighborhood association used the list for outreach, including both face-to-face and phone contact, as well as targeted mailing. Thus far, the high-risk property has received assistance through a local community development corporation and the neighborhood association has begun advocating on behalf of one of the few moderate-risk properties.

Longfellow Community Council

Working with MNIS, the Longfellow Community Council developed a set of criteria to identify properties in the neighborhood that may be at risk of lead exposure through lead-based paint in the home or through lead pollutants in the air. Longfellow Community used four indicators, including census data showing concentrations of children, building condition, age of housing, and proximity to transportation corridors. GIS was used to map the at-risk areas based on perceived level of risk using the above named criteria. Looking at patterns of risk in Longfellow, neighborhood staff are now able to target outreach and educational efforts that will inform residents about the dangers of lead exposure in children and the warning signs for lead poisoning. Additional information about lead exposure and the project results will also be published in a future edition of the Longfellow View, a neighborhood publication that is sent to all residents.

GIS and Technology Resources

Technical Assistance and Mapping Web Sites

Technical Assistance and Mapping Web Sites	Web Site Address
Boston Foundation	www.tbf.org
Coalition for Low Income Community Development (CLICD)	www.clicd.org
GreenInfo	www.greeninfo.org
Map Milwaukee	www.gis.ci.mil.wi.us/isa/Map_Milwaukee/
Metropolitan Area Research Corporation (MARC)	www.metroresearch.org
National Neighborhood Indicators Partnership (NNIP)	www.urban.org/nnip/index.html
Neighborhood Knowledge Los Angeles	www.nkla.sppsr.ucla.edu
Northeast Los Angeles Network	www.nelanet.org
NYPIRG's Community Mapping Assistance Project (CMAP)	www.cmap.nypirg.org/
Peton Foundation	www.peton.org
Philadelphia Neighborhood Information System	apollo.gsfa.upenn.edu/Projects/NIS.asp
Plugged In	www.pluggedin.org
Urban and Regional Information Systems Association (URISA)	www.urisa.org

GIS and Community Technology Information

Alliance for Community Media	www.alliancecm.org
Alliance for Community Technology	www.communitytechnology.org
Alliance for Technology Access	www.ataccess.org/
Alliance for Latino Community Technology	www.alct.org/fullsite/index.html
Alliance for Public technology	www.apr.org/index.html
Center for Applied Special Technology	www.cast.org
City Skills.org	www.cityskills.org
CompuMentor	www.compumentor.org
Computers for Youth	www.cfy.org/
Digital Divide Network	www.digitaldividenetwork.org
Geospatial Information & Technology Association	www.gita.org/
GIS Journals	www.geo.uni-bonn.de/members/haack/gis-journals.html
Go For It (U.S. Department of Commerce)	www.go4it.gov/
HUD Neighborhood Networks	www.hud.gov/nnw/nnwindex.html
Information Technology Resource Center	www.npo.net
KnowledgePlex (Fannie Mae Foundation)	www.knowledgeplex.org
Net Action	www.netaction.org
NPower	www.npower.org
PolicyLink	www.policylink.org/
Tech Library	www.tech-library.org
Technology For All	www.techforall.org
TechRocks	www.techrocks.org
TechSoup	www.techsoup.org/index.cfm
Tech-U-Net	www.techunet.org

Data Sources

HMDA	www.ffiec.gov/webcensus/ffiiccensus.htm
International Monetary Fund	www.imf.org
Tax Assessor Database	pubweb.acns.nwu.edu/~cap440/assess.html
Fed Stats	www.fedstats.gov
FFIEC Census Reports	www.ffiec.gov/webcensus/ffiiccensus.htm
NUA Surveys	www.nua.ie/surveys
U.S. Census	www.census.gov
U.S. Environmental Protection Agency	www.epa.gov/enviro/index_java.html

GIS and Technology Resources

GIS Software

Caliper Corporation	www.caliper.com
Environmental Systems Research Institute, Inc.	www.esri.com
MapInfo Corporation	www.mapinfo.com

Asset Mapping

Asset-Based Community Development Institute	www.nwu.edu/ipr/abcd.html
Community Building Resources	www.cbr-aimhigh.com
Madii Institute	www.assetmap.org/

Foundations and Funding

Aspen Institute	www.aspeninstitute.org
Benton Foundation	www.benton.org
Markle Foundation	www.markle.org
Morino Institute	www.morino.org
Pew Internet & American Life Project	www.pewinternet.org
Technology Opportunities Program	www.ntia.doc.gov/otiahome/top

**Mapping for Change:
Using Geographic Information
Systems for Community
Development** is available online at
the LISC Online Resource Library:
www.liscnet.org/resources.
Printed copies can be ordered at:
publications@liscnet.org.

