



Overcoming the Barriers:

Crime Mapping in the 21st Century

Mapping in Police Agencies: Beyond This Point There Be Monsters

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and

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INTRODUCTION

In 1999, the National Institute of Justice published the results of a survey of police agencies on the use of crime mapping (Mamalian and LaVigne 1999). The survey showed that about 75 percent of responding law enforcement agencies performed some sort of crime analysis by May 1998, but only 13 percent used computerized crime mapping, mainly automated pin maps. An earlier, non-representative survey of the use of computerized mapping reported similar use (Rich 1995).

Relatively few law enforcement agencies use computerized mapping, and fewer still are taking advantage of its full potential. Perhaps the best summary of this potential appeared in *Mapping Out Crime: Providing 21st Century Tools for Safe Communities*, the report of the Task Force on Crime Mapping and Data-Driven Management (1999:7), which noted: “Leading police departments are mapping everything from quality-of-life complaints to car thefts, serial crimes, homicide patterns, place-based incidents such as robberies at ATMs or liquor stores, and the ‘path to crime’ showing distances between where a victim is abducted and later found. Front-line officers may use maps created by crime analysts to deploy resources strategically when they see the pattern, or to work with community groups to discuss the best approach for solving neighborhood complaints.”

An important question, and the focus of this discussion, is why more American law enforcement agencies haven’t adopted and utilized computerized crime mapping? There are, we think, two related answers.

The first answer is that computerized mapping, as a relatively recent law enforcement development, is in an early stage of the innovation cycle. The diffusion of innovation takes some time, and the spread of innovations tends to be curvilinear, proceeding slowly at first, and subsequently accelerating (Monkonen

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1981; Weiss 1992; Spelman, Moore, and Young 1992). So, we can expect mapping to gain wide-scale acceptance and influence if we simply give it more time (Weisburd and Lum 2001).

The second answer is that computerized crime mapping, despite its potential, remains a largely unexplored area that may present unforeseen perils for law enforcement agencies and executives. Not all innovations are deemed worthy of adoption. Some adventurous souls are willing, and even eager, to “go where no man has gone before.” More prudent persons, however, wait to see what happens to the pioneers before setting off to follow, and this explains the curvilinear nature of the adoption of innovation. It also raises the possibility that the computerized crime-mapping trend could die out.

FACILITATING THE ADOPTION AND USE OF COMPUTER CRIME MAPPING

Our goal is to explore the impediments to crime mapping that exist within police organizations, so that we can better understand what to expect of crime mapping in the future. This effort is largely informed by our experience working with the Forest Park, Ohio, Police Department to implement crime mapping and spatial analysis. Colonel Ken Hughes, formerly of the Jefferson Parish (LA) Sheriff’s Department, summed up our experience when he said (2000), “We have made many mistakes and learned much through our initiatives.” We believe the case of Forest Park provides an illustration of impediments faced by most, if not all, agencies implementing crime mapping.

Forest Park is a suburban community to the north of Cincinnati. A product of the Model Cities program of the 1950s, the city is a planned community with single-family housing in specific and adjacent neighborhoods, multi-family housing clustered strategically near small commercial districts, and light industry on the eastern and western ends of the city. A major traffic intersection is the site of large-scale commercial development. The resident population of the city is approximately 25,000, of whom 48 percent are African American. The daytime population exceeds 120,000 people.

The Forest Park Police Department employs 34 full-time sworn officers, five auxiliary officers, six full-time and one part-time civilian dispatcher, and a full-time civilian secretary. The department has long been one of the most progressive in the area, following the “professional” model of policing until the mid-1980s (Kelling and Moore 1988). Under this model, the department placed a premium on the education and training of personnel, creating a permanent cadre of supervisory and administrative officers who were informed about developments in law enforcement. These officers were particularly concerned with crime prevention, which had been part of the department’s mission since the late 1970s.

Over time, administrative attention to crime led to an organization-wide adoption of community-oriented policing in 1990, and to a more recent focus on problem-oriented policing. Throughout the late 1990s, the department supported a number of programs and initiatives designed to support its community-policing mission. As a result of these efforts, the Forest Park Police Department gained local, statewide, and national recognition as a leader in policing innovation.

In the 1970s and 1980s, the Forest Park Police Department made some incipient efforts to use crime mapping as part of its crime prevention effort by manually producing traditional pin maps. The maps had a

Web Sites

Police Foundation: www.policefoundation.org

Mapping and Analysis for Public Safety: www.ojp.usdoj.gov/nij/maps

number of purposes. They were used primarily as conversation pieces among officers and detectives as they discussed which neighborhoods were the most difficult to police. They adorned annual reports and budget requests to city council since they were pretty to look at. The maps also had an operational value since modus operandi charts applied to particularly persistent criminals, or to single, high-profile crimes. These maps, however, had little to do with planning, responses to crime, or general agency management. Since the maps had little utility, they went to the wayside as a needless effort.

In 1998, under a new chief, the department began an effort to become a “learning organization” (Geller 1997) in which management and operations of the agency are linked to data and analysis. The entire police department underwent training in the concepts of problem solving using the SARA model (Spelman and Eck 1987; Goldstein 1990) as the basis to identify and address issues in the community. Mapping and spatial analysis of crime and other problems were seen as technologies that could support the department’s problem-solving efforts.

Currently, mapping serves to support broader departmental goals. Maps have served a variety of purposes, and new uses for mapping continually emerge. To date, the department has used mapping for:

Conventional Mapping. This computerized version of the traditional pin map can visually represent the locations of crimes and allow users to access data from a police report by clicking on the location of the offense. Such maps are used to inform residents of crime problems during neighborhood block watch meetings.

Problem Solving. Maps have allowed the department to identify concentrations of calls for service. Addressing the problems of these “hot spots” then becomes the responsibility of teams of officers, each headed by a sergeant.

Other Applications. Computer-generated maps have been used in a variety of situations to enhance police work. The department has prepared maps to support court testimony, to plan and monitor traffic flow, and to facilitate special operations and hazardous material transport, among other things.

Plans are underway to expand the use of mapping and global positioning technology to enhance performance evaluations of the department’s officers. For the first time in the department’s history, data can be retrieved to evaluate the activities of officers. These data can be used to determine whether and to what extent an officer is affecting the quality of life in his or her assigned beat. Similarly, the technology will couple crime analysis and neighborhood survey data to assess the effect, if any, of police presence on the frequency of crimes, traffic accidents, or calls for service. Such information will help the department to maximize the benefits achieved through alternative resource allocation decisions (i.e., optimal assignments of personnel).

Nothing that the Forest Park Police Department is doing is particularly innovative in comparison to national use of crime mapping in police agencies. Still, the department is the only suburban agency in southwest Ohio using crime mapping. Together with the Cincinnati Police Division, which has also adopted crime mapping, the two agencies represent 5 percent of local agencies in the county, and are the only ones to adopt crime mapping. Neither agency, however, is utilizing the complete capabilities of the technology.

The remaining question is whether the Forest Park Police Department is becoming a learning organization? Will the department be more self-sufficient and effective by using data to affect its mission, strategic planning, and operational efforts? Will officers, dispatchers, and supervisors see the necessity of reviewing the data and applying it to their daily activities? Will the effort reduce crime, auto accidents, and hot spots;

will it improve the community's quality of life? The answers remain to be seen.

COMPUTERIZED CRIME MAPPING AS INNOVATION

The Forest Park experience illustrates the essential truth that crime mapping is a technology, a way of accomplishing some task. This is a truth that the department has increasingly recognized in recent years. Initially, the department saw traditional pin maps as peripheral to its work, and did not regularly engage in manual mapping of crime. More recently, however, the department is incorporating computerized mapping into a variety of tasks ranging from administration and management through operations. The technology facilitates, and now increasingly defines, the work of officers, supervisors, and administrators.

Any attempt to understand or explain the future of crime mapping in policing should view mapping as an innovation or change in established police practice, rather than some independent phenomenon. If we consider mapping to be an alternative means of accomplishing police goals, then obstacles to its implementation are essentially the same as those confronting any innovation. In short, instead of seeing mapping as a means to revolutionize policing, we should consider whether current policing trends will expand crime mapping.

The report of the Task Force on Crime Mapping and Data-Driven Management (1999:4) stated that, "The belief that crime can be reduced through good management is as essential to 21st century policing as is new information technology." We would take this a step further and suggest that the belief in effective management is actually more important than the information technology such as mapping. If necessity is indeed the mother of invention, then need proceeds innovation. The implementation of crime mapping will depend on its relative utility.

The term, relative utility, is crucially important. The implementation of crime mapping and the degree to which mapping becomes central to police operations will depend on how the benefits of mapping are perceived relative to other practices. If allocating resources to mapping is more beneficial than devoting those resources to other activities (additional patrol, community outreach, training, equipment purchases, reducing costs, etc.), it is likely that mapping will prevail. Colonel Ken Hughes (2000:5) supported the development of geographic information systems by arguing, "With all this having been said, *why develop a GIS?* Well, the answer is simple. *It is worth it.*" (Emphasis in original.)

Few police leaders will admit that they have available resources to adopt crime mapping, when responding to queries on their use of the technology. Most will reply that while they might like to do so, they simply do not have sufficient resources—not enough computers, money, time, and training. What is more likely the case, however, is that agency executives are reporting alternative resource allocation priorities. They do not believe that traditional police concepts are outdated, ineffective, and inefficient. That is, compared to routine patrol, smaller investigative caseloads, or improved equipment, crime mapping comes in second. It is instructive to note that agencies who use crime mapping overwhelmingly reported that funding for mapping efforts came from the departmental budget (general funds) rather than external sources (soft money) (Mamalian and LaVigne 1999:3). For computerized crime mapping to expand, increasing numbers of police executives must concur with Colonel Hughes that mapping is, indeed, "worth it."

TYPES OF INNOVATION

There is extensive literature on the specific topic of organizational innovation in policing and on the managerial topic of organizations as a whole (Damanpour 1991; Downs and Mohr 1976; Fiol 1996; Kimberly 1981; Kimberly and Evanisko 1981; King 1998; Maguire 1997; Moore and Sparrow 1988; Mullen 1996; Wilson 1966; Wolfe 1994; Zhao 1995). This literature suggests that innovations differ by type. While some innovations are technical, representing new ways of performing old functions, others are programmatic, representing new approaches to established organizational goals. Others are administrative, resulting in changes to the structure and staffing of the organization. Technical and programmatic innovations are less troublesome than administrative innovations. Radical innovations are particularly problematic and disruptive since they require a reorientation of organizational goals.

We do not know the exact number and nature of the different types of innovations, but William King (2000), in an investigation of innovation typologies, has determined that innovation in the policing milieu is multidimensional, with at least ten distinct variants. To give a specific example, we can differentiate technical innovations as *line technical* (new weapons, body armor, etc.) and *management technical* (MDTs, mobile phones, CAD, etc.). What is important here is that there are different types of innovations, and that innovation type is related to how widely, how quickly, and under what conditions innovations are adopted. In general, the less radical and more practical an innovation, the more quickly it is adopted by organizations.

TYPES OF COMPUTERIZED CRIME MAPPING

Most innovations appear to be easily classified into one of four basic categories: Technical, programmatic, administrative and radical. The adoption of 9mm handguns by police organizations seems clearly technical. The spread of Neighborhood Watch and "DARE" are programmatic changes. Civilianization, accreditation, decentralization, and affirmative action are administrative. Community-oriented policing and problem-oriented policing are radical changes, at least according to their proponents.

We cannot understand the adoption of a particular innovation without examining the context in which the change takes place. For example, departments often cope with the difficulty of implementing administrative and radical innovations by disguising them as technical or programmatic changes. How many times have we seen the criticism that community-policing efforts are treated as programs rather than fundamental (radical) organizational change? Agencies typically explain the use of civilian personnel as a means to accomplish the same work (clerical duties, maintenance, animal control, etc.) at less expense, that is, as a technical improvement. Computerized crime mapping is one of these multi-phasic innovations, and an example of agencies' proclivity to create a new unit for addressing new issues. Crime mapping tends to come under the rubric of the "crime analysis unit," allowing it to appear as a technology in support of an auxiliary function, rather than a central component of the organizational structure.

If computerized mapping is used to improve on existing manual pin maps, then it is a technical innovation. As such, it lends itself to ready adoption. It is difficult to imagine police agencies that routinely use manual pin maps will not eventually adopt computerized pin maps. This is because the function, data, and personnel already exist within the organization and the technology is both relatively inexpensive and widely available (Vincent 2000). In this case, mapping is a technical innovation and unlikely to produce much disruption in organizational operations.

Alternatively, if computerized crime mapping is a key component of crime analysis and problem solving, it is not so easy to adopt. Implementation and use are contingent on organizational commitment to problem

solving and a constellation of organizational resources. The mapping technology must be linked to analytical expertise and the availability of relevant data. The absence of expertise, data, or commitment to problem solving will limit or block the innovation. In this case, mapping is part of a radical innovation and much more difficult to implement.

OBSTACLES TO INNOVATION

Crime mapping, like other innovations, faces several obstacles to implementation. The first and most significant is lack of a vision. Before an innovation is adopted, someone generally sees utility in it. If you cannot provide a convincing reason for mapping crime, chances are that you won't even try mapping.

In an earlier presentation, my colleague, John Eck (2002), noted that medieval mapmakers would mark the boundaries of the known world with a notation to the effect that, "Beyond this point there be monsters." While he correctly observed that this symbolized fears of the unknown, we think that it says more. These historical maps didn't say "there may be monsters," or, more honestly, "we don't know what you'll find." Rather, the maps unequivocally stated that "there are monsters here."

What sane person would willingly sail into monster-infested waters? In contemporary terms, these old maps said, "You don't want to go there." Such a warning puts the burden on the explorer, since who would want to risk such danger. Recall that it was Columbus who had the vision of exploring, it was he who recruited the Spanish court, rather than the reverse. Columbus had a vision. Likewise, police executives who have a vision must impart it to their colleagues and staff. Often the monsters that impede progress are the timid souls who cower behind their desks and refuse to venture upon the ships of change. The first requirement for innovation, then, is one of vision—looking beyond the horizon. In this context, vision means seeing a purpose or use for the innovation. Not everyone has a vision, and those with vision do not all see the same thing. If vision drives the adoption of innovation, then differences in vision can explain differences in how police adopt change.

DIFFERENT VISIONS OF COMPUTERIZED CRIME MAPPING

As a metaphor to the travels of Columbus, we have identified six types of potential travelers who illustrate differences in vision. These voyagers differ in terms of their likelihood of getting underway and, once underway, in the distance they are likely to travel. They are:

Clueless. These are people who don't know where they are, or where they want to go. They are unlikely to travel except, perhaps, to move in a small circle.

Rooted. These are people who know where they are and are satisfied with their circumstances. They are unlikely to travel because they do not wish to leave.

Aimless. These are people who are not happy where they are, but have no final destination in mind. They are likely to venture forth, but where they go is unpredictable.

Passengers. These are folks who have some idea of where they want to go, but leave it to a guide or chauffeur to get them there.

Navigators. These people know where they want to go, and take it upon themselves to get there. Pioneers and adventurers tend to be navigators.

Flotsam. These are people who end up somewhere by chance. They may have started out as aimless, passengers, or navigators, but unforeseen events bring them to an unanticipated destination. While a few float along with the tide and accidentally end up as pioneers, most are never heard from again.

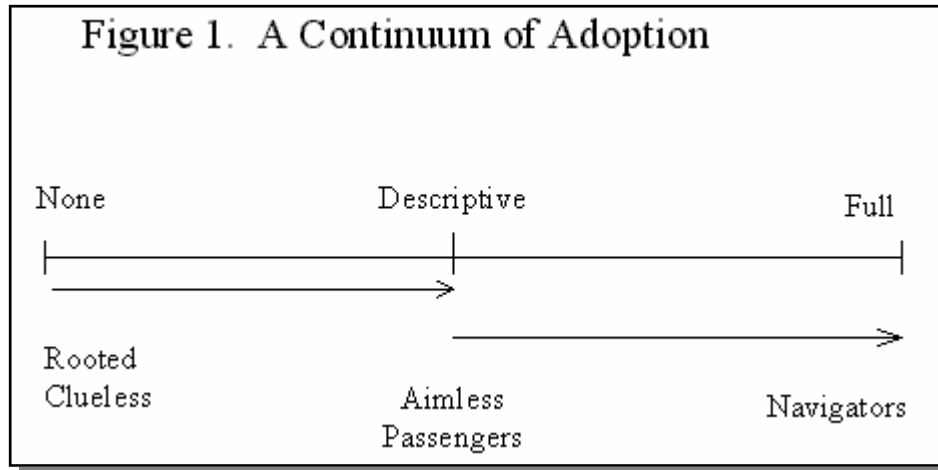
Of these six types, three have a vision and three do not. The clueless, aimless, and flotsam have no idea or control over where they are going. Those who are rooted see themselves as stationary, and do not want to go anywhere. Passengers tend to know where they want to go but have few ideas about how to get there. Navigators know where they want to be and how to get to their destination.

When we relate these types of travelers to organizations, we can identify three orientations towards change. First, there are *leaders* (navigators) who are on the cutting edge of professional developments, whether they be technical or radical innovations. Next, there are *followers* (aimless and passengers), who may not lead innovative trends, but will join those trends in time. Finally, there are those who are unlikely to innovate on their own (rooted and clueless), and who are essentially *stationary*.

This typology identifies two important factors that affect the adoption of innovation. First, some organizations are likely to adopt innovations while others are not. Faced with an innovation, non-adopters say, “so what?” Second, among adopters, some will view the innovation as an end (computerized mapping as a destination) and others will see it as a means (computerized mapping as a vehicle). Those who see an innovation as an end write an application manual (perhaps carved on stone). If the innovation is defined as a destination, we can expect little progress or extension of use. On the other hand, if they describe the innovation as a vehicle, there will probably be experimentation and expansion of its application. Those who see the innovation as a means are continually imagining its further possibilities.

David Weisburd and Cynthia Lum (2001) reported a comparison of police organizations that had adopted computerized mapping earlier (before 1996) as opposed to later (1997 or afterwards). They noted (2001:18), “One general observation among diffusion of innovation researchers is that earlier adopters are more cosmopolitan than later adopters. They are for example more likely to establish and develop connections with colleagues and with outsiders, like researchers. From our data, it appears that this is very much true in diffusion of crime mapping innovation.” Those whom we have called “navigators” are people who are open to new ideas and new technologies.

We can conceive of the expansion of computerized crime mapping as beginning at point zero of no mapping, running through a midpoint of visual representation of issues, and ending at the top level where computerized spatial analysis is an agency’s core technology. At this point, it drives an agency’s daily operations and activities. Along this continuum there are two interesting segments. One lies between zero and the midpoint. The other lies between the midpoint and the top end. It is in these segments that development in the adoption and application of computerized crime mapping can occur. The continuum appears as shown in Figure 1 (on page 8).



Our travelers will find themselves at different points along the road to full integration of computerized crime mapping. Assuming the destination in question is some sort of data-based management, we can expect the following outcomes:

1. The stationary will not generally adopt mapping. The small portion that might stumble across the technology will note its value for producing maps, and that is how they will use it.
2. Followers may adopt mapping, but have no idea of their final destination. They are likely to confine their use of the technology to producing maps or to copying the work of mapping leaders.
3. Leaders will seize upon mapping as a means to implement data-driven management concepts that apply to quantitative and qualitative goals.

As time passes and use of mapping becomes more common, some of the stationary may come to adopt the technology. Similarly, leadership among the followers may develop as they become more familiar and experienced with mapping technology, while others will be products of chance. A few of the leading agencies may abandon mapping, or at least stop pushing the boundaries. A change in administration, a crisis event, the emergence of a new theory, changes in personnel, or some other “natural phenomenon” may alter the orientation of the agency or that of its executive. Any organization can join the flotsam under the right circumstances.

FACILITATING THE SPREAD OF COMPUTERIZED CRIME MAPPING

We need to recognize and overcome existing obstacles if we want to increase the number of police agencies using crime-mapping technology. These obstacles are qualitatively different, depending upon where the agency falls along the continuum of adoption. Those at the early stages who are not mapping are likely to face concrete obstacles that are fairly easy to surmount. Those in the middle face fewer obstacles that are more intractable as a result of their philosophical, political, or organizational nature. To bring an agency from a state of not mapping at all to one where spatial analysis is a core technology is a two-step process.

MAKING MAPS—THE FIRST STEP

Recall that some agencies are unlikely to adopt computerized mapping for two reasons. First is disinterest. They are either aware of mapping and uninterested, or simply unconcerned about new developments in the rest of the policing world. Second is ignorance. If we want to encourage these agencies to implement mapping, we need to educate them.

Some subset of these agencies are unlikely to adopt any innovation, no matter what we do. Others will employ mapping as long as we encourage them, but their motivation will be external (our encouragement) rather than internal (perceived relative benefit). Finally, some portion of these agencies will learn to value mapping and implement the technology for their own reasons.

For those agencies wanting to embark upon mapping, the task is to overcome existing barriers of knowledge and inertia. That is, we must provide an answer to the question, “Why should I map crime?” Any answer must survive the follow-on question, “So what?” There are a number of answers we can offer, but no single answer will overcome the “so what” obstacle. Furthermore, none of the answers will be sufficient to overcome the “so what” follow-on among some agencies.

Once interest in the adoption of computerized crime mapping has been piqued, the next step is to facilitate the making of maps. In Forest Park, the first products of the crime-mapping effort were colorful pin maps of crimes. The entire police department then received introductory, in-service training outlining the uses of crime mapping using Forest Park maps and data. This, in turn, fanned further interest in the technology. The maps are powerful communication tools, and their computer-generated nature inspires pride (“we’re on the cutting edge”) and excitement (“what else can it do?”).

The major impediments to computerized mapping, once there is awareness and interest, are basically technical. A police department seeking to implement crime mapping needs expertise, equipment, and data. The less expensive and more readily available these resources are, the more likely it is that the agency will implement mapping. The step between wanting to map and producing pin maps was relatively small and took place quickly in Forest Park.

Hamilton County in Ohio contains 44 local law enforcement agencies. A strong county police association and a county association of police chiefs have produced a tradition of cooperation. All agencies, for example, use the same arrest and citation forms. There is also a regional crime information center that collects and maintains data on arrests, warrants, case dispositions, and the like. In addition, a consortium of municipal governments and public utilities have developed the Cincinnati Area Geographic Information System (CAGIS), which contains base maps of the county. As a result, much of the data required for mapping in Forest Park were readily accessible.

The development of mapping expertise is an ongoing process. The Forest Park effort received a “jump start” from a locally initiated research partnership funded by the National Institute of Justice and by the technical assistance of the University of Cincinnati. The department sent some officers to mapping classes at the University of Cincinnati and the Tri-State Regional Community Policing Institute. Others attended the annual crime mapping research conference sponsored by the Crime Mapping Research Center of the National Institute of Justice. The department also received help from the mapping unit of the Cincinnati Police Division. At this point, only one officer has been designated as a mapmaker but the department’s goal is to develop similar skills and interest across the entire department.

Given data and minimal qualifications to make maps, the remaining obstacles centered on equipment. The department already had sufficient computing power in the form of an available desktop computer. Now it needed to acquire hardware and software that would support mapmaking. The major hardware expense was a printer capable of producing large, color maps. The CAGIS data were developed and available in ArcView, and the city planning department was already using ArcView software, so the department obtained that

software for its mapping. Following some initial bureaucratic delays in purchasing and obtaining the CAGIS base maps, the technical requirements for mapping were met in relatively short order.

USING MAPS—THE SECOND STEP

Given an ability to make maps, the shift from producing descriptive images of the environment to developing diagnostic and evaluative instruments represents a more radical innovation. In some agencies that are already committed to data-driven management and problem solving, the use of computerized mapping to support and assess agency efforts is likely to occur without encouragement, as a technical innovation. In those less committed agencies, the task is less to sell mapping than to sell an analytic approach that computerized crime mapping supports.

William Geller published an entertaining and enlightening article in the December 1997 issue of the *National Institute of Justice Journal*. Its title, “Suppose We Were Really Serious About Police Departments Becoming Learning Organizations,” was, in itself, a reproach to agencies, and the article fleshed out Geller’s critique by identifying a full plethora of obstacles to developing data-driven management in police agencies. Geller, like others, identified a set of common obstacles to radical change in police organizations. These include tradition, political considerations, and the existence of opponents. It is here that the most frightening “monsters” are encountered.

There are perhaps many possible futures for the fully integrated use of computerized crime mapping in American policing. To illustrate the monsters, however, we will select one. *Mapping Out Crime: Providing 21st Century Tools for Safe Communities*, the report of the Task Force on Crime Mapping and Data-Driven Management (1999), envisioned a brave new world for law enforcement in which, “Law enforcement departments will build an organizational structure based on geographic responsibility, allowing front-line officers to work more effectively with neighborhoods and communities, supported by specialized units and headquarters. All levels of the workforce will have the skills and desire to work collaboratively with communities as well as with technology. Law enforcement agencies in the 21st century will rely on current, integrated information; will employ advanced mapping and analytic techniques; and will have both external and internal performance expectations and measurements. The focus of the entire agency organization, its funding decisions, and the management of resources will be tied to the achievement of agency goals.” Given the current state of the art of law enforcement, this future can be terrifying.

This futuristic scenario also contains a number of criticisms and assumptions about contemporary law enforcement. First and foremost, it suggests that current law enforcement agencies do not link resources to goal attainment. Second, it assumes that agency goals can be clearly identified and will not conflict with each another. Neither of these criticisms has been empirically established and are likely to irk traditional law enforcement personnel who are proud of the work performed by their agencies. How would any of us react to someone saying, essentially, we don’t know what we’re doing? While change may be beneficial, radical change requires that we admit past mistakes and limitations. Similarly, this vision of the future requires that we admit we might not know what it is we are supposed to be doing. Before we can proceed, we need to identify our organizational goals. Maybe we’re supposed to do things we really don’t want to do.

Beyond these threatening issues, the report painted a picture of a much more frightening world. It envisioned a scenario in which all must have the skills and desire to work with communities and technology, and those who don’t face a regimen of retraining. They may even wind up looking for new careers.

Front-line officers are increasingly working with neighborhoods, citizens, and communities. Turning the

troops loose to define and solve problems generally scares supervisors and managers. Requiring personnel and the agency as a whole to work with outside people and organizations threatens self-determination. The agency is now dependent on others, and those others may not be willing or able to cooperate (Sadd and Grinc 1996:11-12). Suppose the public works department does not cooperate with the police department on a particular problem? Not only is the authority to solve problems diffused, but also the agency and its personnel are to be held accountable (through the performance expectations and measurements) for things they do not completely control. This model of data-driven organizations basing operational decisions on sophisticated analyses of problems, and being held accountable for achieving measurable results, seems ideal to an academic. But it is probably more like a nightmare to someone in that organization. This is especially true, we think, for someone who does not have tenure.

Faced with these dangers, what agency is likely to develop the application of computerized crime mapping to its fullest potential in support of a radical restructuring of the organization? This restructuring is philosophical. More than changing organizational size or the chain of command, it requires a radical rethinking of organizational purpose and practice. We think there are three principal routes to this end of the continuum. Some agencies will have decided that the monsters are either fictitious or less formidable than they appear. These agencies will adopt a data-driven approach to doing business because they believe it is the right thing to do. Like Columbus, they see something beyond the monsters that merits the risk. A second path is incremental. Once on the path, some agencies will encounter forces that foster change (a crisis of legitimacy) or slowly evolve (expanding the applications of mapping) so that crime mapping becomes an integral part of setting and achieving organizational goals. Beginning with small increments, the application of mapping will expand from description to analysis and then to planning, until organizational management will ultimately rely on the analysis of existing data. The fear of technology will diminish incrementally as computer literate officers replace officers who retire from the force. The final route is through forced change.

External forces typically drive large-scale changes in law enforcement. Changes in the law, demands of citizens, and political agendas influence police agency actions. Like most of us, police personnel and police organizations become entrenched in what they do and how they do it. Until required to change practices by some outside force, most will continue traditional practices. Adoption of innovation may have to come from pressures outside policing circles, as was the case with changes in the enforcement of laws dealing with drunk driving, domestic violence, and use of seatbelts. It was also external forces that produced and supported the movement toward community policing, tolerance of diversity in hiring, training, changes in how police deal with the public, and similar reforms. Weisburd and Lum (2001) argue that the development and spread of computerized crime mapping itself was, in large part, a response to a crisis in policing. Police agencies will need to adapt to changes in the environment, and increasing involvement with citizens and government will put agencies under greater pressure to explain and justify their actions. Increased accountability will support the development of data-based practice.

We can wait for the accountability monster to push police agencies further into the unknown waters of computerized crime mapping, or we can take steps to encourage them to innovate on their own. If we want to encourage the implementation and use of computerized crime mapping, we must remember that we are dealing with a two-step process. The first step is to help police agencies to overcome obstacles to mapmaking. The second step, that of recognizing the utility of geographic analysis of crime, disorder, and police action, is both more important and more difficult.

OVERCOMING OBSTACLES

Perhaps the greatest impediment to mapping is simple inertia, since many police executives and organizations probably see no compelling reason to develop a mapping capability. Computerized crime mapping is still crime mapping, and the term suggests that it is only a new version of the old pin maps. Moreover, linking mapping to computerization also can be troublesome. Despite its contributions to efficiency, the revolution in computer technology also has contributed to “technophobia,” and to a dread of computerization.

The exponential growth of the computer industry itself adds to this fear. By the time one installs a new computer and becomes familiar with its software, the technology is outdated. Few people in police agencies, as in many types of organizations, possess a detailed understanding of this ever-changing technology. There are few, if any, police training curricula that include coverage of computer operations, much less spatial analysis of data. Computer “experts” in most police agencies are home grown. Officers who are self-taught or who come to the department with some computer skills and interests are assigned part-time to computer duties (Web-site design, technical support, crime mapping, etc.).

Faced with these realities, it is not surprising that most police agencies report that they do not currently use computerized crime mapping. In many agencies, the ability to generate computerized maps simply does not seem to be worth the costs in frustration and disruption of operations. In short, these executives and agencies have decided, based on limited information, that computerized crime mapping is just not worth the trouble.

The more convenient it becomes for police to make or get maps, the more likely it is that mapping can be made to seem “worth it.” To that end, efforts to standardize and integrate data, so that access and use are simplified, will support the spread of mapping. Regional, state, and national (National Crime Information Center) data repositories could ensure that crime reports (National Incident Based Reporting System, or NIBRS) are geocoded, a move that would be particularly valuable for smaller agencies.. Similarly, automated dispatch systems could include geocoded locations of calls for service and reported problems. The availability of the CAGIS dataset greatly facilitated the adoption of mapping by the Forest Park Police Department, showing how the shift to mapping becomes easier when police agencies can access an existing database containing street maps, real estate parcels, public utilities, and other information.

As the current cohort of officers (many of them products of the LEEP years)¹ reach retirement and are replaced by people who “grew up with computers,” we expect the level of computer sophistication among police officers to increase dramatically. Coupled with the increased availability of Internet access through mobile computer terminals, cell phones, and almost all forms of communication, a computer-literate workforce with access to computerized information is likely to expand all sorts of computer applications to policing. This, we believe, will include mapping.

The development of computer-literacy training and computerized-mapping training is crucial, and many training opportunities now exist. The inclusion of these topics in basic training, however, and the development of local training resources through the production of computer assisted instruction modules, distance learning (including Web-based courses), and train-the-trainer activities will make training in computerized mapping more available. The provision of technical support for crime mapping efforts—

¹The Law Enforcement Education Program (LEEP) was part of the Law Enforcement Assistance Administration (LEAA) authorized by Congress in the Omnibus Crime Control and Safe Streets Act of 1968. LEEP provided funding for some 200,000 men and women to attend college while serving as law enforcement officers, or prior to taking law enforcement positions. The program ended in the early 1980s and most remaining beneficiaries are nearing the end of their law enforcement careers.

perhaps the inclusion of a toll-free telephone number—would encourage agencies to explore mapping.

Many of these ideas for overcoming inertia are already reality. The Crime Mapping Research Center of the National Institute of Justice and the Police Foundation's Crime Mapping Laboratory coordinate and provide a variety of services aimed at helping police agencies implement and use computerized crime mapping. The annual National Institute of Justice Crime Mapping Research Center's international crime mapping conference, a listserv, and a number of training opportunities are available to those seeking information about mapping. Ongoing dissemination of information about mapping and its applications to law enforcement should insure a decline in the number of clueless travelers

As for helping police agencies to use maps, the major impediment appears to be one of vision or values. Unfortunately, many police executives do not have a vision of how mapping can improve their work. The focus on crime mapping, itself, probably limits marketing efforts. Busy police executives are unlikely to take the time to learn about mapping and, thus, see its applications. Instead of focusing on mapping, we should emphasize problem solving, data-driven management, and operational applications.

Here, too, we face the burden of the past. Too often police executives hear "data-driven" and think in terms of past practices where agency effort was defined and assessed in terms of counts or quotas. Response time, calls for service, clearance rates, and similar traditional indicators of police practice were data that drove agency management. This was precisely the reactive approach to problems that has been so soundly criticized of late. To many police executives, data-driven management is considered to be current practice.

CONCLUSIONS

Any effort to develop a proactive approach based on data analysis in police organizations—with or without the use of spatial analysis and crime mapping—confronts the monsters mentioned earlier. Recall that we can expect relatively few travelers to be navigators (or pioneers). If we hope to increase the number of police executives and agencies using a proactive, analytic approach to problem solving, we may need to consider most of the field as passengers. Our task then is to chart destinations, develop routes, and work on "passenger safety."

There is ample evidence that problem analysis that includes mapping is an effective means of directing police activities. This evidence, however, tends to be both problem- and site-specific. While computerized crime mapping might help an agency to deal with some specific problems, such as robbery, loitering, vandalism, and drug sales, there is little information on how the technology (and proactive approach) affect the organization. Specific problems are well-known threats or monsters. New technology, decentralized decision making, openness with the community, taking responsibility for prevention, and other changes associated with data-driven management are today's denizens of the deep.

If we are to encourage the use of mapping, we must first encourage a proactive and preventive approach to policing. Once the police organization mission is defined as problem solving, technologies (information systems) that support goal attainment will be developed. Like Columbus, computerized crime-mapping pioneers have found a new world. It remains for us to recruit additional passengers to make the same trip.

REFERENCES

- Damanpour, F. 1991. "Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators." *Academy of Management Journal* 34(3):555-590.
- Downs, G. and L. Mohr. 1976. "Conceptual Issues in the Study of Innovation." *Administrative Science Quarterly* 21(4):700-714.
- Eck, J.E. 2002. "Crossing the Borders of Crime: Factors Influencing the Utility and Practicality of Interjurisdictional Crime Mapping." *Overcoming the Barriers: Crime Mapping in the 21st Century*, (January) No. 1. Washington, DC: Police Foundation.
- Fiol, M. 1996. "Squeezing Harder Doesn't Always Work: Continuing the Search for Consistency in Innovation Research." *Academy of Management Review* 21(4):1012-1021.
- Geller, W. 1997. "Suppose We Were Really Serious About Police Departments Becoming 'Learning Organizations'?" *National Institute of Justice Journal* (December):2-8.
- Goldstein, H. 1990. *Problem-Oriented Policing*. New York: McGraw-Hill.
- Hughes, K. 2000. "Implementing a GIS application: Lessons Learned in a Law Enforcement Environment." *Crime Mapping News* 2(1):1-5.
- Kelling, G. and M. Moore. 1988. *The Evolving Strategy of Policing*. Washington, DC: U.S. Department of Justice.
- Kimberly, J. 1981. "Managerial Innovation." In, *Handbook of Organizational Design, Volume 1: Adapting Organizations to Their Environments*, ed. P. Nystrom and W. Starbuck, 84-104. New York: Oxford University Press.
- Kimberly, J. and M. Evanisko. 1981. "Organizational Innovation: The Influence of Individual, Organizational, and Context Factors on Hospital Adoption of Technological and Administrative Innovations." *Academy of Management Journal* 24(4):689-713.
- King, W. 2000. "Measuring Police Innovation: Issues and Measurement." *Policing: An International Journal of Police Strategies and Management* 23(3):303-317.
- King, W. 1998. "Innovativeness in American Municipal Police Organizations." Ph.D. diss., University of Cincinnati.
- Mamalian, C., and N. LaVigne. 1999. *The Use Of Computerized Crime Mapping by Law Enforcement: Survey Results*. Washington, DC: National Institute of Justice, Research Preview.
- Maguire, E. 1997. "Context, Complexity and Control in Large Municipal Police Organizations." Ph.D. diss., State University of New York at Albany.
- Maguire, E. 1997. "Structural Change in Large Municipal Police Organizations During the Community Policing Era." *Justice Quarterly* 14(3):547-576.
- Monkonnen, E. 1981. *Police in Urban America: 1860-1920*. Cambridge, UK: Cambridge University Press
- Moore, M. and M. Sparrow. 1988. Institutionalizing Innovation in Municipal Police Departments. Paper delivered at the 1998 APPAM Research Conference, Seattle, Washington.

- Mullen, K. 1996. "The Computerization of Law Enforcement: A Diffusion of Innovation Study." Ph.D. diss., State University of New York at Albany.
- Rich, T. 1995. *The Use Of Computerized Mapping In Crime Control And Prevention Programs*. Washington, DC: National Institute of Justice, Research in Action.
- Rich, T. 1999. "Mapping the Path to Problem Solving." *National Institute of Justice Journal* (October):2-9.
- Sadd, S. and R. Grinc. 1996. *Implementation Challenges in Community Policing: Innovative Neighborhood-Oriented Policing in Eight Cities*. Washington, DC: National Institute of Justice, Research in Brief.
- Spelman, W., and J. Eck. 1987. *Problem-Oriented Policing*. Washington, DC: National Institute of Justice, Research in Brief.
- Spelman, W., M. Moore, and R. Young 1992. "The Diffusion of Innovations and the Creation of Innovative Police Organizations." Taubman Center for State and Local Government, Innovations Research Project Working Papers. Kennedy School of Government: Cambridge, MA.
- U.S. Department of Justice, and National Partnership for Reinventing Government. 1999. *Mapping Out Crime: Providing 21st Century Tools for Safe Communities*. Report of the Task Force on Crime Mapping and Data-Driven Management.
(<http://govinfo.library.unt.edu/npr/library/papers/bkgrd/crimemap/content.html>)
- Vincent, K. 2000. "Implementing Crime Mapping: Hayward Police Department." *Crime Mapping News* 2 (1):6-8.
- Weisburd, D. and C. Lum. 2001. "Translating Research Into Practice: Reflections on the Diffusion of Crime Mapping Innovation." Keynote Address at the Fifth Annual International Crime Mapping Conference. Washington, DC: National Institute of Justice.
(<http://www.ojp.usdoj.gov/cmrc/conferences/01conf/Papers.html>)
- Weiss, A. 1992. "The Innovation Process in Public Organizations: Patterns of Diffusion and Adoption in American Policing." Ph.D. diss., Northwestern University.
- Wilson, J. 1966. "The Innovation Process in Organizations: Notes Toward a Theory." In *Approaches to Organizational Design*, ed. J. Thompson. Pittsburgh: Pittsburgh Press.
- Wolfe, B. 1994. "Organizational Innovation: Review, Critique and Suggested Research Directions." *Journal of Management Studies* 31(3):405-431.
- Zhao, J. 1995. "Contemporary Organizational Change in Community-Oriented Policing: A Contingency Approach." Ph.D. diss, Washington State University.

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The Police Foundation is a private, independent, not-for-profit organization dedicated to supporting innovation and improvement in policing through its research, technical assistance, and communications programs. Established in 1970, the foundation has conducted seminal research in police behavior, policy, and procedure, and works to transfer to local agencies the best new information about practices for dealing effectively with a range of important police operational and administrative concerns. Motivating all of the foundation's efforts is the goal of efficient, humane policing that operates within the framework of democratic principles and the highest ideals of the nation.

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