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**COMMUNITY ORIENTED POLICING SERVICES**  
**U.S. DEPARTMENT OF JUSTICE**



## **Guidelines to Implement and Evaluate Crime Analysis and Mapping in Law Enforcement**





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# **Guidelines to Implement and Evaluate Crime Analysis and Mapping in Law Enforcement Agencies**

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The opinions, findings, and conclusions or recommendations expressed in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.





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# Table of Contents

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I. Introduction .....	1
II. Assessing the Crime Analysis and Mapping Needs of an Agency .....	2
Current State of Affairs Agency .....	2
Strategic Goals .....	3
Data Sources .....	4
Technology .....	6
Current Crime Analysis and Mapping Products and Their Uses .....	6
Crime Analysis and Mapping Needs .....	7
Informal.....	8
Formal.....	9
Summary.....	10
Needs Assessment Checklist.....	11
III. Developing an Action Plan .....	13
Structure.....	13
Functions.....	15
Data Issues .....	16
Technology .....	18
Training/Promotion.....	19
Policies and Procedures .....	20
Short-Term and Long-Term Goals .....	20





Summary.....	22
Action Plan Checklist .....	23
IV. Evaluation of Crime Analysis and Mapping .....	25
Comparative Information.....	26
Baseline Measures .....	27
Process Evaluation Measures.....	27
Personnel.....	28
Technology .....	28
Data Sources .....	29
Products.....	29
Impact Evaluation Measures.....	30
Satisfaction.....	31
Summary.....	33
Evaluation Checklist.....	34
V. Conclusion .....	35





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## **I. Introduction**

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The term “crime mapping” has most recently been used to describe what many law enforcement agencies are beginning to do, i.e. map crime and other law enforcement data. But the process of crime mapping is more than just depicting crime data on a map; it is one aspect of the much larger process of crime analysis. Geographical information systems technology that are used to “map crime” are only tools to assist and enhance crime analysis and problem solving, not the end in itself. Thus, crime mapping has come about in law enforcement agencies as part of a larger drive to implement and use crime analysis methodology and techniques.

Some agencies are currently implementing or have already implemented crime analysis and mapping in various ways. That is, some are giving all officers and other law enforcement employees the tools and training necessary to conduct crime analysis and mapping, others are implementing a specific crime analysis and mapping function in which individuals are hired with crime analysis and mapping skills, and still others are designating a few individual officers or other law enforcement agency employees who are not specifically trained in crime analysis or mapping to research, implement, and conduct crime analysis and mapping. Conversely, there are many law enforcement agencies that have not yet implemented crime analysis and mapping and others that are looking to rethink the operation of their current crime analysis and mapping functions.

This document is meant to serve as a guide for the processes of implementing and evaluating crime analysis and mapping for law enforcement agencies that do not currently have the function in place as well as those that are looking to reevaluate and restructure their current crime analysis and mapping functions. It provides a general outline for 1) developing a needs assessment; 2) creating an action plan based on the assessment; and 3) conducting an evaluation of crime analysis and mapping. This document is not meant to be a step-by-step guide for these three processes but offers suggestions and guidance on what and how to collect relevant information, while citing practical examples. Since each law enforcement agency is unique, so is the content of each of these processes. To reiterate, this document will outline the processes of obtaining information for conducting a needs assessment, creating an action plan, and evaluating crime analysis and mapping in a law enforcement agency.





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## II. Assessing the Crime Analysis and Mapping Needs of an Agency

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The first step in implementing crime analysis and mapping in a law enforcement agency is conducting a needs assessment, which serves two purposes. The first purpose is to obtain needs assessment information to develop a crime analysis and mapping implementation plan, and the second is to obtain baseline measurement information to assist in the evaluation of crime analysis and mapping. This section covers the needs assessment process, detailing the types of information that may be obtained. Specific information about baseline measure information needed for the evaluation is provided in the last section of the document entitled, "Evaluation of Crime Analysis and Mapping."

The following are six general areas to include in a crime analysis and mapping needs assessment:

1. Current state of affairs
2. Strategic goals
3. Data sources
4. Technology
5. Current crime analysis and mapping products and their uses
6. Crime analysis and mapping needs

### *Current State of Affairs*

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The first step in assessing the crime analysis and mapping needs of an agency is determining the current state of crime analysis and mapping in the academic community, in the law enforcement community, and in the specific agency that is being assessed. Information about crime analysis and mapping in the academic and the law enforcement communities assists in developing an understanding of the current state of crime analysis and mapping in research and practice and provides a foundation for the assessment of an agency's state of affairs, needs, and an effective implementation. Information gathered about the agency being assessed makes up the majority of the needs assessment and is discussed in the following sections.

The state of crime analysis and mapping in academia can be determined by a literature review of academic books and articles. This can be done by library searches on key terms or by utilizing specific Internet sources that provide bibliographies for this type of information. Some Web sites that may be of use in researching crime analysis and mapping include:

- Office of Community Oriented Policing Services: [www.usdoj.gov/cops](http://www.usdoj.gov/cops)
- Police Foundation: [www.policefoundation.org](http://www.policefoundation.org)
- National Institute of Justice: [www.ojp.usdoj.gov/nij](http://www.ojp.usdoj.gov/nij)
- Crime Mapping Research Center: [www.ojp.usdoj.gov/cmrc](http://www.ojp.usdoj.gov/cmrc)





- Crime Mapping and Analysis Program:  
[www.nlectc.org/nlectcrm/cmaptrain.html](http://www.nlectc.org/nlectcrm/cmaptrain.html)
- International Association of Crime Analysts: [www.iaca.net](http://www.iaca.net)
- International Association of Law Enforcement Intelligence Analysts:  
[www.ialeia.org](http://www.ialeia.org)

A literature review of crime analysis and mapping ten years ago would have turned up a few books and articles, most of which would not necessarily be dedicated to crime analysis and mapping specifically. A more recent literature review reveals not only much more information, but also easier access to the information, i.e. through the Internet. In addition, national and international conferences such as the International Association of Crime Analysts Conference, the Crime Mapping Research Center International Conference, the Problem Oriented Policing Conference, as well as others, are great resources for determining the state of and innovations in crime analysis and mapping.

Information about crime analysis and mapping within the law enforcement community can be obtained by a literature review of practical books and magazine articles as well as by talking to law enforcement personnel that perform crime analysis and mapping. Literature can be found on the key Web sites listed above and correspondence with others conducting crime analysis and mapping can be sought either on the phone, through e-mail, or by conducting site visits.

A search on the Internet would also reveal practical examples and provide links to agencies conducting crime analysis and mapping. For example, the Crime Mapping Research Center at the National Institute of Justice lists resources as well as specific agency Web sites that provide excellent examples of crime mapping. Attending conferences, training, and visiting police departments with outstanding crime analysis and mapping functions are also a way to gather information about current practices of crime analysis and mapping.

It is important to research the current state of affairs of crime analysis and mapping at the beginning of the needs assessment. Not only will it describe an overview of the current state of affairs, but it will also prevent “reinventing the wheel” by providing ideas from others in the discipline that may be borrowed and/or improved upon. The following sections cover the specific areas of the needs assessment, which together describe the “current state of affairs” of the specific law enforcement agency.

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### ***Strategic Goals***

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Strategic goals are concepts or concerns upon which members of an agency have decided to focus their attention and/or resources. Strategic goals can apply to the agency as a whole, to one division within the agency, or even to a small work group such as a patrol squad. Therefore, examples of strategic goals range from general concepts such as instituting community policing and problem solving or improving basic police services, to specific issues such as reducing juvenile crime in a specific area. In many cases, strategic goals are developed by an agency with help from its community.







Focusing crime analysis and mapping efforts towards an agency's strategic goals assists in prioritizing the duties, objectives, and goals of crime analysis and mapping. More importantly, it assists the agency's efforts to effectively address each strategic goal. For example, there is a large juvenile population in the city and the law enforcement agency's strategic goal is to reduce juvenile crime. By producing key reports and maps on juvenile arrests, calls for service, and crime in and around schools, crime analysis and mapping is directly supporting the agency's efforts to achieve its strategic goal.

While a law enforcement agency may have department-wide strategic goals, there may also be strategic goals within specific divisions of the agency. Determining the goals and objectives of all divisions within a law enforcement agency during the needs assessment is important for crime analysis and mapping since it is important to assist the agency at all levels. For example, even though a city may not have an overall traffic accident problem, a particular patrol division may choose reducing traffic accidents as its strategic goal because it is a primarily residential area, and the community has expressed a serious concern about accidents. Thus, specific crime analysis reports and maps that detail accident information may be needed just for that patrol division. This is particularly relevant in larger law enforcement agencies where individual divisions may develop their own strategic goals. Yet, even small law enforcement agencies may have strategic goals and objectives within smaller divisions.

Incorporating an agency's strategic goals within the needs assessment information is imperative for determining its crime analysis and mapping needs. While the strategic goals will initially serve to define and guide the focus of crime analysis and mapping, the crime analysis and mapping function can ultimately assist the agency's efforts to address these goals. Additionally, collecting this information from various divisions of an agency can also enhance the needs assessment by ensuring that the needs of smaller work groups are also considered.

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### *Data Sources*

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An important part of the crime analysis and mapping needs assessment is determining the types, the accessibility, and the integrity of both available and potential data sources. Determining the data types currently and potentially available is a matter of talking to members of the agency, members of other city departments, and representatives from other law enforcement agencies. Internal data sources such as crime, calls for service, arrests, traffic accidents, and citations will be identified through agency personnel. One may also determine potential internal data sources such as sex offender registrants or field card information that may currently be unavailable but will be in the future.

Obtaining data from outside the confines of the law enforcement agency is crucial to crime analysis and mapping. For example, law enforcement agencies typically do not create their own base maps but obtain them from external sources such as other departments within the city government, from the Internet, and/or commercial vendors. It is important to identify these resources and any additional types of data these resources can provide. In addition to base maps, other geographic information such as bus stops, land parcels, school locations, and aerial photographs can be obtained from these sources.







Larger law enforcement agencies usually have better access to demographic and geographic information since larger city governments have established planning departments; however, smaller cities and towns may have to seek help from commercial vendors for such information. Fortunately, much of this information is available publicly or for minimal cost. Census information, which can be obtained from the Internet for free in electronic format, is the best example of a supplemental data source.

Once the data sources have been identified, additional information such as data format, location, accessibility, and timeliness are important to ascertain. Knowing whether data are in electronic format or paper format, where they are housed, whether data are microfilmed or purged after a certain time, or that data can be accessed only on a monthly basis are all issues that may significantly impact crime analysis and mapping. These considerations must be taken into account in the needs assessment as the number, type, and quality of data sources affects much of the work in crime analysis and mapping.

One of the most difficult tasks in conducting crime analysis and mapping in a law enforcement agency is getting access to the data in an electronic format. Although crime analysis and mapping do not require that data be in an electronic format, this can greatly enhance the timeliness and effectiveness of the crime analysis and mapping process. Even though some agencies are becoming computerized and have basic data such as crime and calls for service in a computerized format, data types such as booking sheets, field incident cards, and traffic citations may still be maintained solely on paper. Many people conducting crime analysis and mapping have taken it upon themselves to create their own electronic databases out of necessity. They have chosen to take the time to develop a database and, in some cases, conduct the data entry in order to have valid, reliable, timely data to use for analysis.

Additionally, the timeliness of the data can significantly impact the crime analysis and mapping function. For example, if a goal is to provide recent crime pattern information and the available crime reports are weeks or even months old because of data entry lag time or processing time, products created with these data will be outdated and the goal will not be achieved.

Data integrity is also an important factor in assessing the crime analysis and mapping needs of an agency. Data integrity refers to the quality of the data, i.e., consistency and accuracy of the data. An example of inconsistent data is a single address listed many different ways, e.g. 100 E. Main Av, 100 Main Av, 100 E. Main, or 100 E. Maine Ave. An example of inaccurate data is a report mistakenly coded as a theft from person when, in reality, it was a robbery. These are very simple examples, but data consistency and accuracy, known together as data integrity or data quality, are crucial to conducting crime analysis and mapping.

Data integrity issues can be determined after working with a particular data source over time. However, during a needs assessment, some data integrity concerns can be determined beforehand by interviewing individuals who work with the data such as record clerks, dispatchers, and officers. These individuals are often aware of and/or have control over the data integrity issues since they access or input data regularly. For example, to make their jobs efficient, police dispatchers may have developed their own abbreviations for calls for service in a system that allows free text entry. In this case, the original values of the calls for service code table will not be reflected in the data and the





dispatchers' codes can only be determined by talking to those individuals. Interviewing these individuals and obtaining their knowledge can save time, as remedies to these issues can be formulated during the needs assessment. It is important to identify these data integrity issues early, as they will likely go unnoticed until the data are carefully analyzed.

In addition to the issues surrounding available data, the needs assessment may address accessibility and integrity issues for potential data sources. This will help determine if these data sources are worth pursuing. For example, an agency's primary strategic goal may be reducing juvenile crime, but juvenile arrest information is currently unavailable. By having the accessibility and integrity issues on hand, a method of retrieving the information can be developed. If it would take considerable time and resources to do this, the agency may decide to proceed without the information or develop some other way of obtaining the data. Thus, researching potential data sources does not mean that they will be used, only that their use needs to be deemed worthwhile.

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### ***Technology***

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While determining what data are available, how they are accessed, and the quality of the data, the quantity and quality of technology used in these processes and throughout the agency may also be assessed. Advanced technology is often needed to conduct crime analysis and mapping; however, obtaining advanced technology specifically for crime analysis and mapping may not be enough. For example, if a goal were to disseminate crime analysis information through e-mail or to publish maps on an agency's Intranet Web site, it would be crucial for the potential audience of the information to have access to a computer, to e-mail, and to the Intranet.

As potential data sources are determined in the needs assessment, so may potential types of technology. For example, it is becoming more common for law enforcement agencies to make crime mapping available to all officers. There are specific hardware and software products that are being developed to serve this purpose. The needs assessment may identify these types of resources. In fact, it may be necessary to conduct a review of potential technology prior to the needs assessment to inform agency personnel about hardware and software that are available and their roles in crime analysis and mapping.

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### ***Current Crime Analysis and Mapping Products and Their Uses***

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Part of assessing the crime analysis and mapping needs of a law enforcement agency is determining how crime analysis and mapping are currently being conducted. In an agency that has already implemented crime analysis and mapping, this will be a significant section of the needs assessment. It is important to determine 1) what is being produced, 2) what data are being used, 3) how the information is being produced and used, and 4) who is producing and using the information.

In organizations without formal crime analysis and mapping, individuals throughout the agency may be conducting crime analysis and mapping on an ad hoc basis. For example, a detective inputs various characteristics of each of his/her cases in a





spreadsheet for analysis of trends and patterns; an officer manually tabulates the number and types of crime at a certain location for a problem solving project; or a records clerk produces a weekly stolen vehicle report. Although these are not advanced methods of crime analysis, identifying how members of the law enforcement agency are manipulating, collating, and aggregating data is important for determining ways either the analysis procedures and/or the products can be improved to suit the needs of the agency.

In addition, determining how crime analysis and mapping are being conducted would consist of obtaining copies of the various reports and/or maps people are producing, determining who is using them, and for what purposes. The following are some examples of reports that might be produced in an agency without formal crime analysis and mapping:

- Crime totals by month
- Calls for service totals by day, week, month
- Top 25 traffic accident locations
- Number and types of traffic citations per month
- Number of investigations per detective
- List of calls for service by shift per day

Even though some of these examples would not be considered advanced crime analysis and may be produced by manual counts or automated reports, it is still important to identify how data are being analyzed and how those products are being used in the agency.

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### ***Crime Analysis and Mapping Needs***

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The previous sections have described the process of gathering information about more objective factors or information that already exists such as strategic goals, data sources, technology, and current crime analysis products and their characteristics. But this information alone will not give the full picture of the crime analysis and mapping needs of a law enforcement agency. This objective information must be combined with subjective information and analyzed to determine the crime analysis and mapping needs of that agency.

This section details how to obtain the “subjective” information about crime analysis and mapping needs; that is, the opinions and expectations of members of the law enforcement agency and the community about crime analysis and mapping. It is imperative to ask members of an agency and/or community about their own expectations and needs because these people will be the users of crime analysis and mapping products. This is not to say that crime analysis and mapping has to be tailored only to these stated needs, but that the information gained through this process will be combined with the other needs assessment information to assist in the actual development of the crime analysis and mapping functions. There are two primary methods by which the subjective information can be obtained, informal and formal. It is often necessary to use both methods in an assessment.





## *Informal*

Assessing the agency's needs through informal means entails talking to various members of the agency on an individual basis. A set of questions tailored to each individual or group of individuals can be used to focus the discussion. However, a free flow of ideas and opinions is imperative to gather the most information from the interaction. Some general questions that might be tailored include:

- What are your current problem solving efforts?
- How do you currently use data for statistics and mapping?
- What types of analysis and mapping might help you do your job better?
- How can crime analysis and mapping help other areas of the agency?

Individuals from various positions in an agency can be interviewed, such as the chief of police, an officer working the midnight shift, a communications supervisor, and a front desk receptionist. All of these individuals, whether they know it or not, have experience with needing or providing crime analysis and mapping information to others, and they can offer different perspectives to the needs assessment. Although this process may appear time-consuming, it will prove to be valuable in that it will also develop organizational support for crime analysis and mapping. If individuals feel they have been included in the developmental stages, they are more likely to feel that they have a stake in the results of the needs assessment and subsequent implementation. They are also more likely to contribute to and make use of the information that crime analysis and mapping provide because it will be formulated partially from their input.

Not only is it important to talk to people, but it is also important to see what their jobs entail and how they can use crime analysis and mapping information, as observation may produce new insights to crime analysis and mapping needs. “Ride-a-longs” are an effective method for seeing how individuals work. Although “ride-a-longs” typically entail accompanying a police officer in the car during a shift, there are many types of “ride-a-longs” that may be valuable in a needs assessment, e.g. “ride-a-longs” with patrol sergeants, dispatchers, 911 operators, detectives, records clerks, and even the police chief. In addition to determining what these individuals' jobs entail, “ride-a-longs” also afford an opportunity to inform them about how crime analysis and mapping can assist them. Some issues to consider while on a “ride-a-long” with an individual, no matter what his/her position might be:

- Does the person produce data that can be used by crime analysis and mapping?
- What is the quality of the data?





- How does the person utilize data and analysis to do his/her job?
- What crime analysis and mapping information would be most helpful in his/her everyday work?

Finally, attending meetings and briefings is another effective method of obtaining informal information. Crime analysis and mapping may not be specifically discussed at a meeting, but the meeting can provide general information on the goals and expectations of individuals and the agency, which may help to identify underlying crime analysis and mapping needs. For instance, by attending a meeting with detectives, it can be determined if information on recent crime trends and patterns may assist them.

### *Formal*

One formal method for soliciting input from members of a law enforcement agency is through a crime analysis and mapping “user committee,” which is a group of individuals convened to discuss crime analysis and mapping needs. Oftentimes, group interaction can lead to the development of ideas different from what any one person could suggest. Two types of committees can serve this purpose: a committee of law enforcement personnel and a committee with a combination of law enforcement personnel and representatives from other relevant groups.

In the first type of committee, representatives from various divisions and job functions in the law enforcement agency can sort out the possible crime analysis and mapping needs. Many times, officers are considered the primary resource for information about crime analysis and mapping needs; however, call takers, dispatchers, receptionists, crime prevention personnel, and records clerks may also be valuable resources. These individuals not only provide useful information concerning the crime analysis and mapping needs of the agency, but they also bring several different perspectives to the committee based on their knowledge, experience, and job functions.

In the second type of committee, external representatives may include district attorneys, probation/parole officers, members of neighboring law enforcement agencies, school officials, community leaders, community members, and city government employees. This type of committee is important not only in assessing needs and determining additional resources, but also for tapping into a variety of perspectives about policing and crime analysis. For example, it may be useful to include representatives from the city planning and development office, as they may be able to provide information about new building permits and detailed maps that would assist in determining the impact of new building projects on police staffing levels, calls for service, and crime.

The committee comprised of law enforcement personnel can be conducted first to gauge the needs and opinions of law enforcement personnel before opening the discussion to the larger community. These individuals may also participate in the committee that includes individuals from groups external to the law enforcement agency.

Another formal method of soliciting input on crime analysis and mapping needs from members of an agency is through a survey. The survey can be distributed through inter-office mail or through e-mail. Because this is a needs assessment survey, not a





survey to produce statistical results, the majority of the questions may be open-ended, allowing respondents greater freedom to discuss their opinions. The following are some very general questions:

- Do you know what crime analysis and crime analysis mapping entails? If so, explain. (To determine if training is needed)
- What types of information are you aware of that can be used for crime analysis and mapping? (To determine available/potential data sources)
- Do you currently conduct crime analysis/use crime analysis information? (To determine if crime analysis is conducted and/or used)
- How can crime analysis and crime analysis mapping assist you in your current position? (To determine needs)

As the needs assessment may address an agency's specific area of interest (strategic goals), more specific questions may also be included in the survey. The following are more specific sample questions that may be directed towards a group of people such as a patrol division or a particular project such as a special problem solving detail:

- Is there a particular report of crime analysis information or a map that would be helpful to you on a weekly basis? Monthly basis? If so, please describe.
- What types of information not currently available would be most helpful to you?
- Is there a report that would help inform the progress of your project?
- How are you evaluating the project?

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### *Summary*

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The information gathered in the crime analysis needs assessment of a law enforcement agency contains both objective and subjective information garnered through various methods and from many different individuals. These types of information are important to determine the current status of crime analysis and mapping and in identifying the future needs of the agency. This information can then be used to develop an overall plan of implementation and/or revitalization of crime analysis and mapping. Thus, the next section of this report, "Developing an Action Plan," describes the process by which the information from the needs assessment is analyzed to determine how crime analysis and mapping should be operationalized within the agency.

As noted earlier, this process of determining data sources, technology, and current uses and needs can be useful for developing baseline measures for evaluation. Discussion of using needs assessment information in the evaluation process is discussed in the last section of this report, "Evaluation of Crime Analysis and Mapping."

On the following page is a list of tasks to be completed and information to be collected during the needs assessment. It is included here to be used as a checklist for the needs assessment process.





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## *Needs Assessment Checklist*

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*The following is a list of information to be collected as part of the needs assessment. The intent of this list is not to be an outline of the previous section, but to be used as a checklist during the process.*

- ❖ Current State of Affairs
  - In the academic community
    - Literature review of academic books and articles
    - Attending conferences
    - Internet search
  - In the law enforcement community
    - Literature review of practical books and magazine articles
    - Talking to other agencies conducting crime analysis and mapping
    - Attending conferences
    - Attending training
    - Police department site visits
    - Internet search
  - In the specific agency that is being assessed (see below)
  
- ❖ Strategic Goals
  - Of the agency as a whole
  - Within specific divisions
  - Within small work groups
  
- ❖ Data Sources
  - Current internal data sources
    - Types
    - Data format
    - Location
    - Accessibility
    - Timeliness
    - Data integrity
  - Current external data sources
    - Types
    - Data format
    - Location
    - Accessibility
    - Timeliness
    - Data integrity
  - Potential internal data sources
    - Types
    - Data format
    - Location
    - Accessibility







- Timeliness
- Data integrity
- Potential external data sources
  - Types
  - Data format
  - Location
  - Accessibility
  - Timeliness
  - Data integrity
- ❖ Technology
  - Current technology
    - Hardware
      - ✓ Quantity
      - ✓ Quality
    - Software
      - ✓ Quantity
      - ✓ Quality
  - Potential technology
    - Hardware
      - ✓ Quantity
      - ✓ Quality
    - Software
      - ✓ Quantity
      - ✓ Quality
- ❖ Current Crime Analysis and Mapping Products and Their Uses
  - Determine products produced in the agency
  - Determine data sources used for each product
  - Determine who formulates the products and how
  - Determine who utilizes the products and how
- ❖ Crime Analysis and Mapping Needs
  - Informal methods of obtaining information
    - Talking to/interviewing individuals
    - Conducting “ride-a-longs”
    - Attending meetings and briefings
  - Formal methods of obtaining information
    - User committees
      - ✓ A committee of law enforcement personnel
      - ✓ A committee with a combination of law enforcement personnel and representatives from other relevant groups
    - A survey





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### III. Developing an Action Plan

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To make the leap from needs assessment to implementing crime analysis and mapping, the information obtained from the needs assessment must be analyzed, prioritized, and operationalized. One way to do this is by developing an action plan. An action plan is a written document that outlines the various functions, resources, and goals of crime analysis and mapping for a particular agency. The process of developing an action plan includes bringing a group of individuals together to formulate the action plan.

One of the key benefits of developing an action plan collectively is that individuals from various levels and areas of the law enforcement agency have the opportunity to provide comments and criticism, to help prioritize goals and objectives, and to afford both credibility and accountability to the process. That is, the crime analysis and mapping action plan is not a report that comes from one person but from the agency itself, making members of the agency responsible for developing the plan and carrying it out.

An action plan may be formulated as a guide either for agencies just implementing crime analysis and mapping or for agencies that have already instituted crime analysis and mapping yet lack an explicitly stated course of action. The following are components of a crime analysis and mapping action plan that will be discussed in this section:

1. Structure
2. Functions
3. Data issues
4. Technology
5. Training/promotion
6. Policies and procedures
7. Short-term and long-term goals

The intention of this section is to provide a framework for developing an action plan. The categories are described generally, as the contents of a particular action plan will depend on the characteristics of a particular agency. Importantly, an action plan is not static, but rather a dynamic document that will be adjusted as an agency changes. In addition, an action plan not only describes the immediate expectations, it also anticipates future needs.

#### *Structure*

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The structure of crime analysis and mapping in a law enforcement agency includes 1) who conducts crime analysis and mapping, 2) what their duties are, and 3) where they are located in the organization both in the chain of command and geographically.

An agency may decide to reassign officers or other law enforcement personnel, hire individuals specifically to conduct crime analysis and mapping, or a combination of





both. Some agencies do not have the resources to add a new position of crime or GIS (Geographic Information Systems) analyst and will assign internal personnel to conduct crime analysis and mapping. Other agencies may decide to partner a civilian employee hired specifically to conduct crime analysis and mapping with an officer on special detail. In either case, an action plan will outline the current practice and may include future goals for new positions to be added or changed.

This section of the action plan will also outline each individual's job responsibilities. For example, an agency may hire two individuals to conduct crime analysis and mapping and choose one of the individuals based on crime mapping skills. In this case, the action plan may outline that one of the two persons will be primarily conducting crime mapping whereas the other may be conducting other crime analysis duties such as staffing analysis or surveys. In addition, the roles of different individuals may be described, e.g. a supervisor, an analyst, a clerk, or a volunteer. Depending on the expectations of the agency, the action plan may also include more specific information such as individuals' work schedules.

The third part of the structure section of the action plan details where individuals conducting crime analysis and mapping are placed both organizationally and geographically. There are two considerations in organizational placement of crime analysis and mapping, the first is within the organizational chart and the second is what level of the chain of command.

Determining where to place the crime analysis and mapping function within an organizational chart depends on how it will be carried out. For example, if the focus is on short-term pattern recognition and investigation, crime analysis and mapping may be placed within the investigations bureau. However, if the focus is on long-term problem solving, a placement in the patrol division may be reasonable. It is important to consider that crime analysis and mapping will largely be influenced by the goals and objectives of the division to which they are assigned. Because of this, some agencies have housed their crime analysis and mapping functions in a neutral division such as support services or administration.

Placing crime analysis and mapping within the chain of command is important because it can affect credibility and resources. Thus, individuals conducting crime analysis and mapping should not be buried within the organization. The fewer the number of steps between those individuals conducting crime analysis and mapping and the chief of police of the organization, the higher priority, responsibility, and respect that can be achieved. For example, individuals conducting crime analysis and mapping request to receive the police reports on a timelier basis. Assuming that other informal methods of procuring them have been unsuccessful, the request must go up the chain of command. Going through five or six levels to the chief versus two or three would significantly impact whether or not the change occurs as well as the time it takes to achieve the goal.

The geographic placement of individuals conducting crime analysis and mapping should also be included here. This refers to the physical placement of individuals' offices. Geographic placement should be made considering the accessibility of crime analysis and mapping to both line level patrol and investigative officers as well as to administrative personnel. Of course, this also depends on the focus of the crime analysis





and mapping functions. In fact, geographic placement can sometimes be more important than organizational placement, e.g. officers may not care who conducts crime analysis and mapping as long as it is accessible to them.

Geographic placement can produce a negative result of the effectiveness of crime analysis and mapping, i.e. “out of sight, out of mind.” If an individual’s office is in a sparsely occupied basement or is located across the hall from the chief or internal affairs, officers and sergeants, primary crime analysis and mapping customers, may not stop in. Thus, the ideal location is close to line-level personnel, as they may not be as likely to seek out the function.

Another issue having to do with geographic placement occurs when there is more than one person conducting crime analysis and mapping and whether to have them in a central office or to decentralize their offices among different physical locations. There are solid arguments on both sides of this issue, and invariably, the decision depends on the nature of the agency and how crime analysis and mapping are operationalized.

The argument for keeping individuals working in the same office or area is that they will work together, be aware of one another’s work, exchange ideas, and can be more innovative than if they work by themselves. Another argument is that there is a “united front” to handle issues and individuals who challenge crime analysis and mapping. If individuals are separated, they may have less power and other law enforcement personnel can more easily have them doing “their work” which may not even be related to crime analysis and mapping, e.g. typing letters, writing staff reports, developing brochures, printing non-crime analysis charts and graphs, etc.

On the other hand, the argument for decentralization is that the individuals can be accessible and work hands on with the officers in the field. In other words, there is a “crime analysis and mapping presence” throughout the smaller divisions of an agency. Weekly and/or monthly meetings, as well as technology (e-mail and phone), can allow the individuals performing crime analysis and mapping to maintain constant contact with one another. Nonetheless, this issue is primarily contingent on the demands of an individual agency and the qualifications and capabilities of individuals conducting crime analysis and mapping.

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## ***Functions***

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The functions outlined in the action plan refer to how crime analysis and mapping will proceed. For instance, if the needs assessment of an agency indicates that problem solving is a strategic goal and a high priority, the crime analysis and mapping function may be tailored to provide statistics and maps to assist with the problem solving process. The possible functions of crime analysis and mapping in a law enforcement agency are largely dependent on the characteristics of a particular agency such as budget, size, purpose, etc. and the results of its needs assessment. The following are a few general examples of the functions crime analysis and mapping can serve in a law enforcement agency:

- An agency with 20 officers may focus their crime analysis and mapping efforts towards identifying hotspots/patterns of activity and intelligence information versus conducting statistical analysis of their data.





- A larger agency may choose to deploy individuals to conduct crime analysis and mapping at the division level to help with specific problem identification, analysis, and assessment.
- An agency may utilize crime analysis and mapping only for special task forces or particular issues such as robbery, auto theft, etc.
- An agency may carry out crime analysis and mapping primarily for administrative purposes, e.g. staffing analysis or long-term forecasting of crime and calls for service.
- An agency may have several individuals who conduct numerous types of crime analysis and mapping such as short-term pattern identification, problem-solving analysis, and preparing administrative reports.

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### *Data Issues*

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This part of an action plan includes an overview of the data available for crime analysis and mapping purposes and how these data can be accessed. This information comes from the needs assessment and may also contain a wish list of data sources such as updated map files, computerized citation information, probation and parole information, or an extra variable in the records management system that would denote whether the crime was a domestic violence case. In addition, the action plan may include problems or integrity issues with relevant and potential data sources in addition to possible remedies (if known).

Many law enforcement agencies' older computer aided dispatch systems and records management systems were not developed with the intent of accessing and analyzing data. Thus, this section of the action plan may need to be lengthy and specific in order to outline the problems with these systems and potential remedies. For example, an agency with a records management system incapable of exporting data may need to include acquiring that capability in the crime analysis and action plan. However, it is more important to detail how the data will be exported and the specific variables included in this particular section of the action plan. In another case, an agency may not have a functioning records management system and thus needs to detail how data will be collected and warehoused.

One of the most important issues for crime analysis and mapping is acquiring data (whenever possible, in electronic format), obtaining data with minimal integrity issues, and on a timely basis. This is not an easy task, but documenting the issues is part of the solution. Not all of the data integrity issues will be apparent at the creation of the action plan, but since it is a fluid document, they can be added as they are found. The following chart is an example of the types of data sources, variables, and content of a chart that would be included in the data section of the action plan. The chart's content and length will vary for each agency.





**Crime Analysis and Mapping Action Plan: Current and Potential Data Sources Chart**

Data Source	Format	Availability/Location	Timeliness	Variables Included	Integrity Issues	Remedies
Calls for Service	ASCII dump	Downloaded by I.T. personnel	Monthly	Incident number Type of call Disposition code Location Received date/time Dispatched date/time <i>More...</i>	Addresses not standardized Data not timely Duplicate calls included <i>More...</i>	Central geographic database Obtain direct access to data Take out duplicate calls <i>More...</i>
Crime	Paper format	Copies from Records Bureau Located in individual file folders	Same day as report was written	Incident number Type of crime Location Report date Disposition code <i>More...</i>	Not available electronically Hand written, hard to read Missing copies? <i>More...</i>	Create database and enter data Encourage readability Determine paper flow <i>More...</i>
Field Information	Written on Cards	Copies from Officers Cards deposited in Briefing Area	Same day as card was written	Location Type of incident Contact person informati <i>More...</i>	Not available electronically Hand written, hard to read Missing copies? <i>More...</i>	Create database and enter data Encourage readability Determine paper flow <i>More...</i>
Probation Information	Not currently available	From Probation Department	Unknown	Individual description Residence Place of work Social Security # <i>More...</i>	Updated regularly? Timeliness <i>More...</i>	Ask about updating procedures Direct download <i>More...</i>





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## *Technology*

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This part of the action plan describes the technology that is currently available for conducting crime analysis and mapping and outlines immediate and future technological needs. Technology may refer to types of hardware and software needed to conduct crime analysis and mapping, and it may also refer to technology needed to enhance crime analysis and mapping, such as an interface to the records management system that allows data query and download capabilities. An action plan may include a projection of technology needs for the coming years. Many times in a public organization, it takes a significant amount of time to obtain resources. However, since technology changes so quickly, long-term requests may be more general than the immediate requests to allow more advanced technology to be specified as it becomes available. Technology needs for the future may also be dependent on new personnel and may coincide with future personnel forecasts.

The following are some technological products that can be used depending on the structure and function of crime analysis and mapping in an agency:

### Hardware:

- High-end personal computer with the ability to conduct advanced statistical analysis, load and manipulate images, multi-task, and handle large amounts of data.
- Laptop (for presentations and work in the field)
- Projector (for presentations)
- Laser printer
- Color printer
- Plotter printer
- Scanner
- Server space to save large amounts of data and for continual backup of data

### Software:

- Word processing software
- Spreadsheet software
- Statistical software
- Geographic information systems software
- Database manager software
- Presentation software
- Graphics software
- Internet and e-mail software
- Agency specific records management software







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## *Training/Promotion*

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Training needs for the individuals conducting crime analysis and mapping can be forecasted for at least two years. It is recommended to include all relevant crime analysis and mapping training courses in hopes of being funded for a select few. In doing so, the training course may be ranked by importance to give supervisors and those in the budget process an idea of what is a higher priority. Since training is not always posted this far in advance, funds can be requested for additional training courses as they arise.

The following are some Web sites that may be helpful in researching crime analysis and mapping training (not an exclusive list):

- Office of Community Oriented Policing Services: [www.usdoj.gov/cops](http://www.usdoj.gov/cops)
- Police Foundation: [www.policefoundation.org](http://www.policefoundation.org)
- Crime Mapping Research Center: [www.ojp.usdoj.gov/cmrc](http://www.ojp.usdoj.gov/cmrc)
- Crime Mapping and Analysis Program: [www.nlectc.org/nlectcrm/cmaptrain.html](http://www.nlectc.org/nlectcrm/cmaptrain.html)
- International Association of Crime Analysts: [www.iaca.net](http://www.iaca.net)
- MapInfo Corporation: [www.mapinfo.com/events](http://www.mapinfo.com/events)
- ESRI: [www.esri.com/events](http://www.esri.com/events)
- The Alpha Group Center for Crime and Intelligence Analysis Training: [www.alphagroupcenter.com/index2.htm](http://www.alphagroupcenter.com/index2.htm)
- Carolina Institute for Community Policing: [www.cicp.org/](http://www.cicp.org/)
- ACT NOW, Inc.: [www.actnowinc.org](http://www.actnowinc.org)

Promotion refers to educating individuals in a law enforcement agency about the value, the specific capabilities, and the successes of crime analysis and mapping itself. Promotion includes taking the information from the action plan that describes data, reports, and procedures of crime analysis and mapping and disseminating it to members of the department. For example, if information request procedures are such that there is a two-day turn around on requests and this policy has been advertised throughout the agency, an officer or administrator will know not to expect an immediate response to a request.

It is important to include how crime analysis and mapping will be promoted in the action plan. For instance, some law enforcement administrators may be wary of the Internet and publishing information on a Web site. If the use of the Internet to publish certain crime analysis and mapping information to the public is written into and agreed upon in the action plan, the debate about using the Internet can occur *before* instead of *as* the process is being implemented. This will save valuable time in the future and serve to further legitimize the crime analysis and mapping function within the agency.





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## *Policies and Procedures*

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The action plan may include an initial set of policies and procedures to guide both those conducting as well as those utilizing crime analysis and mapping. A policy refers to a set of rules for those utilizing crime analysis and mapping products, e.g. a citizen request policy that outlines how citizens can request crime analysis and mapping information. A procedure refers to the internal methodology of conducting crime analysis and mapping, e.g. the steps of conducting an annual resource allocation study from data collection to statistical analysis to presentation of results.

Policies and procedures may vary by agency according to reasons such as political climate or an agency's mission. Within an agency, the crime analysis policies and procedures may change or be added over time as the characteristics of the agency and process of analysis evolve. A discussion of policies and procedures is particularly relevant in a law enforcement agency that is just implementing crime analysis and mapping, as many of the policies and procedures will not yet be developed.

The following are some types of policies and procedures that might be kept:

### Policies:

- Citizen/business request policy
- Media request policy
- Release of information policy
- Internet posting policy
- Internal request policy
- Other government agency request policy

### Procedures:

- Annual citizen survey methodology
- Monthly crime bulletin methodology
- Staffing analysis methodology
- Annual report methodology
- Monthly crime and calls for service maps methodology
- Dissemination of information methodology
- Data entry methodology
- Data cleaning methodology

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## *Short-Term and Long-Term Goals*

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Short-term goals provide immediate direction for the crime analysis and mapping function whereas long-term goals offer overall direction and facilitate planning. Together, these encompass an overall strategy and set of expectations to fulfill the needs of the law enforcement agency and are crucial to the action plan. As an agency evolves and changes, so will the goals and expectations. For this reason, it is important to adhere to these goals but also have flexibility in adapting them to new situations. The process of





developing the action plan and bringing in various individuals from throughout an agency will help to develop and prioritize goals.

Short-term goals primarily address what is to be accomplished within the first year of the action plan. Examples of short-term goals that an agency first implementing crime analysis and mapping may have are:

- Purchase two new computers
- Hire a crime analyst
- Attend introductory crime analysis and/or mapping training
- Gain access to electronic crime data currently not available
- Produce monthly reports based on the crime data
- Obtain feedback from users at six month and one year intervals

These examples are fairly general and may be written into an action plan more specifically, but they are realistic and important goals to outline in an agency without crime analysis and mapping capabilities.

In an agency that has an established process of crime analysis and mapping, short-term goals may include:

- Hire an additional crime analyst specializing in geographic information systems
- Purchase upgrade of statistical software
- Improve data integrity of electronic crime data
- Conduct two site visits at other agencies to learn new ways of conducting crime mapping and analysis

As noted earlier, the action plan is a fluid document, which is apparent in including short-term goals. If short-term goals address one year, the action plan will need to be revisited at least that often. Consequently, not only will subsequent action plans include new short-term goals, but also including the successful fulfillment of the goals may help to demonstrate that implementing crime mapping and analysis was a worthwhile endeavor.

There are two types of long-term goals. One type addresses issues that will take longer than a year to complete. For example, an agency might include long-term goals such as:

- Hire three new crime analysts over the next three years
- Implement a crime analysis and mapping Intranet application by which all officers can access and query information
- Obtain 2000 Census information and incorporate it into crime analysis reports and mapping
- Obtain funding from the Federal Government for a specific study
- Write an article about crime analysis to be published in a practical journal or newsletter





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Another type of long-term goal is one that has no specific date of completion but is a general theme about how the action plan will be carried out. Examples of this type of long-term goal are:

- Provide excellent customer service to internal law enforcement employees and external customers
- Keep up-to-date on the state of crime analysis and mapping in the academic and law enforcement communities
- Continually work with other city departments and neighboring jurisdictions to improve crime analysis and mapping in the agency
- Attend available training and conferences whenever possible

### *Summary*

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Because the intention in this section is to provide a framework for creating an action plan, specific content of each category was not covered. The goal is to provide an outline, examples, and a structure to the process of taking information from the needs assessment and reformulating it into an action plan in order to implement crime analysis and mapping in a law enforcement agency.

On the following page is a list of what the action plan should contain. It is included here to be used as a checklist for creating an action plan.





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## *Action Plan Checklist*

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*The following is a list of information to be collected as part of the development of an action plan. The intent of this list is not to be an outline of the previous section, but to be used as a checklist during the process.*

- ❖ Structure
  - Who conducts crime analysis and mapping
    - Number of personnel
    - Type of personnel (civilian, officer, etc.)
    - Job duties of personnel
    - Various roles of personnel
  - Location of individuals
    - Within the organizational chart
    - Within the chain of command
    - Geographically
      - ✓ Physical placement of individuals' offices
      - ✓ Central office or decentralized offices
  
- ❖ Function: how crime analysis and mapping will be conducted
  - Budget
  - Size
  - Purpose of the agency
  
- ❖ Data Issues
  - Current internal data sources
    - Types
    - Data format
    - Location
    - Accessibility
    - Timeliness
    - Data integrity
  - Current external data sources
    - Types
    - Data format
    - Location
    - Accessibility
    - Timeliness
    - Data integrity
  - Potential internal data sources
    - Types
    - Data format
    - Location
    - Accessibility
    - Timeliness





- Data integrity
- Potential external data sources
  - Types
  - Data format
  - Location
  - Accessibility
  - Timeliness
  - Data integrity
- ❖ Technology
  - Current technology
    - Hardware
      - ✓ Quantity
      - ✓ Quality
    - Software
      - ✓ Quantity
      - ✓ Quality
  - Potential technology
    - Hardware
      - ✓ Quantity
      - ✓ Quality
    - Software
      - ✓ Quantity
      - ✓ Quality
- ❖ Training/Promotion
  - List of possible training
  - Prioritization of training opportunities
  - How crime analysis and mapping will be promoted
- ❖ Policies and Procedures
  - List of Policies
  - List of Procedures
- ❖ Short-Term and Long-Term Goals
  - List of short-term goals
  - List of long-term goals
    - Long-term goals to take more than one year
    - Ongoing long-term goals





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## IV. Evaluation of Crime Analysis and Mapping

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Assessing crime analysis and mapping needs is the first step in implementing crime analysis and mapping in a law enforcement agency. Part of assessing needs is obtaining information that can later be used as baseline measures for an evaluation of crime analysis and mapping. Baseline measurement information is a set of measures taken at a particular point in time to which a set of measures taken at later points in time, called evaluation measures, is compared. Baseline measures are analogous to the pre-test of an experimental design while evaluation measures are analogous to the post-test. This entire process makes up the evaluation.

There are two parts to evaluating any program, one is evaluating the process of the program, and the other is evaluating the impact. The process refers to how the program is administered, and the impact refers to whether it fulfills its intended purpose. Because the crime analysis and mapping function is one of many functions that support police operations' decision making and the problem solving processes, it is difficult to isolate the impact of crime analysis and mapping to conduct an evaluation. In this section, the evaluation measures for crime analysis and mapping apply more to evaluating the process of crime analysis and mapping than to evaluating its direct impact although measures of both are discussed.

There are several reasons to evaluate crime analysis and mapping in a law enforcement agency. One reason is to provide an internal mechanism for monitoring the progress of the function of crime analysis and mapping and the individuals conducting it. More specifically, this type of evaluation may focus on the action plan to see if it has been implemented as intended and if the goals have been achieved. The results of the evaluation may be used to modify the action plan and possibly change or improve internal processes of crime analysis and mapping in an agency.

Another reason for evaluation is to assess the process and impact of crime analysis and mapping within the agency. Evaluation of the process may refer to how products are distributed and the availability of individuals conducting crime analysis. The impact may refer to the usefulness of crime analysis and mapping within the agency in specific instances such as identifying a crime pattern that leads to the capture of a suspect or a report that was used to identify specific problems at a particular location.

Lastly, a global reason to evaluate crime analysis and mapping in law enforcement agencies is to evaluate how particular agencies' crime analysis and mapping function compare to others and have contributed to the overall discipline of crime analysis and mapping. The results may be used as part of assessing the value of crime analysis and mapping as a general practice in law enforcement and subsequently, its role in improving policing overall.

In sum, this section of the document lays out a number of process and impact measures that may be gathered for an evaluation of crime analysis and mapping. The intention here, as in the two previous sections, is to provide a general overview. For the sake of brevity, this section does not cover the specific contents of what the evaluation might contain or how to evaluate an agency's specific information. The types of information discussed may not be exclusive of what can and should be collected in an







evaluation of crime analysis and mapping, since the information will depend on the agency, the information that is available, and the reason for the evaluation.

Consequently, this section includes a discussion of:

1. Comparative information--general information about an agency and the jurisdiction it serves
2. Baseline and evaluation measures--how and when they might be gathered;
3. Process evaluation measures
4. Impact evaluation measures
5. Satisfaction measures of both process and impact of crime analysis and mapping

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### *Comparative Information*

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Comparative information is obtained from the information about the current state of affairs collected during the needs assessment. This type of information refers to basic quantitative information that reflects the overall characteristics of a law enforcement agency and its jurisdiction at a certain point in time and can be analyzed fairly easily. By obtaining this type of information as baseline and evaluation measures, data collected about crime analysis and mapping can be placed in the context of the current state of affairs. For example, if the number of people conducting crime analysis and mapping has stayed the same over a five-year period, but the population served and the number of sworn officers has doubled, comparing the ratio of individuals conducting crime analysis and mapping by population at different times may illuminate the evaluation of the effectiveness of crime analysis and mapping in that agency.

In the case of evaluating crime analysis and mapping as it relates to the overall discipline, measures of the current state of crime analysis and mapping in other agencies and in relevant literature may also be considered. The following comparative information can be collected:

- Population served by the law enforcement agency
- Number of square miles served by the law enforcement agency
- Number of sworn personnel in the law enforcement agency
- Number of civilian personnel in the law enforcement agency
- Number of crime analysis personnel in the law enforcement agency
- Number of crimes and crime rate per population
- Number of calls for service and calls for service rate per population
- Overall budget of the law enforcement agency
- Number of crime analysis and mapping units in law enforcement agencies throughout the US and internationally (for comparison with other crime analysis and mapping functions)
- Number of books, articles, organizations, or Web sites dedicated to crime analysis and mapping (for comparison with other crime analysis and mapping functions)





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## ***Baseline Measures***

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One of the most important and difficult parts of evaluation is obtaining baseline measures. In a law enforcement agency that has not implemented crime analysis and mapping, knowing what to record and measure about something that does not yet exist is difficult. However, collecting baseline measures is a natural fit with conducting a needs assessment, as the needs assessment is a comprehensive look at most of the factors related to crime analysis and mapping even if they do not yet exist.

In law enforcement agencies where crime analysis and mapping already exist, the baseline measures can come from the agency's "institutional memory" which refers to formal sources, such as statistical and administrative reports and informal sources, such as the memories of individuals. Even though these sources may not be entirely accurate, as reports may be inconsistently created and people tend to forget information over time, this is the most practical method of obtaining information about crime analysis and mapping before the function existed.

Another possibility for collecting baseline measures in an agency that has already implemented crime analysis and mapping is to select a point in time and collect the information at that time as baseline measures, i.e. use the current status of crime analysis and mapping as the baseline measure and evaluate at a later time. In addition, this process is relevant to evaluating crime analysis and mapping over a longer period of time, as it may be helpful to compare one year to the next instead of comparing each subsequent year to the original baseline measures.

In an evaluation, most types of information are collected both as baseline measures and as evaluation measures. As mentioned earlier, baseline measures, whether they are taken before or after implementation of crime analysis and mapping, are taken at one point in time. However, evaluation measures will be collected throughout the evaluation period, but analyzed at one point in time. For example, information on how many requests and the time taken to complete each request needs to be stored and kept as the requests are being completed. It is not realistic to obtain this kind of information at the end of the evaluation period if no record is kept; thus, a system of recording this as well as other information has to be developed for the evaluation.

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## ***Process Evaluation Measures***

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Process evaluation measures include types of information that address the administration and resources of crime analysis and mapping. In general, these fall into four categories: personnel, technology, data resources, and crime analysis and mapping products. Thus, process evaluation focuses on who is conducting crime analysis, what technology and data they are using, and what they are producing. The process evaluation measures may include both the quantifiable characteristics as well as the quality of those characteristics. An example of a quantifiable process evaluation measure may be that an agency has two computers dedicated to crime analysis and mapping. The quality of that measure may be types of computers, the processor speed, etc.





## *Personnel*

Various characteristics of personnel are important in the evaluation of crime analysis and mapping. Obviously, before an agency implements crime analysis and mapping, there may be no one formally conducting crime analysis and mapping; however, there may be individuals conducting crime analysis and mapping informally; that is, on a part-time or ad hoc basis in addition to their normal job duties. The number of people and more importantly, the average number of hours spent conducting crime analysis and mapping per week either formally or informally can be collected as baseline and evaluation measures.

In addition, the type of analysis conducted as well as each individual's job title, education, and training may be collected as indicators of the quality of personnel. These are not perfect measures in that someone with a certain degree may not conduct crime analysis and mapping better than someone without that degree, but it is a simple indicator of the difference in the quality of personnel.

For example, before implementation of crime analysis and mapping, a sergeant in patrol may have spent an average of four hours per week preparing basic crime analysis information for the agency. A year after crime analysis and mapping are implemented, there might be two designated crime analysts who each spend forty hours a week conducting crime analysis and mapping. The quantitative information shows an increase of seventy-six hours per week of time devoted to crime analysis. The measures of quality of personnel show that the individuals conducting crime analysis and mapping have training and education specific to that purpose.

## *Technology*

Technology is an important tool used in the process of crime analysis and mapping as it can affect the quantity and quality of crime analysis and mapping products and the efficiency of their production. Currently, technology drives many of the advances and capabilities in crime analysis and mapping. In evaluating technology, one may count the number of, types of, and the quality (speed, memory) of hardware used. The types of hardware range from computers and scanners to printers and plotters. One can also record the number, names, versions (3.0 or 6.9) and types of software programs used such as Windows98®, Microsoft Word®, Microsoft Excel®, Statistical Package for the Social Sciences (SPSS)®, ArcView®, MapInfo®, etc.

Using technology efficiently and effectively is critical to the success of crime analysis and mapping and thus may also be evaluated. For example, years ago, reports were done by running statistics, printing them out, and typing them with a typewriter into a form for publication, as technology did not exist to bridge the gap between processes. With the advent of Windows® technology, the ability to share information among various formats has improved significantly, allowing users to copy and paste the numbers into an electronic form for publication. Most recently, technology has advanced to the point where users who are not necessarily computer programmers can create a program, often called a "macro" or a "script" that can access data, run the statistics, and produce the report or map, all in a matter of minutes.





## *Data Sources*

Quantifiable characteristics of data sources used in crime analysis and mapping may include a number of different measures. The first is the number and types of data sources, e.g., an agency may over time obtain access to three additional data sources, which may be traffic accident data, citation data, or census data. A more specific quantifiable measure is the number of variables in each data source. For example, an agency may have hand written reports from which a few selected variables, such as date, type of crime, and address, are entered into a computer system for crime analysis and mapping purposes. However, later in time, the agency may implement an automated report writing software program that allows analysis of all variables in the report.

Secondly, both how data are accessed and the length of the process it takes to access the data are quantifiable measures of data sources. For example, data may be in paper or electronic format or they may be accessed through a network or through a mainframe system. In addition, the data may be accessed directly or the process of accessing the data may involve several steps such as data entry, downloading, and/or cleaning.

Thirdly, timeliness of the data is a quantifiable measure and refers to how often the data are available. For example, at the end of the day, all the calls for service are dumped into a directory for others to access. The data can be accessed with a maximum delay of 24 hours. Timeliness of data is an important factor in crime analysis and mapping, as having data that are out-of-date can be detrimental to the process of conducting crime analysis and mapping.

The quality of data sources is more difficult to measure. Oftentimes, the baseline measures will not provide adequate information about the quality of data sources, especially if the data have never before been used for crime analysis and mapping. Data integrity, which is the consistency and accuracy of the data, is the key indicator of the quality of data. An example of data consistency might be various people coding a location type of a mobile home trailer as an apartment, a trailer, or a single family home. An example of data accuracy might be if a commercial location changes its name from Pizza Hut to Dominos, but the computer aided dispatch database does not capture the change.

## *Products*

Evaluating the quantity and quality of products produced by individuals conducting crime analysis indicates how well the processes of crime analysis and mapping are being conducted. In an agency that is implementing crime analysis, there may be few products to observe as baseline measures. However, in evaluating crime analysis and mapping over several years, the number and quality of products may change and grow over time as processes change; recognizing this is one of the goals of conducting an evaluation.

The quantity of crime analysis and mapping products can be measured by looking at the number of standard products such as daily, weekly, monthly, and annual reports





and maps, the number of ad hoc reports completed, and the number of other types of reports/studies produced. It is important not only to record the number of products, but also the amount of time it takes to complete the products. Recording the time to complete the product is a quantitative, albeit simplistic, way to determine the complexity and/or difficulty of the report.

There are several ways in which to document the quality of a crime analysis or mapping product. There is the quality of presentation, content, and relevance to its purpose. The types of information that can be gathered are:

- Presentation/format: color, black and white; tables, charts, graphs, maps, photos
- Content: detail of the information, explanation of information/disclaimers
- Purpose: reason for the product
- Relevance: does the product satisfy its purpose

The presentation/format refers to the “look and feel” of the product. It is important to the reader’s ability to understand and glean the necessary information. On the one hand, there is the importance of color in distinguishing between two points on a map, but there is also the difference between whether information is presented in a table, a graph, a map, or all three. A graph can allow the reader to easily distinguish between values, a table gives the actual values, and a map will spatially display the information. Since crime analysis and mapping information is developed considering the data, the purpose of the product, and the estimated skill level of the audience; thus, they may be evaluated based on these aspects.

The content of crime analysis and mapping products refers to characteristics such as the level of detail that is included, the type of information, and explanation of the information. For example, it may be important to note in a report that the crimes listed only include certain types of crimes and does not include all reported crimes. If the reader assumes all crime is included, significant errors of judgment may be made. The purpose of crime analysis and mapping products must also be taken into consideration during the process evaluation. Each crime analysis product should have a clear purpose and should effectively meet the needs of the request.

### ***Impact Evaluation Measures***

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As noted earlier in this section, the impact that crime analysis and mapping have on overall decision-making and problem solving is indirect and difficult to measure; therefore, usefulness of crime analysis and mapping products to those decision makers and problem solvers is the best way to evaluate the impact. This part of the evaluation changes the focus to the users of the information and begs the question “Was the information useful?” Although this measure depends on the perceptions and capabilities of the users of the information and not on the crime analysis and mapping functions, it is the most practical way of measuring the impact of crime analysis and mapping.

Evaluation of the usefulness crime analysis and mapping information can be conducted in several ways. The first is through a survey of the customers who request





and use crime analysis information. Questions that might be asked that directly relate to the usefulness of crime analysis and mapping information are:

- Overall, is crime analysis and mapping information useful to you?
- How is the crime analysis and mapping information useful to you?
- How have the following products been useful to you:
  - a. Monthly calls for service report
  - b. Weekly map of crime in your beat
  - c. Custom report request by you for a specific project
- Give a specific example of when a crime analysis and mapping product/process was useful.

These questions are primarily open-ended in order to allow for the respondents' opinions rather than obtaining a quantifiable answer. This information will be primarily anecdotal but nonetheless important as part of the impact evaluation. By obtaining this information from a large number of individuals, one may determine overall themes of usefulness of specific crime analysis and mapping products and of crime analysis and mapping information overall.

However, a survey alone may not be the best methodology to measure the usefulness of crime analysis and mapping since those completing the survey may also need to be evaluated in terms of their ability to use the information, as usefulness depends on the capabilities of the user. If users do not know how to interpret the crime analysis and mapping information, it may be necessary to provide training about these products/processes, rather than trying to alter the products/processes. Thus, the second way in which to evaluate the utility of crime analysis and mapping products is to observe specific situations in which they are used. That is, conduct several case studies in which the circumstances are observed from the time of the request for information through how it is used for response or decision making to the outcomes of the response or decision.

These particular results have to be taken conservatively since they are not systematically obtained and since crime analysis and mapping are only one of many factors that go into the problem solving and decision making processes. In reality, it may be impossible to follow each request of a crime analysis report or map from inception to outcome and impossible to directly observe its impact, but following a few such cases may provide important evaluation information if considered carefully.

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### *Satisfaction*

In general, the term satisfaction refers to the fulfillment of needs, expectations, wishes, or desires of an individual. In an evaluation of crime analysis and mapping, satisfaction refers to the opinions of individuals who use the information as to whether their needs, expectations, etc. have been met, just as law enforcement agencies measure citizen satisfaction with police services. Satisfaction measures are primarily collected *after* crime analysis and mapping have been implemented. They will not be collected as baseline measures in an agency that has not implemented crime analysis and mapping. This is because the fulfillment of needs and expectations cannot be measured before the







functions exist. However, it may be used as a baseline measure in an agency where crime analysis and mapping have already been implemented.

Satisfaction can be measured for both the process and the impact of crime analysis and mapping. Satisfaction measures of the process may include opinions about the process such as availability of crime analysis and mapping personnel, timeliness of product completion, and the quality of the products. Satisfaction measures of the impact include opinions about the usefulness of the crime analysis and mapping information. A crime analysis or mapping product may not be useful to its customer for reasons out of the control of the crime analysis and mapping capabilities, yet the customer may still be satisfied that the information was the best it could be in that situation. For instance, an individual requests a report concerning traffic citations for the past year, yet there are only six months of data available. In this situation, the person may be satisfied by a well-developed report even though it does not meet the original request.

Satisfaction information from numerous individuals, such as officers, administrators, neighborhood groups, Internet users, etc. can be measured through a survey. The following are some examples of questions that might be used in a satisfaction survey:

*How satisfied are you with the following about crime analysis and mapping? Use the following answers for each statement: Very Satisfied, Satisfied, Somewhat Satisfied, Somewhat Unsatisfied, Unsatisfied, Very Unsatisfied, No Opinion.*

#### *Satisfaction Measures of Process*

- The ability of the crime analysis and mapping personnel to produce reports in a timely manner.
- The availability of crime analysis and mapping personnel.
- The quality of the presentation/format of crime analysis and mapping products.
- The quality of the content of crime analysis and mapping products.
- The data sources utilized by crime analysis and mapping.
- The technology utilized by crime analysis and mapping.
- The way in which crime analysis and mapping products are disseminated.

#### *Satisfaction Measures of Impact*

- The usefulness of the crime analysis products in general.
- The usefulness of (a specific product).
- The impact of the crime analysis and mapping information on the effectiveness of your problem-solving project.
- The impact of crime analysis and mapping on the agency's commitment to community policing.

It is essential to survey a large number of individuals from different ranks and functions in the agency so that extreme opinions do not skew the satisfaction measures and subsequently the results of the evaluation and so that reliable statistical results can be formulated from the data.







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## *Summary*

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This section has described the types of information that can be collected as part of an evaluation of crime analysis and mapping. It addresses measures of both the process and impact of crime analysis and mapping. For the sake of brevity, it has not described how that information may be analyzed. To reiterate, the nature of crime analysis and mapping is such that an impact evaluation is difficult. In essence, evaluating crime analysis and mapping in a law enforcement agency is not an exact science. However, the areas of evaluation suggested here provide an overall picture of both the process of conducting crime analysis such as personnel, technology, data sources, and products as well as the impact which includes measures of usefulness of the crime analysis and mapping products. Finally, a subjective measure of satisfaction can be used to supplement both the process and impact evaluation measures.

On the following page is a list of the types of evaluation, the reasons for conducting an evaluation, and types of data to collect. It is included here to be used as a checklist for conducting an evaluation of crime analysis and mapping.





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## *Evaluation Checklist*

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*The following is a list of information to be collected as part of collecting information for conducting an evaluation of crime analysis and mapping. The intent of this list is not to be an outline of the previous section, but to be used as a checklist during the process.*

- ❖ Selecting purpose and type of evaluation
  - Type of Evaluation
    - Process
    - Impact
  - Purpose of evaluation of crime analysis and mapping
    - Provide an internal mechanism for monitoring the progress of the function and the individuals conducting crime analysis
    - Assess the process and impact of crime analysis and mapping within the agency
    - Compare crime analysis and mapping of one agency with crime analysis and mapping of other agencies
    - Evaluate how a particular agency's crime analysis and mapping function has contributed to the overall discipline of crime analysis and mapping.
  
- ❖ Baseline and Evaluation Measures
  - Comparative Information
  - Baseline Measures
  - Process Evaluation Measures
    - Personnel
    - Technology
    - Data sources
    - Products
  - Impact Evaluation Measures
    - Survey of opinions of usefulness
    - Observation/case studies
  - Measures of Satisfaction
    - Satisfaction with process
    - Satisfaction with effectiveness (impact)





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## V. Conclusion

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Crime analysis and mapping are becoming more common in law enforcement agencies, but agencies struggle with how they should implement and evaluate them. Oftentimes, a new individual is hired or an officer is reassigned and told to “implement crime analysis and/or mapping,” yet given little direction. The purpose of this document is to provide an outline of the implementation and evaluation processes as a starting point to gather information to complete these tasks. The content of the information and how it is used to implement and evaluate crime analysis and mapping will vary by agency since each agency exists in its own unique combination of political, demographic, and organizational characteristics.

