

Theoretical foundations of hot spots policing and crime mapping features

Ihor Fedchak

PhD of Law, Associate Professor
Lviv State University of Internal Affairs
79007, 26 Horodotska Str., Lviv, Ukraine
<https://orcid.org/0000-0002-4539-5988>

Oleksandr Kondratiuk*

PhD in Law, Associate Professor
Lviv State University of Internal Affairs
79007, 26 Horodotska Str., Lviv, Ukraine
<https://orcid.org/0000-0001-6102-2690>

Anatolii Movchan

Doctor of Law, Professor
Lviv State University of Internal Affairs
26, Horodotska Str., Lviv, Ukraine 79007
<https://orcid.org/0000-0002-6997-6517>

Sviatoslav Polyak

PhD in Law
Lviv State University of Internal Affairs
26, Horodotska Str., Lviv, Ukraine 79007
<https://orcid.org/0000-0003-0345-3550>

Abstract. The study is devoted to one of the ways to solve the problem of reducing the crime rate in the region due to the concentration of police forces and means in correctly defined places of criminal activity. The purpose of the study is to determine the content of the concept of police activity in places where criminal activity is concentrated in “hot spots” and examine the features of crime mapping. The key methods used are system and structural analysis, dogmatic analysis, synthesis method, modelling method, and structural-functional and formal-logical methods. It is determined that the problems of criminal activity, for the most part, are concentrated in a small number of places of an administrative-territorial unit, which continue to be dangerous for a long time in the absence of police intervention. It is proved that different types of “hot spots” require the development of individual police countermeasures, and the analysis of “hot spots” should be based on a logical and systematic approach and depends on understanding the theory of the origin of different types of analysed criminal offences and choosing the way to display the results. A reservation is made that arbitrary analysis by an analyst, or the use of only software algorithms is excluded because they can lead to a subjective perception of a “hot spot”, which may not turn out to be an accumulation of criminal activity. It is proved that the analysis of “hot spots”, in addition to simply identifying places with high crime rates, is crucial for solving problems in these places and choosing the most effective police response measures. The practical value of the proposed study is to generalise and adapt international developments to improve the theoretical and practical foundations for improving the efficiency of criminal analysis units of the National Police of Ukraine in the field of visualisation of information about criminal activity, introducing international experience in crime mapping into the practical activities of criminal analysis units of the National Police of Ukraine

Keywords: criminal activity; crime mapping, visualisation, targeting, criminal situation, victimisation, operational services

Suggested Citation

Article's History: Received: 06.12.2023 Revised: 06.03.2024 Accepted: 28.03.2024

Fedchak, I., Kondratiuk, O., Movchan, A., & Polyak, S. (2024). Theoretical foundations of hot spots policing and crime mapping features. *Social & Legal Studios*, 7(1), 174-183. doi: 10.32518/sals1.2024.174.

*Corresponding author



Introduction

The effectiveness of law enforcement agencies largely depends on the state of information support for law enforcement activities and the introduction of new approaches using modern achievements in the field of information technology. The implementation of the powers of the national police units to improve the criminal situation, as a necessary condition for the successful and safe functioning of Ukraine, is possible if the heads of police at various managerial levels have a clear understanding of the existing trends in the development of crime in the territory of their operational services, the so-called criminal activity in hot spots, and the features and problems of the functioning of the police units and services entrusted to them. Such an understanding of the criminal situation or territorial operational situation allows not only successfully identifying and stopping criminal activity but also to effectively implement organisational and administrative-managerial powers in the direction of preventing crime and ensuring public order and safety. Therefore, the search and development of ways to improve the effectiveness of law enforcement agencies in the fight against crime is a priority task of any country, including Ukraine. However, each period of police operation is characterised by rational approaches, the examination and implementation of which in the practice of the Ukrainian police can lead to positive changes, which in turn will be considered, albeit not a general but partial success, on the way to implementing the mission assigned to the National Police of Ukraine.

A substantial number of scientific and applied studies are devoted to the analysis of crime through the localisation of crime concentrations – the so-called “hot spots”, that is, the activity of mapping the facts of detected crime. O. Buhara (2018) conducted an analysis of world experience and proposed ways to develop internet mapping of criminological information in Ukraine. Researcher M. Kolodiaznyi (2019) investigated the content of crime mapping, identified prospects for further development of this tool for crime prevention, and concluded that mapping is a necessary condition for effective crime prevention and protection of citizens' rights. O. Manzhai & A. Potylchak (2020) conducted a review of tools, organisation, and tactics for mapping criminal manifestations, analysed strategies that are used for mapping to predict crime, established the specifics of mapping criminal manifestations, taking into account the specifics of criminal trends in Ukraine and the activities of national police units. I. Fedchak (2023) summarised and investigated conceptual and theoretical propositions regarding proactive law enforcement models. The researcher states that the model of proactive law enforcement based on data (Data-Driven Approaches to Crime and Traffic Safety / DDACTS) reviews the place as a source of information that is considered by law enforcement officers when making managerial decisions on the use of forces and means (resources) to organise and ensure a preventive function, stabilisation of a criminal situation or operational situation.

A. Braga *et al.* (2019) devoted their study to the possibility of police influence on crime in hot spots of small geographical areas and empirically established that police activity in hot spots generates statistically substantial small reductions in total crime and disorder in areas where the strategy is implemented. The researchers concluded that policing in hot spots generates crime-fighting benefits that extend to areas directly bordering target locations. C. Telep &

J. Hibdon (2019) reasoned that analysing hot spots, not just their identification, is crucial for solving problems in these places and choosing the most effective countermeasures. Researchers identified problem-oriented approaches as a particularly effective type of police intervention in problem-solving.

The analysis of theoretical ideas on the effectiveness of police management (the sphere of police activity) allows concluding that a systematic approach is necessary to determine the relevant tasks of law enforcement reform. Consistency lies in the fact that all structural elements in the activities of the police are closely interrelated and interdependent. It would be wrong to translate international experience into the practice of reforming the activities of the National Police without a thorough examination of the feasibility and effectiveness of measures developed within the framework of various models of law enforcement activities. Any model of organising police activities primarily requires scientific research, and positive developments should be implemented considering the already established practice of the National Police.

The purpose of the paper is to determine the content of the concept of police activity in places where criminal activity is concentrated in “hot spots” and examine the features of crime mapping. The goal of the study is to identify theoretical mechanisms for maintaining the effectiveness of police work in places where criminal activity is concentrated and substantiate practical aspects of understanding the levels, types, and types of maps of “hot spots”.

Materials and methods

For a more detailed investigation of issues related to the theoretical foundations of the concept of police activity in places of concentration of criminal activity “hot spots” and features of crime mapping, as well as the possibilities of their application in the activities of criminal analysis units of the National Police of Ukraine, the authors of the study applied such methods of scientific knowledge as the method of system and structural analysis, dogmatic method, structural-functional method, synthesis method, modelling method, formal-logical method. With the help of systematic and structural analysis, theoretical ideas on crime mapping are investigated, which are reduced to the main idea that on the basis of reliable maps of “hot spots” of crime, police leaders can effectively manage the limited resources of police units to ensure public order and public safety on the ground. These methods are used to identify factors that affect the criminal situation on the ground and circumstances that contribute to criminal behaviour.

The dogmatic method was used to establish the interdependence of a person's choice of a safe environment depending on the criminal situation, to establish the interdependence of the state of crime from police preventive measures, identify the features of mapping, justify the need to map only the facts of committing criminal offences for the purpose of detailed search and analysis of cause-and-effect relationships of their manifestation, which will serve as the basis for the development of measures for the prevention of criminal situations. The method of analysis was used to analyse the content of environmental criminology and theoretical mechanisms for maintaining the effectiveness of police work in “hot spots”. The synthesis method was used to formulate reservations about the exclusion of the possibility of arbitrary analysis by an analyst or only the use of software

algorithms since both alone can lead to a subjective perception of a “hot spot”, which may not turn out to be a cluster of criminal activity. The formal-logical method contributed to the formulation of conclusions that police activities in “hot spots” are an important strategy of police units. This method justified the need to individualise police countermeasures to specific types of “hot spots” and provisions to reduce criminal activity due to the concentration of police resources in reliably defined places of problematic criminal activity.

In the presented study, theoretical researchers, encyclopedic materials, materials of practical activities of international law enforcement agencies, and visualised examples of maps and histograms from information sites were used, in particular, the theoretical conclusions made in the article were illustrated with examples from such resources as the NYC Crime Map (n.d.), Zaxid.Net Project (n.d.), CrimeMapping.com (n.d.).

The study was conducted in five stages: development of the research protocol; collection, analysis, generalisation of international theoretical and practical experience in the field of crime mapping; familiarisation with studies in the field of visualisation of criminal activity and the practice of their application by the units of criminal analysis of the National Police; analysis and generalisation of the obtained data; adaptation of the obtained theoretical results for practical application by the units of criminal analysis of the National Police and formulation of theoretical conclusions for criminal analysts.

Results and discussion

The essence of the concept of police activity in hot spots.

In the modern law enforcement sphere, proactive models of police activity were developed, which are successfully used by law enforcement agencies and have proven themselves positively, in particular, regarding mapping criminal manifestations. Hot spots are crime concentration zones. However, there is no single understanding of what a “hot spot” is. A “hot spot” refers to specific addresses, territories without reference to addresses, and a concentration of individuals and events that may be relevant to a number of related criminal offences. Also, “hot spots” include small areas where more facts of criminal behaviour or violations of public order are recorded, compared to other territorial units, even if there is no common offender (criminal).

In addition, “Insubstantial places where crimes occur so often that they can be predicted for at least one year” are considered to be hot spots (Kolodiazhnyi, 2018). Analysis units in “hot spots” have different sizes. A point can be either very small units of analysis, such as buildings or addresses, shops, street blocks or street segments, street intersections, or address clusters – multiple streets, an area in a city, etc. where there is an abnormal cluster of illegal behaviour. Although there is no generally accepted definition of the term “hot spot” of crime, it can nevertheless be argued that this is an area that has more than the average number of criminal events or areas where the risk of victimisation is higher than the average. Therefore, it can be assumed that there are so-called “cold spots”, that is places (districts) with a lower-than-average number of criminal or other offences. This also suggests that some “hot spots” may be “hotter” than others, i.e. criminogenic above average.

The concept of Hot Spots Policing is a local approach to law enforcement in which traditional policing strategies,

such as increasing the police presence, are implemented in areas where crime is disproportionately higher than in other areas within the jurisdiction (in “hot spots”). The results of available research on this issue show that police response to “hot spots”, whether specific or combining a group of addresses, street segments, or blocks, effectively reduces crime rates. However, there are studies in which the sustainability of crime reduction is limited by the fact that the results are mostly short-term (Braga & Weisburd, 2012). However, when policing hot spots is combined with deeper problem solving (i.e., not only identifying hot spots but also understanding why they are “hot”), such a strategy can also be effective in the long run.

The main idea of the proactive concept of law enforcement in hot spots is that prepared maps of crime hot spots can most effectively guide the actions of managers and line police officers if the preparation of these maps is based on experience, knowledge, and verified reliable information (Eck *et al.*, 2005). In general, Hot Spot Policing is an important strategy for improving security and reducing crime in the area of responsibility. Its implementation is based on detailed data analysis and specialised measures to achieve positive results. Although the results of applying the concept are mostly short-term, however, if law enforcement officers carefully and responsibly investigate the root causes of problems in specific locations (i.e., not only identifying “hot spots” but also understanding why they are “hot”), such a strategy can be effective in the long term (Braga & Weisburd, 2012).

For the purpose of high-quality and timely crime prevention, bodies and divisions of the National Police should have objective information that would allow them to consider crime on time and territory, examine the relationship between the causes and consequences of negative impact on society, predict their further development, etc. Not only a clear organisation of accounting and reporting in police units but also appropriate visualisation of such information can ensure the use of a cartographic method of research and knowledge of reality. Therefore, the problem of mapping individual crimes or groups of them on the territory of a street, city, or region gains scientific and practical importance (Korystin *et al.*, 2019).

Mapping (visualisation) of places of manifestations of crime is a means of targeting, which is associated with the definition of the object of preventive influence, which is mainly reduced to a certain physical space, in which various criminal offences are often committed. Targeting using crime mapping contributes to the purposefulness of preventive measures and increases the effectiveness of police activities. With its use, various prevention concepts are being implemented, for example, the Hot Spots model currently used in the United States (Kolodiazhnyi, 2019).

Scientific research proves that it is necessary to map the facts of committing criminal offences to search in detail and analyse the cause-and-effect relationships of their manifestation. Next, measures should be developed to prevent criminogenic situations, such as the elimination of unemployment to reduce the risk of criminological situations (Peresadko & Orlov, 2015). As a way to visualise crime topography, crime mapping can be used to test the effectiveness of spatial prevention measures, situational prevention, or broken window theory. Knowledge by local authorities and the police of the state of public utilities, the degree of arrangement of the territory and comparison of such data with the

crime rate will contribute, firstly, to clarifying the area that requires strengthening preventive measures and secondly, to checking the effectiveness of such measures in areas where they are already being implemented (Korystin *et al.*, 2019).

Defining the criminogenic situation, it should be highlighted in two terms – in a broad and narrow sense. In a broad sense, a criminogenic situation is a set of circumstances that characterise the level of crime in the region, the sphere of life, the economy, etc., and a complex of interrelated factors and phenomena of an economic, social, ethical, and psychological nature (alcoholism, drug addiction, and other phenomena related to crime). A criminal situation can be assessed as stable (satisfactory), difficult, or very difficult (Legal encyclopedia, 2001).

Considering the above, it can be noted that in a narrow sense, the concept of a “criminogenic situation” should be understood as a system of interacting objective circumstances that encourage the emergence of a specific manifestation of illegal behaviour. Depending on the impact on the behaviour of the criminal, the criminal situation may provoke the commission of a criminal offence or contribute to criminal behaviour. The first may be social, material, psychological, and other life circumstances, offensive or illegal behaviour of the victim in relation to the guilty person (offender, criminal), immoral, antisocial influence of adults on the behaviour of a minor, etc. Circumstances that contribute to criminal behaviour include miscalculations in the financial and economic or other activities of an enterprise or an entire industry, unsatisfactory state of control over inventory items, lack of signalling and surveillance equipment at storage facilities, etc. A criminal situation can spread over a substantial territory or concentrate locally (in a limited space), be long-term or short-term, and affect the interests of the population or a specific group of people.

The state of the criminal situation in a particular territory affects the choice of place of residence, kindergarten, school, leisure facilities, etc. of a person (family), and this decision is made depending on the level of security of the environment in the chosen area. No one wants their child, wife, parents, or themselves to become a victim of illegal activities. A community that has lived for a long time in an area that it considers its own does not always want to accept strangers and, therefore, treats them cautiously and with suspicion, while in other places, such people are welcomed. The public is aware that crime is unevenly distributed in the territories of administrative divisions. Surely, people may be wrong about the risks in specific territories, but most of them are aware that the risk of becoming a victim of violence in different places is varying.

Being aware of the criminal situation on the territory, in specific places, with criminal tendencies, the psychology of criminal behaviour, a general understanding is formed regarding the organisation of police work in the field of ensuring security and public order. Therefore, organisational and managerial decisions on how to allocate the limited human, material, and technical resources of national police units should be based on where the requirements for the police’s active offensive actions are most desirable and where they are least necessary.

Theoretical mechanisms for maintaining the effectiveness of police work in “hot spots”. The effectiveness of police work in “hot spots” in preventing criminal offences is supported by two key theoretical mechanisms: deterrence

and reducing the possibility of crime. Deterrence theory assumes that crime can be prevented if the offender is aware that the costs of committing the crime outweigh the benefits. The work of law enforcement agencies in places where criminal activity is concentrated in “hot spots” is also substantially influenced by three complementary theories of the possibilities of crime: rational choice, routine activities, and environmental criminology. Rational choice assumes that “criminals seek to benefit from criminal behaviour. This implies the need for decision-making and the choice of means. These processes are limited by time, the offender’s abilities, and the availability of relevant information” (Cornish & Clarke, 1987).

The theory mentioned above is often combined with the theory of routine (daily) activities to explain criminal behaviour during the commission of a criminal offence. The theory of everyday activity states that a criminal act occurs when a likely perpetrator approaches a suitable target (such as a victim or property) in the absence of a capable guardian in space and time (Cohen & Felson, 1979). Rational offenders face criminal opportunities when they go about their daily business and make decisions about whether to commit illegal activities. It is assumed that if the victim and the offender are prevented from combining in space and time by effectively manipulating situations and conditions that create criminal opportunities, in such circumstances, the police can positively influence crime trends.

Environmental criminology examines the distribution and interaction of goals, criminals, and opportunities in time and space. Understanding the characteristics of places that attract criminal behaviour is important because these characteristics create opportunities that rational criminals face in their daily activities (Brantingham, 1991). The main contribution of environmental criminology is its call to change the centre of analysis from individuals to specific locations. In the mentioned theory, the attributes (characteristics) of a place are considered as key to explaining episodes of criminal events. For example, a poorly lit section of a street with an abandoned building located near a transport highway is an ideal place to sell narcotic drugs. The lack of proper lighting, the abundance of hiding places around the abandoned property, the constant flow of potential customers near entertainment venues, and the lack of informal social control (so-called protective possession) in this place create an attractive opportunity for drug traffickers. In many such cases, the police spend a lot of time and effort detaining drug traffickers, without substantially affecting the level of drug trafficking. Compelling criminal opportunities in this place attract both sellers and buyers who support criminal activity. If the police want to be more effective in eliminating the sales channel, this suggests that they should focus on the specifics of the place where drug trafficking is concentrated in that particular location (Braga, 2019).

On the practical side, the police’s law enforcement activities in “hot spots” cover a number of police responses that share a common focus of resources in places with a high concentration of crime. There is no single universal way to exercise police powers in “hot spots”. Approaches to the work when choosing methods of intervention can vary quite a lot depending on a whole range of factors. For example, local police strategies in “hot spots” for solving crime problems can be either simple – increasing the time spent by patrol policemen in “hot spots”, or complex – for example, a three-stage approach (identifying and analysing problems,

developing individual responses, and supporting success (results) in the fight against crime).

It can be clarified that the timely allocation of available police resources to those territorial and administrative units where criminal offences are most expected contributes to achieving high results in crime prevention. The appeal of focusing on the limited resources of police units in a small number of areas with high crime activity should be based on the belief that the share of crime in the city will decrease by neutralising criminal activity in certain “hot spots”. For Ukraine, this practice will be effective for a general reduction in the crime rate and a promising reduction in the share of criminal offences against the life and health of a person, property, public safety and order, in the sphere of trafficking in narcotic drugs and psychotropic substances.

The main problem in applying the concept of police activity in “hot spots” is that crime will move to other locations in response to the police’s attention to places with a high crime rate (spatial displacement of crime), thus devaluing any achievements in the fight against crime. However, researchers identified strong evidence of spatial displacement in only one study, and even in that case, the volume of displacement was far less than the main benefit of the intervention for the purpose of crime prevention (Ratcliffe *et al.*, 2011). Thus, it is established that crime does not tend to completely change the places of manifestation of “hot spots” in the adjacent territories. The result of police interventions in “hot spots” is to reduce the number of manifestations of crime in the established “hot spots” of criminal activity. Moving criminal activity is not inevitable, partially because “hot spots” tend to have certain terrain features that make them attractive targets for criminal activity, and these same features may not exist in nearby areas or spaces. Such features can include abandoned unfinished buildings and structures, improperly lit and sparsely populated areas, crowded entertainment venues that sell alcoholic beverages, etc. (Weisburd & Telep, 2014).

Notably, the study by Braga (2012) affirms the potential benefits of focusing law enforcement efforts on crime prevention at crime-concentration sites (in high-crime geographical areas), and police strategies and tactics focused on these geographical areas are commonly referred to as a model or concept of police activity in “hot spots” or a model or concept of police activity at a specific location. The paper of the author confirms that there is often a substantial concentration of crimes in small places or “hot spots”, which give rise to half of all criminal events. The authors argue that many crime problems can be more effectively reduced if police officers focus on such deviant locations.

Indeed, the appeal of focusing limited resources on a small number of active crime sites is simple. If it is possible to prevent crime in these “hot spots”, then the total number of crimes, evidently, can be reduced. This focus of activity on a specific location or locality correlates with traditional ideas about the work of the police and crime prevention in general, in which the efforts of the police are concentrated primarily on people. N. Lishchuk (2020) notes that the success of preventing criminal offences in the field of domestic violence depends on the timeliness and completeness of their detection and ensuring the inevitability of punishment for criminals. When considering the criminological characteristics of various types of criminal manifestations, the state, structure and dynamics of criminal actions,

criminological characteristics of the criminal’s personality, and the reasons and conditions (determinants) under which a particular criminal behaviour was implemented are most often considered (Talakh, 2021)

The revolutionary development of internet technologies, in particular, geographic information systems (GIS), opens up new opportunities for using crime maps to support crime prevention. For example, in the United States, resources based on GIS technologies were created that provide free access to data on criminal offences committed (their type, place of commission, date, and time). These are maps of the criminological situation that are constantly updated and available to the whole world (Peresadko & Orlov, 2015). Examples of such sites where the method of drawing icons on interactive maps provides criminogenic information with the ability to freely scale and select factors for analysis are resources CrimeMapping.com (n.d.), Community Crime Map. (n.d.).

US police officers use geographic information systems that allow them not only to get acquainted with the topography of crime at the national level but also summarise such information at the level of individual administrative divisions, for example, NY Crime Map. The NY Police Department visualises crime in three ways: by the criminogenicity of districts (districts of New York are depicted from white to brown); by the localisation of crime or individual criminal offences – the territory of the city is indicated by circles that mark the places of criminal encroachments; by the degree of criminogenicity – sections of the city, residential areas, and streets will be indicated by shades of red), and the topography of crime can be analysed according to the NY Crime Map for a period of no more than two years (Kolodiazhnyi, 2019).

Analysis is an important aspect of correctly identifying “hot spots”, as many researchers established that law enforcement officers do not accurately identify “hot spots” or regularly disagree on what “hot spots” are in their areas of responsibility. These resources are constantly updated, which allows tracking up-to-date information regarding the spatiotemporal trend of the criminological situation.

There is strong evidence that police activities can have a substantial impact on crime and misdemeanour if officers take appropriate preventive measures specifically for specific locations as elements of the crime triangle “hot spots”. Responses vary from one intervention to another but usually involve some combination of increased police presence, greater community involvement in law enforcement, and addressing the underlying crime issues through situational crime prevention measures. Initiatives in “hot spots” that use a problem-oriented structure seem particularly effective. There is also strong evidence that police actions in “hot spots” do not displace crime in neighbouring areas or at other times of the day. In general, carefully developed policing in “hot spots” is an effective and efficient proactive model of law enforcement (Telep & Hibdon, 2019).

In the author’s dissertation, V. Santos (2013), through a reliable quasi-experimental examination, determined that responding to micro-temporal “hot spots” (i.e. hot spots that “flare up” in the short term) was effective in reducing the number of burglaries and vehicle thefts. In this study, criminal analysis played a clear and important role in the fact that over the course of 5 years, two criminal analysts who worked for the police identified micro-time “hot spots” to which response measures were directed. Although the study did not specifically address the role of criminal analysis, it is

a prime example of how the police systematically use criminal analysis in everyday life to reduce crime.

Surely, in their activities, police officers never completely ignore geography. Geographical features of administrative divisions are considered when allocating police resources and are crucial in how the police respond to calls and how they patrol the service area. However, Hot Spots Policing involves focusing police work on smaller geographical units.

Theoretical ideas regarding the levels, types, and types of Hot Spots maps and their limitations. Interest in policing in “hot spots” is partly due to the changes and innovations in law enforcement that have taken place over the past three decades and the emergence of theoretical ideas in the field of proactive law enforcement activities that confirm the importance of “place” in understanding the state and trends of crime to use police interventions for the purpose of conducting preventive activities. J. Eck (2005) stated that the distribution of crime varies within the neighbourhood and is unevenly distributed between districts. However, with the advent of powerful computer equipment and information technologies capable of performing complex spatial analysis, analysts of criminal analysis units are able to identify and track spatial concentrations of criminal offences.

In the field of crime mapping, “hot spots” can range in size from “points” to “regions”. Although practical approaches to the content of the concept of “hot spot” have something in common – the division of places into places of concentration of crime or offences, and places with a much lower level of crime or offences, however, they differ in the area of coverage of the “hot spot” (Gonzales *et al.*, 2005). The factors that cause a particular “hot spot” are different from the factors that cause a “hot spot” on a street, block, or city. Therefore, the actions and measures applied by the police unit and other interested actors regarding the place of manifestation of a criminogenic hot spot will differ from the actions and measures necessary to stabilise the criminogenic situation of a “hot spot” in similar territories. These approaches differ in two criteria: the level of analysis and the size of the geographical area of crime or violations of public order. Using the example of drug sales, it can be understood that police measures to neutralise places of sale in the city will differ substantially from measures to eliminate drug supply channels to this city. Notably, determining the appropriate level of analysis is crucial to understanding the problem and determining what measures and actions should be taken or applied.

Types of “hot spots” include “hot spots” of places of repetition of criminal activity, “hot spots” of victimisation, and “hot spots” of streets. The main form of “hot spot” is the place where criminal activity is concentrated. As mentioned, a place can be a specific address, a section of the street, a shop, a house, or any other small place, and most of them can see the person standing near its centre. Places usually have one “manager” or owner (a person who has authority over this place and controls its use) and perform a specific function – accommodation, recreation, training, trade, production, etc. Crime is often concentrated in multiple locations (areas with high crime rates) (Community Policing Services, 2014). Hot spots are often concentrated in certain locations that border on places where there are few or no criminal offences. They are best represented pointwise, they have zero dimension.

Maps for displaying places of repetition of criminal activity have a number of elements and functions. When searching for a “hot spot”, point maps outperform other

forms of mapping. The goal is to identify isolated locations with high crime rates, which can be done in several ways. Graded points (the size of the point is proportional to the number of crimes on the spot). This method allows displaying repeated and non-repeated places on the same map and comparing repeated places by the number of criminal offences. Points also allow finding the concentration of “hot spots”. Graded points can obscure neighbouring objects (for example, a large point can overlap the nearest smaller points), this technique is best used on large-scale maps (Fig. 1).

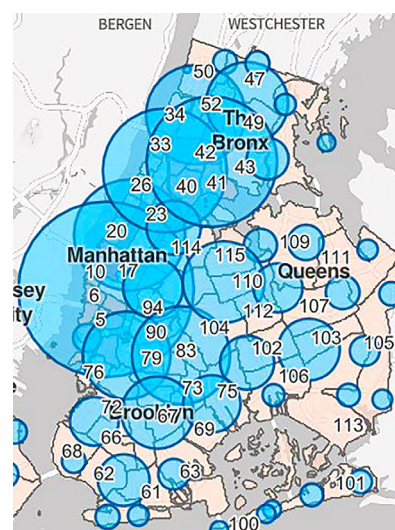


Figure 1. Hot spots graded by the number of crimes
Source: NYC Crime Map (n.d.)

The other two approaches are useful in small-scale maps. For example, a yellow dot can indicate a place with one crime, a light orange dot can indicate places with two crimes, and darker dots can indicate places with three crimes (Fig. 2). Another way to map criminal offences is to identify the most “hot” addresses. For example, identifying the 10% of addresses that are most affected by illegal behaviour may be useful to the police. Such addresses are plotted on the map using dots to indicate “hot spots”. This method has two absolute advantages. First, the map is clearer because it has less clutter. Secondly, such maps are useful for clearly defining police goals. However, such maps do not consider information about other places less affected by criminal manifestations. This lack of information can be overcome by creating additional maps that reflect all the places or by colouring the available data using a colour gradient so that the target “hot” addresses have a clear colour.

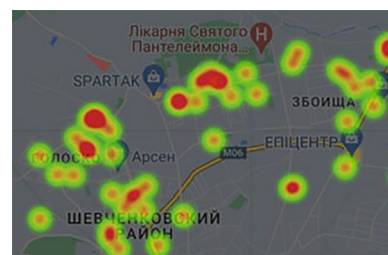


Figure 2. Hot spots graded by the number of crimes using colour
Source: Zaxid.Net Project (n.d.)

The next type of “hot spot” is the victimisation hot spot. Repeated victimisation is a recurrent criminal manifestation committed by the same person, regardless of the place where they were committed. Repeated victimisation is often confused with places where crimes are repeated. There may be cases when crimes can be committed against several different victims at a particular scene. Admittedly, it is possible to have both repeated victimisation and repeated crime scenes. For example, a person can visit an entertainment venue where a certain number of cases of illegal actions will be committed against them. However, if repeated victimisation extends to many places (as would happen in the case of repeated illegal behaviour against a person in different entertainment establishments (there is no repetition of the same institution twice), this will not be displayed on the map as a “hot spot” (zero dimension). Repeated victimisation can be displayed as lines (one dimension) if victims are constantly attacked using the same paths (alley, underpass, etc.), or as a polygon (two dimensions) if victims are repeatedly identified in the same areas. Re-victimisation is reflected to identify patterns with vulnerable groups of the population – potential victims of illegal activities in the same places.

Repeated crime scenes with different victims and repeated victimisation with different locations have different causes. Repeated crime scenes (with different victims) may be related to the behaviour of the “managers” of the place, but

if victimisation occurs in different places, the “managers” of the place play a much smaller role. In such cases, the professions, travel patterns to work, or lifestyle of potential victims should be considered. Thus, most likely, the victims of the attack will be those people who are involved in deviant and illegal activities (for example, drug dealers, alcohol and drug addicts, prostitutes, people who conduct illegal currency transactions and own substantial amounts of cash, etc.). Some professions increase the likelihood of becoming a victim, which can increase re-victimisation. For example, police officers have a higher victimisation rate than many other professions. However, the circumstances that make a person an illegal target are sometimes difficult for the person to change.

The third type of “hot spots” are repeated “hot spots” of the streets. Repetitive streets are those paths or streets that are characterised by a high level of victimisation. Such places on maps are marked in the form of a line. Such linear “hot spots” are likely the result of the interaction of targets and offenders along certain paths. This may be due to the fact that criminals sometimes choose places to commit criminal offences or places to search for a target for a crime based on the state of the situation (insufficient lighting, distance from the nearest populated areas, neglected paths, places of movement of people that are densely covered with vegetation, etc.) (Fig. 3).

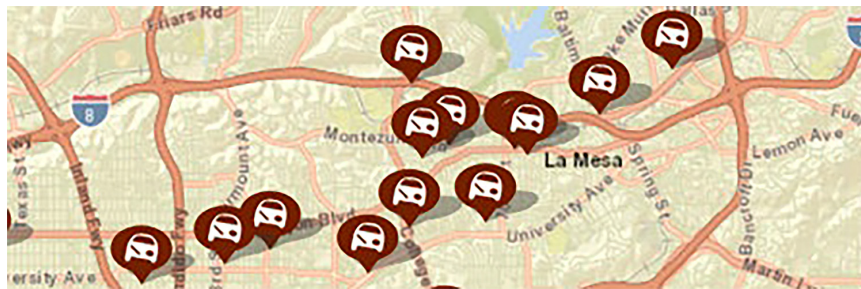


Figure 3. Concentration of hot spots along the street

Source: CrimeMapping.com (n.d.)

Offenders also find “targets” by doing their usual routine chores – going to and from work, shopping, etc. Potential targets that are not located along or near the routes used by offenders are unlikely to become victims, but those who are near such areas of movement of offenders have an increased risk of victimisation. Since the main directions of people’s movement are concentrated in some places (including offenders), people who are in such places (along such traffic directions) face a higher risk of crime than people who are away from such main traffic directions. In addition, some types of “targets” are concentrated along central streets. Shops, fast food establishments, and service establishments are located in places where their customers are concentrated. Therefore, often criminal hotspots are actually hot lines. Some violations may focus on specific locations on individual streets, or form a set of events along a section of individual streets, forming lines. These lines are sections of streets. Thus, street segments, or points on street lines, also make up “hot spots” (CrimeMapping.com, n.d.).

Sometimes it can be difficult to distinguish “hot spots” from “hot streets”. In fact, sometimes both “hot spots” and “hot streets” can be identified. As an example, robbers

attack pedestrians on the street leading from bars to the parking lot. Robberies can form a line along the street. However, even on this hot street, where numerous robberies have taken place, there can be a “hot spot”. Sometimes police officers, if it is difficult to determine the exact location of the commission of a criminal offence, enter inaccurate or approximate locations in their reports and information accounting systems. The analyst involved in crime mapping will have experience and knowledge about the offender, the victim, and the activities of the police to distinguish the exact model of a criminal offence from the information recorded in information arrays.

Usually, mapping programmes are available for street mapping, which simplifies the work of identifying “hot spots” or their clusters but does not create linear “hot spots” (hot lines). Such a map will show areas of concentration of illegal behaviour, but it is difficult to display the number of incidents in the lines. On the example of committing street thefts, it is cartographically presented in Figure 4. If a high level of accuracy is not particularly important, then such maps without displaying the number of events on the lines can also be useful.

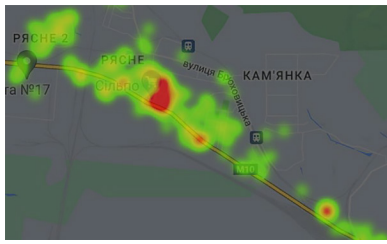


Figure 4. Creating a “hot line” from a large set of hot spots
Source: Xaxid.Net Project (n.d.)

As a rule, the concentration of victimisation can be shown using various types of maps, but there are cases when this cannot be done. Maps will be useful if the risk of victimisation is at least partially related to geography. A point map of the city with the designation of a gas station with two or more facts of robbery over the past 6 months shows criminal concentration. Dots represent concentration,

for example, of robberies at a specific location. A point map for this type of victimisation makes some sense, but point maps do not reflect all forms of victimisation concentration. If objects (victims) are not stable in space (mobile), maps of hot streets or areas may be more useful. However, the use of maps is limited for some forms of victimisation analysis. If the concentration of potential victims is scattered throughout the territory (there is no territorial concentration), it is advisable for the analyst to choose other analytical methods for displaying the concentration. For example, the facts of taxi driver robberies scattered around the city – the corresponding signs of victims of robberies may be related to specific companies, the age of drivers, working hours, or many other factors that cannot be displayed on the map. For analysts, operatives, and investigators trying to investigate or prevent such types of criminal offences, histograms showing the characteristics of victims and other variables can be much more useful than mapping (Fig. 5).

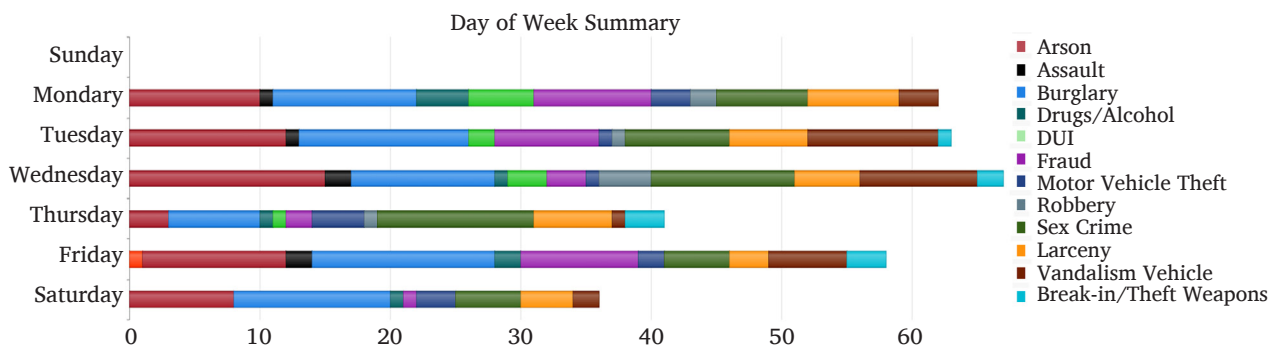


Figure 5. Crime histogram

Source: CrimeMapping.com (n.d.)

If the level of concentration of criminal activity and the shape of the image of the “hot spot” are not displayed qualitatively, then the map will be useless at best, which can lead to the preparation of ineffective countermeasures. Maps with images of “hot” streets or districts will not help determine the places where concentrations occur. Alternatively, a point map is too specific to display “hot” streets.

The consequences of using different types of maps are different. Point maps are simpler than street or district maps. Point maps allow the user to see the main picture of crime and determine whether it is appropriate to analyse crime at higher levels. However, maps of “hot” streets or districts often do not illustrate “hot” places, so the concentration of places may remain hidden. This suggests that crime mapping should start from the lowest level to the highest levels so as not to ignore low-level concentrations where effective measures can also be taken.

Conclusions

The causes of criminal activity are largely concentrated in a small number of local locations, which in police practice are called “hot spots”. The latter remain criminally active for a long time if they are not properly responded to. The concentration of police resources in these areas will reduce criminal activity, which will lead to an improvement in the operational situation in the region as a whole. Analysis of criminal trends in such locations is crucial for selecting the most effective police response measures. Depending on the

types of “hot spots”, individual police countermeasures are developed to neutralise criminal activity. For analysts of the National Police’s criminal analysis units, who are just mastering crime mapping methodologies, this means that the visual display of the crime pattern should correspond not only to the type of “hot spot” but also to a set of possible highly effective police response measures. Mapping only the “hot spot” will not be informative for police units since the map shows the area’s scale. This directs the attention of police officers in large areas where law enforcement efforts are not necessary to stabilise the situation and spreads out police resources away from places where they are needed. Focusing on points in cases where the problem is widespread at the level of a particular area draws attention to too limited territory and involves too limited opposition, which can ultimately lead to a lack of a positive result.

The study offers a theoretical basis for methodological work for analysts of criminal analysis units to determine the location of “hot spots”, which consists in the need to use statistical tools in combination with a human understanding of cause-and-effect relationships to provide an analysis of a reasonable basis for determining the actual location of a local concentration of criminal activity. With the skills, competencies, and appropriate tools, analysts will be able to correctly position information about criminal activity in a geographical context. For the correct understanding of the results of analytical activities, a human interpretation of events and trends is necessary, and a special role in this

is assigned to professional experience and knowledge of the features of the operational service area and the population contingent located in the analysed area. Conducting statistical and spatial analysis by analysts will contribute to a better understanding of the causes and places of increased criminal activity, which will allow other units and services of the National Police to respond in a timely manner to the level of the criminal situation, choosing the most effective and efficient forces and means, considering the resources at their disposal.

Further research in this direction, therefore, can be aimed at developing a methodology for developing Hot Spots Policing skills for National Police officers.

Acknowledgements

None.

Conflict of interest

None.

References

- [1] Braga, A. A., & Weisburd, D. L. (2012). The effects of focused deterrence strategies on crime: A systematic review and meta-analysis of the empirical evidence. *Journal of Research in Crime & Delinquency*, 49(3), 323-358. doi: 10.1177/0022427811419368.
- [2] Braga, A., Turchan, B., Papachristos, A., & Hureau, D. (2019). Hot spots policing of small geographic areas effects on crime. *Campbell Systematic Reviews*, 15(3), 1-88. doi: 10.1002/cl2.1046.
- [3] Brantingham, P. (1991). *Environmental criminology (2nd ed.)*. Long Grove: Waveland Press.
- [4] Buhera, O.I. (2018). [Internet mapping of criminological information: Status and development prospects](#). *Scientific Bulletin of the Uzhhorod National University*, 2(48), 45-48.
- [5] Cohen, L., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44(4), 588-605. doi: 10.2307/2094589.
- [6] Community Crime Map. (n.d.). Retrieved from <https://communitycrimemap.com/map>.
- [7] Community Policing Services. (2014). *Community Policing Defined*. Retrieved from <https://portal.cops.usdoj.gov/resourcecenter/RIC/Publications/cops-p157-pub.pdf>.
- [8] Cornish, D., & Clarke, R. (1987). Understanding crime displacement: An application of rational choice theory. *Criminology*, 25(4), 933-947. doi: 10.1111/j.1745-9125.1987.tb00826.x.
- [9] CrimeMapping.com. (n.d.). Retrieved from <https://www.crimemapping.com/map>.
- [10] Eck, J.E., Chainey, S., Cameron, J.G., Leitner, M., & Wilson, R.E. (2005). *Mapping crime: Understanding hot spots*. Washington: Office of Justice Programs, National Institute of Justice.
- [11] Fedchak, I.A. (2023). Conceptual and theoretical provisions about place as a source of information for the application of the data-driven approach to crime and traffic safety (DDACTS). *International Scientific Journal "Internauka", Series: "Legal Sciences"*, 6(64), 70-75. doi: org/10.25313/2520-2308-2023-6-8967.
- [12] Gonzales, A.R., Schofield, R.B., & Hart, S.V. (2005). *Mapping Crime: Understanding Hot Spots*. Washington: U.S. Department of Justice Office of Justice Programs.
- [13] Kolodiaznyi, M.H. (2019). [Crime mapping](#). *Bulletin of the Criminal Law Association of Ukraine*, 1(12), 147-163.
- [14] Korystin, O.Ye., Svyrydiuk, N.P., Tsilmak, O.M., Zaiets, O.M., Ismailov, K.Yu., & Nekrasov, V.A. (2019). [Tactical criminal analysis: Theory and practice: Training manual of the Ministry of Internal Affairs of Ukraine](#). Odesa: State Research Institute of the Ministry of Internal Affairs.
- [15] Legal encyclopedia. (2001). Kyiv: Ukrainian encyclopedia named after M. Bazhana. Retrieved from https://leksika.com.ua/19650107/legal/kriminogenna_situatsiya.
- [16] Lishchuk, N.O. (2020). [Violence against women: Causes and prevention](#). (PhD thesis, Lviv Polytechnic National University, Lviv, Ukraine).
- [17] Manzhai, O.V., & Potylchak, A.O. (2020). Peculiarities of mapping criminal manifestations. *Law and Security*, 4(79), 66-72. doi: 10.32631/pb.2020.4.10.
- [18] NYC Crime Map. (n.d.). Retrieved from <https://www.arcgis.com/apps/instant/sidebar/index.html?appid=8153f961507040de8dbf9a53145f18c4>.
- [19] Peresadko, V.A., & Orlov, Ye.V. (2015). [Mapping of the criminological situation \(on the example of the Sumy region\)](#). *Problems of Continuous Geographical Education and Cartography: A Collection of Scientific Works*, 22, 94-98.
- [20] Ratcliffe, J., Taniguchi, T., Groff, E.R., & Wood, J.D. (2011). [The Philadelphia foot patrol experiment: A randomized controlled trial of police patrol effectiveness in violent crime hotspots](#). *Criminology*, 49(3), 795-831.
- [21] Santos, R.G. (2013). [A quasi-experimental test and examination of police effectiveness in residential burglary and theft from vehicle micro-time hot spots](#). (Doctoral Dissertation, Nova Southeastern University, Fort Lauderdale, USA).
- [22] Talakh, A.M. (2021). [Criminological characteristics and prevention of criminal offenses related to the activities of religious organizations](#). (Doctoral thesis, V.M. Koresky Institute of State and Law of the National Academy of Sciences of Ukraine, Kyiv, Ukraine).
- [23] Telep, C.W., & Hibdon, J. (2019). Understanding and Responding to Crime and Disorder Hot Spots. *Problem-Solving Tool Guide*. Retrieved from <https://popcenter.asu.edu/content/understanding-and-responding-crime-and-disorder-hot-spots>.
- [24] Weisburd, D., & Telep, C. (2014). Hot Spots Policing. *Journal of Contemporary Criminal Justice*, 30(2), 200-220. doi: 10.1177/1043986214525083.
- [25] Zaxid.Net Project. (n.d.). Retrieved from <https://zaxid.net/projects/crime/?type=carhighjack>.

Теоретичні основи hot spots policing та особливості картографування злочинності

Ігор Андрійович Федчак

Кандидат юридичних наук, доцент
Львівський державний університет внутрішніх справ
79007, вул. Городоцька, 26, Львів, Україна
<https://orcid.org/0000-0002-4539-5988>

Олександр Володимирович Кондратюк

Кандидат юридичних наук, доцент
Львівський державний університет внутрішніх справ
79007, вул. Городоцька, 26, Львів, Україна
<https://orcid.org/0000-0001-6102-2690>

Анатолій Васильович Мовчан

Доктор юридичних наук, професор
Львівський державний університет внутрішніх справ
79007, вул. Городоцька, 26, Львів, Україна
<https://orcid.org/0000-0002-6997-6517>

Святослав Петрович Поляк

Доктор філософії у галузі знань “Право”
Львівський державний університет внутрішніх справ
79007, вул. Городоцька, 26, Львів, Україна
<https://orcid.org/0000-0003-0345-3550>

Анотація. Стаття присвячена одному із способів вирішення проблеми зниження рівня злочинності в регіоні зарахунок концентрації поліцейських сил та засобів у правильно визначених місцях кримінальної активності. Метою наукової праці є визначення змісту концепції діяльності поліції у місцях концентрації кримінальної активності “гарячих точках” та дослідження особливостей картографування злочинності. Ключовими методами наукової розвідки стали методи системного та структурного аналізу, догматичний метод, метод синтезу, метод моделювання, структурно-функціональний та формально-логічний методи. Було встановлено, що проблеми кримінальної активності, здебільшого, зосереджені в невеликій кількості місць адміністративно-територіальної одиниці, які продовжують бути небезпечними тривалий час при відсутності поліцейського втручання. Було доведено, що різні види “гарячих точок” потребують розроблення індивідуальних поліцейських контрзаходів, а проведення аналізу “гарячих точок” повинно відбуватись на основі логічного та системного підходу і залежить від розуміння теорії про походження різних типів аналізованих кримінальних правопорушень та обрання способу відображення результатів. Зроблено застереження, що довільне проведення аналізу аналітиком чи лише використання алгоритмів програмного забезпечення виключаються, адже можуть призвести до суб’єктивного сприйняття “гарячої точки”, яка може не виявитися скупченням кримінальної активності. Обґрунтовано, що аналіз “гарячих точок”, окрім простого визначення місць з високим рівнем злочинності, має вирішальне значення для вирішення проблем у цих місцях і вибору найбільш ефективних заходів поліцейського реагування. Практична цінність запропонованої наукової праці полягає у узагальненні і адаптації міжнародних напрацювань для удосконалення теоретичних і практичних засад підвищення ефективності роботи підрозділів кримінального аналізу Національної поліції України у сфері візуалізації відомостей про кримінальну активність, впровадження міжнародного досвіду картографування злочинності в практичну діяльність підрозділів кримінального аналізу Національної поліції України

Ключові слова: кримінальна активність; картографування злочинів; візуалізація; таргетінг; криминогенна ситуація; віктимізація; оперативне обслуговування