



Geospatial Technology for Homeland Security

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a watershed is modern history



World brought to the brink of disaster

Most negative use of technology
history of mankind

The world changed forever

Privacy was given a go by

Technology took the world
center stage

The images of 9/11 will remain
with us forever



Geospatial Technology

A picture is better than a thousand words

The story of the six blind men and the elephant

The third eye



Geospatial Technology

the logic is!!!

think visually



Homeland Security

Technological Framework for Safe and Secure Cities in India

- Command and Control Centers
- City based Video Surveillance System
- Interception Systems
- TETRA Public Safety Network
- Geospatial Technology
- Managerial Response to War on Terror



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Presentation Structure

The need

Data with a difference

The power of processing

The US Geospatial Admin/functional
mechanism

Homeland Security, its scope

Usage of Geospatial Data

Remote Sensing Data Policy

Most Critical Input/Usage



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Geospatial Information

As per DHS Spatial Data Infrastructure (SDI) Geospatial information includes Surveys, maps, charts, remote sensing data and images and aerial photographic services; and technology including global surveillance, GPS, GIS, mapping, geo-coding and remote sensing



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GS Requirements

Who needs Maps?

I think everybody does. The Map of today is the Geospatial Information as the requirements are much more complex yet precise, the demand for which is dictated by ground realities.

Herein lies the need for Geospatial Information



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Geospatial Information- the need?

Internal and external wars are getting intertwined

Insurgency groups in far flung areas

Prevalence of Naxalites in large number of states

Terror strikes primarily in urban centers in open areas, critical and important infrastructure and mass transit systems



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Geospatial Information- the need?

These are certainly normal law and order issues or situations and has to be tackled differently in strategy and inputs

Conventional inputs are not able to give actionable data to a level where the results can either be predicted or dictated, the requirements of geospatial inputs is of critical importance

Clarity on requirements



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DHS Mission Statement provides the connect

According to the National Strategy for Homeland Security and DHS'S mission statement,

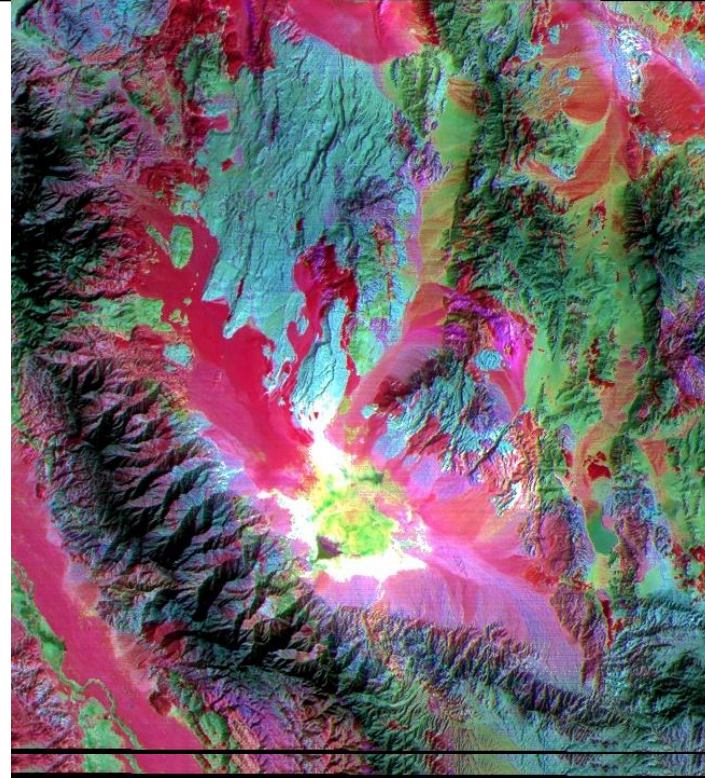
homeland security covers prevention, protection, response, and recovery.

Geospatial products and intelligence play a key role in departments' preparation for disasters and its response to them and support incident management

Sun Sync Satellite



Swath



Spectral Bands

Ortho Pan

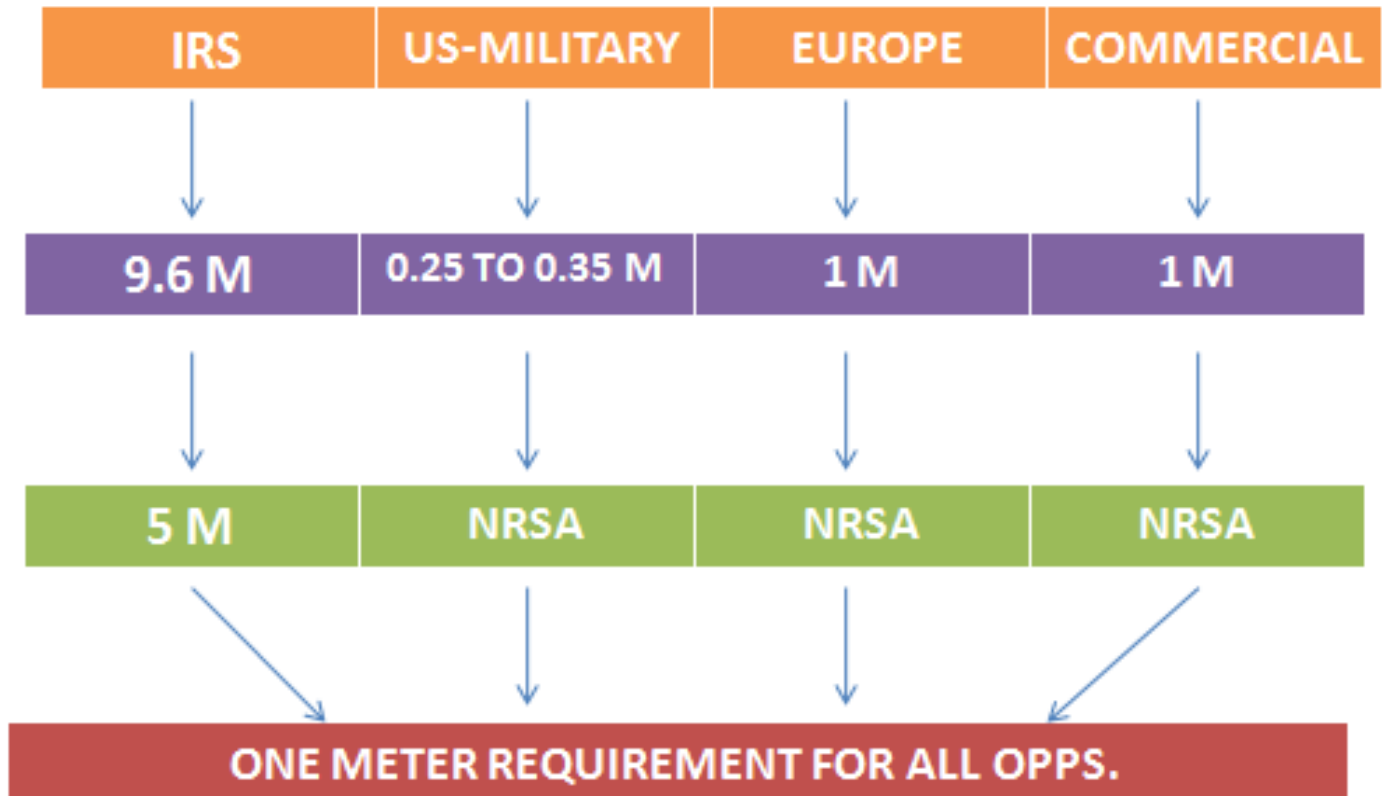


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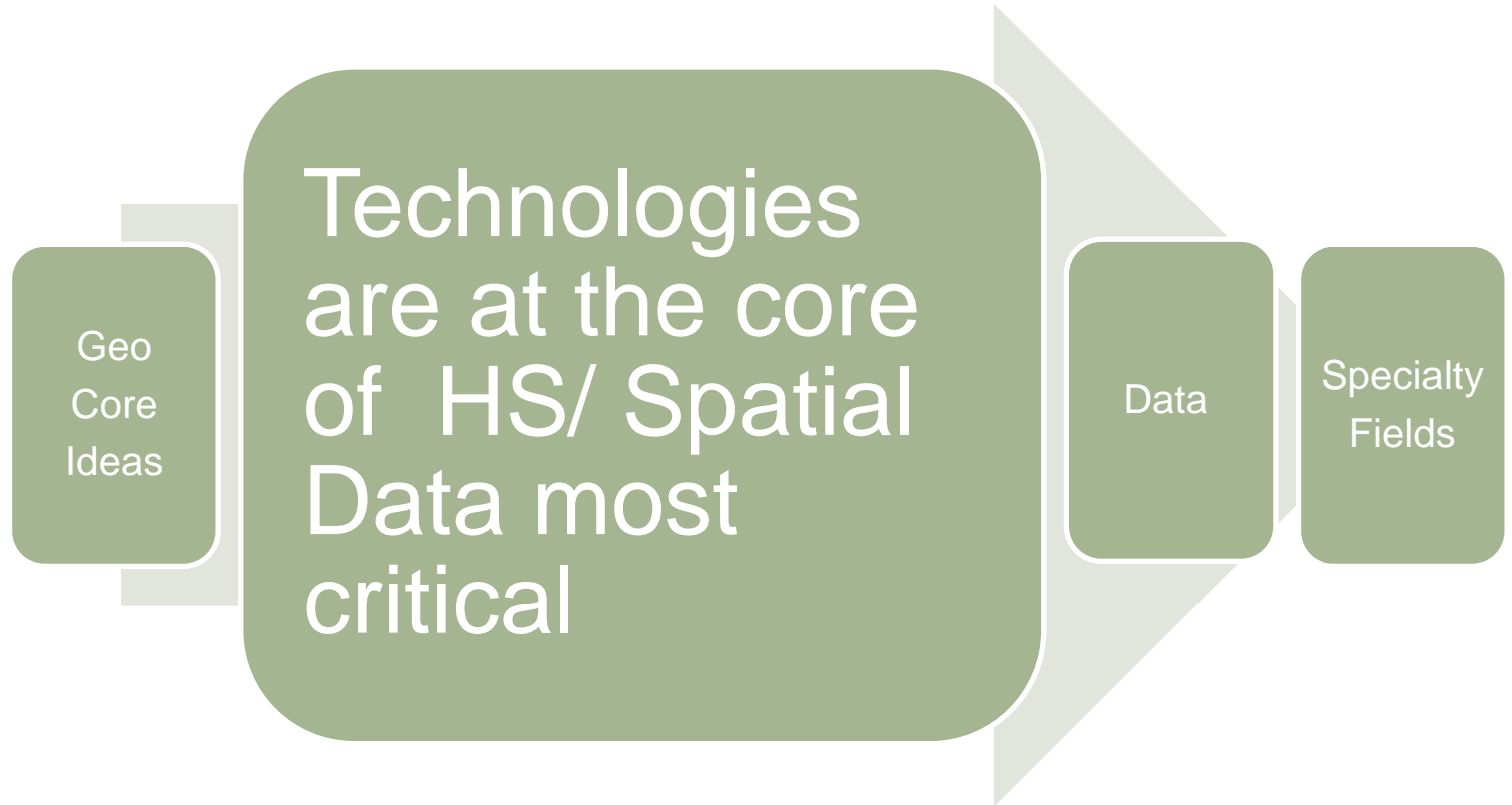
Geospatial Tech for HS Requirement **IMAGERY**





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Geospatial Information Stages





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Geospatial Preparedness

The power of Processing

Appropriate
Geospatial Assets

Imagery/data as
required

Processing



Geospatial Tech for HS

Geospatial Preparedness

The power of Processing

Inputs as per software requirements

Appropriate Software

Actionable Output



Geospatial Tech for HS

Geospatial Preparedness

The power of Processing

The human expertise

Standard Communications
& Operations

The data/the SP/the Ops
Commander all on the
same page, real time



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DHS Spatial Data Infrastructure

DHS Spatial Data Infrastructure (SDI), a subset of Enterprise Architecture, consists of geographic system software and hardware, geospatial applications, data, standards, policies, programs, and the human resources necessary to acquire, process, analyze, store, maintain, distribute, and otherwise use geospatial data as a strategic asset for the DHS and the nation



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DHS Spatial Data Infrastructure

Basis

The basis for an SDI is to identify and organize core capabilities that have common applications and to ensure the transport of data, via compatible formatting, across DHS



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DHS Spatial Data Infrastructure

What will it deliver

Completing and maintaining an SDI with integrated applications and systems would provide the level of geospatial preparedness required to protect the nation's critical infrastructure, strategic assets , economic base, and America's citizens



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Homeland Infrastructure Foundation Level Data (IHFLD) Working Group

Homeland Infrastructure Foundation Level
Data(IHFLD) Working Group

Dept of HS

Dept. of Defense

National Geospatial
Intelligence Agency

US Geological Survey



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Homeland Infrastructure Foundation Level Data
(HIFLD) Working Group

The HIFLD members recognize that to collaborate during terrorist attacks, natural disaster and other crisis, all agencies need a common operating picture and the assurance that their data is consistent and complete



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Inter- Agency Geospatial Concept of Operations GeoCONOPS

Background

In recent years, federal mission partners have been have been operating with minimal formal guidance and little direction on how to conduct geospatial support to the emergency response and homeland security operation regimes, relying instead on ad hoc coordination and best efforts



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Geospatial Concept of Operations

GeoCONOPS

Background

As a result, previous geospatial effort in support of incident management has frequently been slow to start or have been completely unavailable immediately following a disaster, leaving the “full power” and benefits of geospatial technology unrealized

GeoCONOPS ensures that timely and accurate geospatial data is shared



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Geospatial Concept of Operations

GeoCONOPS





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Geospatial Concept of Operations

GeoCONOPS

By defining the mechanisms and authorities, the **GeoCONOPS aims to reduce redundancy and confusion** and ensure efficient access to geospatial information for incident management

Geospatial technology provides a significant role in incident management. Its uses today include disaster early warning and mitigation, border monitoring, criminal investigations, public health protection and critical infrastructure oversight



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National Geospatial-Intelligence Agency (NGA)

The **National Geospatial-Intelligence Agency (NGA)** is an agency of the federal government of the United States with the primary mission of collecting, analyzing, and distributing geospatial intelligence (GEOINT) in support of national security.



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The National Geospatial-Intelligence
Agency

"Know the Earth...

Show the Way...

Understand the World"



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The National Geospatial-Intelligence Agency

The NGA was credited by White House and military officials with providing critical information in support of [Operation Neptune's Spear](#) on May 2, 2011, in which the United States Military raided a secret compound housing [Osama Bin Laden](#) in Abbottabad, Pakistan, at which time he was killed in action.



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Geospatial Preparedness

The Final Destination

Means the level of **overall capability and capacity necessary to enable all levels** of the Dept to use geospatial data, geographic information systems software and hardware, and geospatial applications **to perform essential functions such as prevention, detection, planning, mitigation, response, and recovery in order to minimize loss of life and property** from weapons of mass destruction, terrorist threats, major threats, major man made accidents, and natural disasters



Geospatial Tech for HS Homeland Security

- Homeland security is an umbrella term for security efforts to protect the United States against terrorist activity
- United States Department of Homeland Security (DHS), is a new cabinet department established as a result of the Homeland Security Act of 2002.



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- United States National Guard,
- Federal Emergency Management Agency,
- United States Coast Guard,
- U.S. Customs and Border Protection,
- U.S. Immigration and Customs Enforcement,
- United States Citizenship and Immigration Services,
- United States Secret Service,
- Transportation Security Administration,
- Civil Air Patrol etc



Geospatial Tech for HS Homeland Security

Homeland security is officially defined by the National Strategy for Homeland Security as

“ a concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism, and minimize the damage and recover from attacks that do occur ”



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Scope of Homeland Security

- Emergency preparedness and response (for both terrorism and natural disasters), including volunteer medical, police, emergency management, and fire personnel;
- Domestic intelligence activities, largely today within the FBI;
- Critical infrastructure and perimeter protection;
- Border security, including both land, maritime and country borders;



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Scope of Homeland Security...

- Transportation security, including aviation and maritime transportation;
- Biodefense;
- Detection of radioactive and radiological materials;
- Research on next-generation security technologies.



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Some applications in Homeland Security

Terrain plays a key role/nature and profile of the terrain

Security of Critical Infrastructure and Mass Transportation Systems



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Some applications in Homeland Security

The information about the **floor plan and the structure** of the building can help in designing the security plan for the same

Living Memory Provides For Large Number Of Such Examples.

This itself can transform our confidence level in our day to law enforcement



Geospatial Technology

Some applications in Homeland Security

Geospatial Technology provides enhanced geospatial understanding of a facilities vulnerabilities and speed up detection and response time in the event of a security breach

Rapid access to extensive data, displayed in a geospatial medium helps protect critical assets and infrastructure and ensures public safety



Asymmetric Warfare

Remote Sensing Data Policy

Department of Space (DOS) of the Government of India will be the nodal agency for all actions under this policy, unless otherwise stated.

For operating a remote sensing satellite from India, license and/or permission of the Government, through the nodal agency, will be necessary.



Asymmetric Warfare

Remote Sensing Data Policy

As a national commitment and as a “public good”, Government assures a continuous/improving observing/imaging capability from its own Indian Remote Sensing Satellites (IRS) program



Asymmetric Warfare

National Remote Sensing Policy

Government guidelines for dissemination of satellite remote sensing data in India:

All data of resolutions up to 5.8 m shall be distributed on a nondiscriminatory basis and on “as requested basis”

With a view to protect national security interests, all data of 5.8 m and better than 5.8 m resolution images will be screened by the appropriate agency before distribution so that images of sensitive areas are excluded.



Asymmetric Warfare

National Remote Sensing Policy

NRSA will be **competent to enter** into **agreements** with foreign satellite operators for acquisition/distribution of **foreign satellite data** in India. However, so far the acquisition/distribution of **IKONOS data** in India is concerned, Antrix Corporation Limited (of DoS) will conclude agreements with **Space Imaging Coporation** on such terms and conditions as may considered appropriate by it and **NRSA will distribute** as per the terms agreed with Antrix



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Most Critical Input

- Geospatial data **dovetails perfectly** with homeland security, law enforcement and emergency response at all levels.
- It enables people to know **where they are**, find **where** they **need to go**, **what** they can expect **to find there** and how to effectively deal with it.
- It can **greatly improve information sharing and decision making**.



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Most Critical Input

Geospatial Technologies help overcome the enormous challenges associated with major incidents.

think of a Osama type operation for 26/11?



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Objective Data

- Geospatial mapping also helps **remove language barriers** among mission partners.
- Each specialty has its own lexicon that other partners may not fully understand.



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Objective Data

- Geospatial mapping enables people to comprehend data **without having to learn different disciplines' jargon.**
- This has the important **side benefit of fostering better relationships** and trust among mission partners.



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The real usage

- Geospatial technology is already integrated into many U.S. fire and police departments.
- Specialized mobile devices and smart phones equipped with mobile applications are now commonplace.



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The real usage

- Most fire and **police vehicles** have laptops running mapping software, which enables them to respond more quickly and accurately to incidents.
- They can determine if a route is blocked or will accommodate their vehicle.
- That kind of real-time insight makes a real difference.



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The Future

- Recent years have seen **quantum jump** in the use of this technology- quantitative and qualitative
- In coming years, geospatial technologies will only become **more common, powerful and intuitive.**
- The proven business case for their utility will drive **integration** with other existing technologies (voice recognition, for instance) and **innovation** into new areas.



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The Future

- The proliferation of Web mapping services will make it easier to share information across federal, state and local levels.
- It will continue to become easier to fuse different kinds of data and build even more layered, detailed maps to aid near real-time decision making.



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The Future

The ability to integrate information in a geospatial context will improve our nation's responders' ability to think visually, prepare nationally and respond locally – leading to a safer country for us all.



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Conclusion

A paradigm shift in the thought process of the Internal Security apparatus, to treat geospatial inputs at par with intelligence, easy availability of imagery of the right level of resolution, direct communication between the user and the provider, prescribed standards and uniformity, right governance structures and a software to boast of, run by enviable human resources, is the panacea



thank

YOU



In Aid of Homeland Security





In Aid of Homeland Security



Geospatial Technology you are lost without it

Impacts everything from navigation to law enforcement

Case studies - Snapshots

DESIRED SCENARIO

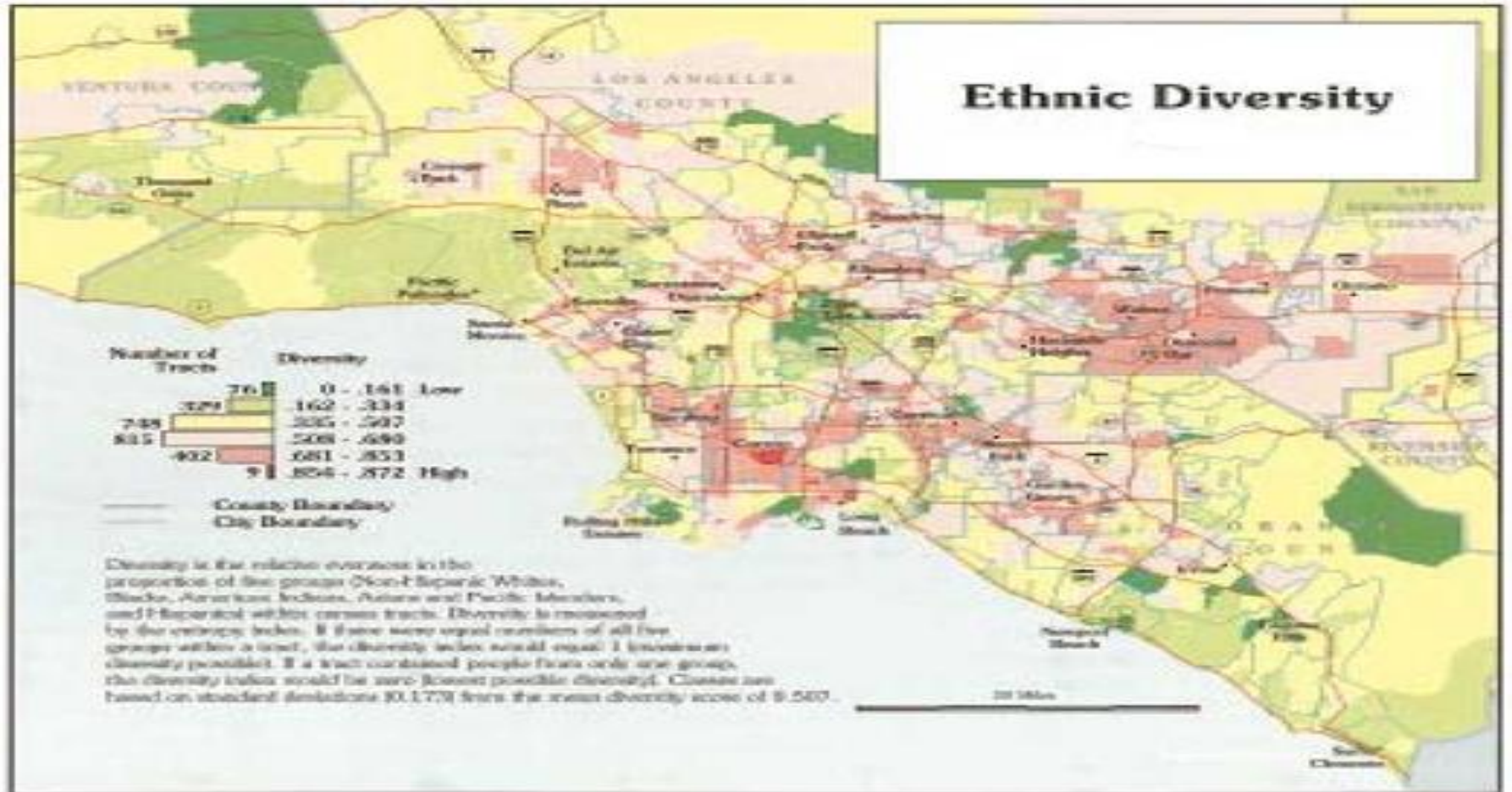


Analysis of Crime Mapping Data



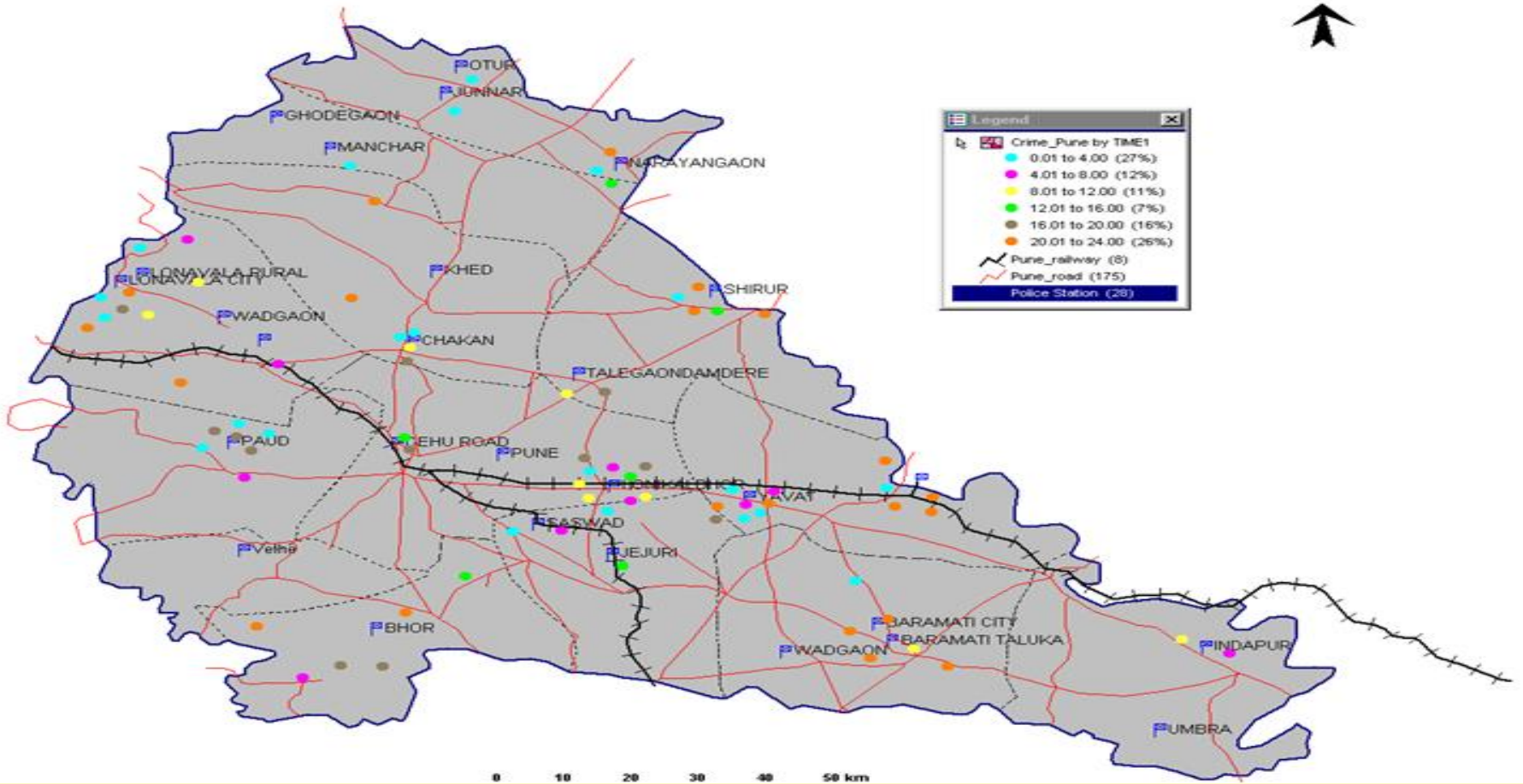


Religion wise classification



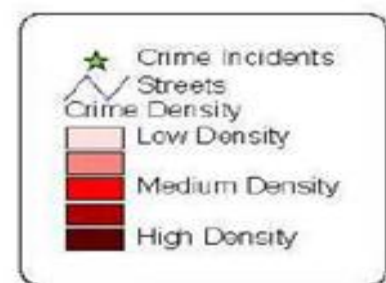
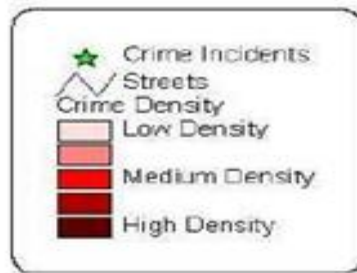
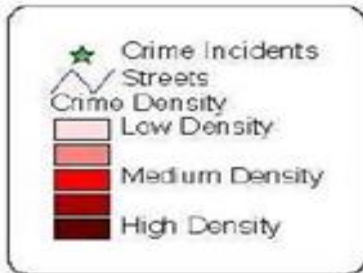
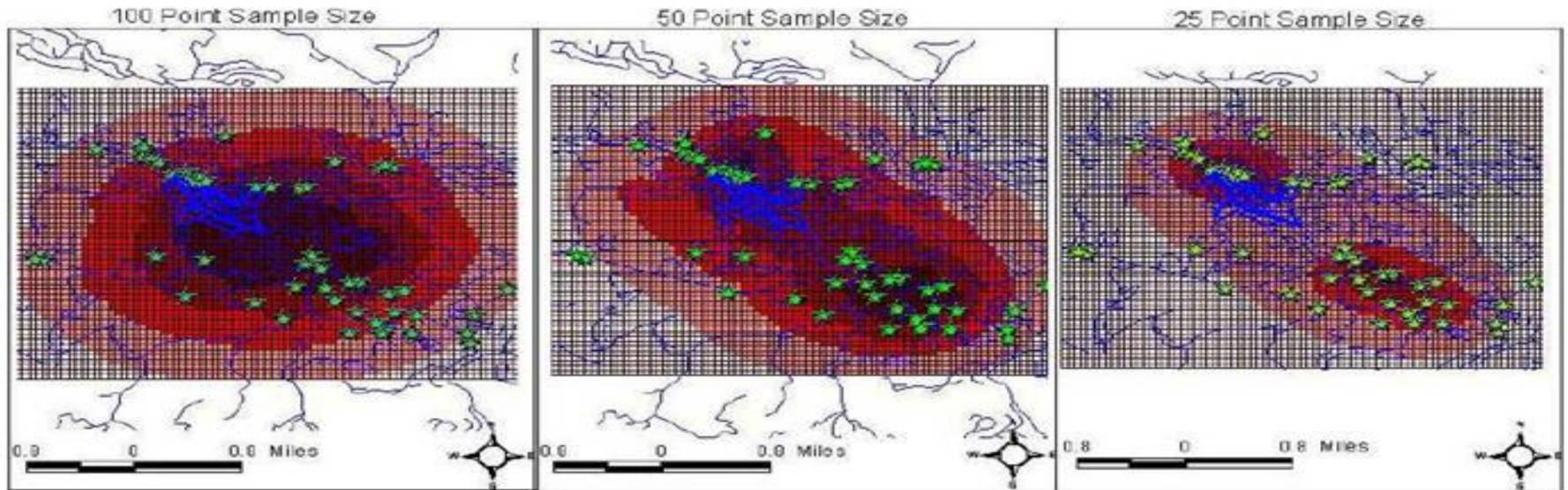


Classification based on Crime time



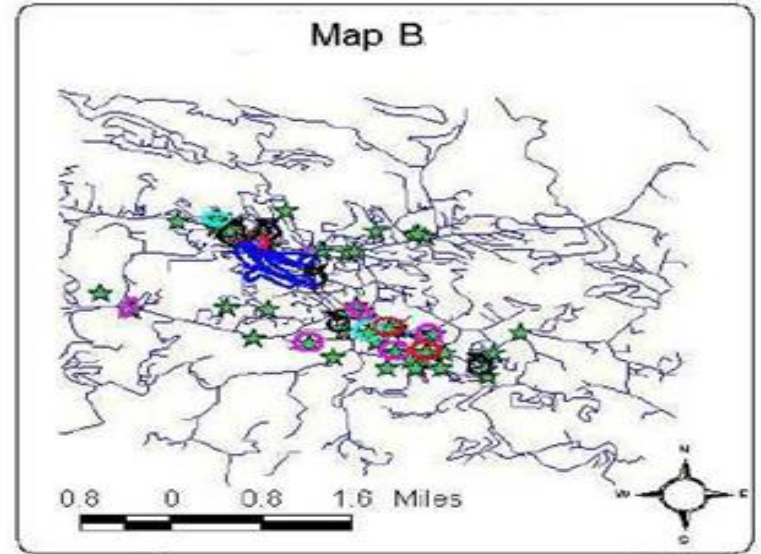
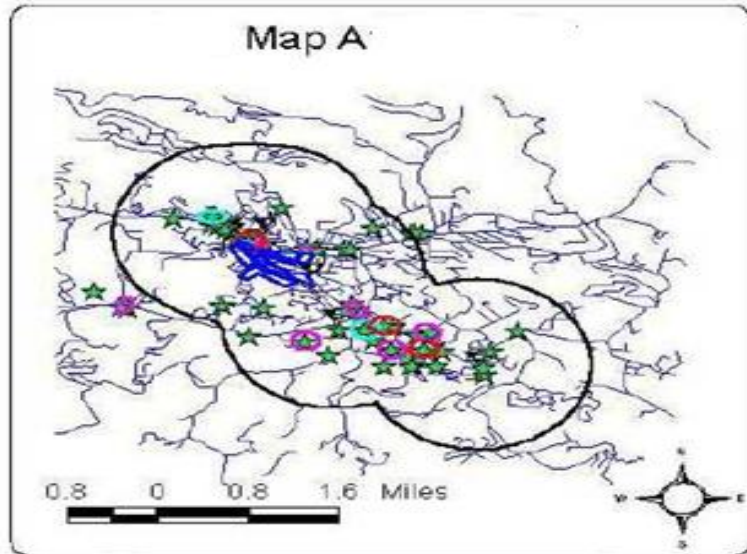


Crime Analysis



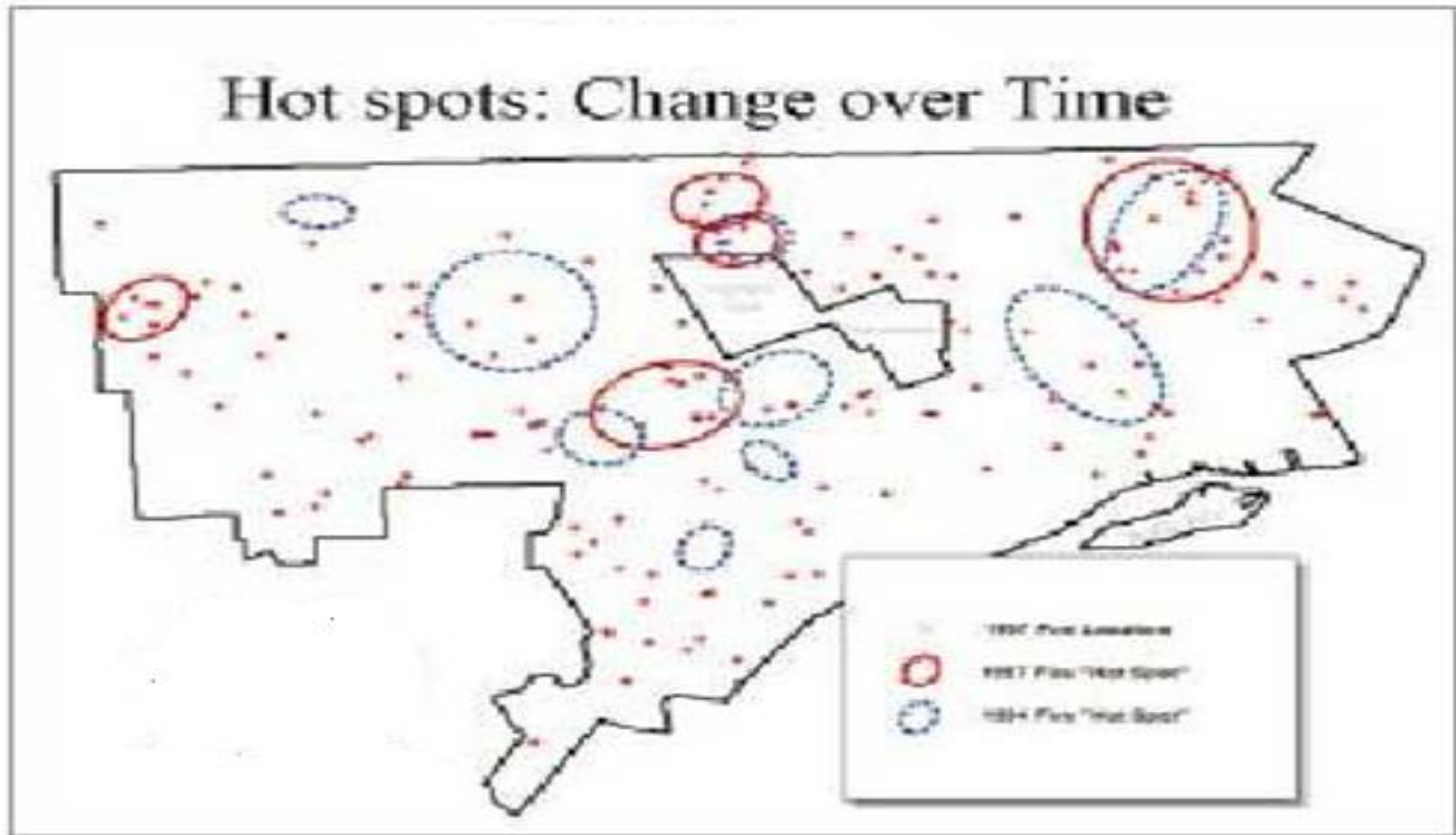


High Risk Crime Zones



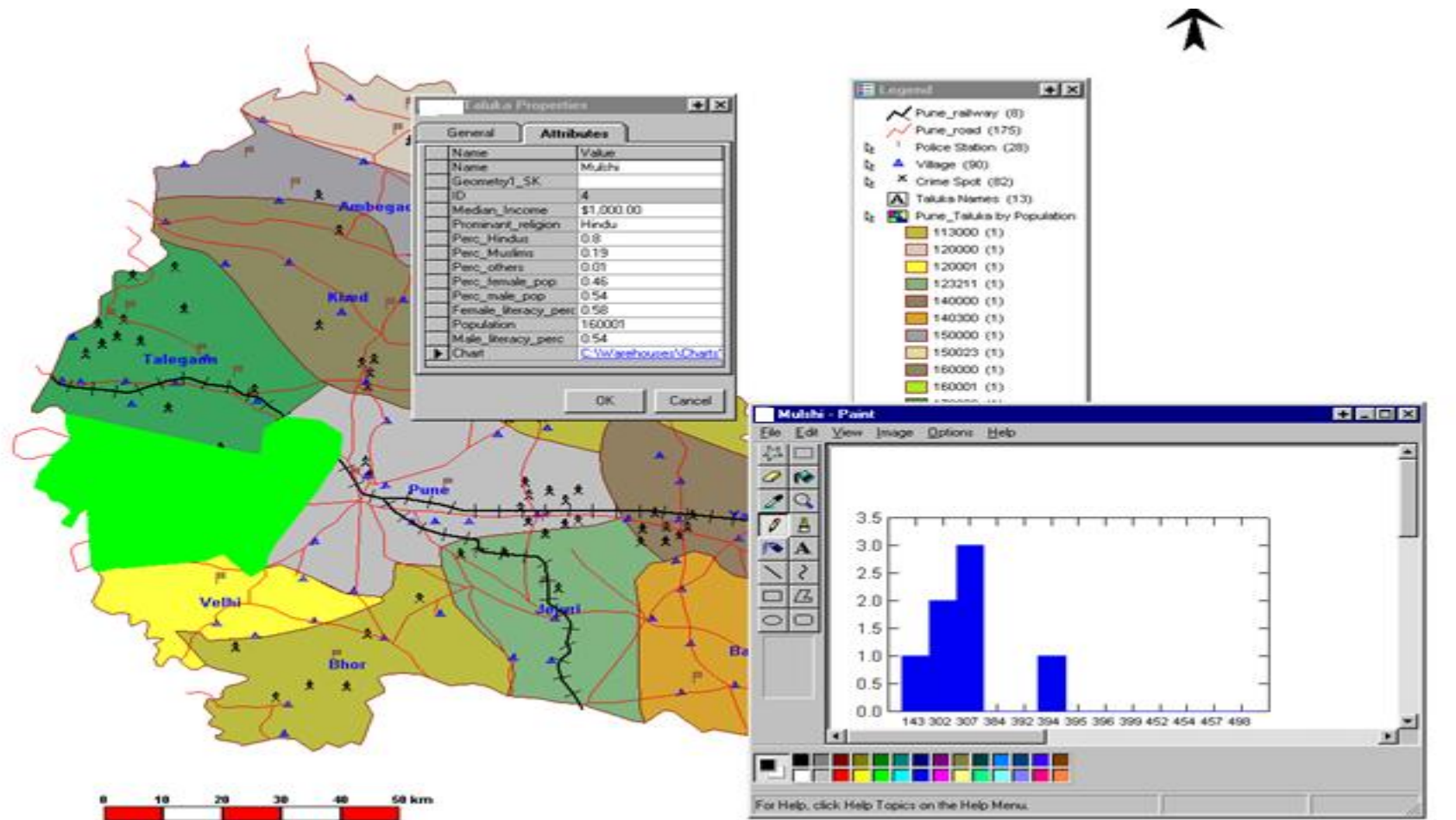


Hot Spots : Change over Time



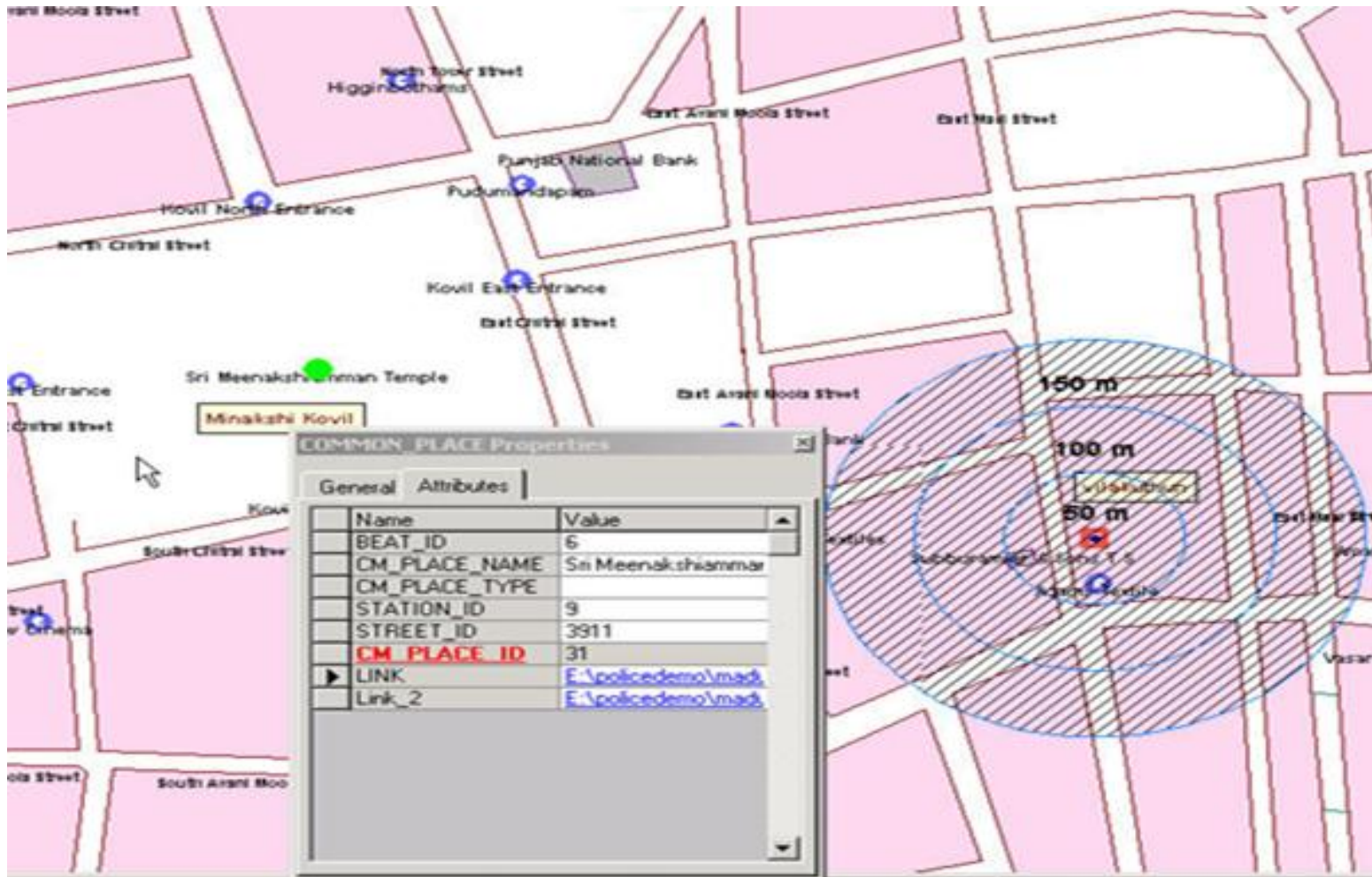


Traffic Crime and Graphical Analysis



Buffer zone

64



Thematic Maps

65

