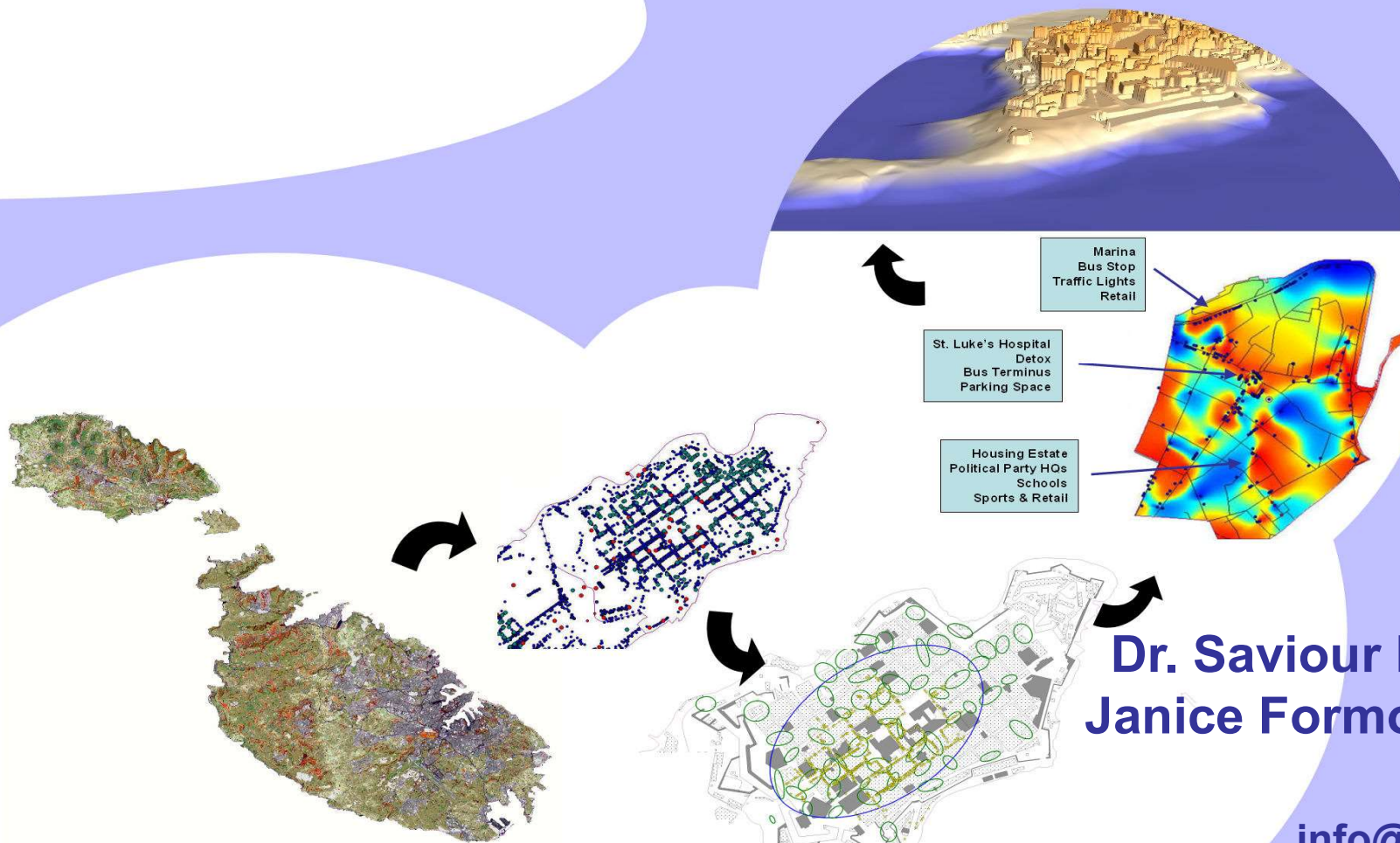


'The Impact of Land Use and Environmental stressors upon Mental Health, Criminology and Other Social Factors: a spatio-temporal approach'

"The Environment and its effects on Mental Health"
Seminar – Richmond Foundation



Dr. Saviour Formosa PhD
Janice Formosa Pace MSc

24th April 2008

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Presentation Plan

- Why do we need to view society employing new research perspectives:
an urban ecology approach
 - A spatio-temporal vision
 - The GI Tech component
- Landuse, crime and social aspects: the **CRISOLA** model
- Spatial concepts and results
- Landuse Planning
- Future Issues



How can we study urban ecology?

What tools are available?

Tools are varied:

- some are linked to traditional manual approaches
- others to transition methods (manual and digital)
- latest to high-end technology

All need the scientific approach but some need more than just a helping hand...

So technology raises its head: a socio-technic approach

Amongst these technologies are:

- statistical software such as SPSS, SAS, etc

Spatial Scientists deal with **GIS**



Why use crime as a surrogate for mental health?

It is an 'activity' that impinges on an individual's actions on the societal fabric and vice versa.

Irrespective of theme, the activities of the individual are somehow linked to a point in space.

Criminology deals mainly with the basic issue of one's rights and obligations. This includes the linked process of harm caused to:

- i) victims and to
- ii) social consensus and includes also
- iii) official societal response

(McLaughlin et al, 2001, 59)

The methodology used in understanding the above can be transposed to the study of Mental Health.



Urban Ecology - Environmental Criminology

What is this?

Chicago to UK to Malta

Park and Burgess's zone model of urban development

The Concentric Zone Model:

1. Central Business District

2. Transitional Zone

***Recent Immigrant Groups*

—Deteriorated Housing

—Factories

—Abandoned Buildings

3. Working Class Zone

—Single Family Tenements

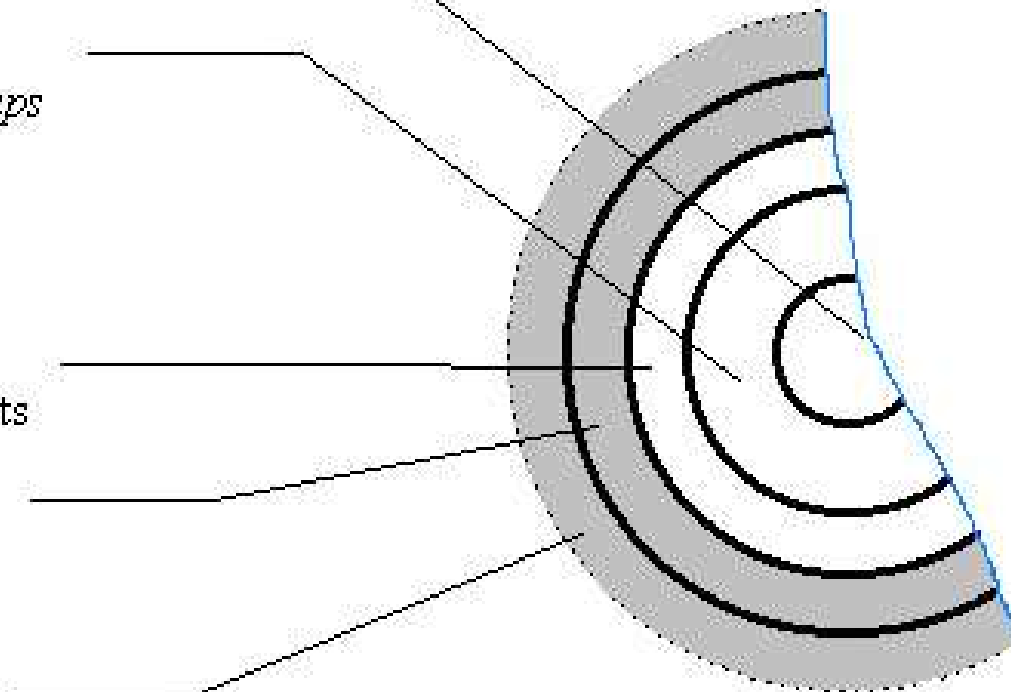
4. Residential Zone

—Single Family Homes

—Yards/Garages

5. Commuter Zone

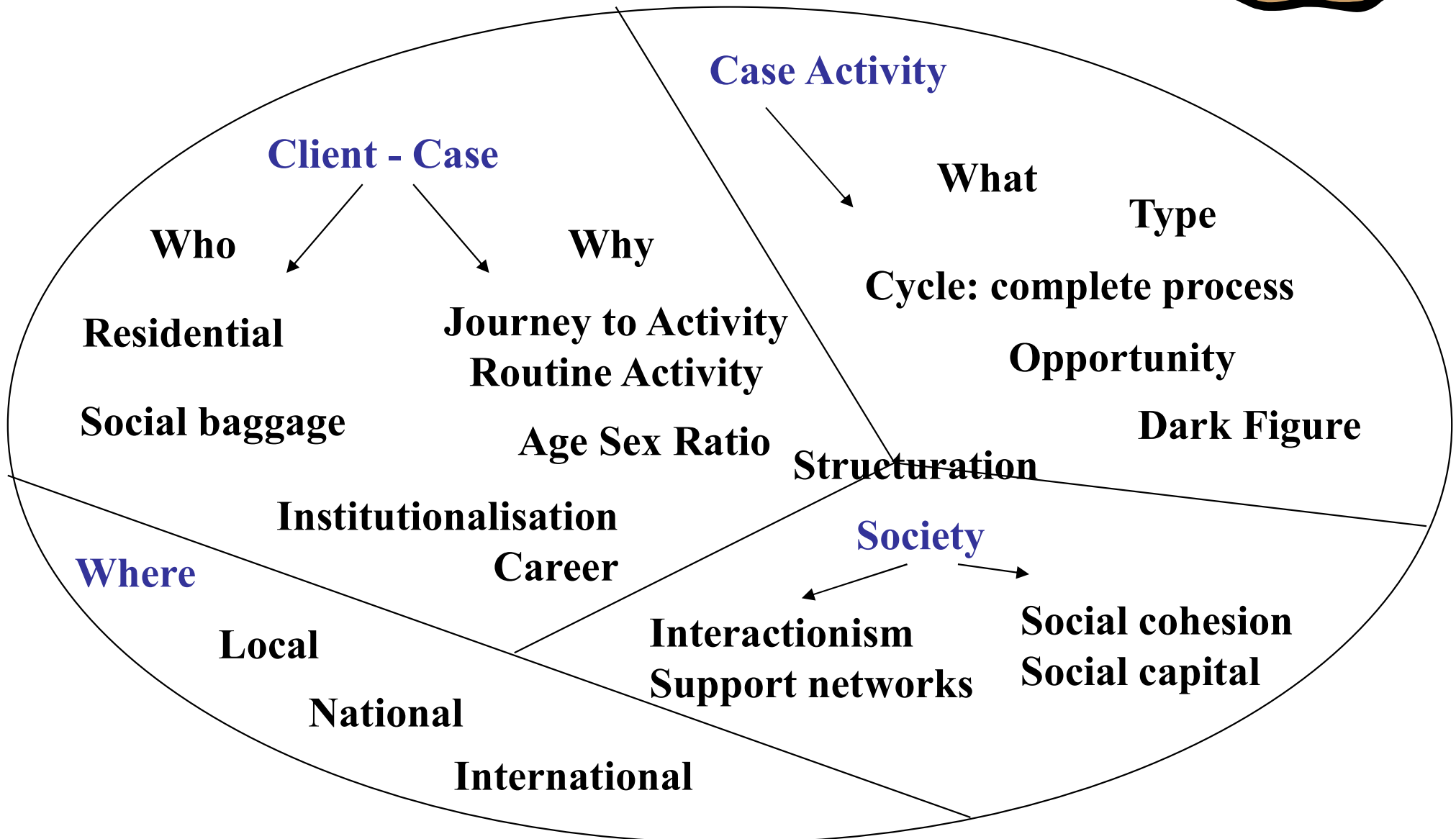
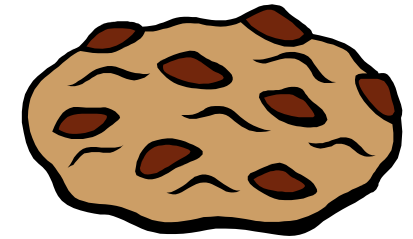
—Suburbs



Source: <http://www.csiss.org/classics/content/66>



Ingredients in the Environment Cookie: W6H



What is a GIS?

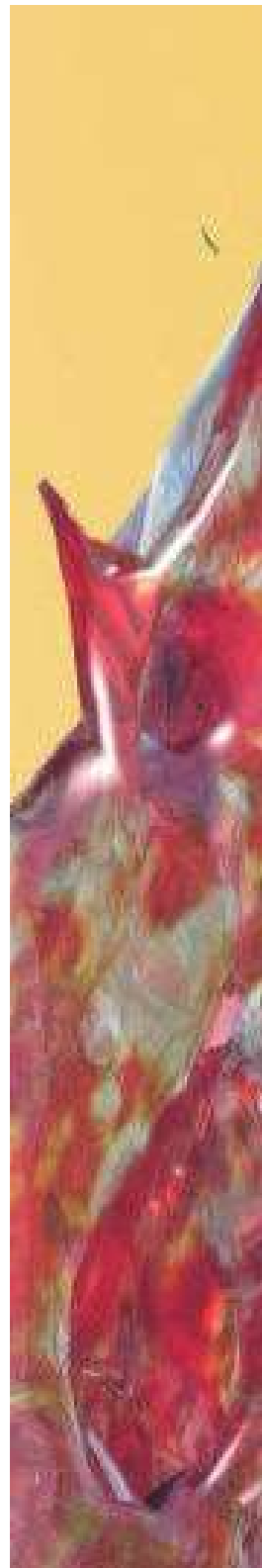
Geographical Information System

“A geographical information system is a group of procedures that provide data input, storage and retrieval, mapping and spatial and attribute data to support the decision-making of the organisation”
(Grimshaw, 1994)

Military	to	Physical/Urban	to	Environmental	to	Social
1960s	to	1980s-1990s	to	1990s-2000s	to	2000s

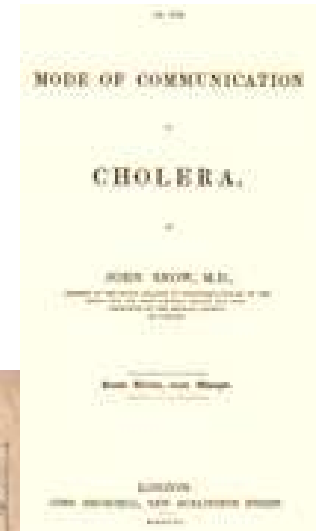
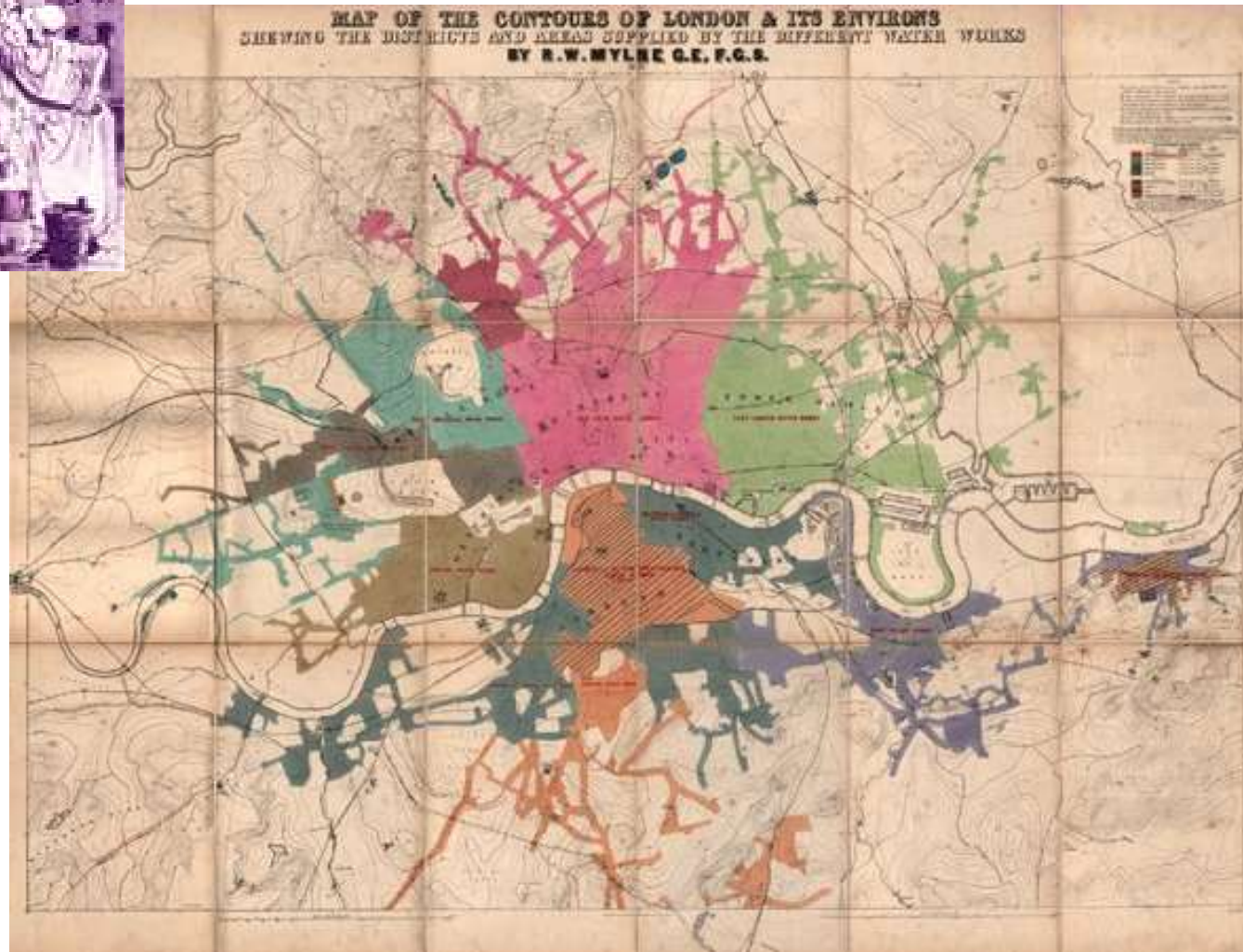
Theoretical and practical issues are spreading beyond mere use to incorporate the hard-scientific physical and earth sciences approach to the more complex **fuzzy** concepts identified by social-scientific theories.

Techno-Centric or Socio-Technic Approach?



Pre-Technology GIS

First Use: Dr. Snow: 1854 Soho-London - Mapping of Cholera

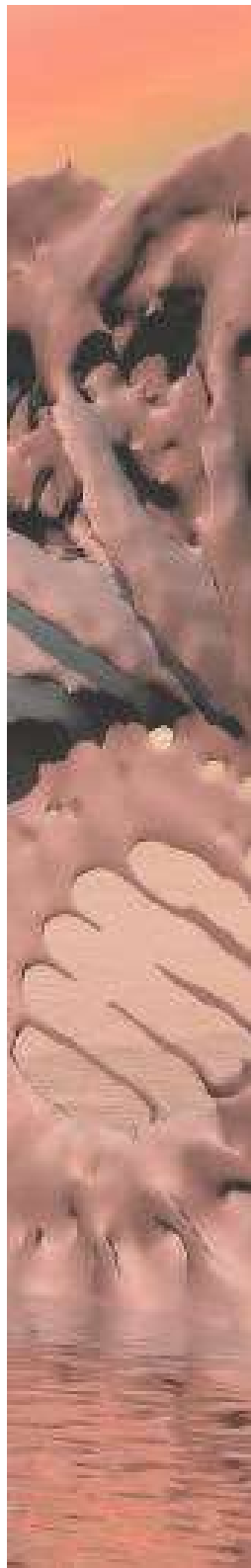


CRISOLA

Model

a case of
crime, social and landuse
interactivity

(the challenge is to transpose the crime theme to other
bio-psycho-social themes)



Analytical Constructs

Thematic – analysis based on specific themes (disciplines)

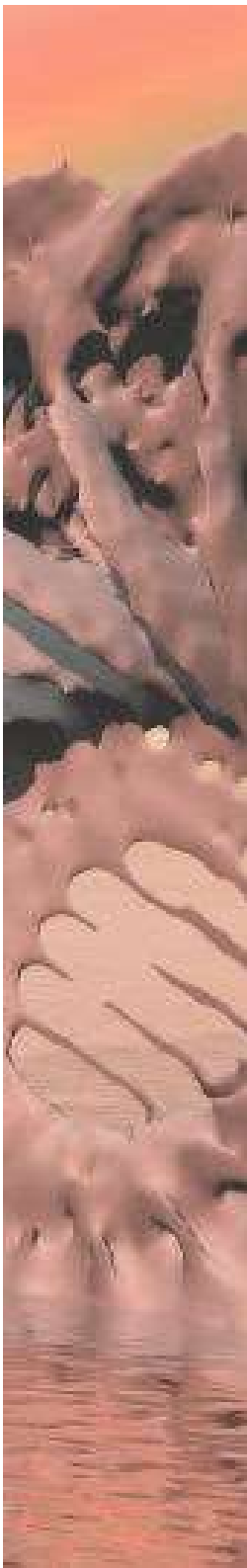
- i) zoning – development zoning (retail & resource availability)
- ii) income analysis – poverty and deprivation
- iii) crime analysis – offence analysis and predictability
- iv) mental health analysis – incidence and support – social cohesion

Geographical – based on exact coordinates on a geographical map

Spatial – based on the context within which the geographical location is situated

Temporal – study in time / over time

- i) cross-sectional – incidences in Gozo in 2004
- ii) longitudinal – incidences in Gozo in 1995, 2000, 2005



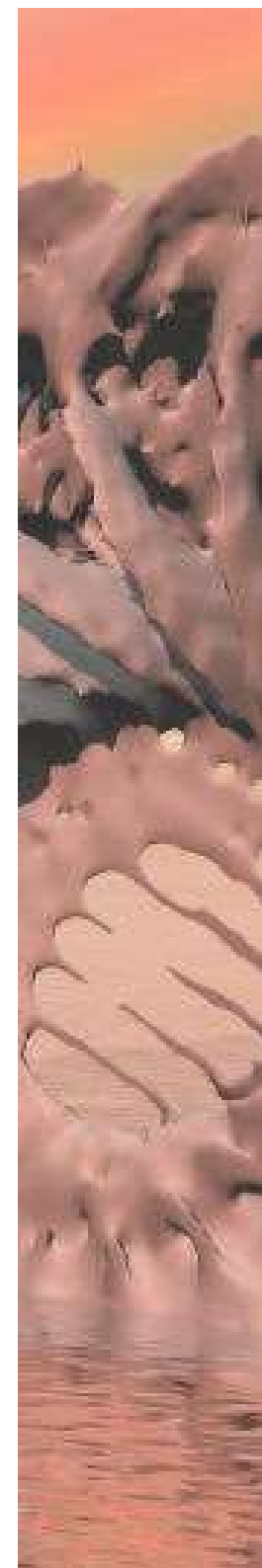
CRISOLA

Phase 1 - Conceptual Model Logical Matrix

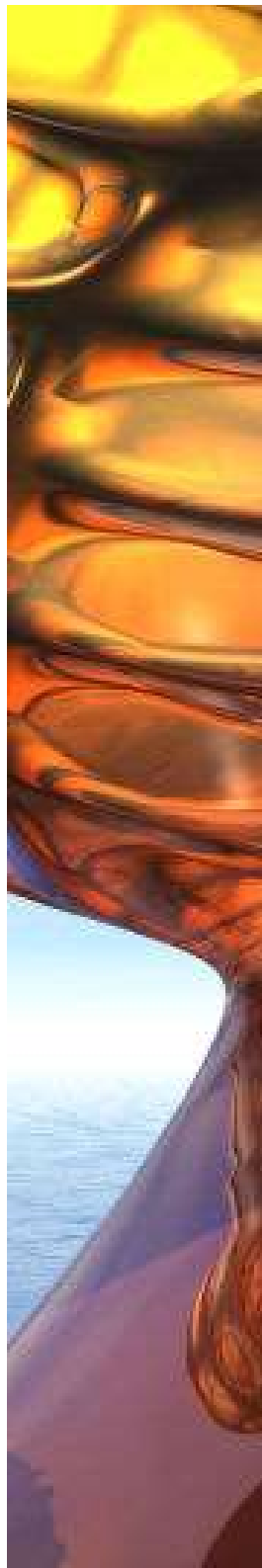
Phase 2 – Identifying the linkages

Phase 3 – Identifying the datasets and attributes

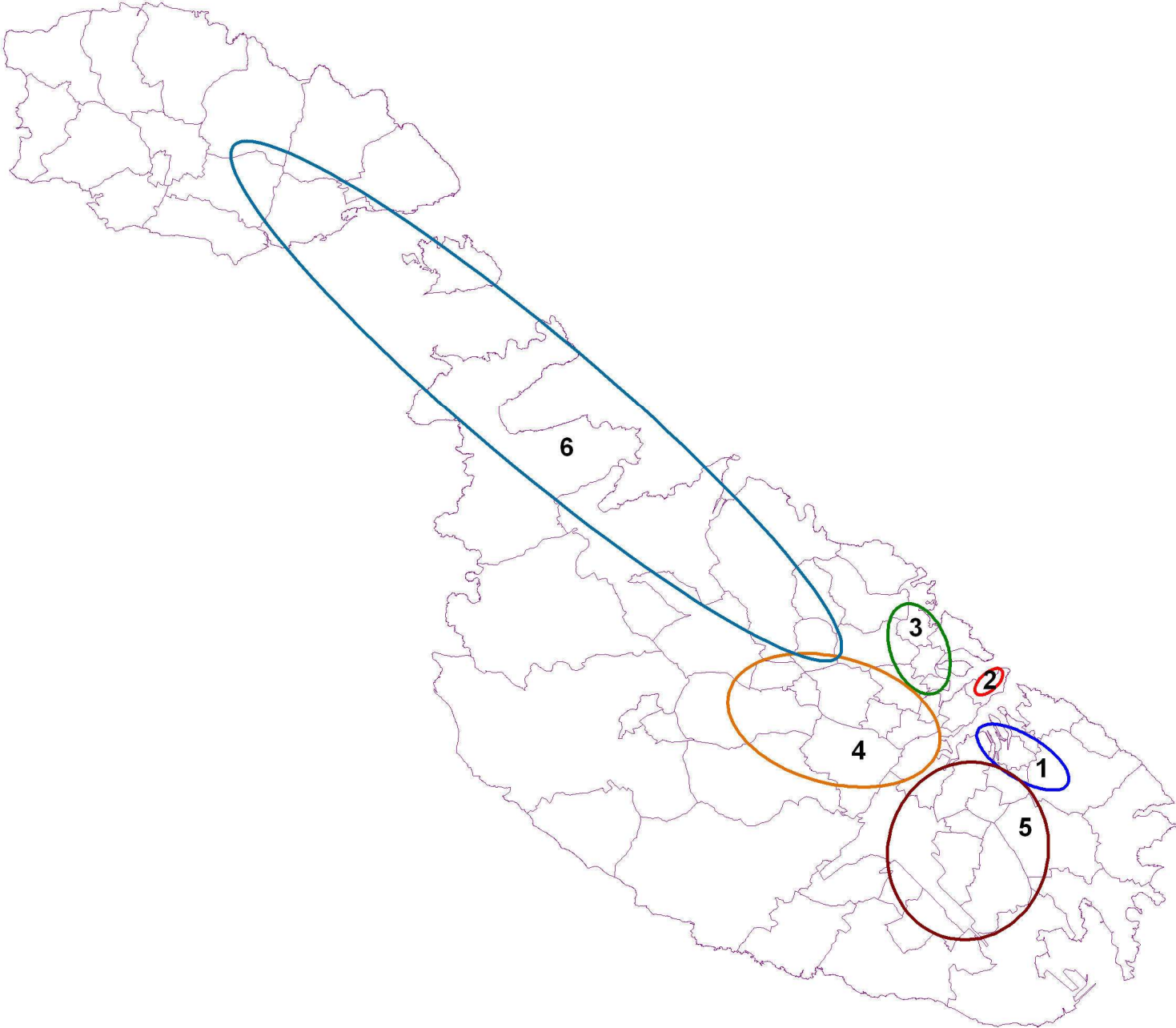
	Social	Crime	Urban
Analyse Constructs	Analysis of the Social structure of the area under study	Analysis of crime in the area under study through offences and the behaviour of offenders	Analysis of spatial constructs through a study of landuse zoning, spatial aggregates and physical structures
	↓	↓	↓
Focus Setting	Focuses on socio-economic and socio-cultural parameters towards an understanding of poverty and deprivation as a surrogate for social and community health	Focuses on offences as a measure of attractiveness of an area and focuses on offender data as a measure of social disorganization	Focuses on landuse zoning as a measure of affluence, leading to an understanding of opportunity structures
	↓	↓	↓
Identify Spatial Issues	Identifies the social-spatial constitution of the areas, leading to a social-zoning structure	Identifies the criminal-spatial constitution of the areas leading to a crime-zoning structure	Identifies the physical constitution of the areas leading to a landuse-zoning structure
	↓	↓	↓
Assess Impact	Impact on social capital – social cohesion	Impact on security and safety	Impact on spatial capital
	↓	↓	↓
Effect Change	Social change	Crime change	Landuse change



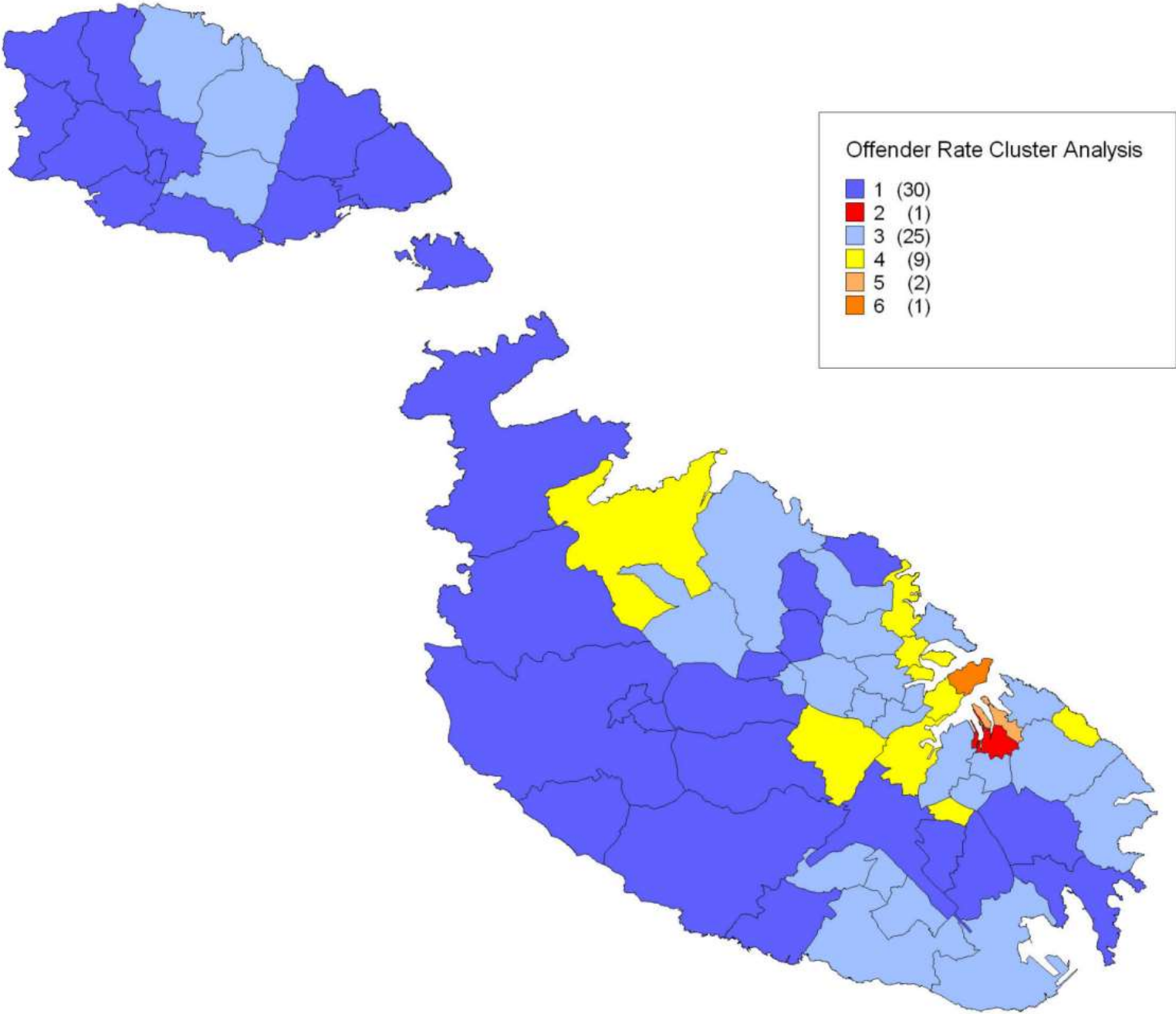
Some results from urban ecology



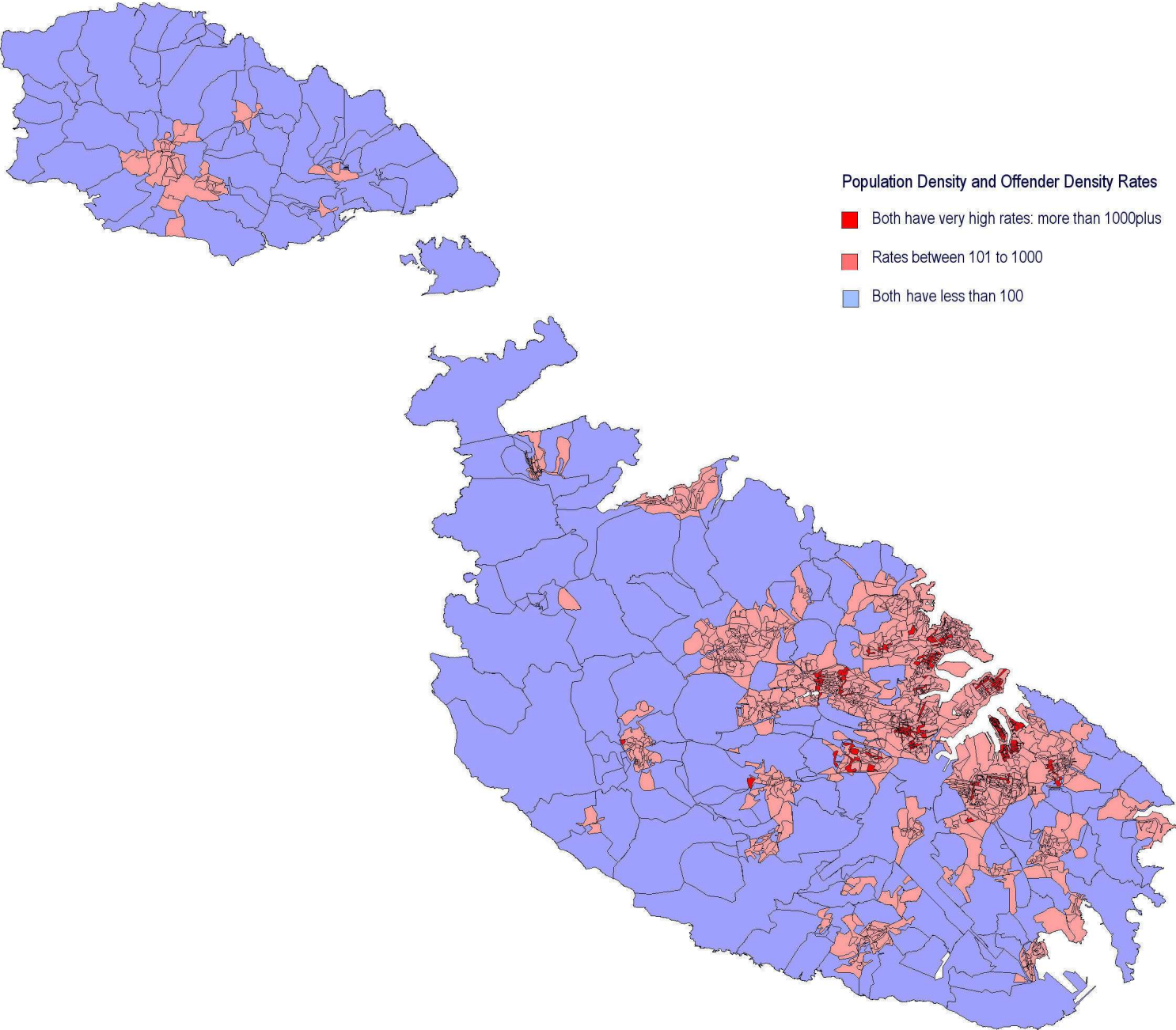
Case clusters in 1990s – points at national scale



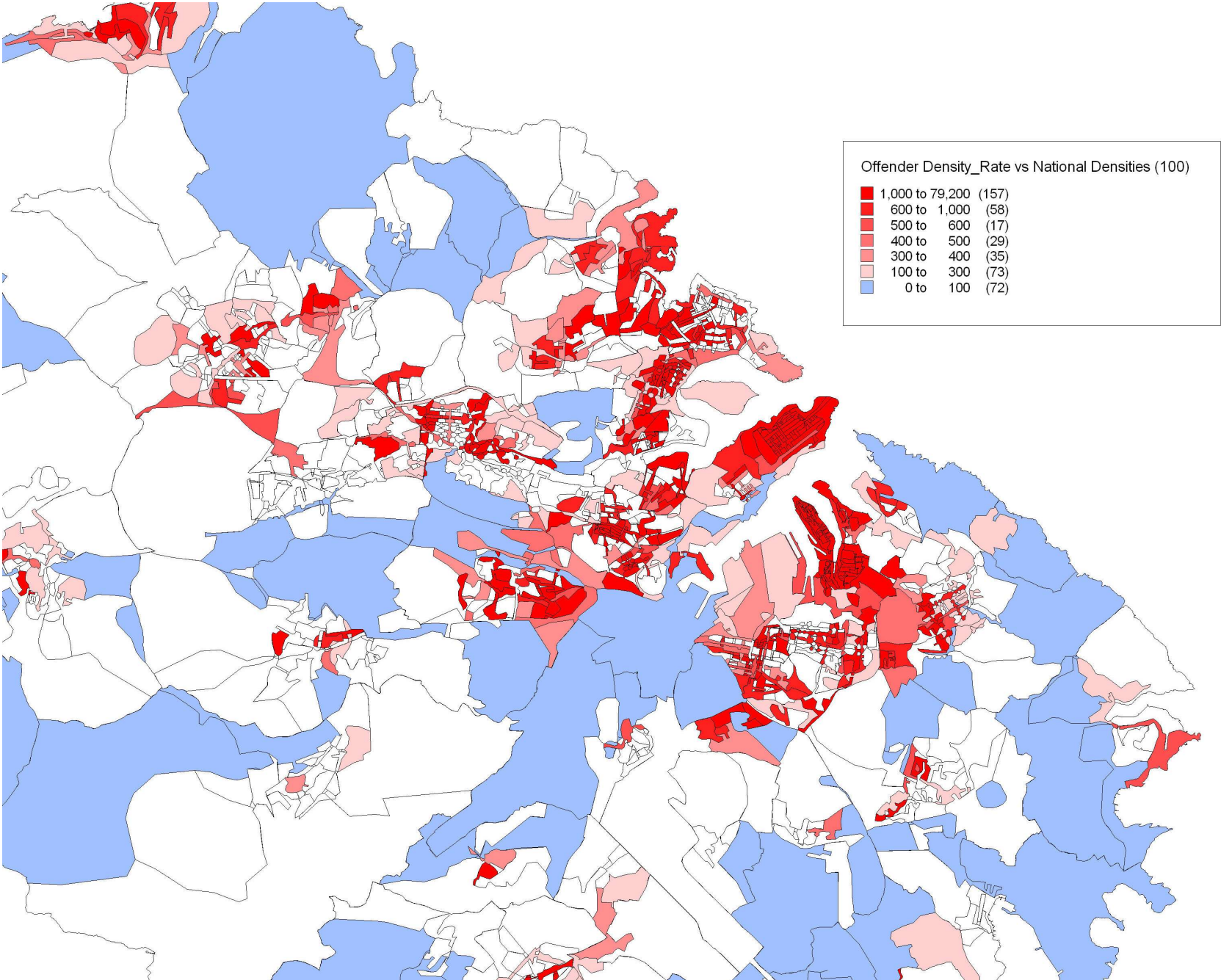
Case cluster analysis – polygons at local scale



Case densities by EAs: popdens-case correlation

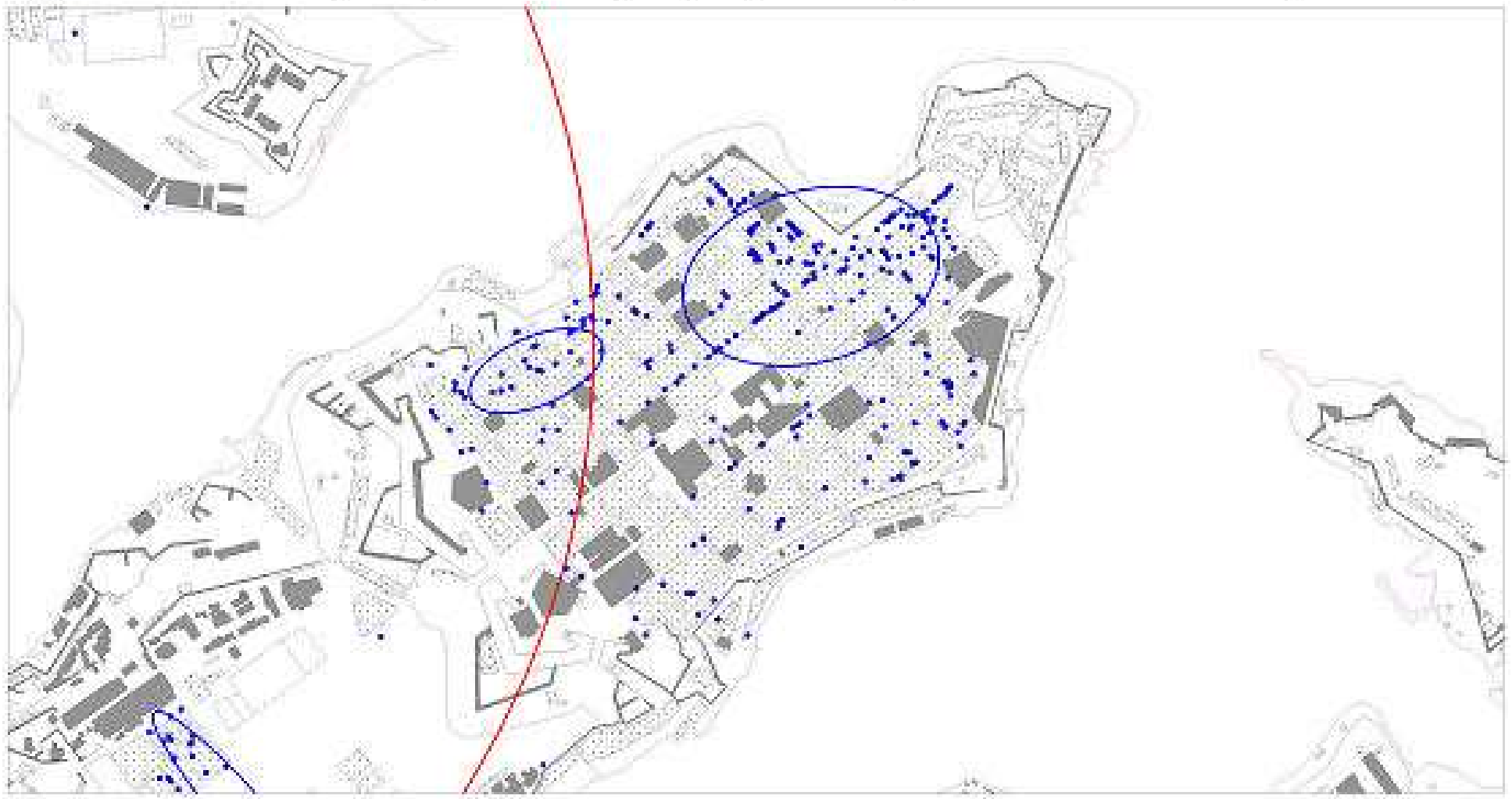


Case densities: EAs vs National densities



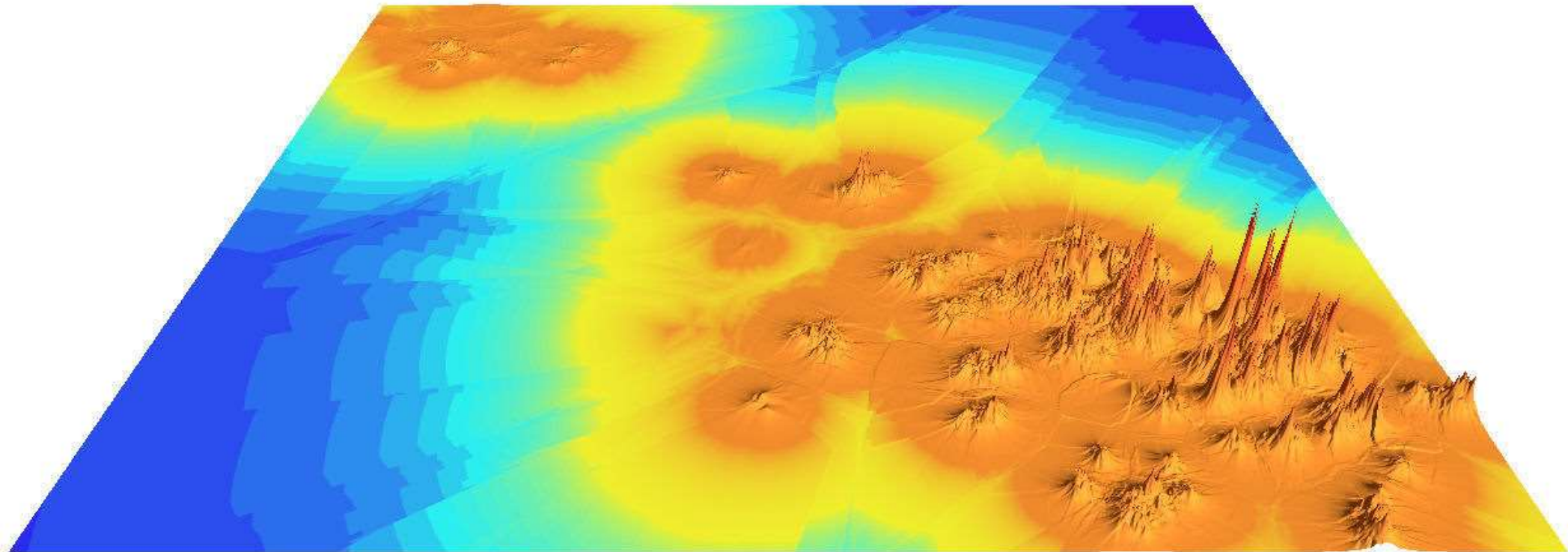
Case hotspots: a spatio-statistical approach

Figure 8.26d: 1NNH (blue) and 2NNH (red) map showing the Valletta 1990s' hotspots



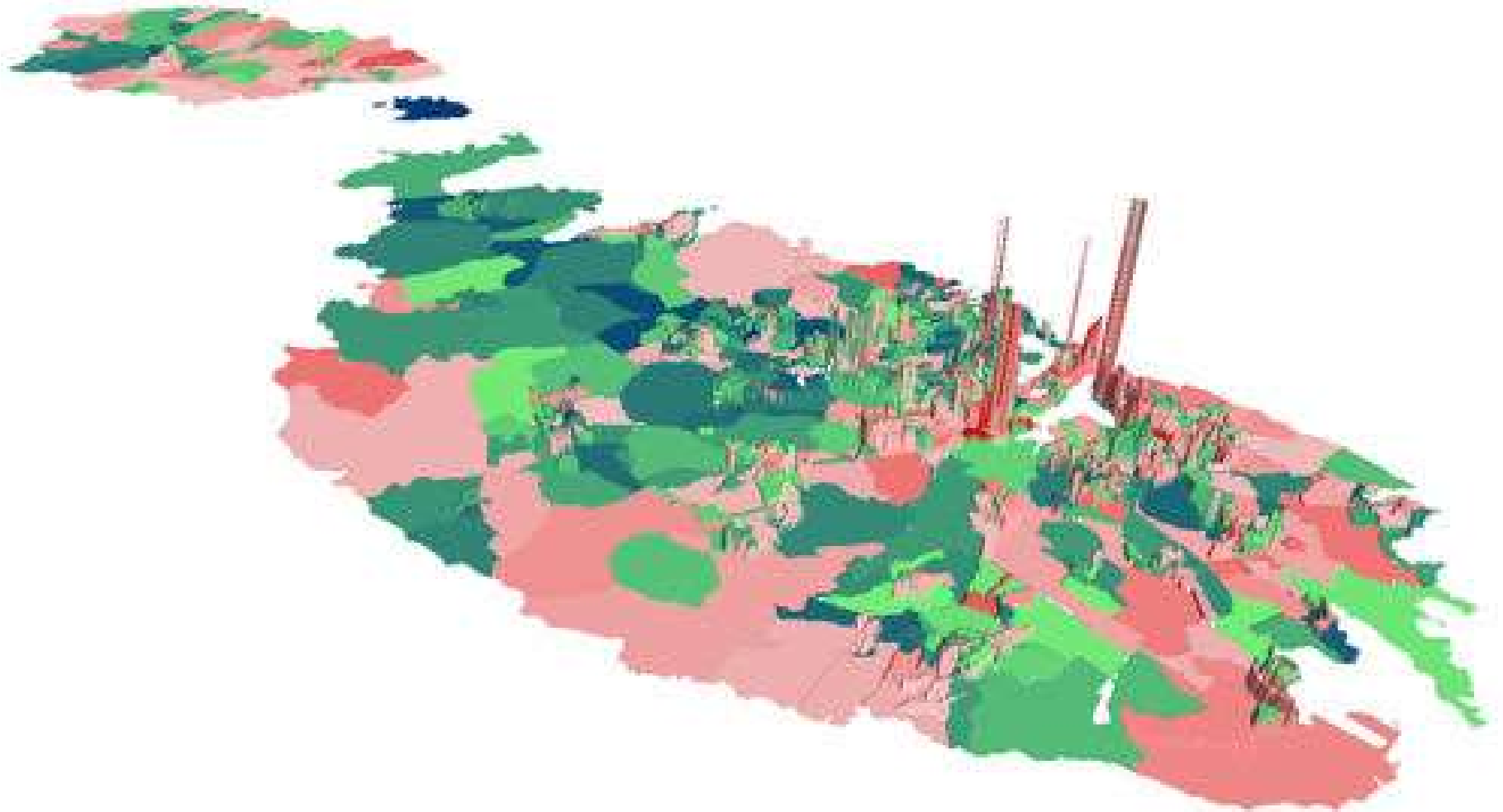
Poverty hotspots: a spatio-statistical approach

Unemployment 2003



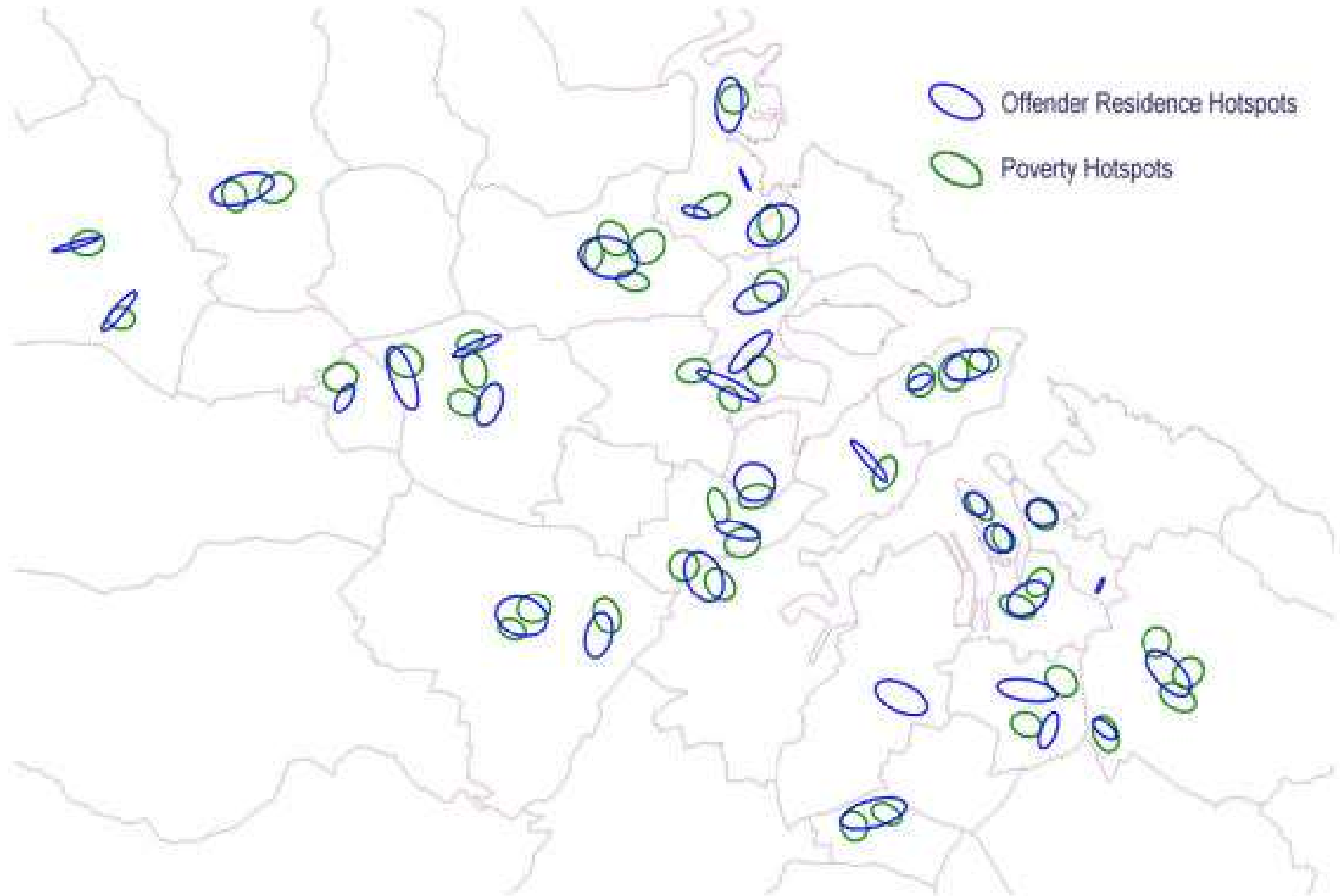
Poverty hotspots: a spatio-statistical approach

Figure 8.37: Risk of Poverty map draped over a population density map



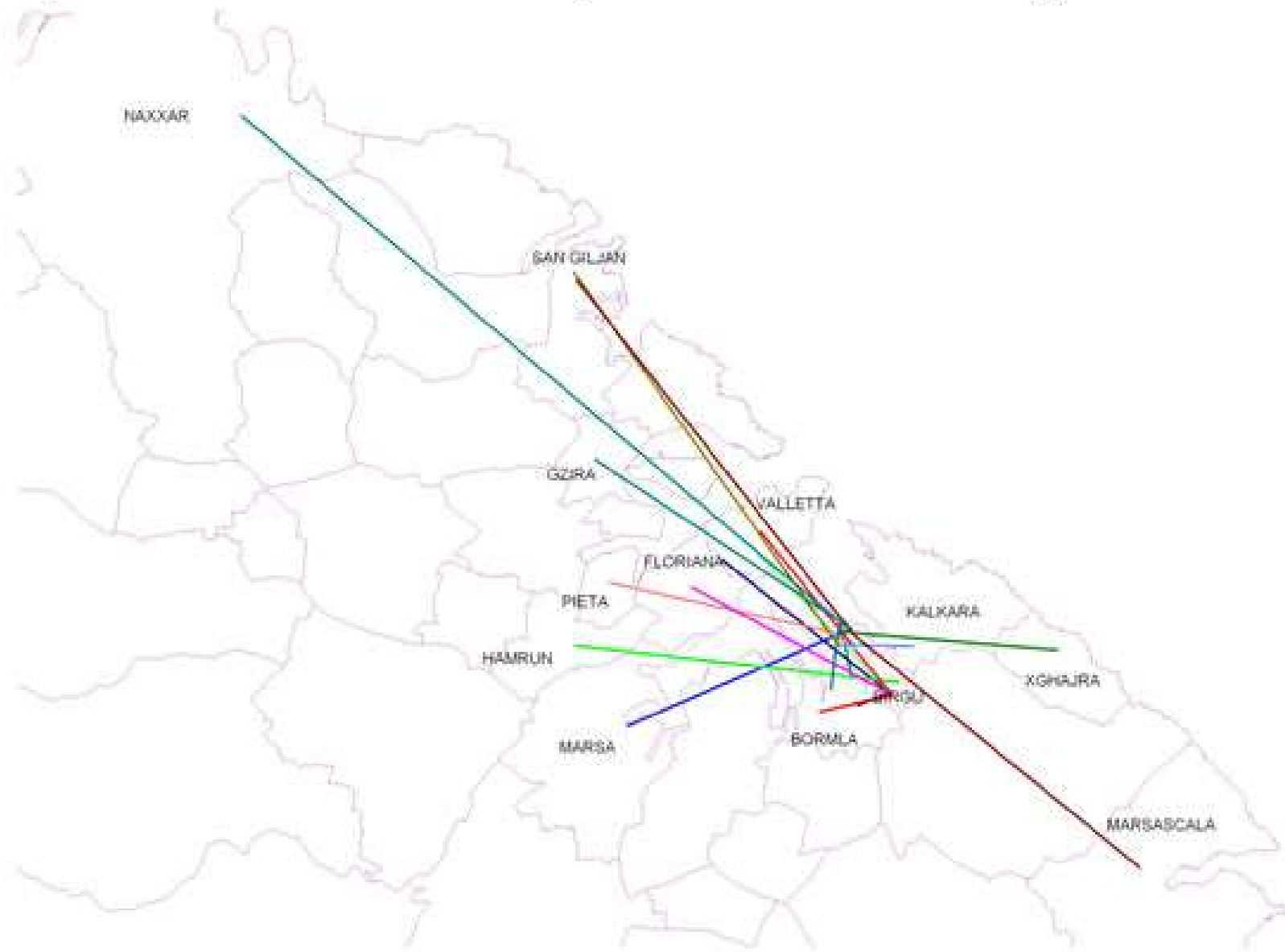
Case/poverty hotspots: a spatio-statistical approach

Figure 8.39: 1NNH hotspot analysis for offender residence and poverty



Case journey : a spatio-statistical approach

Figure 8.50: The Maltese Islands Journey-to-Crime Web: the case for Birgu

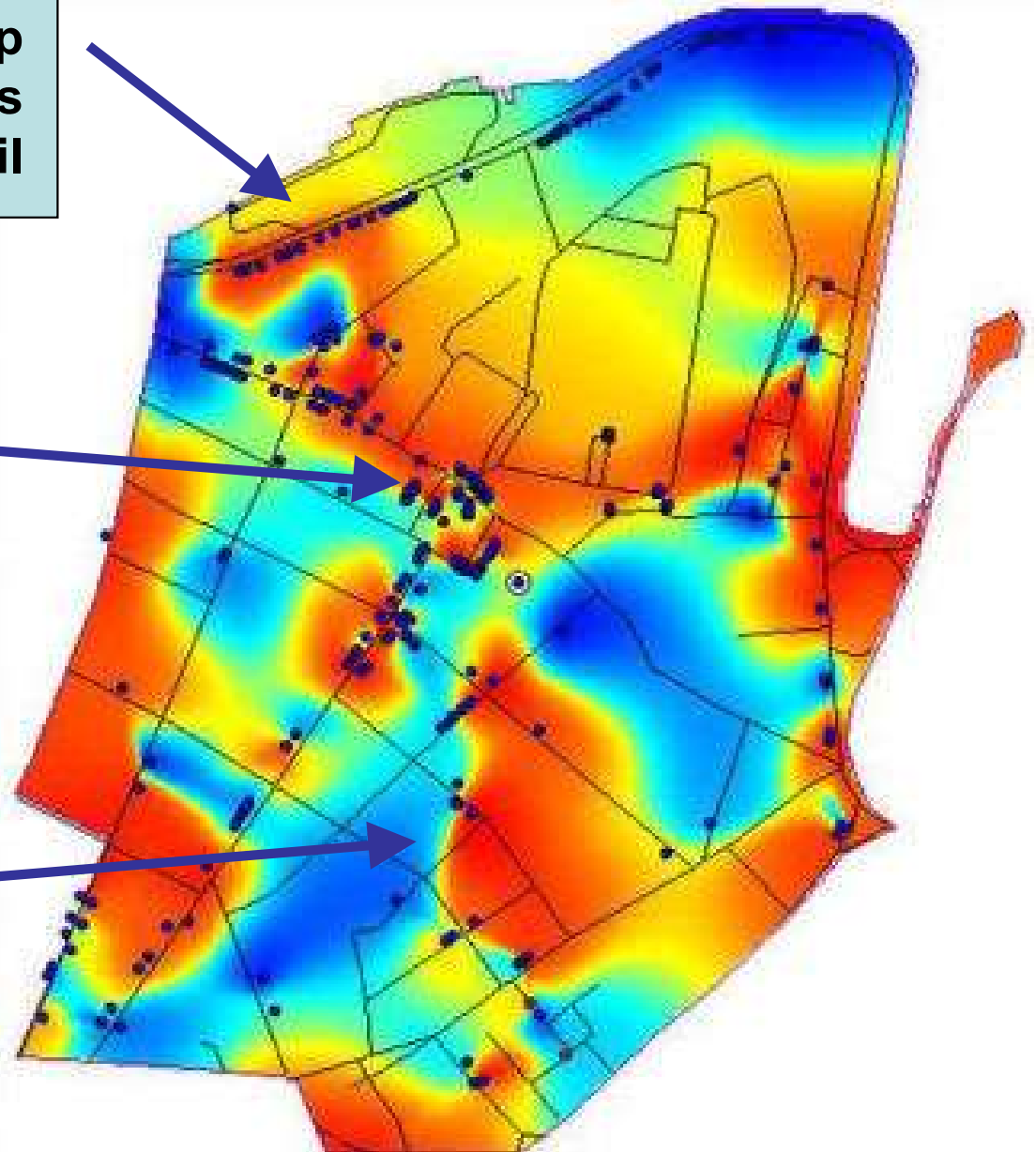


Incidence NNA: spatial – Type by spread – Pieta Detailed

**Marina
Bus Stop
Traffic Lights
Retail**

**St. Luke's Hospital
Detox
Bus Terminus
Parking Space**

**Housing Estate
Political Party HQs
Schools
Sports & Retail**



The Parallel Spatial Parameters

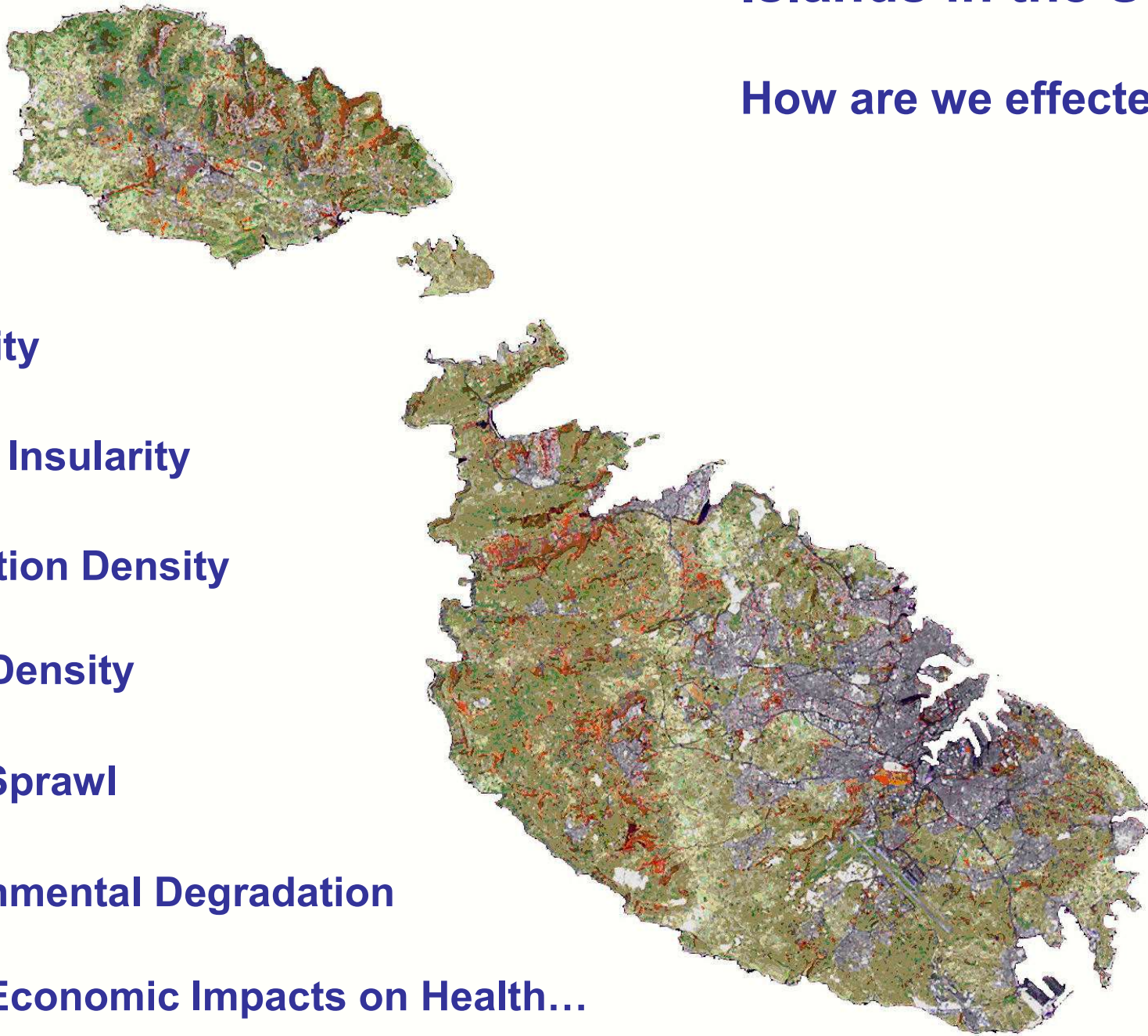
Planning
&
Environment

(Natural – Urban – Social)



Islands in the Sun?

How are we effected?



Insularity

Double Insularity

Population Density

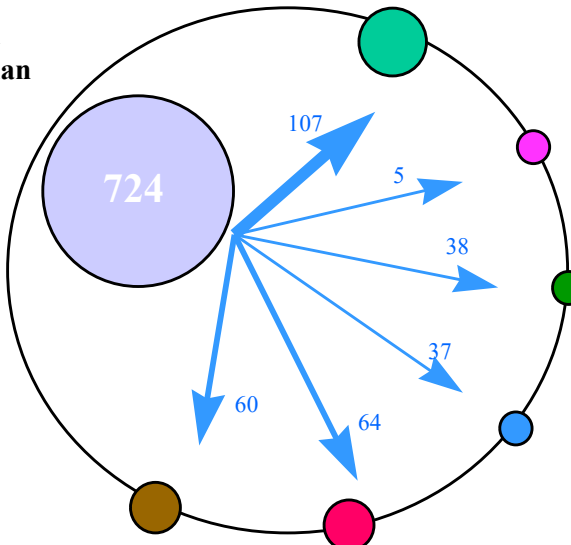
Urban Density

Urban Sprawl

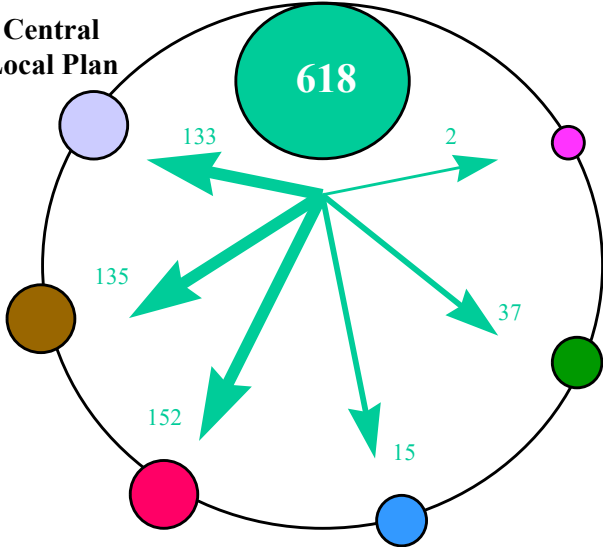
Environmental Degradation

Socio-Economic Impacts on Health...

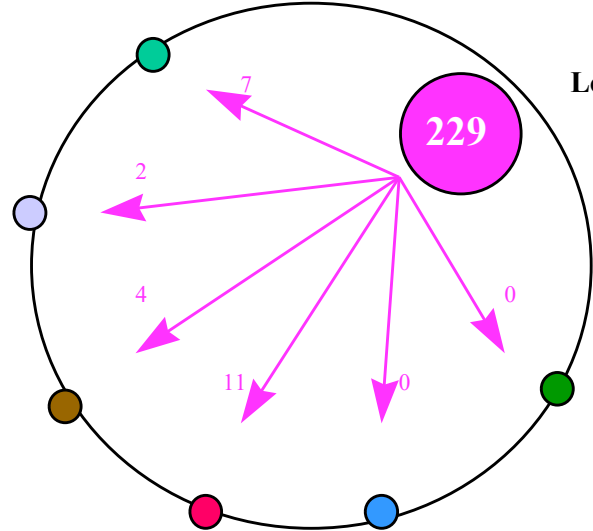
South Local Plan



Central Local Plan

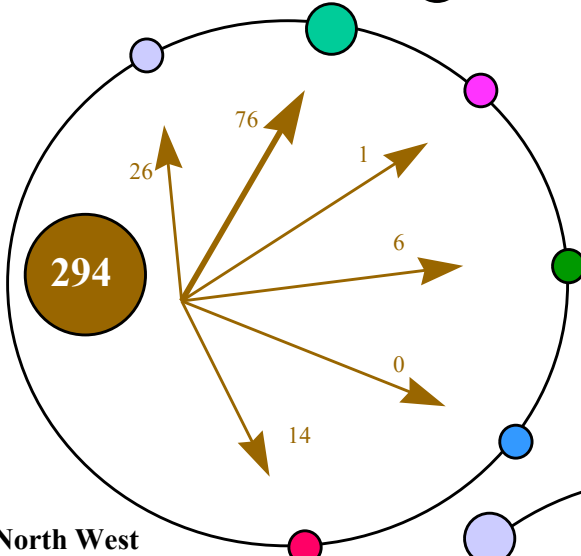


Gozo Local Plan

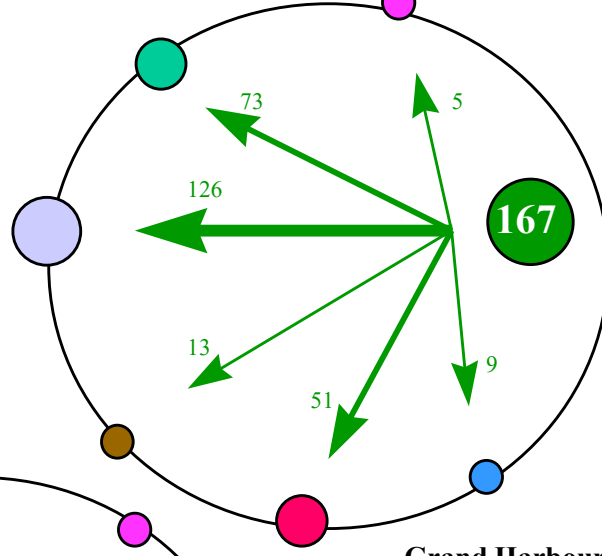


Migration Patterns: 1996
Loss of Social Networks?

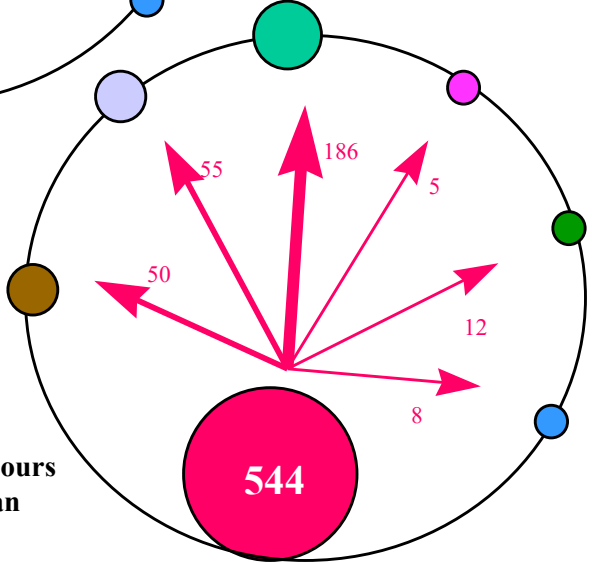
North West Local Plan



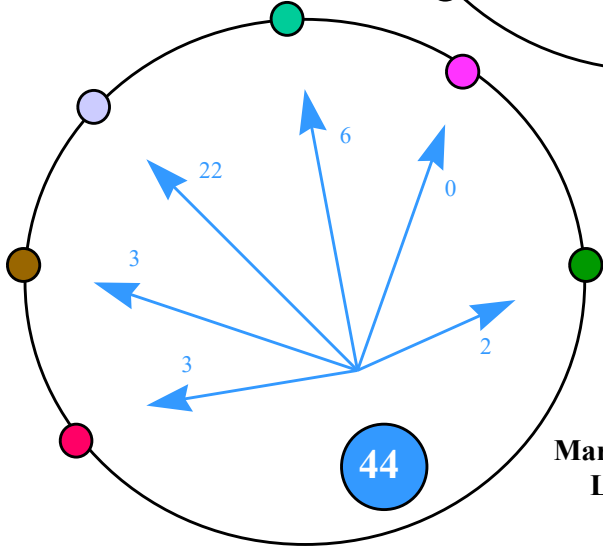
Grand Harbour Local Plan



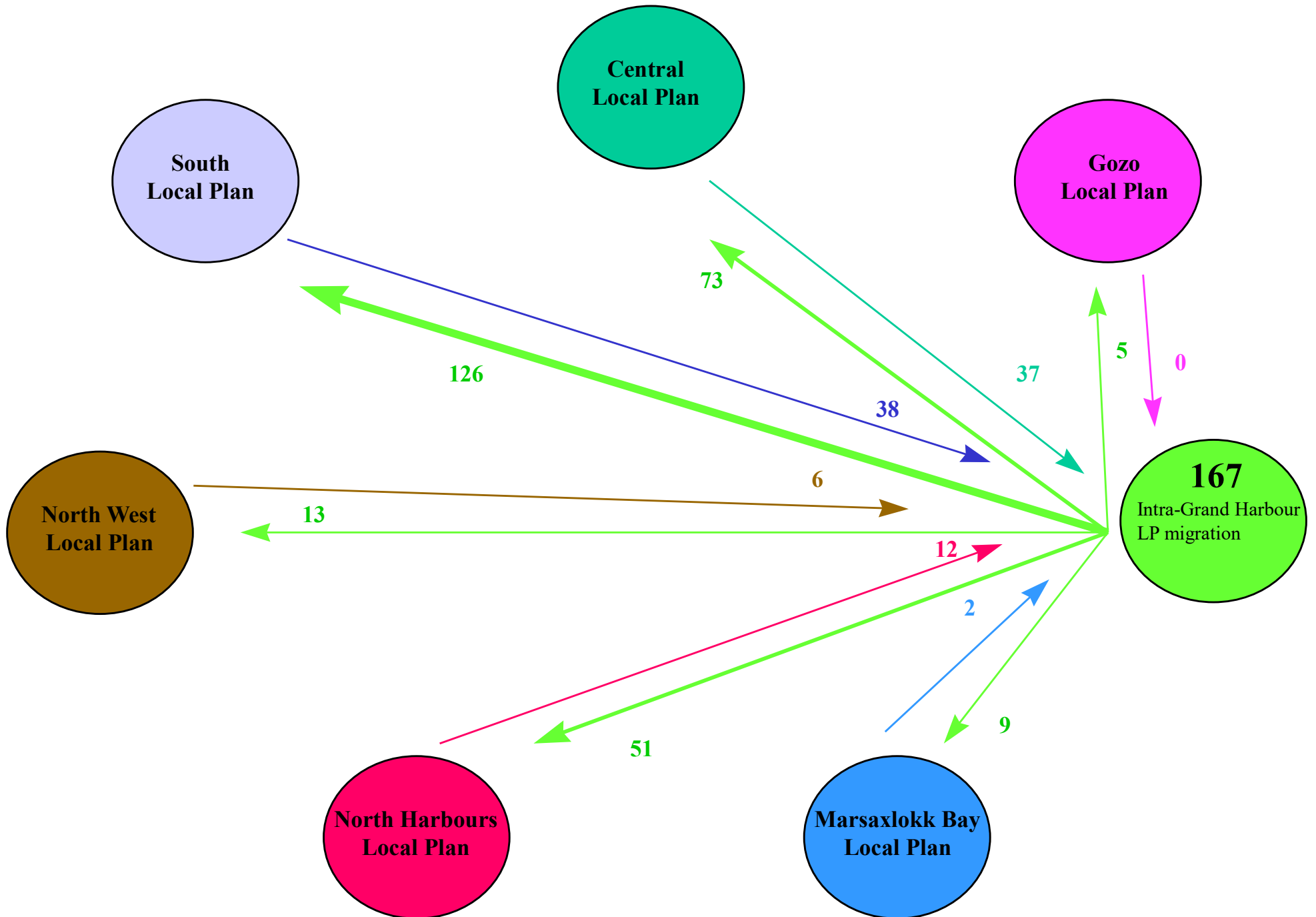
North Harbours Local Plan



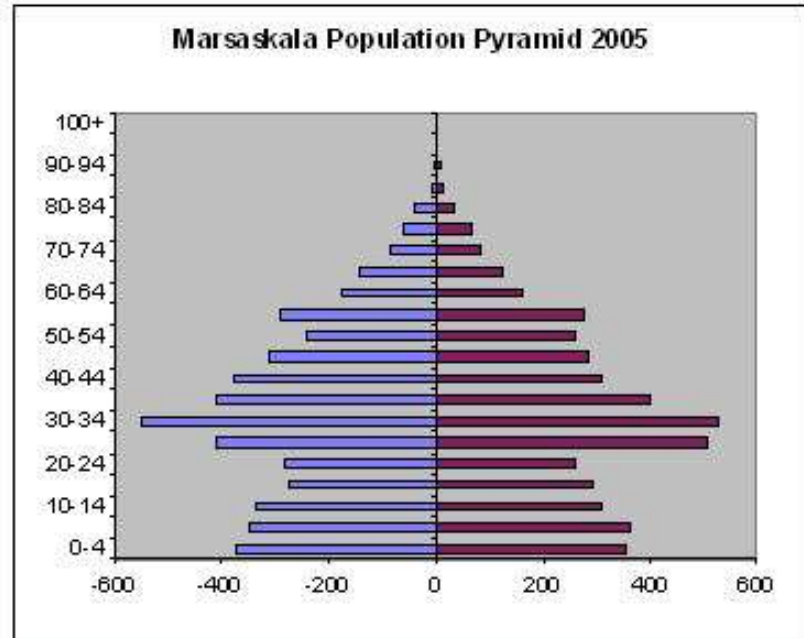
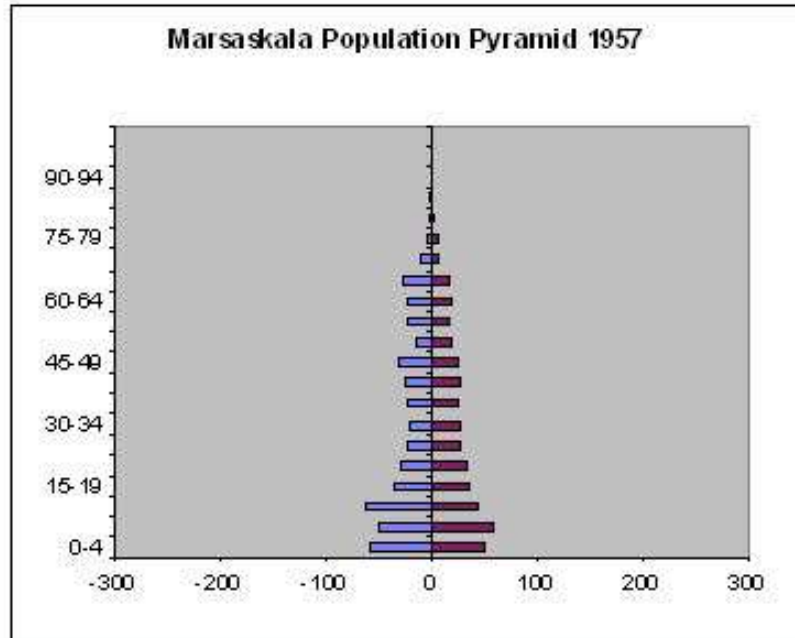
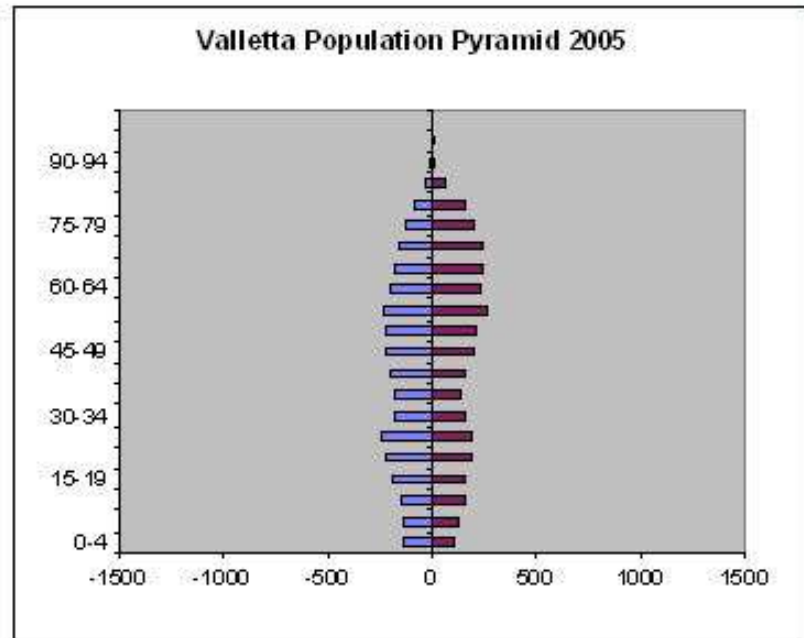
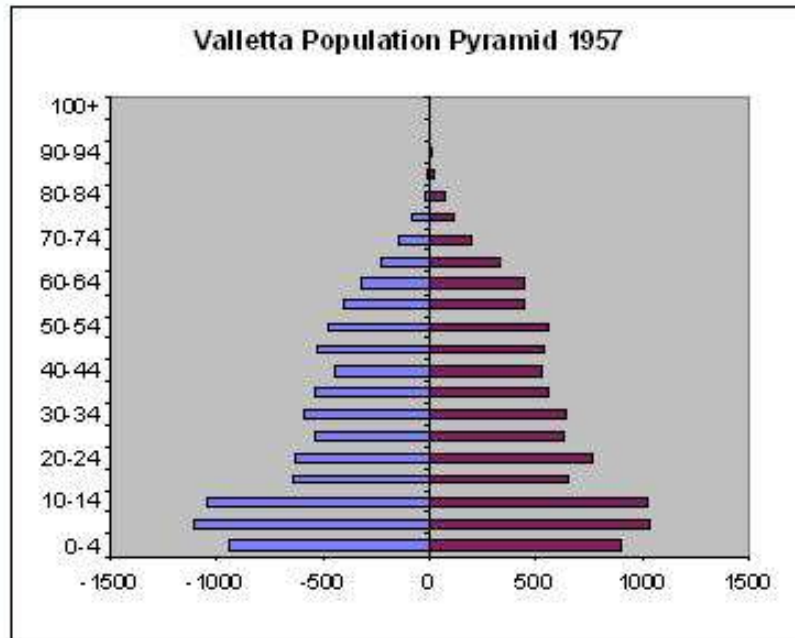
Marsaxlokk Bay Local Plan



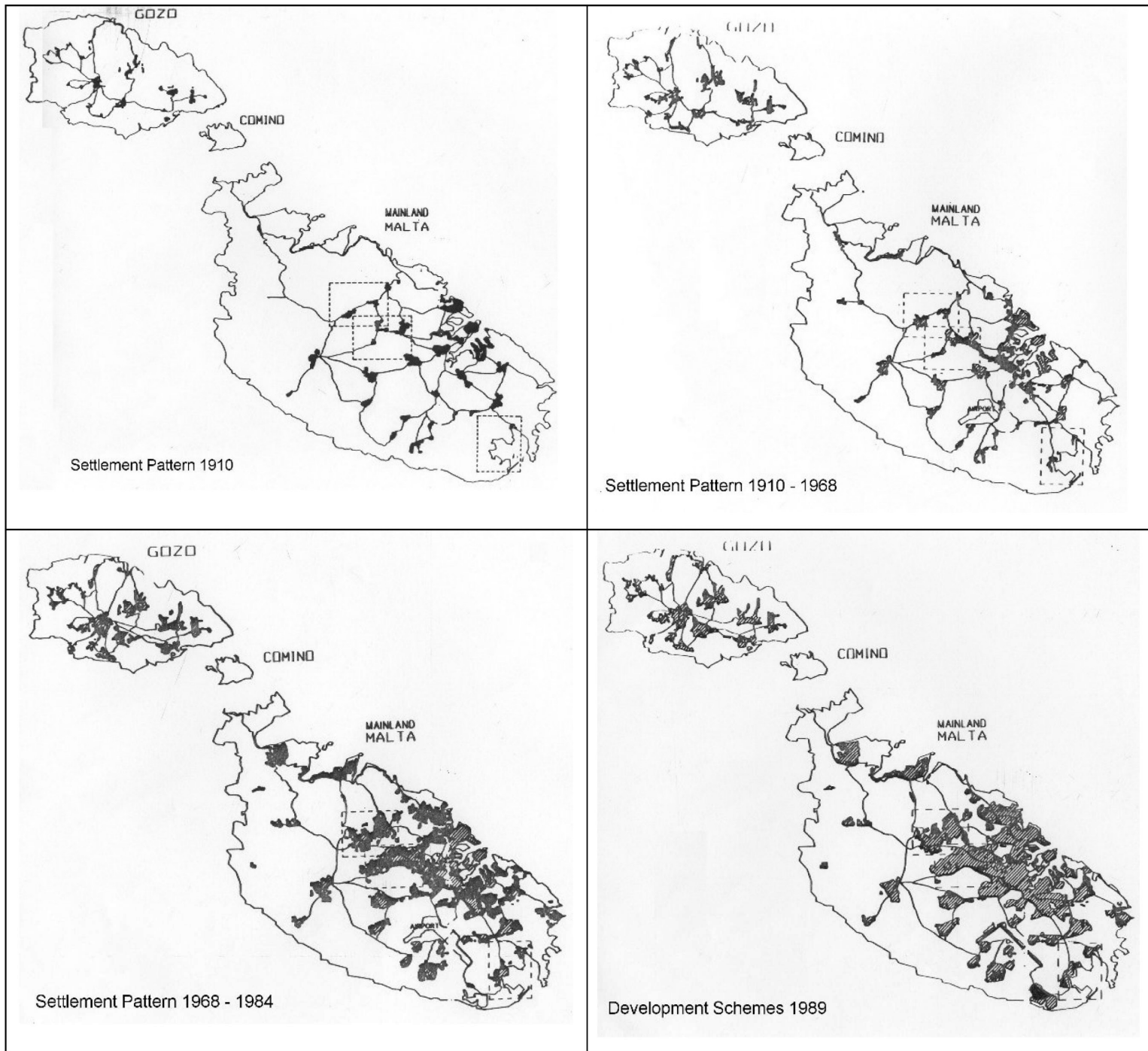
Migration: Grand Harbour Local Plan and other Local Plans - 1996



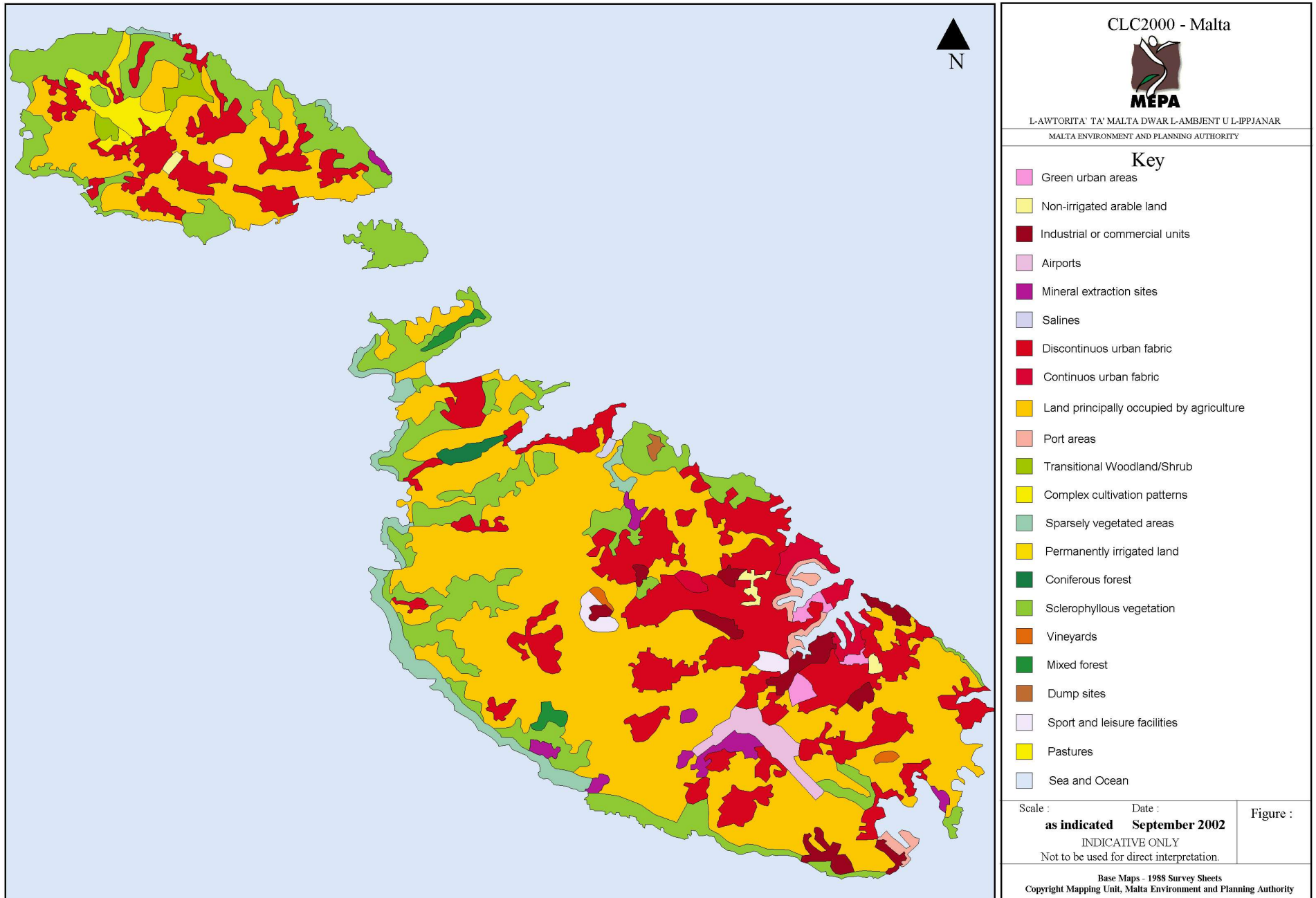
Population Impacts – 1957 - 2005



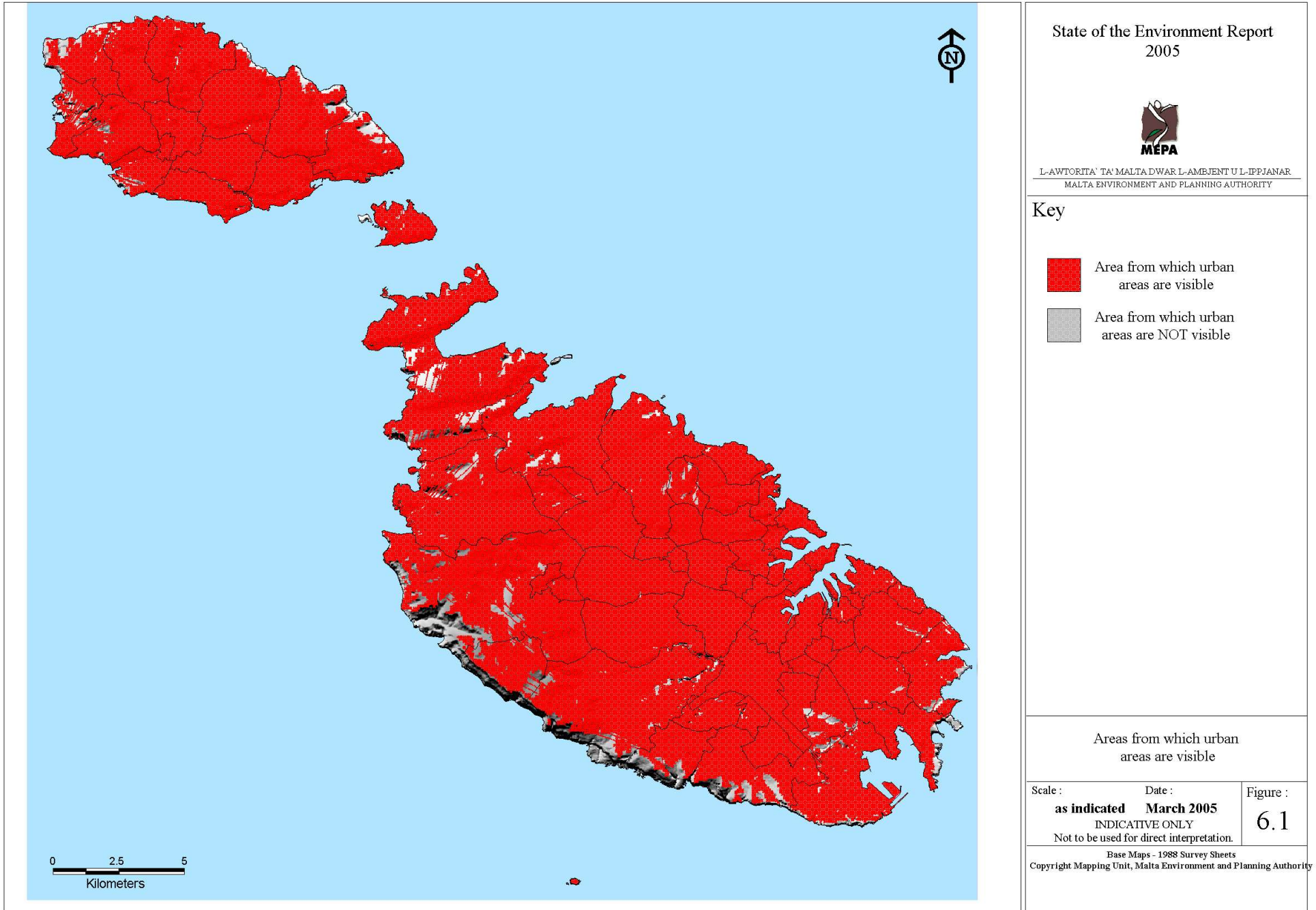
Land Cover – sprawl



Land Cover – a walk in the park?



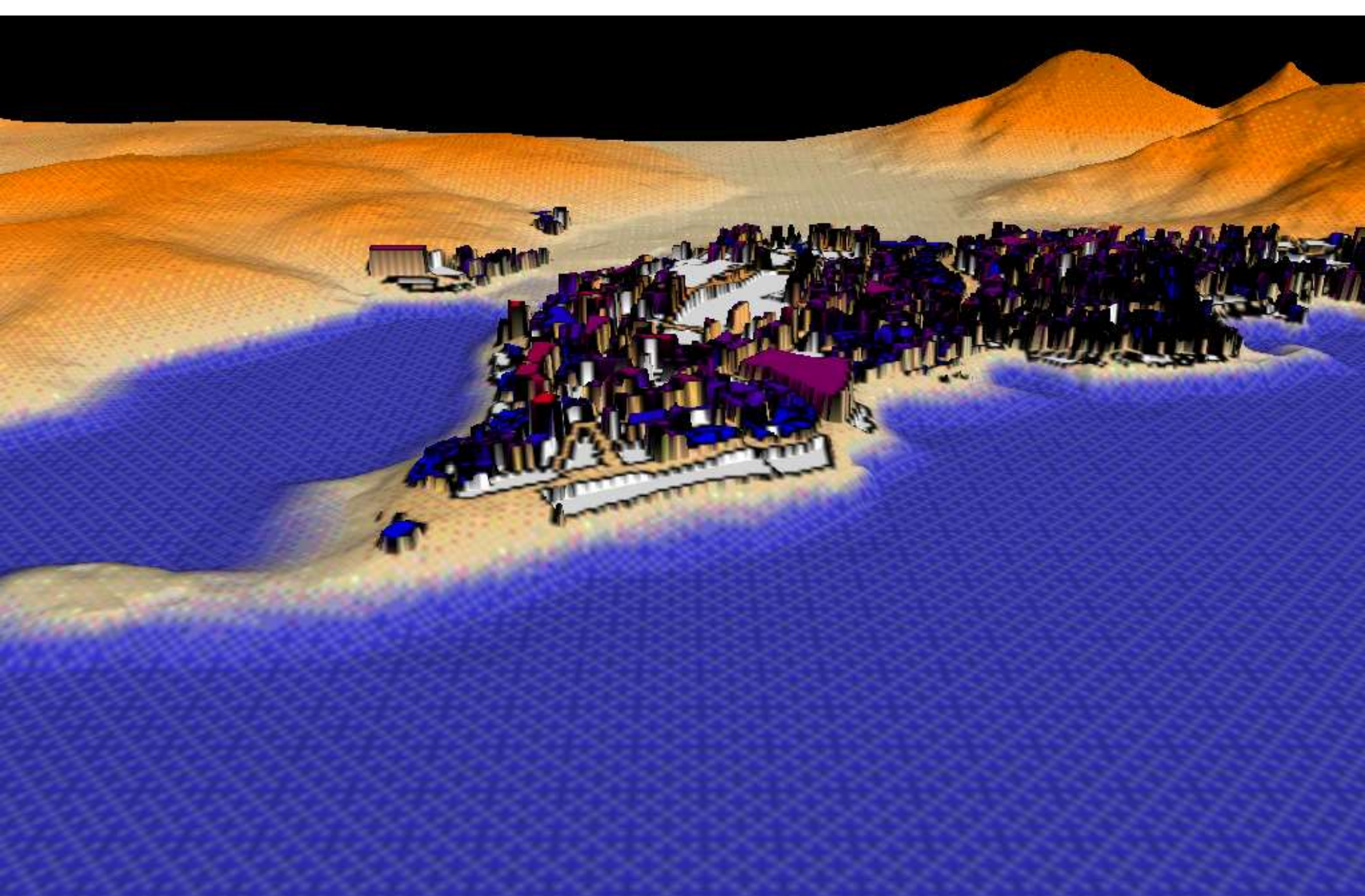
Viewshed Analysis: the impact of sprawl – a place of rest?



3D Analysis: the impact of shadow

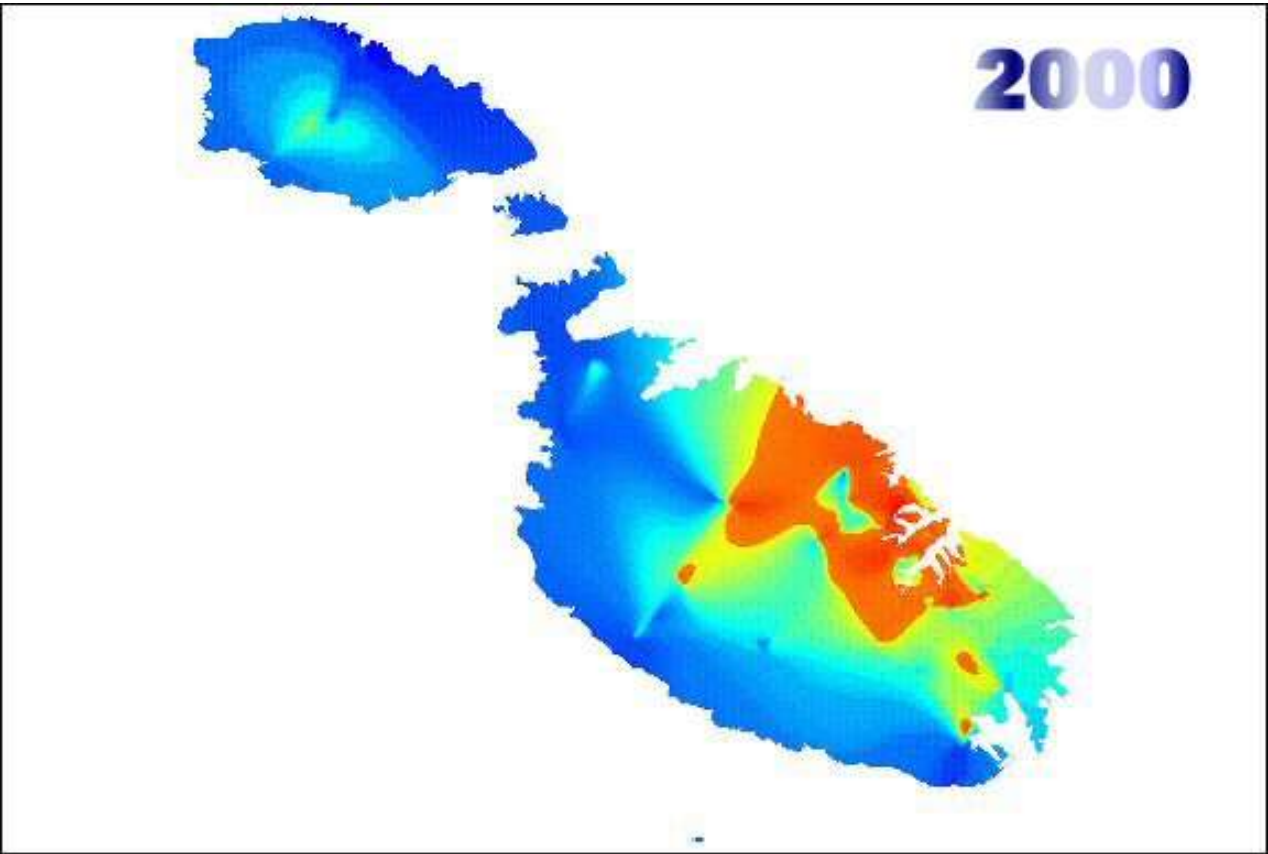
MSc GIS (2005) research results by S. Conchin ©



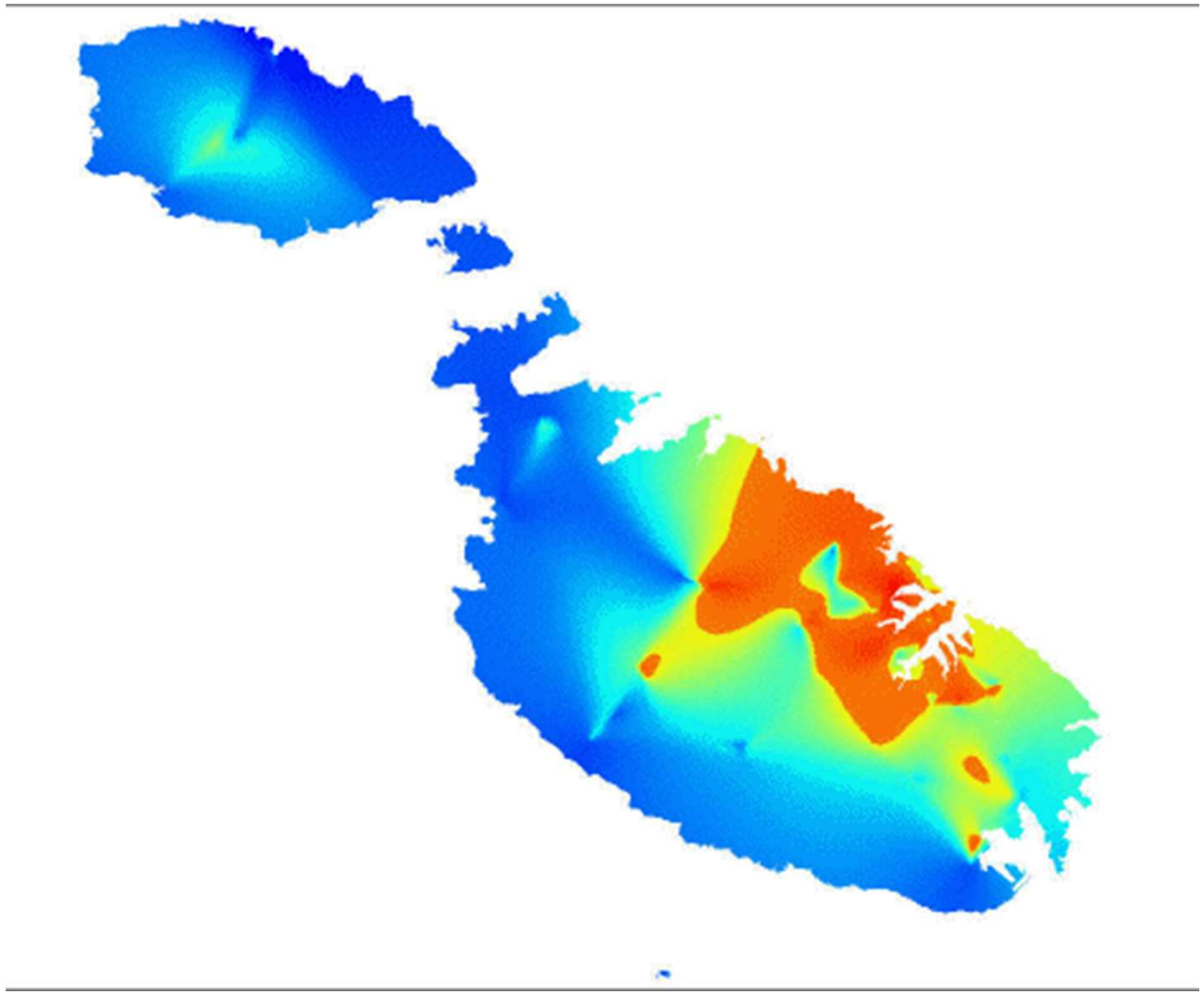


Creating base datasets: the impact of dwelling densities

Environment: Pollution and Health



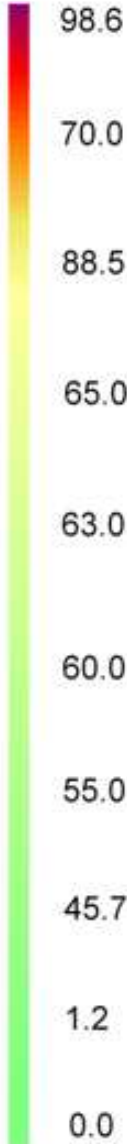
Benzene in Air Interpolation 2000-2003: Anim



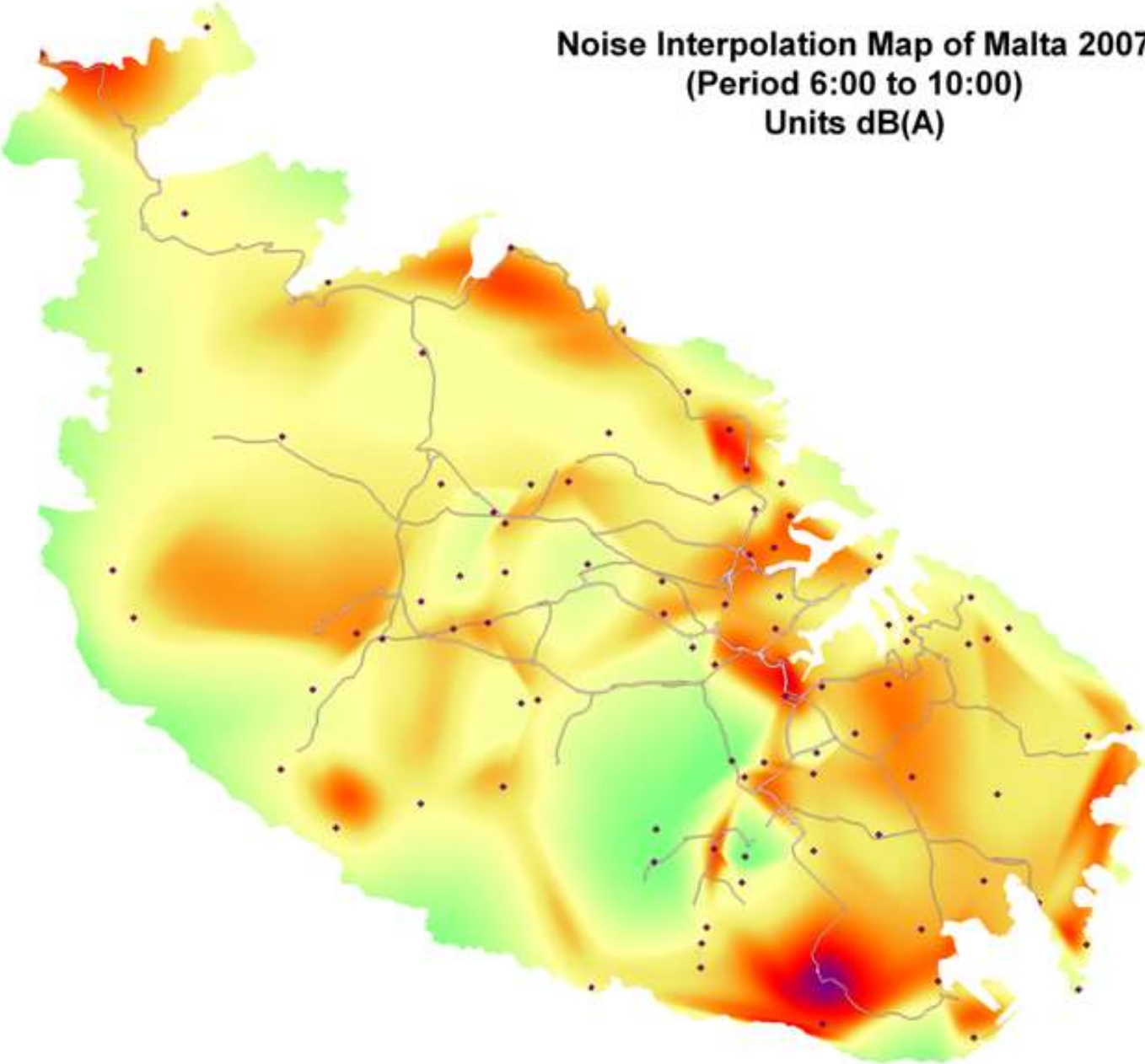
Environment: Noise and Health

MSc Physics (in progress) research results by C. Camilleri ©

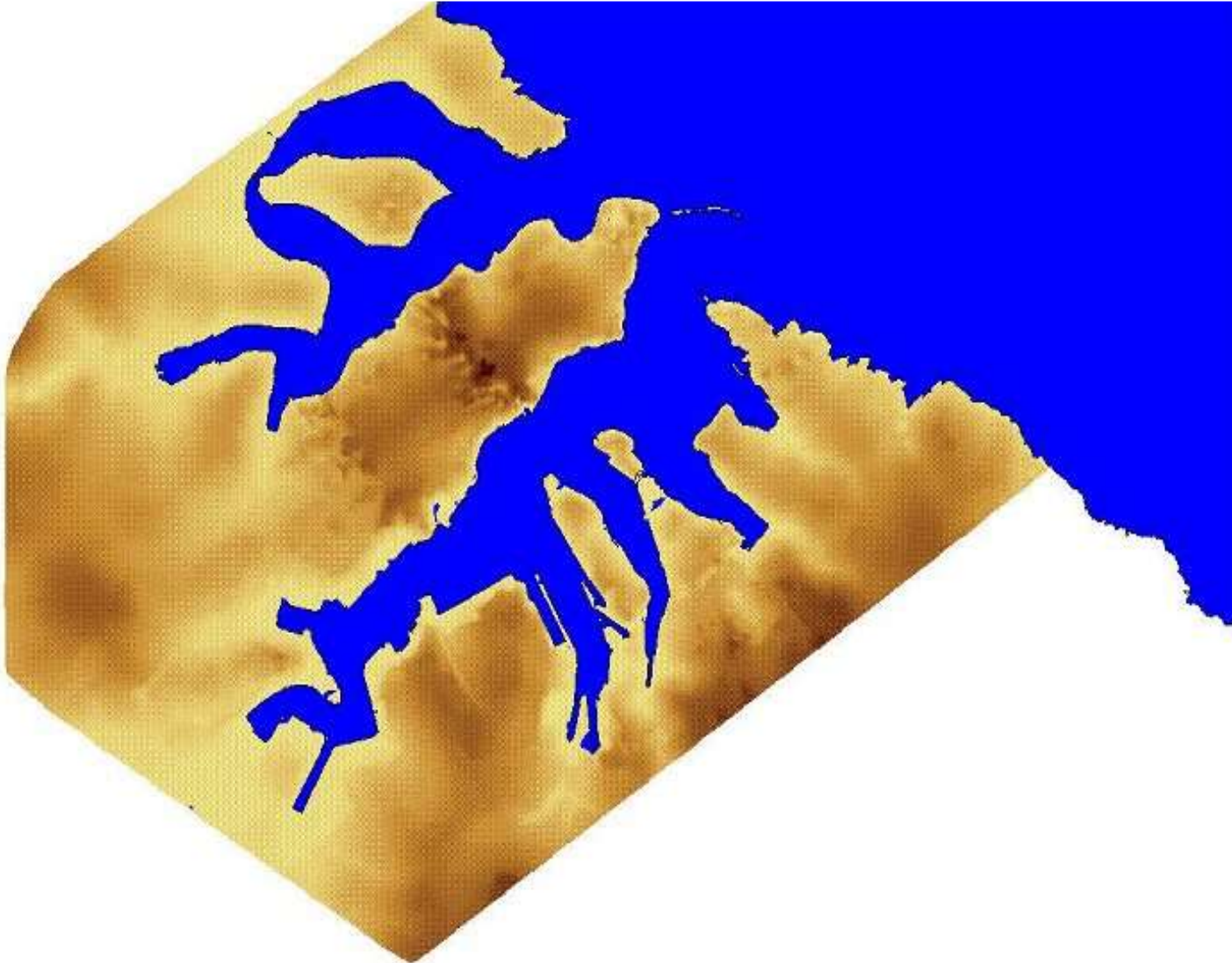
Noise Legend dB(A)



Noise Interpolation Map of Malta 2007
(Period 6:00 to 10:00)
Units dB(A)

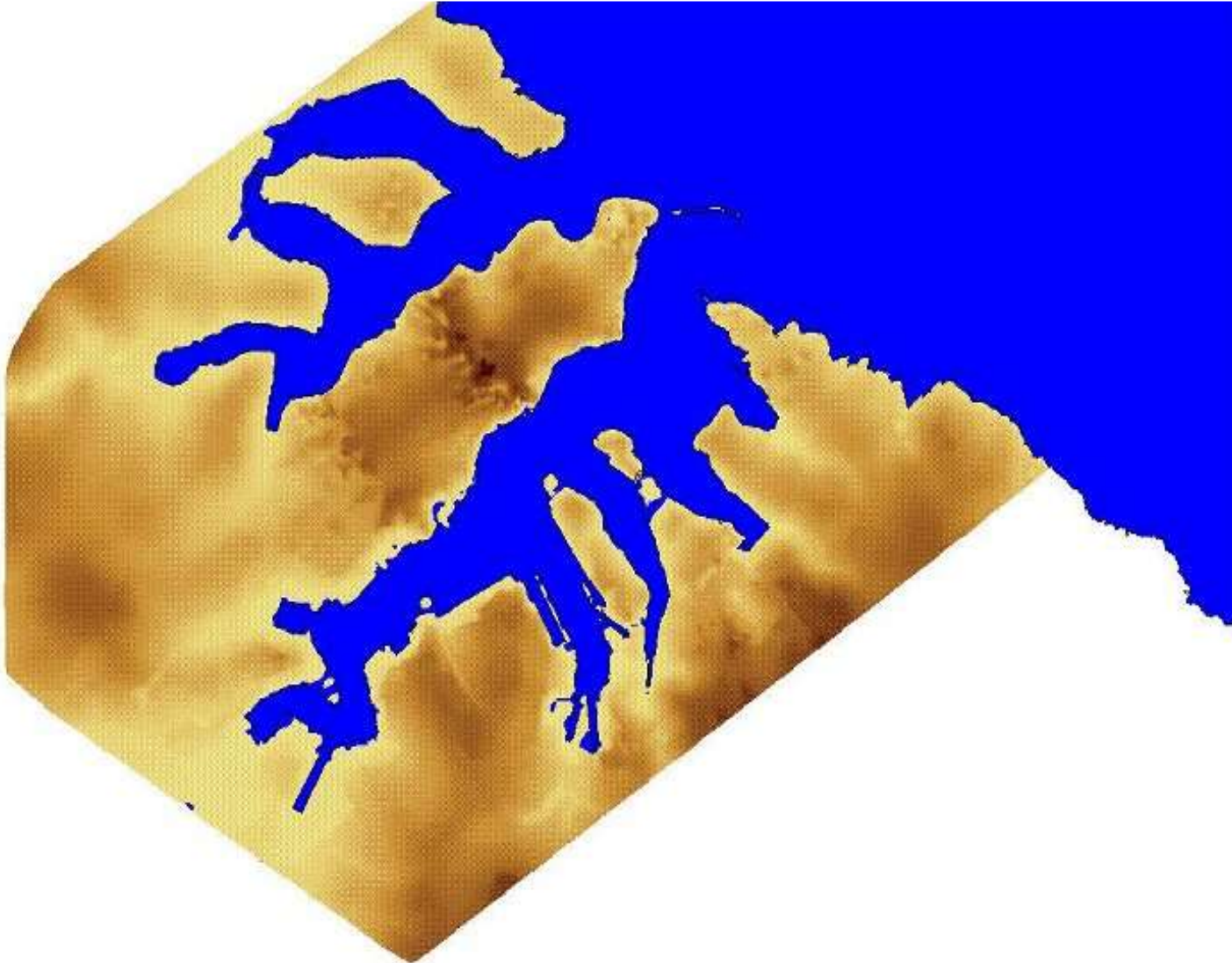


Climate Change – Whence we go?



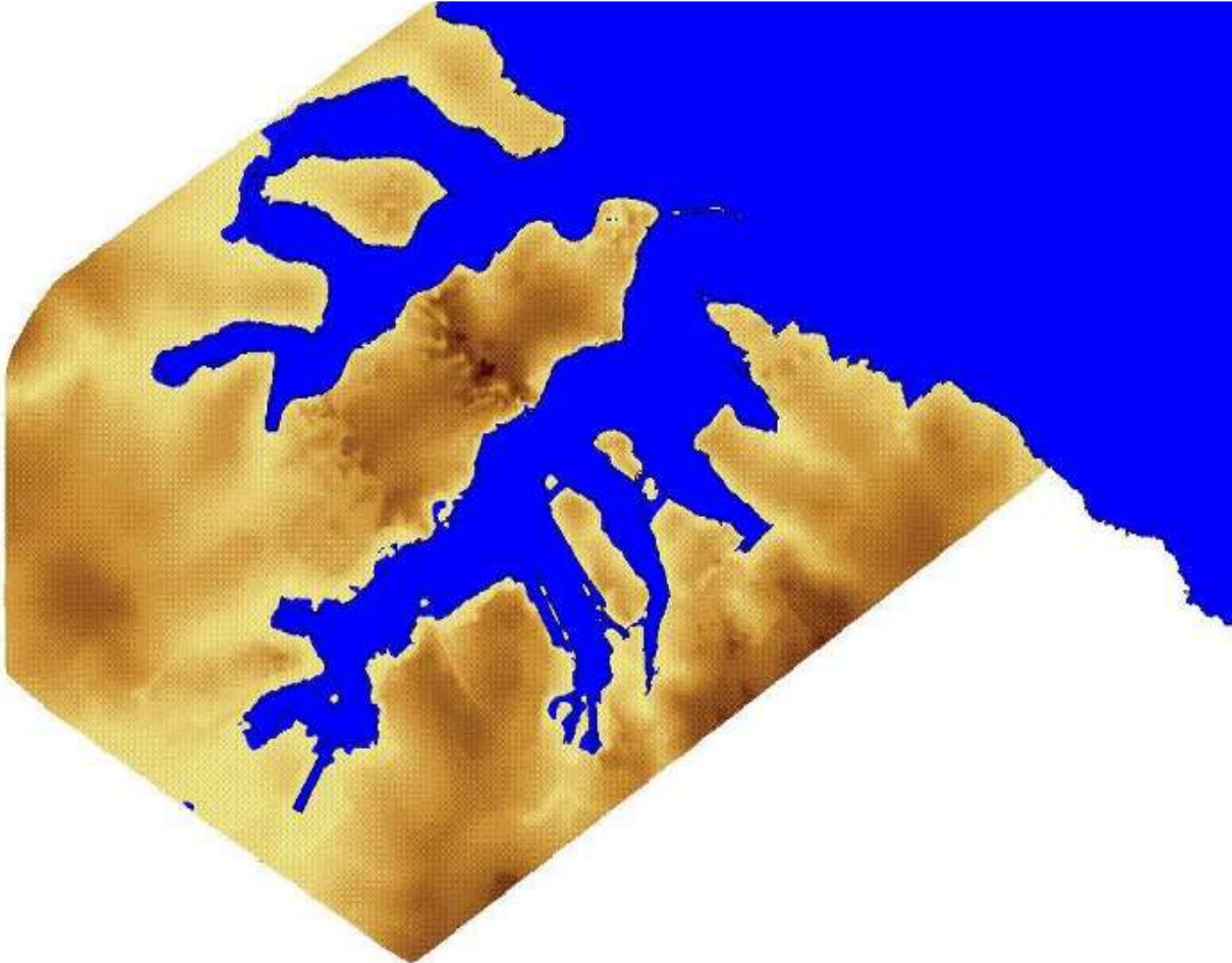
Grand Harbour – 0m

Climate Change – Whence we go?



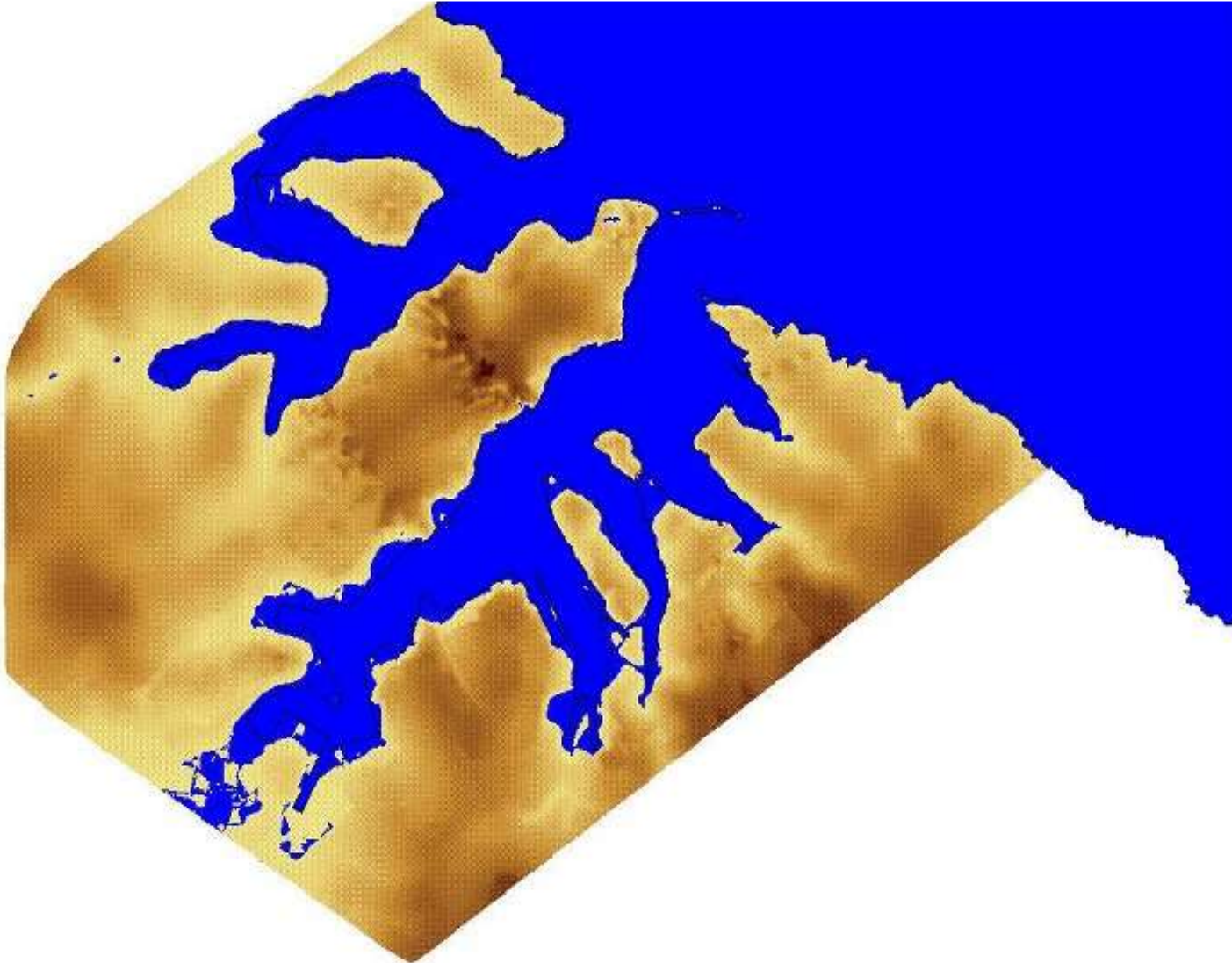
Grand Harbour – 0.5m

Climate Change – Whence we go?



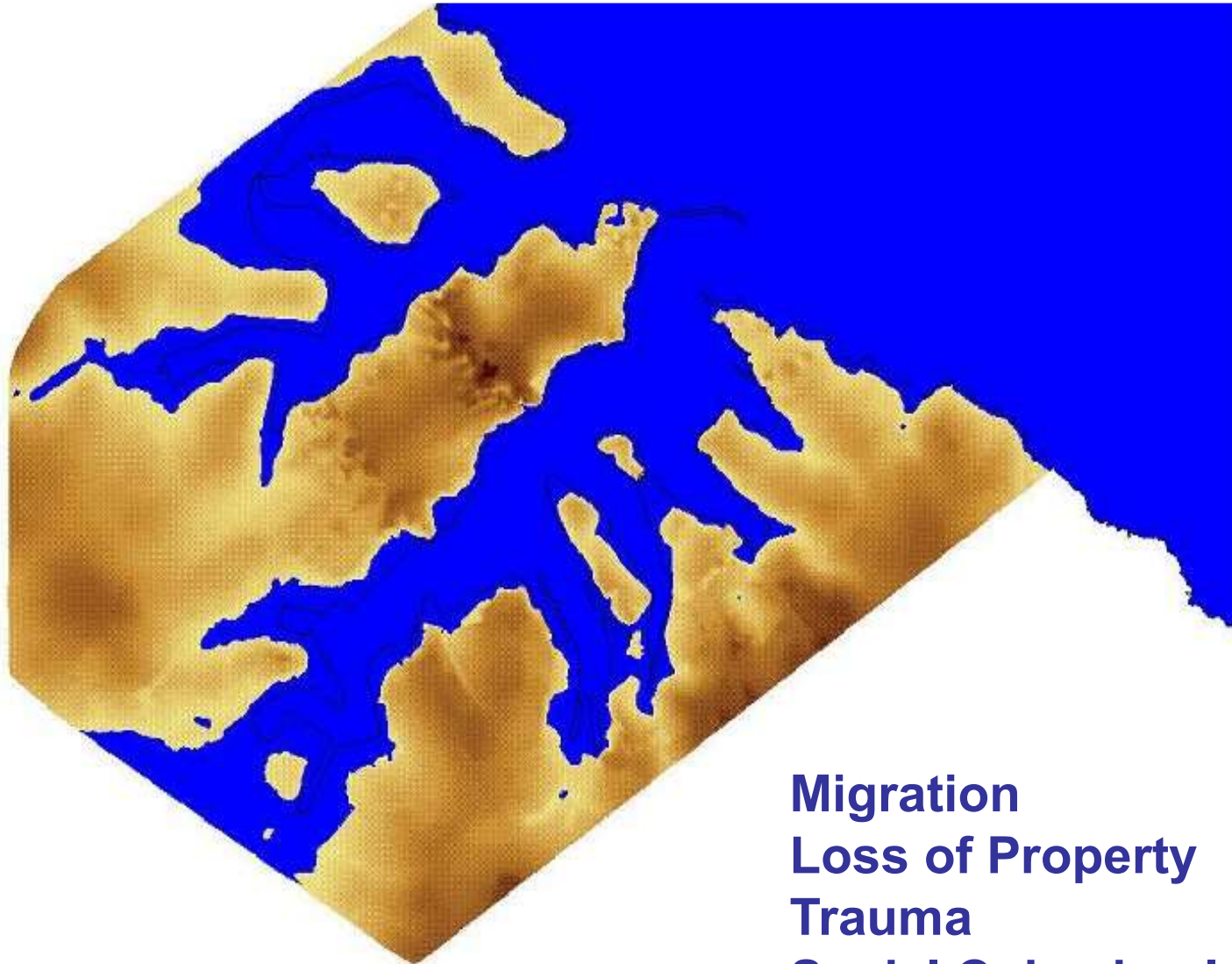
Grand Harbour – 1m

Climate Change – Whence we go?



Grand Harbour – 2m

Climate Change – Whence we go?



Migration
Loss of Property
Trauma
Social Cohesion Impact
Health Impact

Grand Harbour – 6m

A Proposed Study on Mental Health

The CRISOLA model can be investigated within the mental health scenario particularly with reference to:

- i) patient's residence location
- ii) social cohesion
- iii) impacts of spatial planning on well-being (clustering-distance)
- iv) inner city impacts on social parameters and
- v) hotspots in relation to the daily/seasonal/temporal patients' interactions.

This study should investigate mental health epidemiology in the islands; taking into account the incidence-reporting bias posited by the demographic, socio-economic, affluence and insularity factors.

The intention is to map variables such as diagnosis and historical parameters in correlation with the already established social factors, so as to identify bio-psych correlation strengths with the social variables.

The research would attempt to run parallel island-area comparative studies.



Thank You

