# Local & Indigenous Spatial Knowledge, Culture and PGIS

What is Special about PGIS?

Understanding Mental Maps

Respect for Indigenous /Local Spatial Knowledge

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ITC, Twente
june 2010

# Which is P-GIS?

**P-GIS as form of PSP which makes use of maps and GI output, especially GIS.**

- Core is ‘degree of participation’ in planning,
- essential issues are: processes, activities, instruments, and procedures that involve participation

**P-GIS is ‘doing (technical) GIS with some degree of people’s participation –**

- Participation could be simply data collection, or choice of data inputs, data layers, analysis, data queries.
- Core activity is the GI outputs (maps, etc.)

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# Participatory Mapping and PGIS is special

- information about local interests and priorities
- representative of  social communities, as well as individuals
- involves multiple processes of people's participation in information identification and selection
- capacity-building: groups can be empowered by involvement in P-mapping / PGIS processes;
- elicits, represents & validates **local (and indigenous) knowledge**

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# “IK / LK” -- names

- Local Knowledge (Internal Knowledge)
- Indigenous (Technical) Knowledge, ITK
- Local Spatial Knowledge, LSK
- (Rural) Popular Knowledge
- Traditional Knowledge

# Local / Indigenous Knowledge

- "Indigenous knowledge is the sum total of the knowledge and skills
- which people in a particular geographic area possess, and which enables them to get the most out of their natural environment.

IKDM Editorial (July 1998)

# Local / Indigenous Knowledge

- {Most of} this knowledge and these skills have been passed down from earlier generations, but {individual} men and women in each generation adapt and add to this body of knowledge in a constant adjustment to changing circumstance and environmental conditions.
- They in turn pass on the body of knowledge {intact} to the next generation, {in an effort} to provide them with survival strategies."

IKDM Editorial (July 1998)

# Local / Indigenous Knowledge

Flavier et al (1995) p. 479.

"IK is …. the information base for a society, which facilitates communication and decision-making. Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems."

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Questions:

Strengths and Opportunities of using LSK.

# Distinctive Characteristics of ITK/LK

- **Localness** of LSK – derived from close and long relationship between people and a specific land / resource area gives local knowledge its contextual focus.
- **Ownership** by the local community, - even though communities are not homogeneous - integrates LSK with social priorities.

  Some argue that LK is always communal and not individualistic, because of its origin in local community roots.

# Distinctive Characteristics of LK

- Taxonomies and **classification in LSK & ITK** are usually assumed to be more based on functionality / purposiveness than in modern scientific knowledge. (There is some evidence countering this.)
- LSK/ITK is more **holistic** because of the **purposiveness** -

  thus an emphasis on holistic, combinatorial qualities of products or events.

# Common between LK and Scientific Knowledge (SciK)

- **Openness & dynamism** - Interest and Ability to incorporate new knowledge from other (outside) sources, even if they might contradict held beliefs, (similar to paradigm shifts in science).
- **Experimentation** – explore alternative outcomes and parameters, (altering the underlying conditions) e.g. Sierra Leone rice farmers
- **Taxonomies,** as the building blocks of (empirical) explanations.

# Common between LK and SciK

Identification of specific conditions under which more **general 'laws' or explanations** will hold, -

i.e. this is the basis of deductive science, and it is the mechanism in eliciting expert knowledge.

# Knowledge as a Social process – factors common between LK and SciK

- **Distribution of knowledge amongst experts** within community – e.g. the 'control' of key LSK/ITK is arrogated by male elders/ castes.

  Similar dominations by closed scientific 'academies'.
- **Relation to culture** – ITK is often devalued as "culturally-embedded, mixing the sacred and profane, encoded in ritual, etc.",

  But there is a parallel with growth-driven, individualistic, materialistic *cultures* being the context for applied modern SciK.

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# Local Knowledge is a key - Summary

- LK reflects capability & competence of local community
- LSK is maybe more accurate because it embodies generations of accumulated practical knowledge, and
- works in interactive, holistic systems.
- Local knowledge is operational.

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# Local Knowledge is a key - Sumary

- LK is resource that disadvantaged & marginalised groups possess – even if their land, property, resources, labour are appropriated
- LK is a resource needing little capital for realisation.
- LK can place community on equivalence with outside forces
- LK is often unique and threatened knowledge

Question :

Weaknesses & threats for LSK / ITK

# ITK / LK HAS LIMITATIONS

- Uneven distribution, generation, transmission of Indigenous / Local Knowledge
- Slow rates of knowledge generation (slow experimentation & measurement techniques)
- Unrecorded knowledge; limits of storage
- Knowledge is lost when it is not utilised

- Technical limitations "what farmers don't know cannot help them"

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# ITK / LK HAS LIMITATIONS

- Knowledge is Controlled within rural society, thus unequal access: age, gender, economic & social class, religion, institutions, ...

  e.g. weather forecasting = rain-making.

- Focusing on just Local Knowledge factor diverts attention from structural issues -

  such as, lack of access to land, markets, capital, technology, etc, & lack of power vis-a-vis globalisation, prices, tenure, trade, ..

# PGIS represents many types of (Local) Spatial Knowledge:

I. ADD to CONVENTIONAL INFORMATION on resources etc

ADD NEW & UNKNOWN INFORMATION e.g. new resources.

II. LOCAL ALTERNATIVE KNOWLEDGES i.e. needs, priorities, 'counter maps'

III. CULTURAL/ HISTORICAL (SACRED) Knowledge

IV. SPIRITUAL, MYSTICAL SPATIAL KNOWLEDGE in MENTAL MAPS of people's culture mythologies; Indigenous spatial concepts – culture space, sacred spaces, cosmovisions

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# ISK / ITK - Indigenous (Spatial) Technical Knowledge

- IK and scientific knowledge are not always so different.
- ITK/ISK maybe more accurate because it embodies generations of practical knowledge and work in interactive, holistic systems.

Examples:

- Interpret satellite images of land capability with Bedu shepherds in Jordan (Patrick 2002);
- ITK of grazing lands in Burkina Faso (Sedogo 2002);
- Australia: mapping ITK of valuable vegetation types
- Senegal River valley: compare farmers' & scientific soil classifications (Tabor & Hutchinson 1994);

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# LSK / ITK – Local / Indigenous (Spatial) Technical Knowledge

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# II. ALTERNATIVE COMPETING GeoSpatial INFORMATION - *Counter Maps*

- Knowledge representing different viewpoints, priorities, interests, problems of different local actors, (different from dominant 'official' view, & from other local actors).
- The knowledge of local actors' needs, priorities values includes local configurations of land & resource ownership with complexities of multiple user rights, communal property regimes, etc.

Different viewpoints can be reflected in '*counter maps*'.

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# III. CULTURAL/ HISTORICAL (SACRED) K.

## Cultural-Historical Identity > Building the Community

- Cultural knowledge & local history
  - Places of historic, cultural and religious significance, ancestral grounds and sacred areas
  - Indigenous names; cosmovisions, creation and origin myths, etc.
- Sacred Lands
- Land for the Ancestors
- Promote Community awareness e.g. Community development of GIS strengthened Ifugao historical cultural consciousness and prepared for negotiations.

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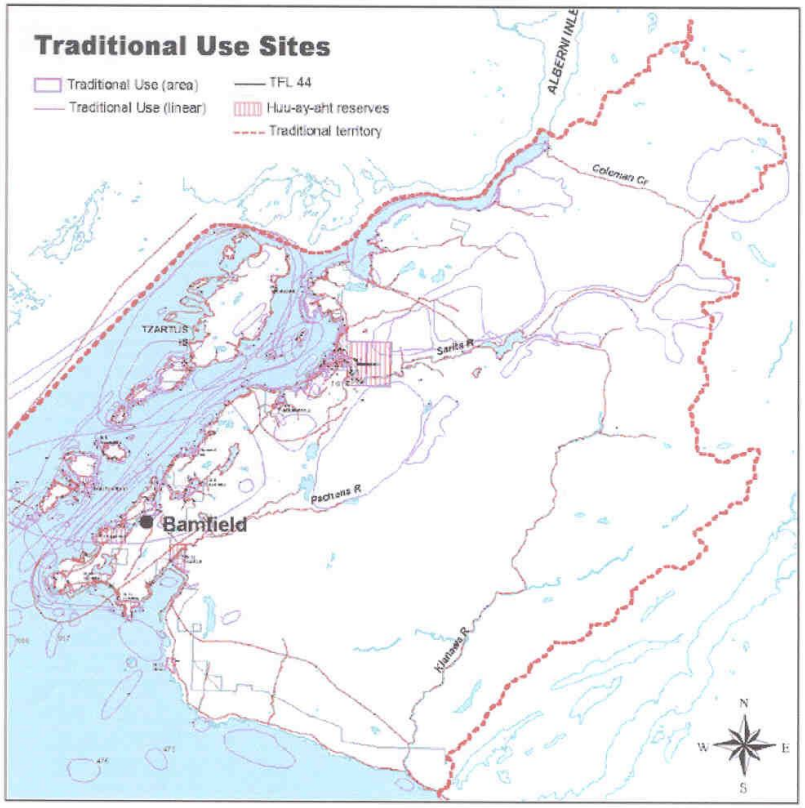
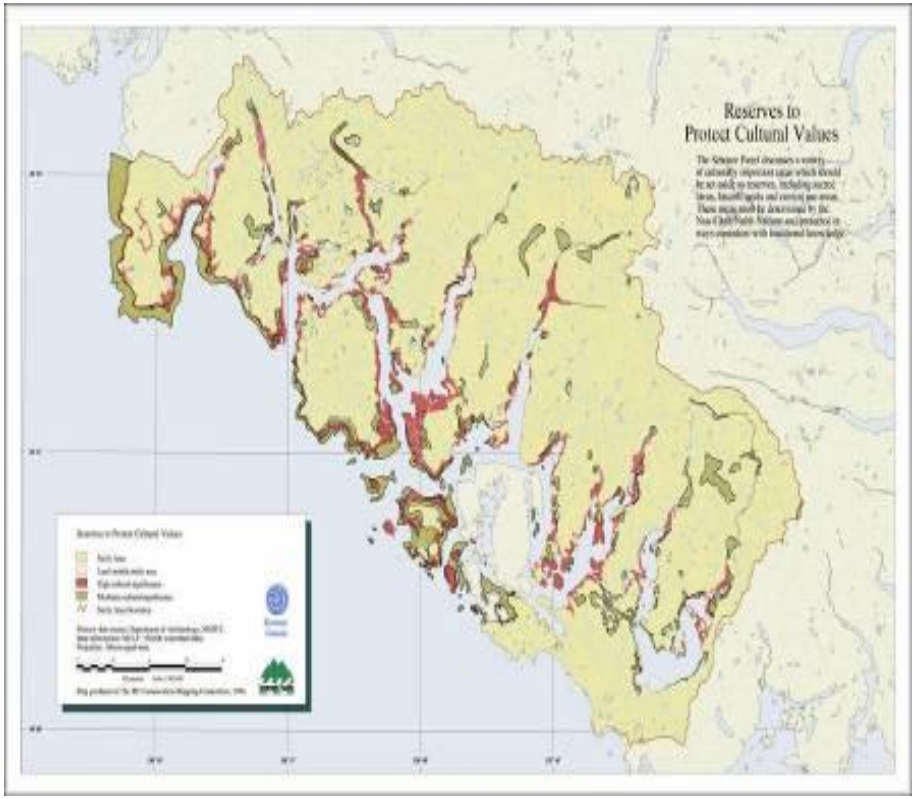
# Cultural Historical Identity



# Cultural heritage, physical preservation, and prevention of material theft

LSK of secret sites, historical sites, cultural artefacts, treasures, holy locations which local people do not want to become universal knowledge:

- Native Americans in the USA fear vandalism of burial and sacred sites by souvenir-hunters.

- New Zealand: for example in the Auckland region, over 50% of significant pā (fortified village) sites have been destroyed, < 2.5% of stone field wāhi tapu (sacred sites) remain.

# IV. SPIRITUAL, MYSTICAL SPATIAL KNOWLEDGE

Specialised and restricted to particular peoples, is the spiritual or mystical spatial knowledge associated with cultural spaces, particularly with specific landscapes.

- This indigenous knowledge is qualitatively different from scientific knowledge. This IK is symbolic, metaphoric, and visionary, (mystical in 'scientific' terms), and especially related to land & land features.
- Knowledge of landscape is the embodiment of the people's identity.

# spiritual and material

But, there may often be functional connections with ‘scientific’ explanations, as in

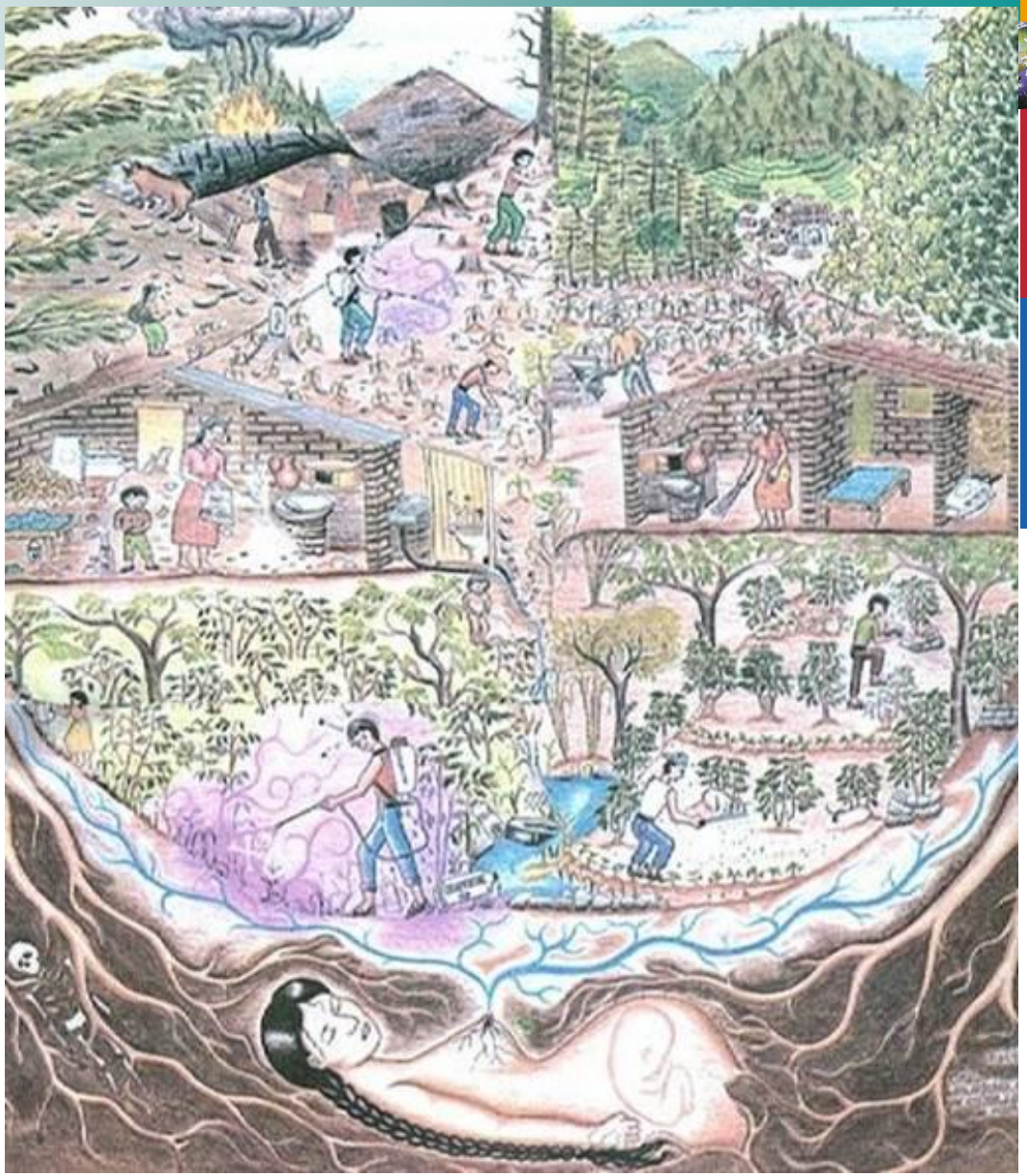
- traditional restrictions on using ‘sacred land’,
- protected forest or dry season grazing reserve.
- Forest lands restricted from slash & burn by ghost birds

# spiritual or mystical spatial knowledge

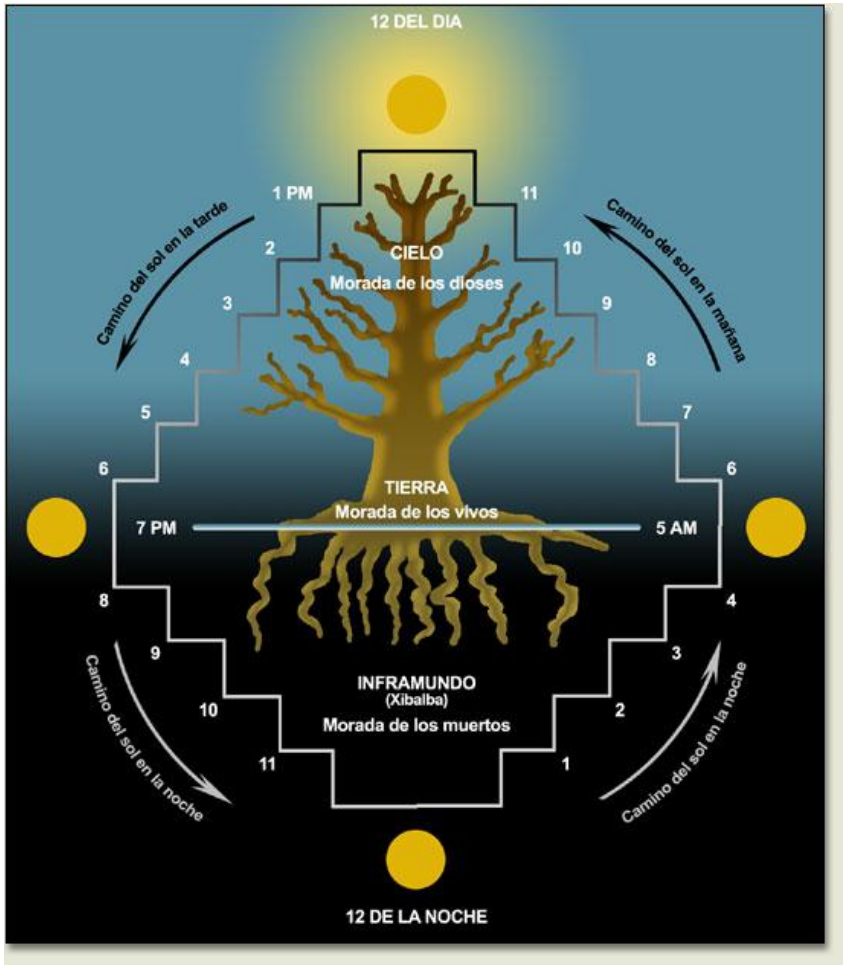
- Interpreted as ***cosmovisions*** (= cosmos, corpus & praxis) commonly incorporate origin or creation myths of cultures,
- therefore more usually found among indigenous, natural resource-dependent, less-globalised peoples.
- cognitive maps which preserve a sacred, cultural and personal significance in terms of cosmological explanations, where geography (relative location and space) as well as landscape hold deep significance for individuals and communities.

# Cosmovision - Mexico

This deep knowledge frequently holds obligations of stewardship of the land, and specialised, location-specific, problem-oriented ITK



# Cosmovisions

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# Local Spatial Knowledge

| Ontology of LSK (local spatial knowledge) | Spatial representation (communication | Inscriptive / Incorporative |
|---|---|---|
| *3 levels of increasing complexity, 'otherness', and 'distance' from standard positivist 'scientific' spatial knowledge* | | |
| Local (technical) spatial knowledge (c.f. ITK) | Conventional maps & GIS products (dynamic GIS, ) | Geo-referenced, Geodetic. Inscriptive communication |
| Community & Individual (spatial) values & needs. Secret spaces Sacred locations | Counter Maps Sketch / ephemeral maps Pictorial imagery | Both Inscriptive & Incorporative |
| Cosmological visions & explanations. (c.f. creation myths, sacred stories) | Images, music, dance, stories | Incorporative communication |

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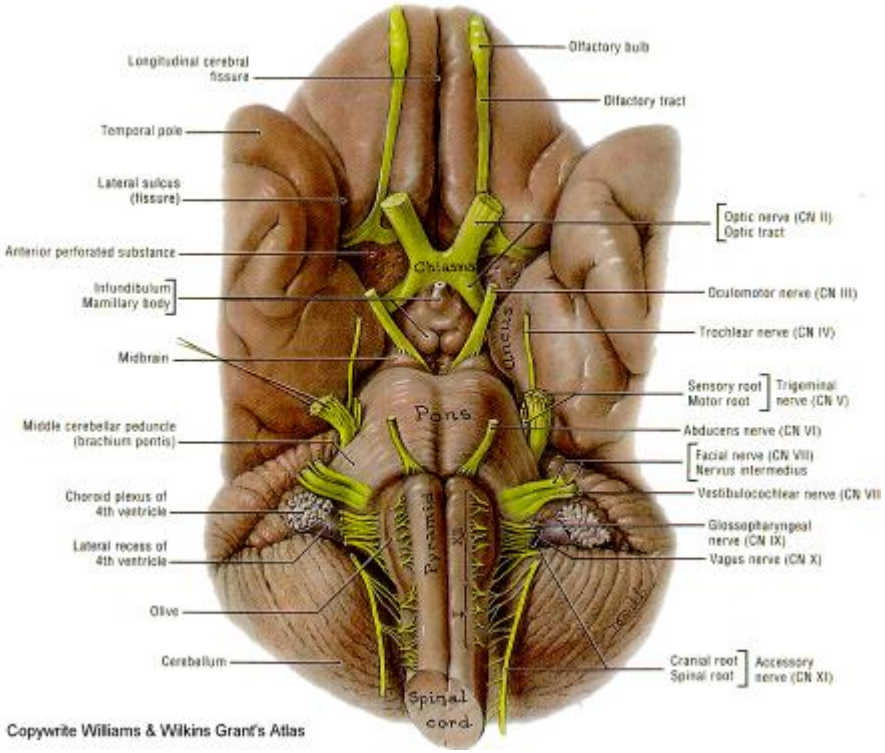
# Looking for Mental Maps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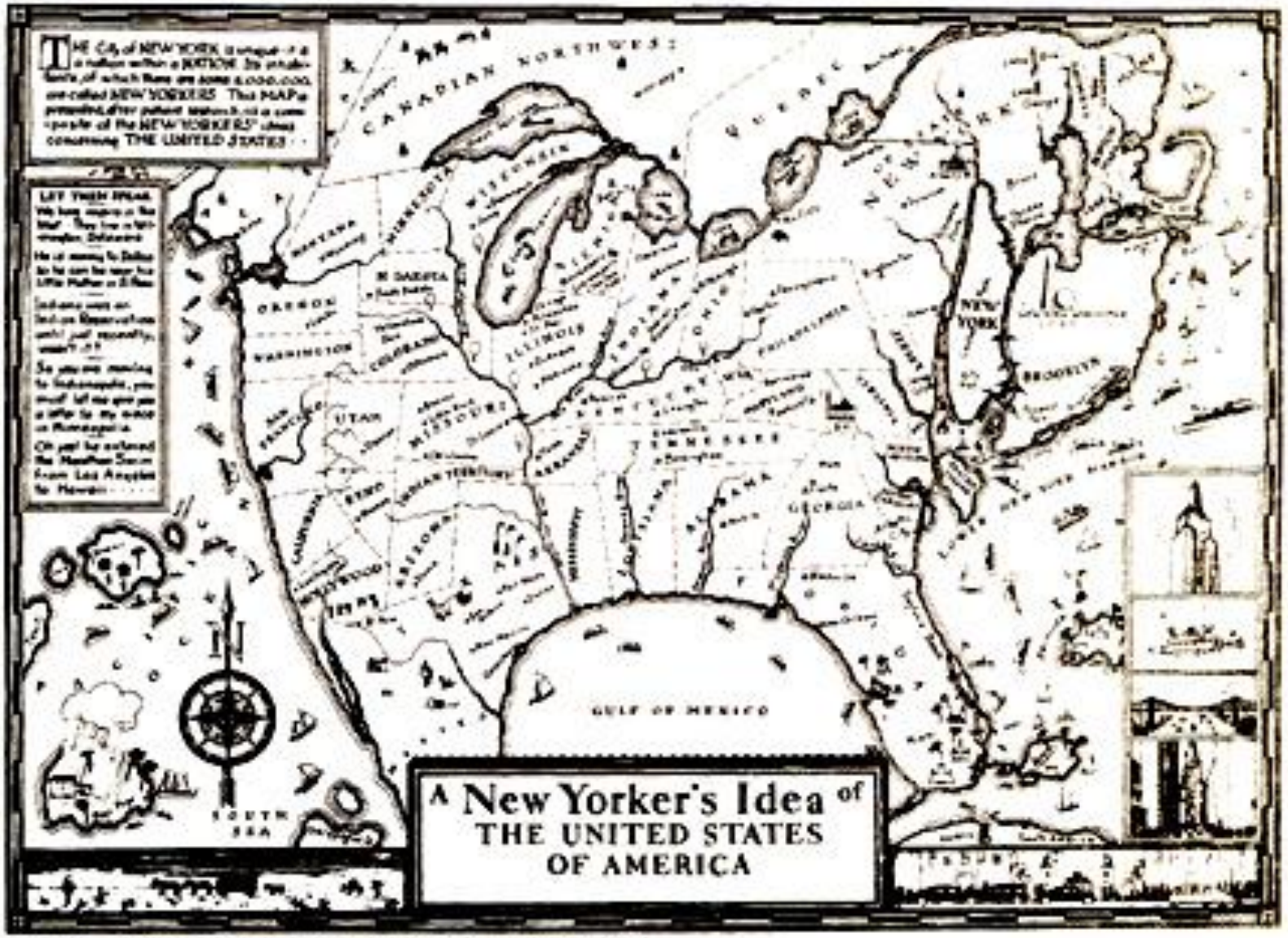


Fig 1.8 The New Yorker's View of the United States

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# Bostonian's Image

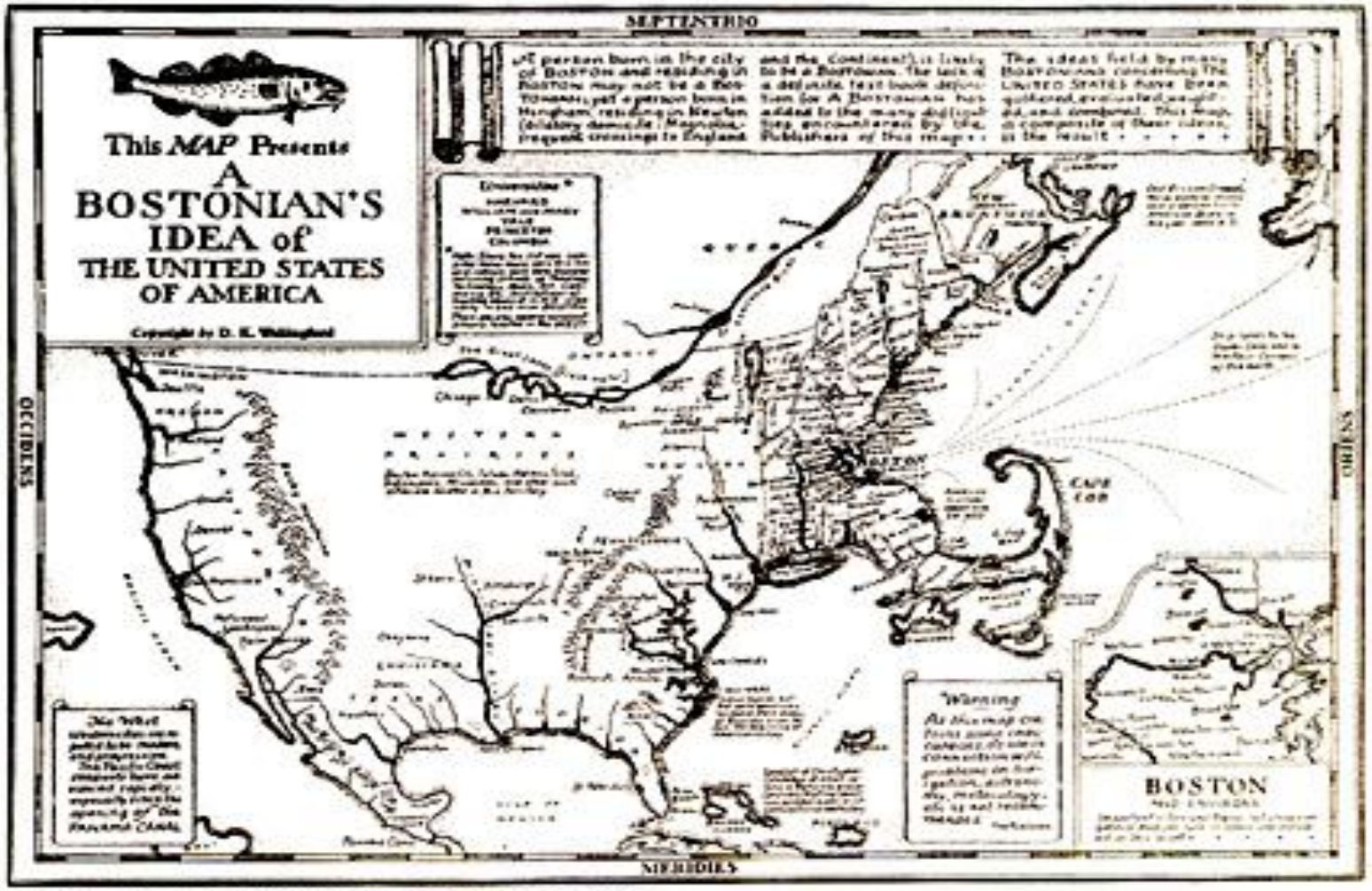
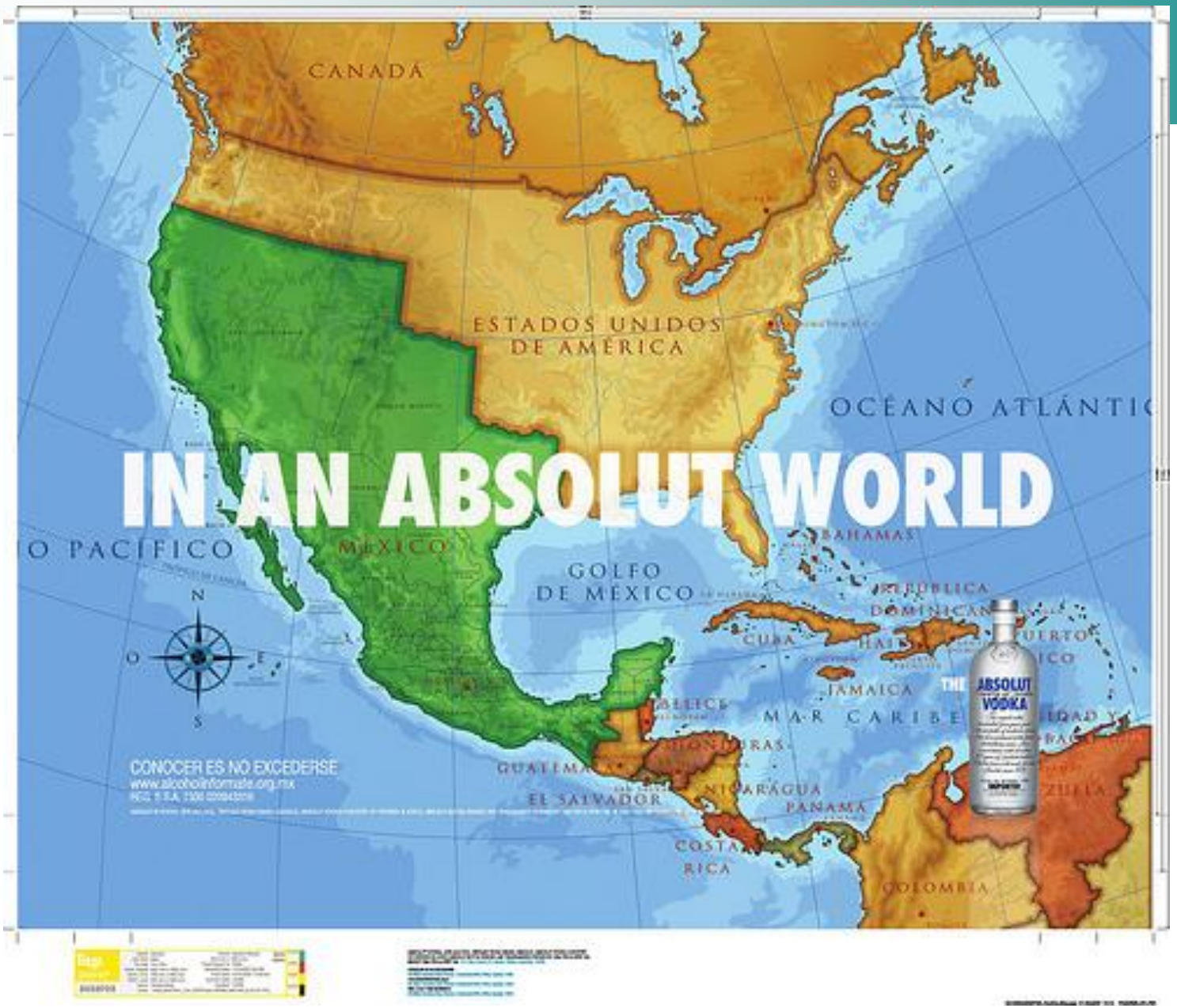



Fig 1.9 The Bostonian's View of the United States

# Bushie World


CANADA
ESTADOS UNIDOS
DE AMÉRICA
OCÉANO ATLÁNTIC
IN AN ABSOLUT WORLD
O PACÍFICO
MÉXICO
GOLFO
DE MÉXICO
BAHAMAS
CUBA
JAMAICA
MAR CARIBE
GUATEMALA
EL SALVADOR
NICARAGUA
PANAMA
COSTA
RICA
COLOMBIA
N
O
E
S
CONOCER ES NO EXCEDERSE
www.alcoholinformate.org.mx
THE
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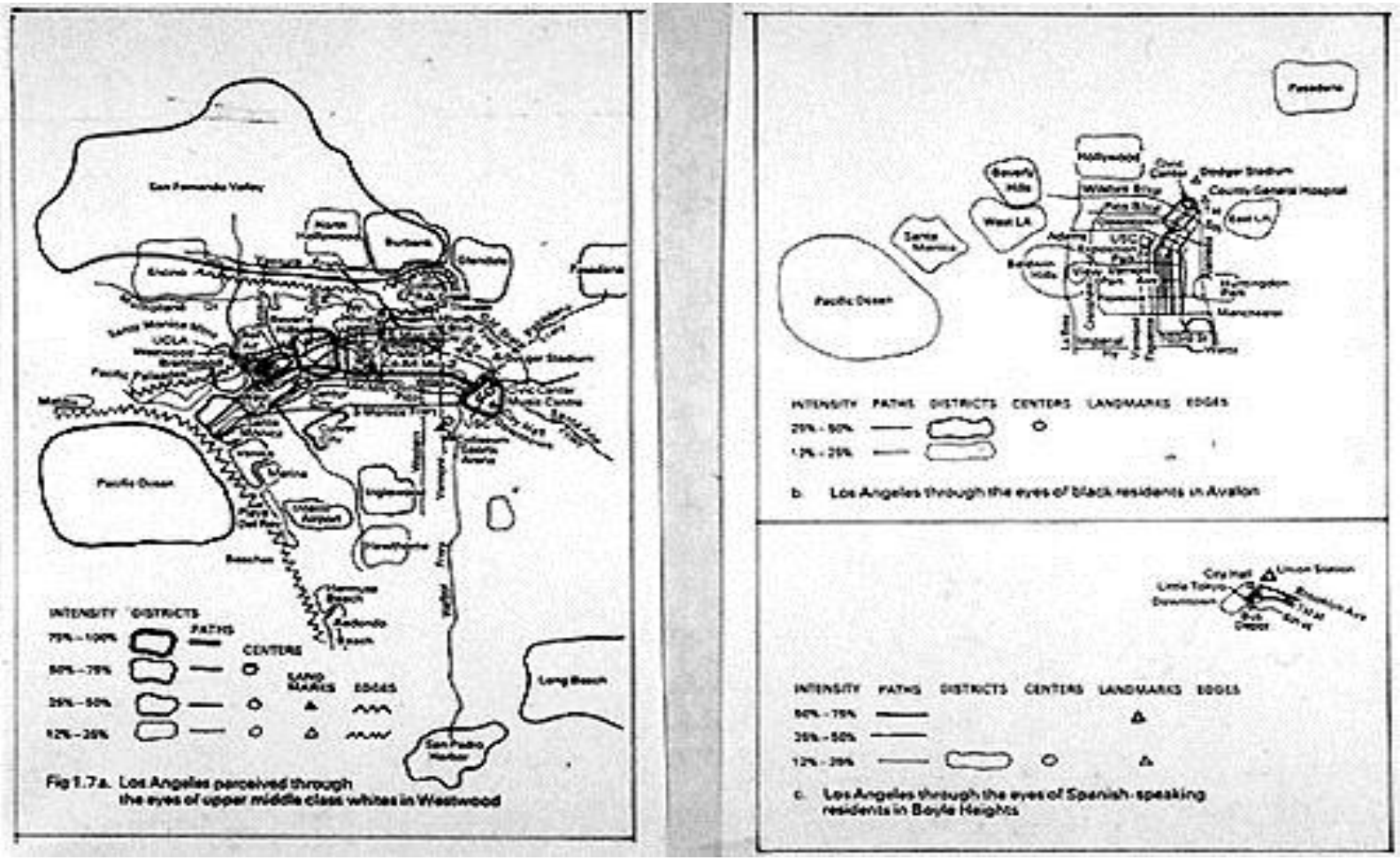
# Mental Maps - Los Angeles white elite, black, latino



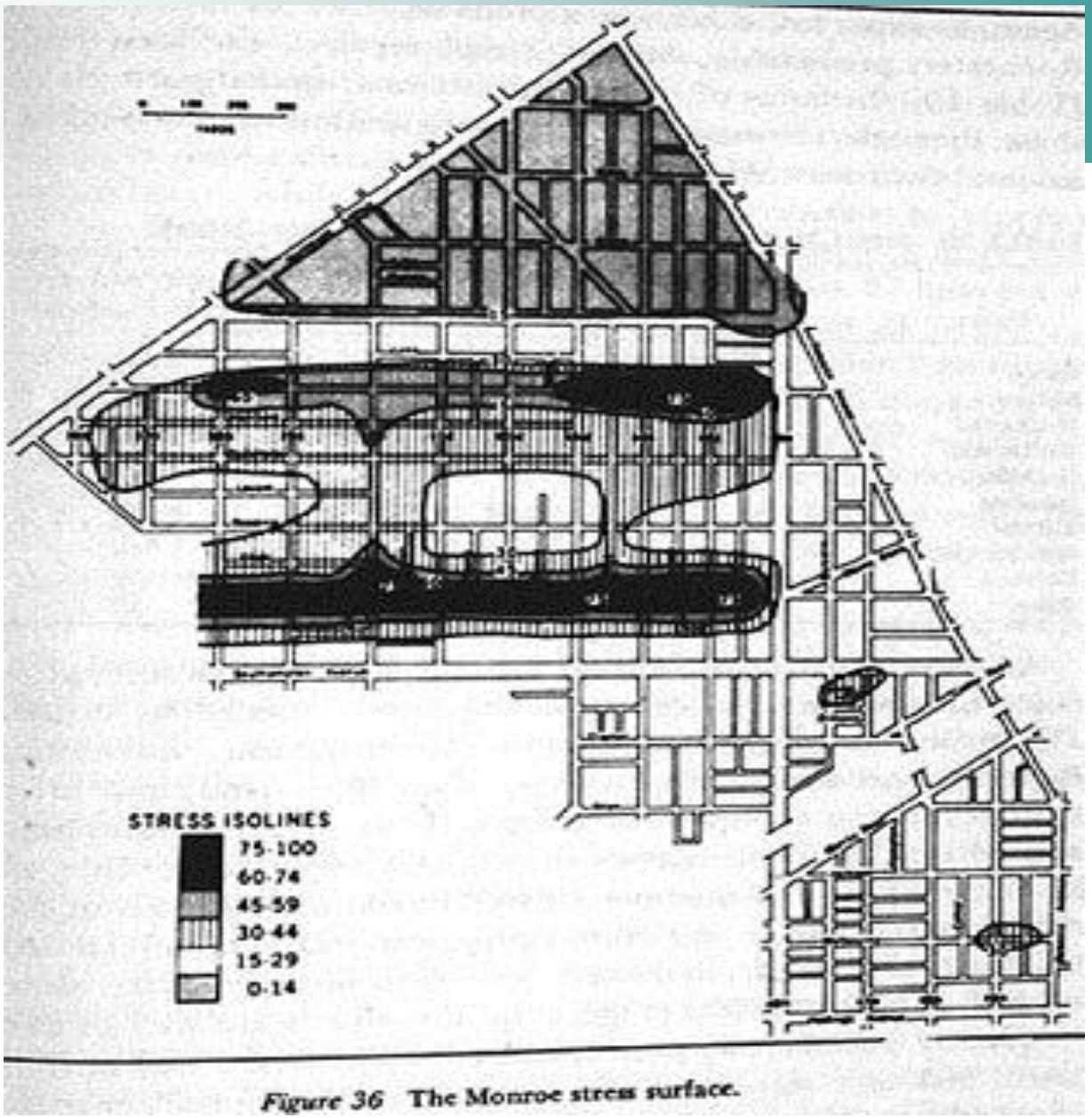
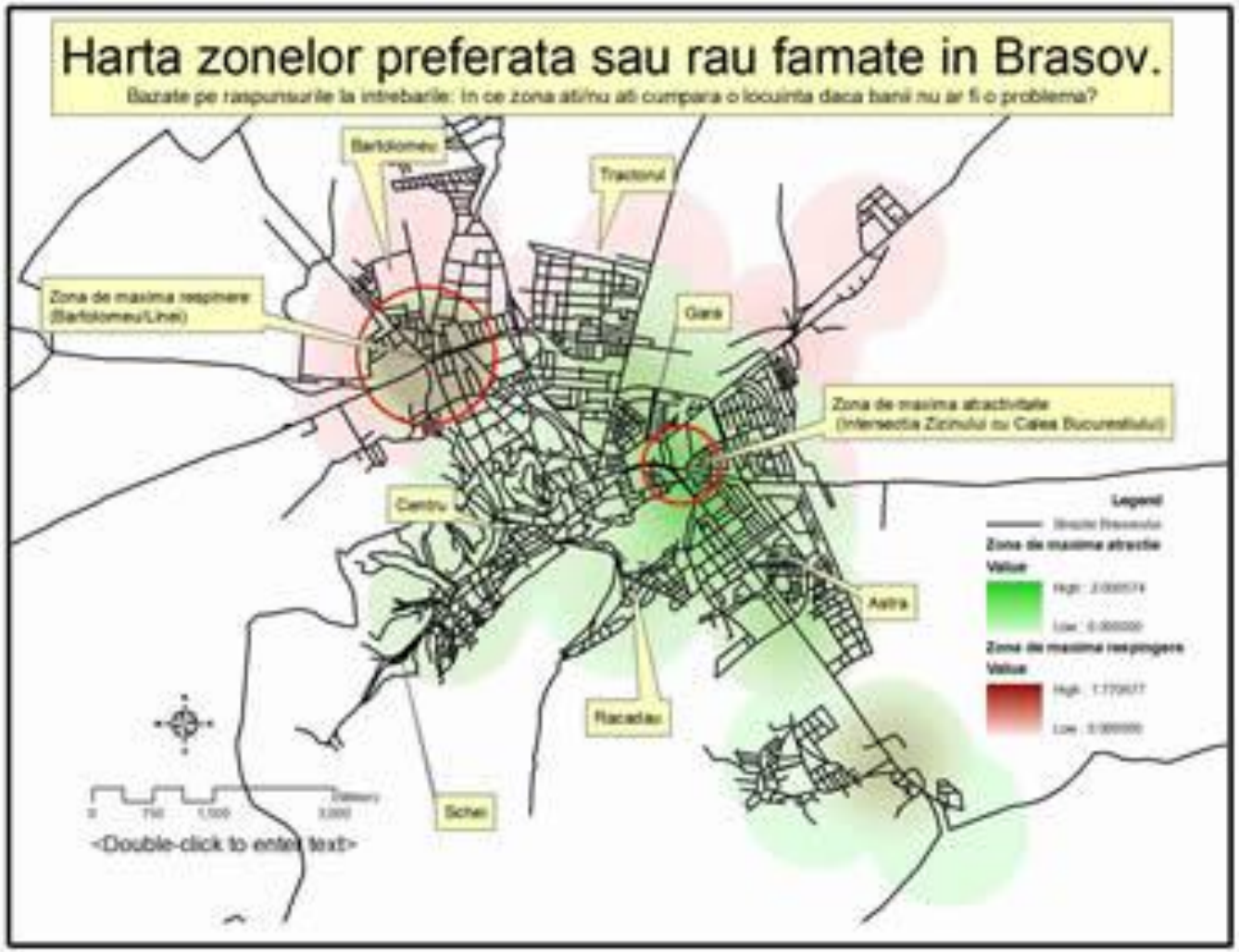
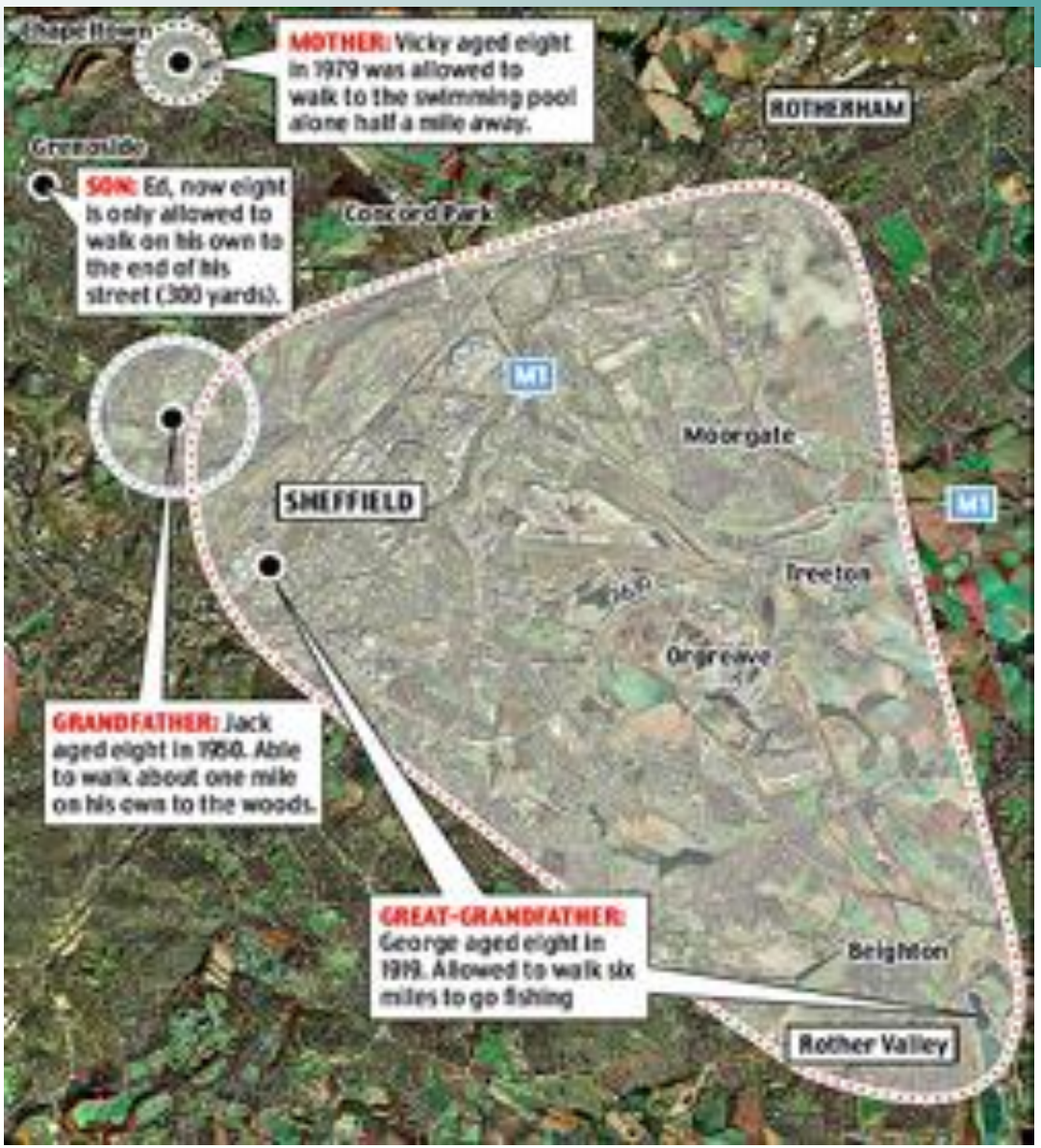
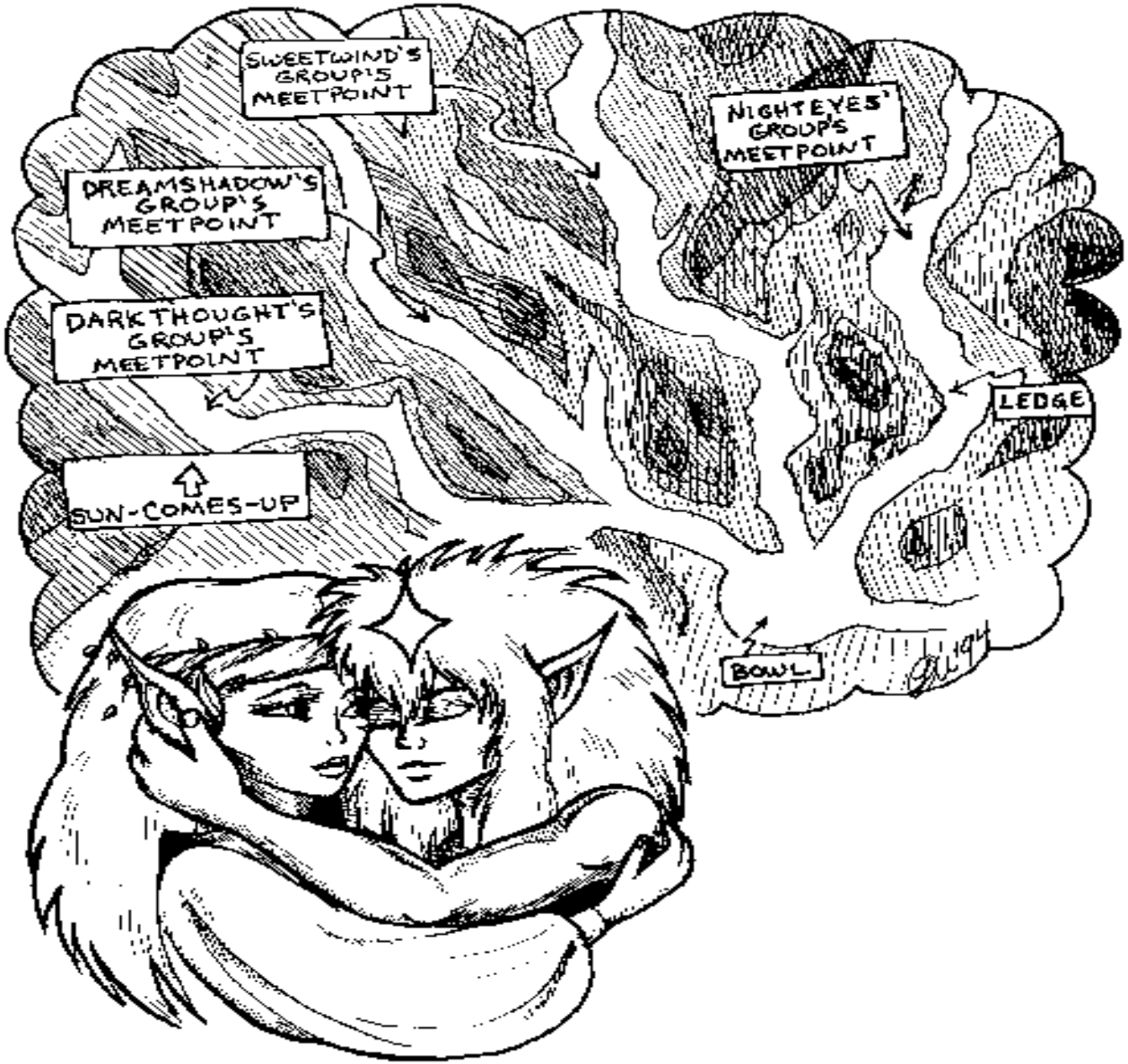



*Figure 36* The Monroe stress surface.


Harta zonelor preferata sau rau famate in Brasov.
Bazate pe raspunsurile la intrebarile: In ce zona ati/nu ati cumpara o locuinta daca banii nu ar fi o problema?
Bartolomeu
Tractorul
Zona de maxima respingere (Bartolomeu/Livei)
Gara
Zona de maxima atractivitate (Intersectia Zizinului cu Calea Bucurestilului)
Centru
Astra
Racadau
Schei
Legend
Zona de maxima atractie
Value
Zona de maxima respingere
Value
<Double-click to enter text>

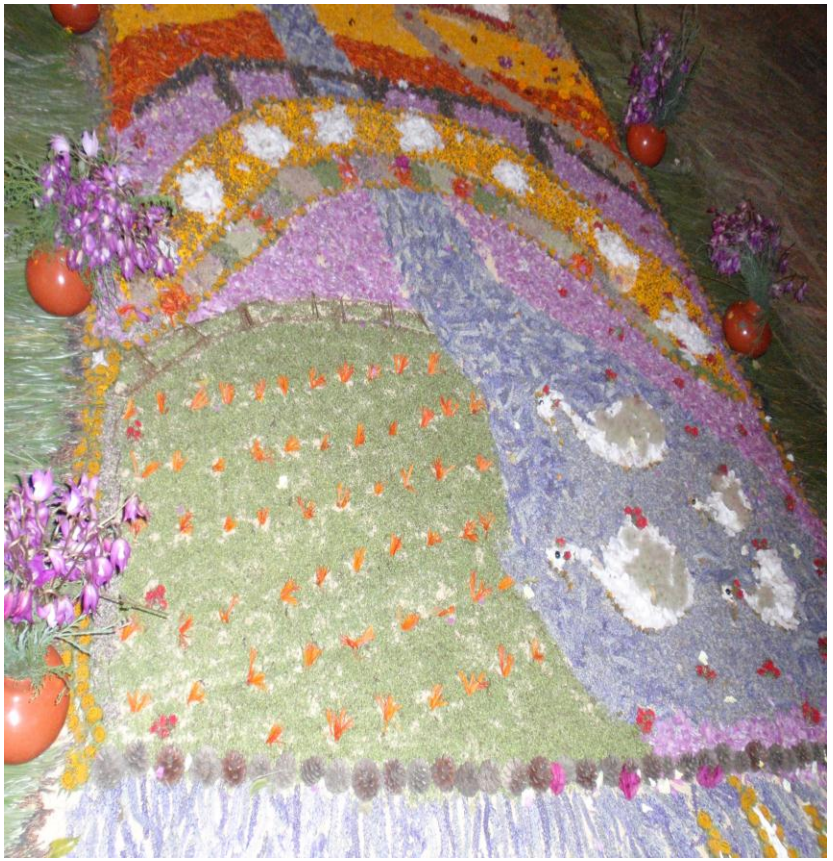

Chapeltown
MOTHER: Vicky aged eight in 1979 was allowed to walk to the swimming pool alone half a mile away.
ROTHERHAM
Greenside
SON: Ed, now eight is only allowed to walk on his own to the end of his street (300 yards).
Concord Park
M1
Moorgate
SHEFFIELD
M1
Treeton
Orgreave
GRANDFATHER: Jack aged eight in 1950. Able to walk about one mile on his own to the woods.
GREAT-GRANDFATHER: George aged eight in 1919. Allowed to walk six miles to go fishing
Brightion
Rother Valley

# Cataclysm Linda Tam Dreamsongs



# Jefferson City - watersheds

# Mental maps in Michoacan



# Children's Mental maps

- Children´s  mental maps

urban examples

- Animals´Mental maps

# Mapping Lost Homes

- Drawing, painting therapeutic after trauma of surviving tsunami, especially for children
- Memories of home & community need preserving, a “home map” recreates child’s mental map of a lost home & neighbourhood
- *TOOLS*
- Sketch maps; plastic overlays on topo maps, tourist map; best on aerial photos; 3D models.
- Symbology (map legend) from the children
- Digitally photograph for preservation

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# Indigenous Spaces

- “the Inuit don’t make maps.. *even though they could*. … their mapping behavior reflects – not potential ability (the Inuit suffer no cognitive deficit) – but cultural values and social needs. (Wood 1993

- ´Places emerge as sites of the hybrid articulation of representations, practices, & things, as spatialized imaginaries´. The meanings of ´locations´ can be extended to describe the intricate topologies of bodies and things, as well as landscapes. (Thule Inuit people. (Whitridge 2004)

# Indigenous Space - Songlines

It is the act / process of making the “map” or the spatial representation which is the significant activity, not the material product. ´Singing the map´ by Australian Aborigines.

# Songlines

Songlines – are the paths / tracks along which ancestral and mythical beings travelled during the Dreamtime (Creation), and therefore connect sacred sites widespread in Australia.

Digital Songlines website

http://songlines.interactiondesign.com.au

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# Inscribing & Incorporating Local Spatial Knowledge - Rich Pictures & Stories

- *Inscribing* K.: reports, maps, cadastres
- *Incorporating* K.: ceremony, stories, dance, song, pictograms

- Qualitative, implicit, & emotional knowledge elicited through qualitative methods
- - discourse, story-recording, sketching, video, before transcribing to visual and geoinformation

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# Respect for People's Land Rights
## Concepts of Land

- ISK as symbolic, emotional, and visionary knowledge –
- Cultural, historical, & spiritual values of land.
- Land in the stewardship of people.
- Land determines activity spaces and responsibility spaces.

# Representing Land Tenure

| *Customary Land Tenure System e.g. Aboriginal Australia* | *Market-oriented Land Tenure e.g. Australian Cadastral System* |
|---|---|
| Spiritual physical connection to land | Land as a marketable commodity |
| Communal Ownership. Stewardship. | Register land@cadastre. Exclusive ownership. |
| Land transferred through inheritance | Transfer land sale, lease, inheritance. |
| Evidence tenure via song, dance, stories, pictures, ceremony - 'incorporating' | Written Records by Certificate of Title granted by state. Long-term 'inscribed' storage in databases. |
| Boundaries are 'limits of influence' topography, sacred spaces. | Boundaries geodetic, demarcated by monuments. State regulation. |
| Overlapping rights, responsibilities, negotiate with neighbour peoples | Rights on neighbouring lands restricted & controlled by the State |
| Soft boundaries.<br>Temporary/Seasonally flexible bound | Hard boundaries<br>Mostly fixed boundaries |
| Richer Meanings - holistic<br><br>GIS cannot handle - Maybe PGIS | Preciser meanings - reductionist<br><br>GIS handles very well |

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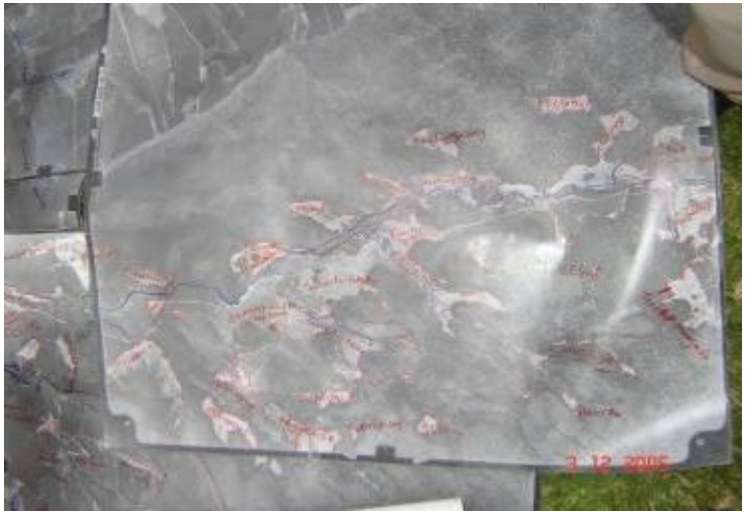
# Stewardship of the Land

- Maori : Tapu – respect for resources
- Mana - authority Mauri - Life force life energy

- Stewardship - Land is held in trust:
- NZ, India, islamic law, Solomon Islands, First Nations
- International Court of Justice,
- FoE : “our grandchildren´s grandchildren”

# Mapping Land Claims using Aerial Photographs & LK



# Naive Geography – “real space”

- Real space tightly coupled with Time
- Distances are non linear
- Distances are asymmetric
- Key nodes are the interest, not the space between – space jumps

- Fuzzy, Flexible, boundaries & zones
- Layered zones
- Continuous or discrete space
- Uncertain and Restricted spaces

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# Representing Real Space - special capabilities:-

- Natural language uses near, far, isolated, crowded, etc.
- 3 dimensions of space not universal.  E.gs. of Ethnospace adding diurnal, seasonal, centrality, zenith, nadir
- ‘jump scale’: enabling people at scales relevant to their daily lives or long-term interests;
- Real space tightly coupled with Time – short & long term
- represent counter-maps of disadvantaged or genders;

# Representing Real Space on maps or GIS requires special capabilities:-

- represent some areas as fuzzy or fading zones, or as multi-layered zones;
- represent fuzzy, blurred boundaries, flexible, or multiple boundaries;

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# Representing Real Space - special capabilities:-

- represent flows of resources, information, ideas,
- or flows of influence, power, and control;
- dynamic, showing changes over time in resource management, in locations, boundaries, or in conflicts.
- Space includes soundscape, smellscape, memoryscape
- Spatial learning – Landmarks, Routes, Survey Area

# Representing Real Space on maps or GIS requires special capabilities:-

- represent some data as uncertain spatial locations, or as hidden (e.g. sacred) or restricted locations;
- provide immediate access to linked information, via hyperlinks;
- transparent representation, e.g. of multiple land rights and entitlements, correlating with transparency of information;

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# Male - Female differences

- Spatial orientation
- Verbalising
- Perception of movement
- Colours
- Sounds?
- Route finding – orientation OR visual clues

# Gendered Differences in Navigation

*Hypotheses*

- Males:

  directions, distance, movement,
  simplicity, certainty,

- Females:

  landmarks, verbal information, colours,
  complexity, ambiguity,

# 3 Wise Men (los tres reyes) Route Finding -without a Woman

"We are lost, but, No need to ask the way – we have a GPS"

# 3 Wise Men Route Finding – with a woman "We are lost - For heaven's sake, just ask someone!"

# Spatial Certainty & Representational Certainty

- ***Failure to distinguish between positional accuracy and representational accuracy***
- ***False precision*** because of legitimising elite control, professional arrogance, closed shop - *precision as fetish*.

- Precision as (deliberate) distraction, or obfuscation – the hiding of process, of realities of power and control
- Precision as step towards external expropriation – a market for land requires legal recognition needing high level of precision

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# PGIS Purposes and Need for Precision – continuum

There is a need for more:

*Fuzziness* ⟵ ⟶ *Precision*

| | |
|---|---|
| *qualitative information* | *quantitative information* |
| *lower resolution* | *higher resolution* |
| *incorporation* | *inscription* |
| *broader scale* | *detailed scale* |

PGIS spheres (applications):

| | | | | | | |
|---|---|---|---|---|---|---|
| Empowerment & Sensitisation | Culture & Heritage | Conflict Management | Hazards & Risks | Natural resource manage-ment systems | Indigenous technical knowledge of natural resources | Property claims |

In order to represent:

*Ambiguity* ⟵ ⟶ *Certitude*

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