

A Network Theory Framework for Urban Cultural Heritage Conservation

LEMA

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Objective

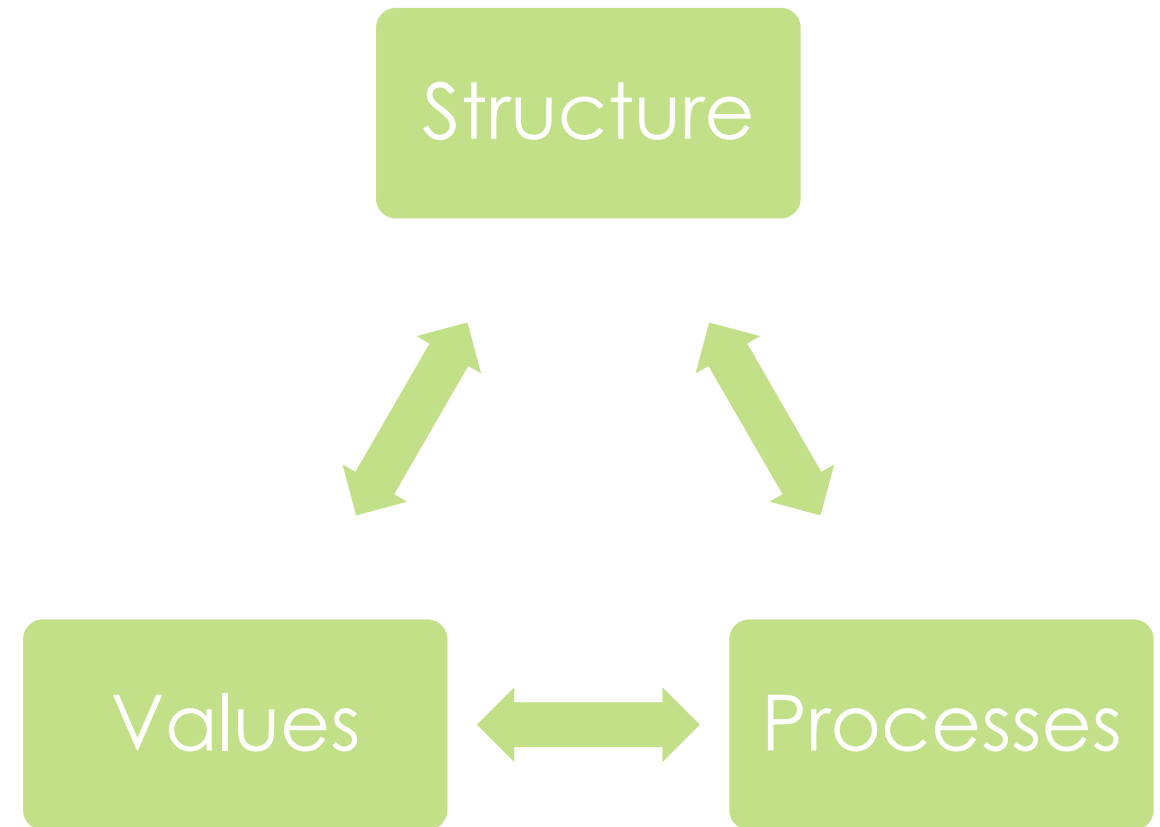
Develop an ecological approach to the integration of heritage conservation and urban development using the framework of HUL

HUL “the urban area understood as the result of a historic layering of cultural and natural values and attributes, extending beyond the notion of ‘historic center’ or ‘ensemble’ to include the broader urban context and its geographical setting” (UNESCO, 2011).

Such concept considers all layers of the city **spatial structure**.

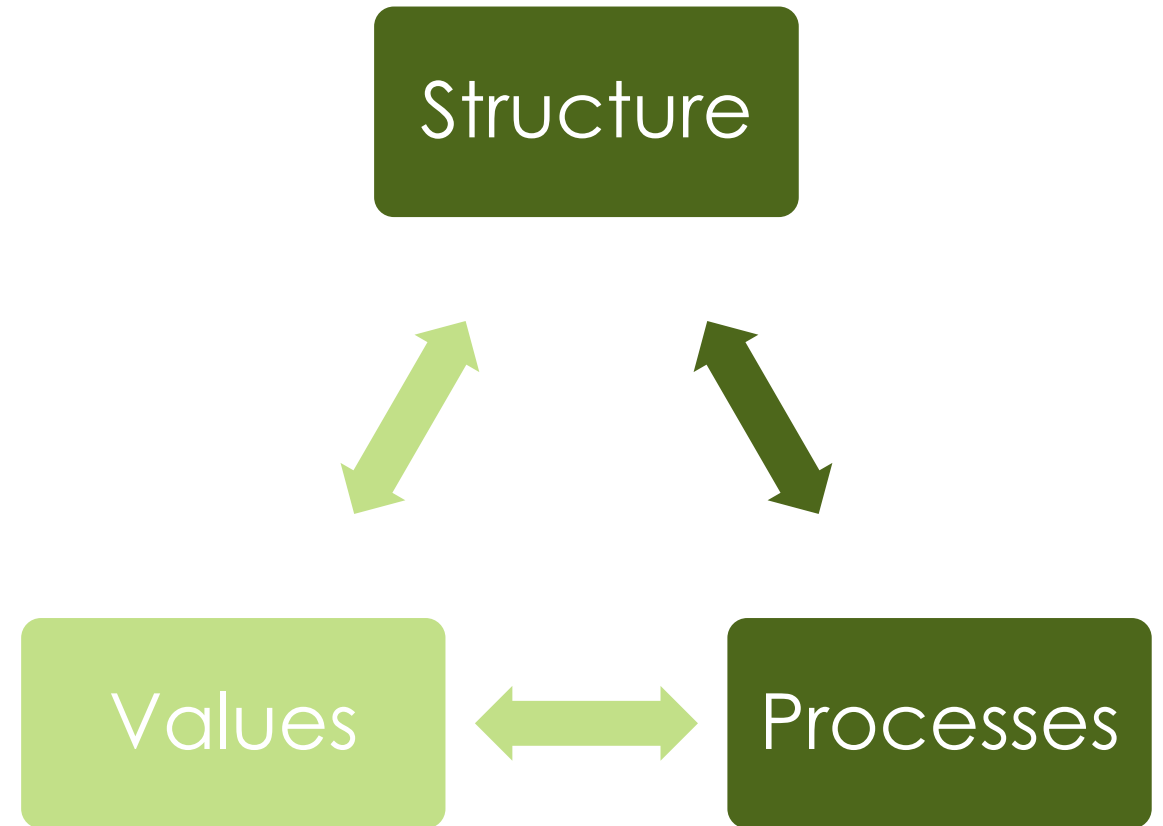
It looks at the different socio-economic **processes** and urban development **processes** that shape the city over time, and the different **cultural values** conveyed in an urban landscape and their different interpretation.

In other words , Urban heritage management within the framework of HUL calls for the understanding of the relationship between the spatial structure of cities, different values attributed to the tangible aspects of cities, and processes.



The reciprocal relationship between landscape structure (matrix, patches, corridor) and ecological processes (function) is the fundamental hypothesis of landscape ecology discipline.

Contributions of landscape ecological studies provide understanding on the implications of particular landscape patches, such as the size, shape, & orientation on ecological processes (Collinge, 1996).



Ecological Network

In a natural landscape, and within landscape ecology discipline, the management of landscape structure by means of **Ecological Network** has developed significantly over the past 40 years to **manage landscape processes** (Forman, 1995; Shkedy & Saltz, 1999; Jordan, 2000).

Ex: Ecological Networks in the European Alps, The Pan-European Ecological Network for central and eastern Europe, & the Dutch National Ecological Network.

Ecological Networks were applied to maintain axes for conserving ecologically important habitat areas and protecting these from outside disturbance and at the same allow them to adapt to change occurring in the landscape as to achieve an overall ecological integrity.

Ecological Network

Sequence of analysis

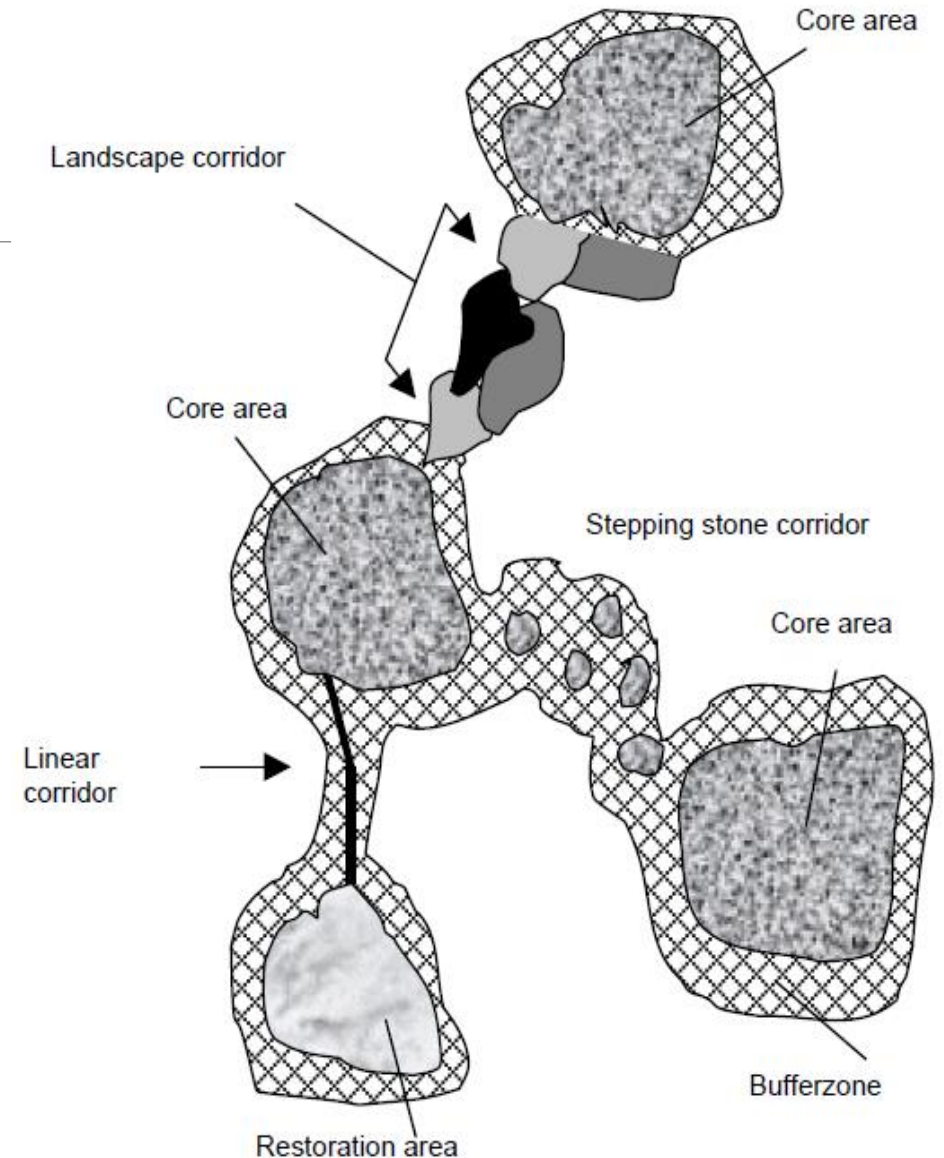
1. The structure of the landscape is studied based on the :
Matrix-patch-corridor model
2. The pattern process relation is studied by means of specific parameters:
Continuity- heterogeneity- fragmentation
3. Ecologically important endangered habitats are identified
4. Network scenarios are proposed using graph theory, and network analysis
5. The most suitable Network is identified through suitability analysis. In this phase different network structures are assessed based on indicators that describe the interrelationships between landscape elements. Moreover, the number, length and density of corridors are analyzed to describe their structural characteristics and the complexity of the network.

Ecological Network

Results

Network structure consists of:

- Core areas (existing species and ecosystem areas)
- Corridors (physical linkages between core areas)
- Buffer zones (surrounding area which protect the network from external negative impacts).



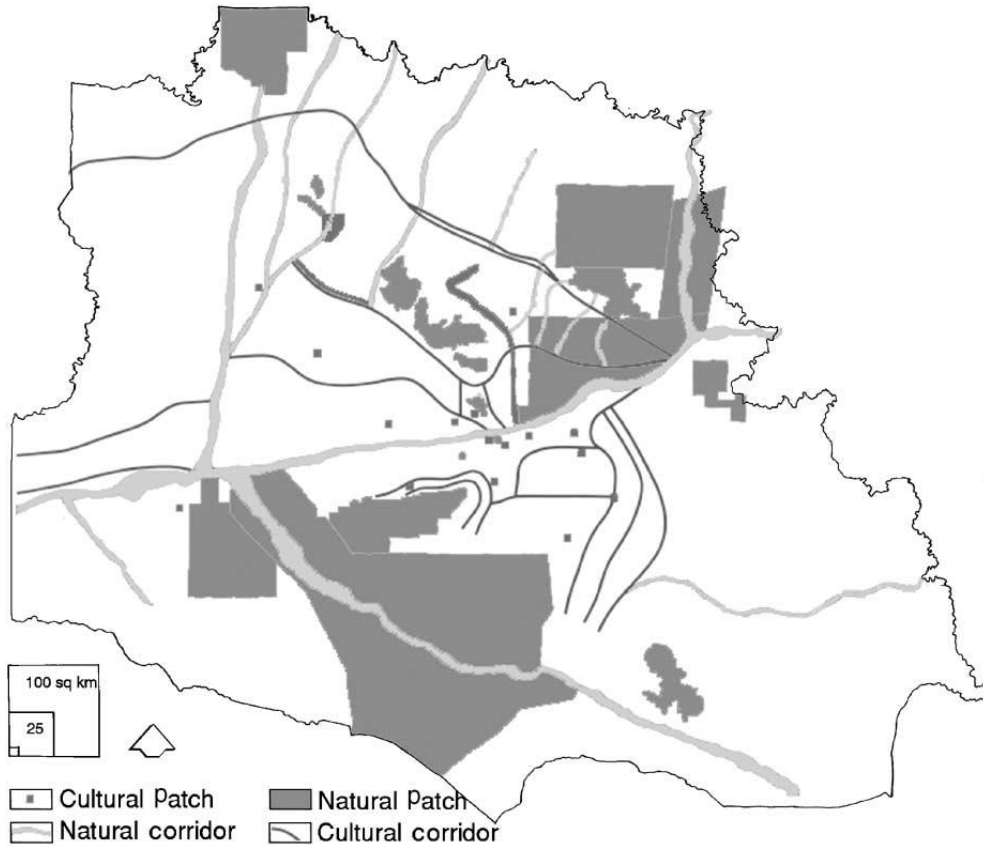
Ecological Network

Urban heritage conservation and management

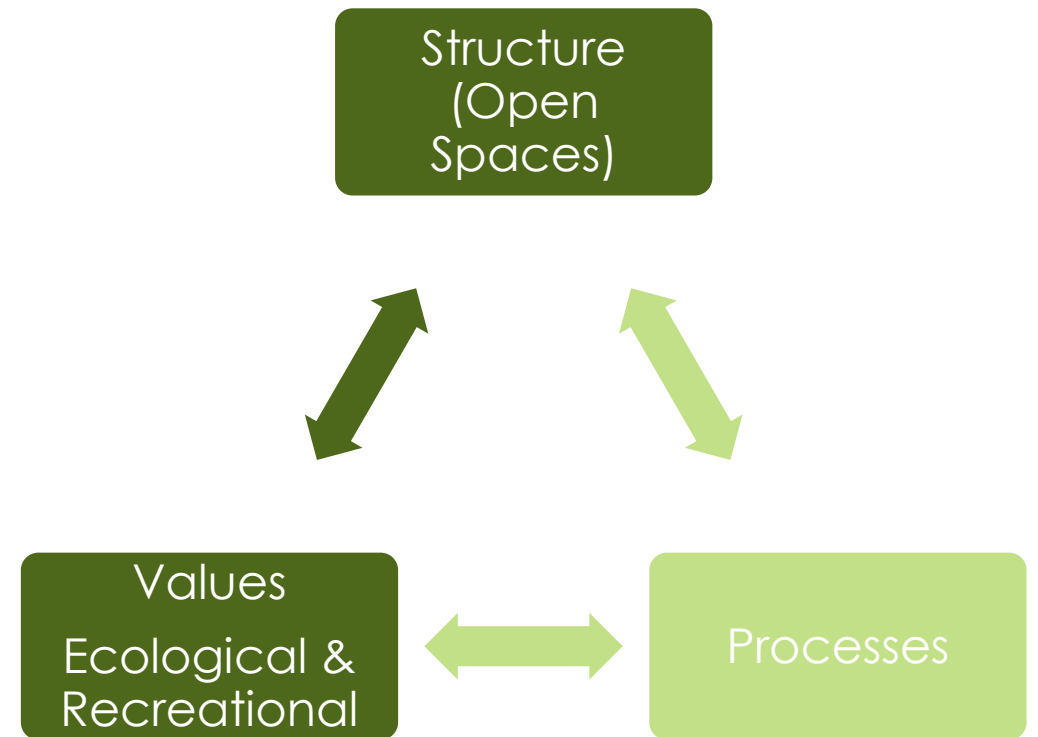
We suggest the application of this approach in urban contexts for the conservation and management of urban heritage considering **structure, processes, and values**.

As urban contexts are complex and dynamic there are a multiplicity of methods, metrics, and graphical representation to the analysis and design of networks.

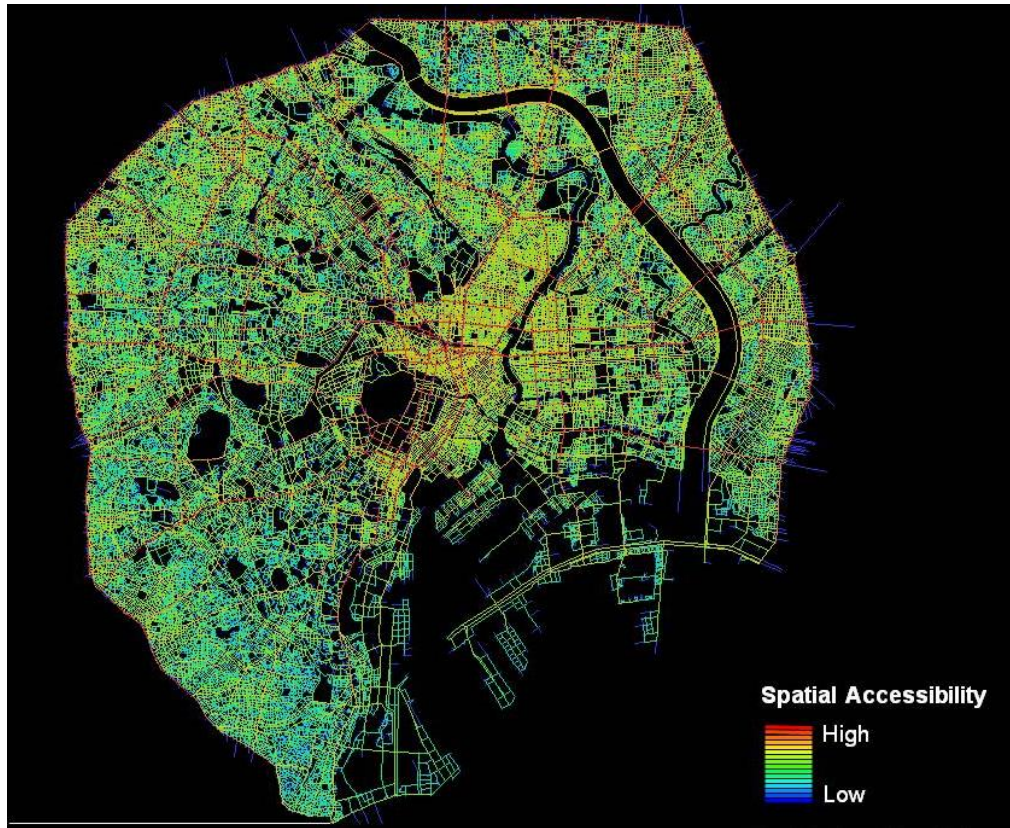
The **landscape ecology principles** have already been applied to the development of **ecological networks** also known as greenways to the conservation of ecological and recreational value of urban open spaces.



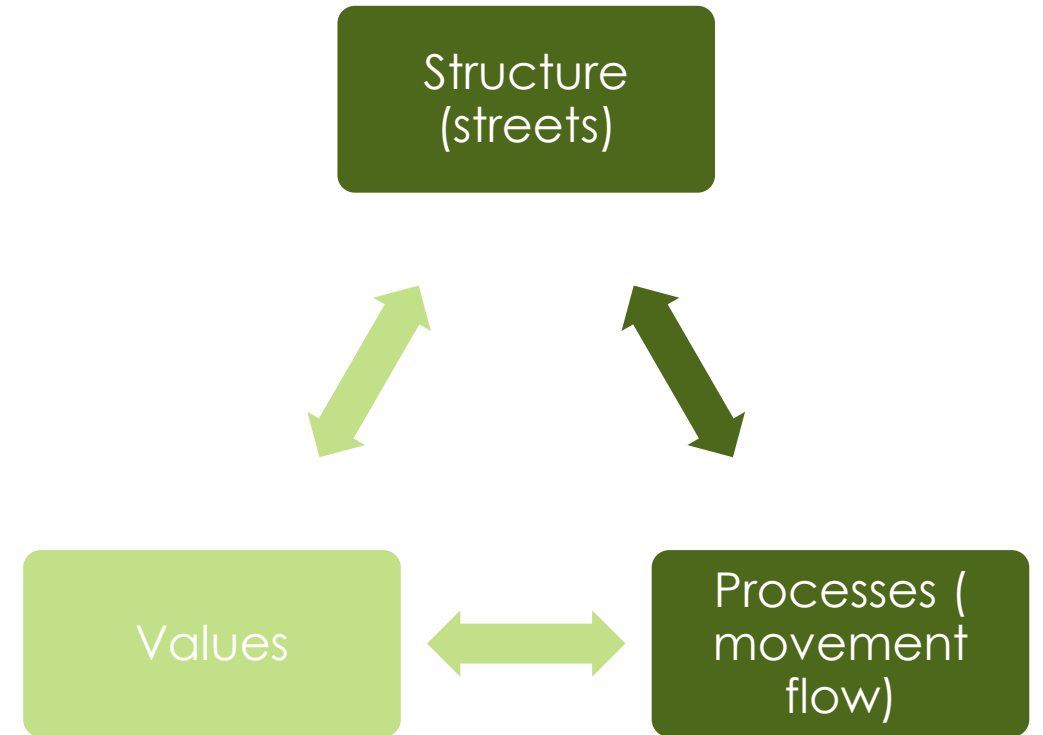
Ecological network plan for Phoenix, Arizona (Cook, 2000).



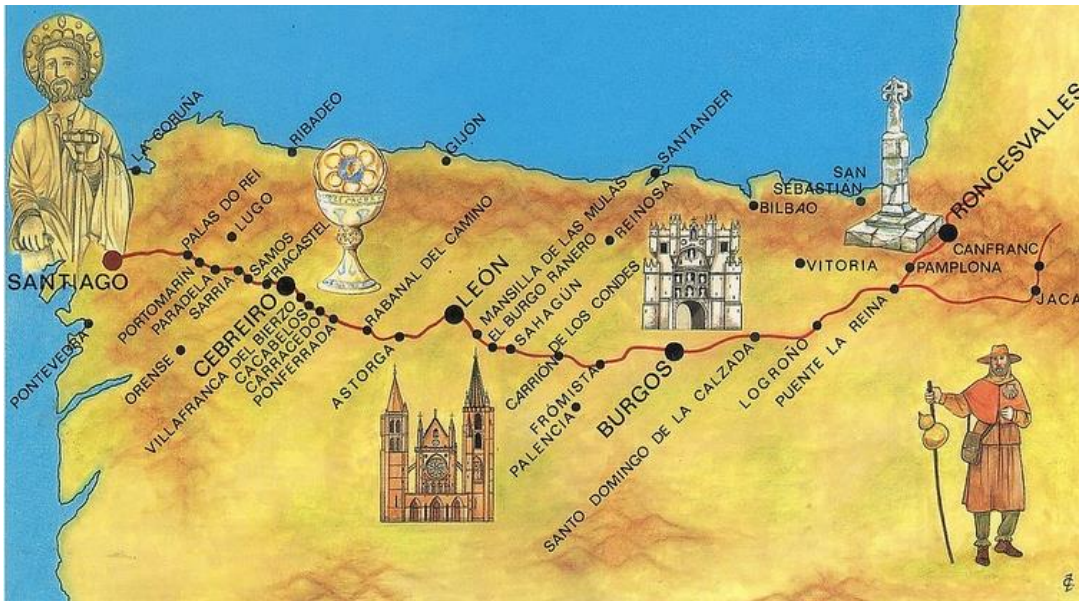
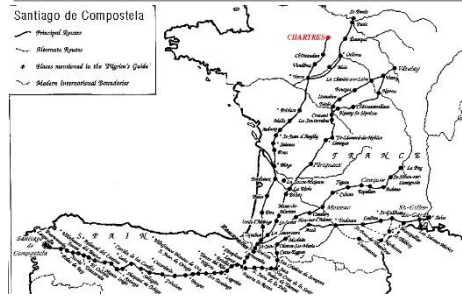
The **space syntax method** looks at the relation between street network and urban flow where lines (streets) are nodes and the street system is the network.



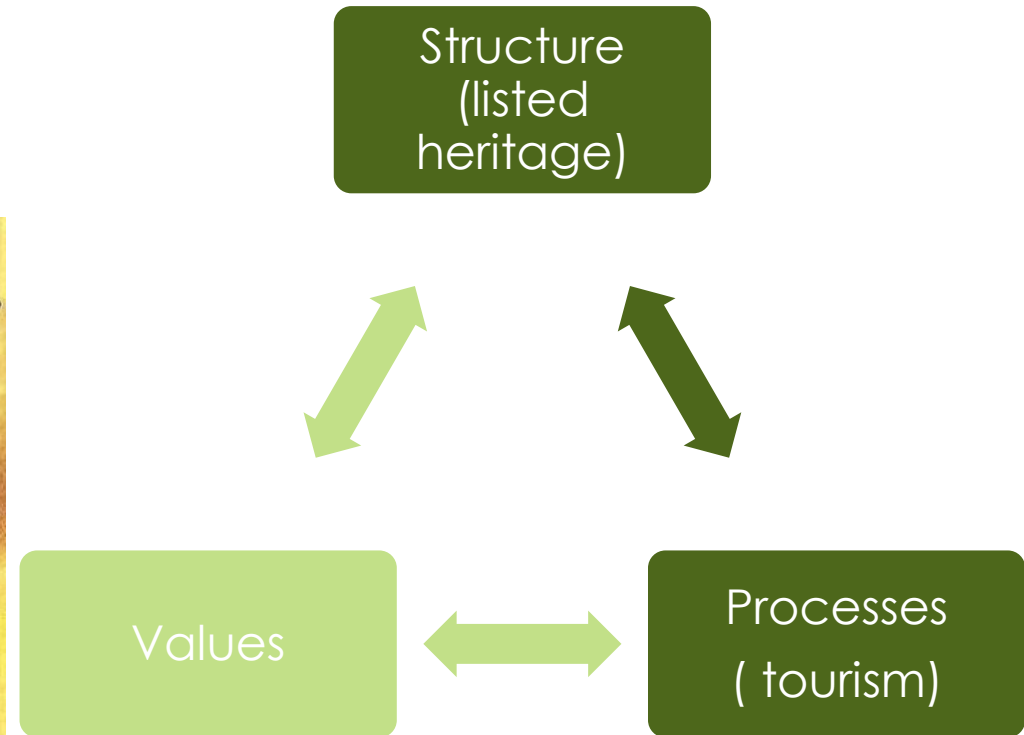
Tokyo segment space syntax map (Hillier, 2014).



Heritage Networks (cultural routes) connect different listed buildings, squares, and spaces.



Santiago de Compostela Route, Spain.



Ecological Network

Urban heritage conservation and management

From a landscape ecology point of view ,ecological networks are single-purpose and look for achieving connectivity for wildlife movement. Higher quality linkages between habitat patches or stepping stones can achieve this (Dramstad et al.,1996).

Urban context are complex and dynamic. Accordingly, the application of the ecological network approach for cultural heritage conservation and management considering structure, values, and processes is very challenging:

1. Urban Ecological networks should be multi-purpose and integrate different ecological, aesthetic, cultural, social and recreational considerations.
2. In an urban context connectivity could be physical, visual, and spiritual.
3. Values conveyed in cultural heritage assets are diverse :
Social, Economic, Aesthetic, Political, Age, Historic, Scientific, and Ecological (ICOMOS Australia, 1999; Manson, 2002; Pereira Roders, 2007; English Heritage, 2008).

Ecological Network

Urban heritage conservation and management

So based on the landscape ecology methods for the development of a network, and relying on the matrix, patch, corridor model for the analysis of the city spatial structure.

How to identify the patches and corridors that will form the structure of heritage corridors?

Theoretical Application of This Approach to Tripoli (Lebanon)

Heritage



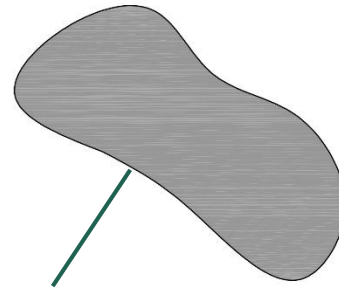
NODES

Heritage by designation

Heritage by designation :

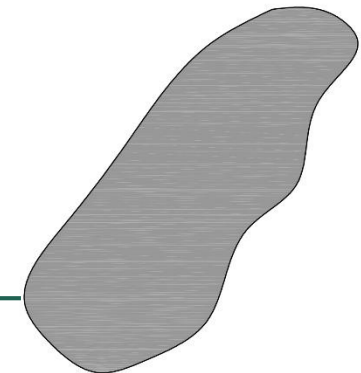
cultural objects that are listed, institutionalized and labelled by experts.

The city has 2 historic poles



location of the old Phoenician city of Tripoli

Medieval Mamluk Core



Heritage

NODES

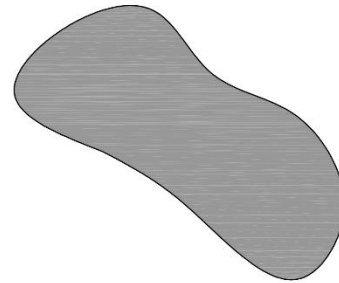
Heritage by designation

Heritage by appropriation

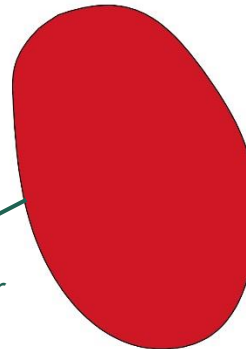
Heritage by appropriation :

the social, or ethnologic heritage that includes landscapes, townscapes, living places and non-exceptional building ensembles.

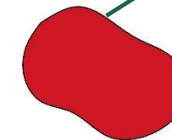
The search for places that people value and attribute to them different cultural values in the city of Tripoli, shows the existence of additional patches within the heritage matrix that enhance the heterogeneity of the landscape heritage pattern.



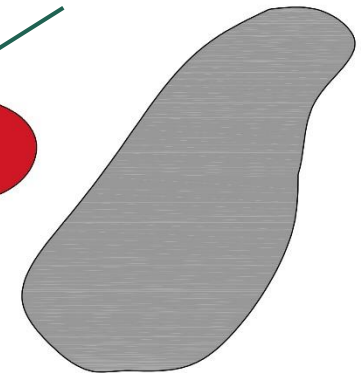
French train rail and station



International Fair



Ottoman district

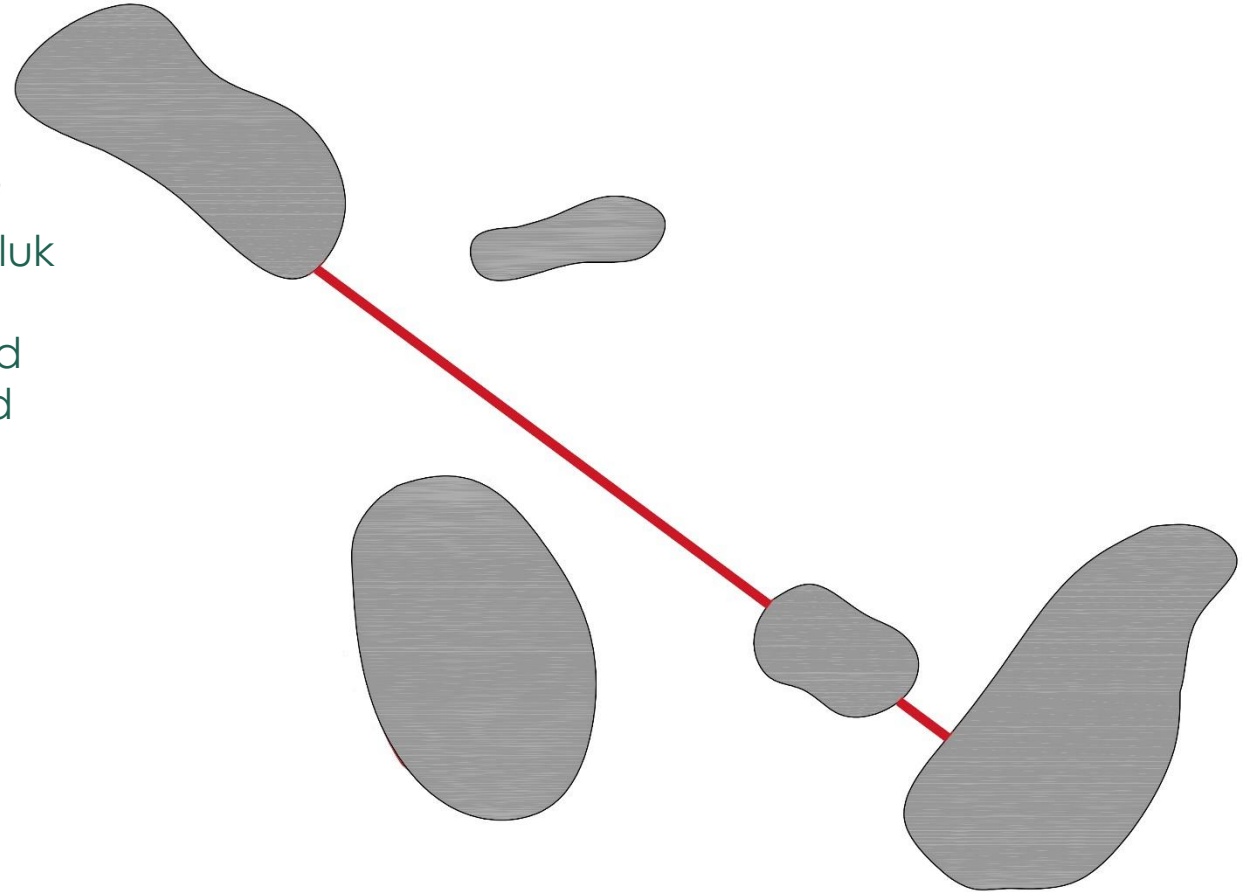


CORRIDORS

- Historic

The attempt to connect the two poles of the city started since the Medieval Mamluk period.

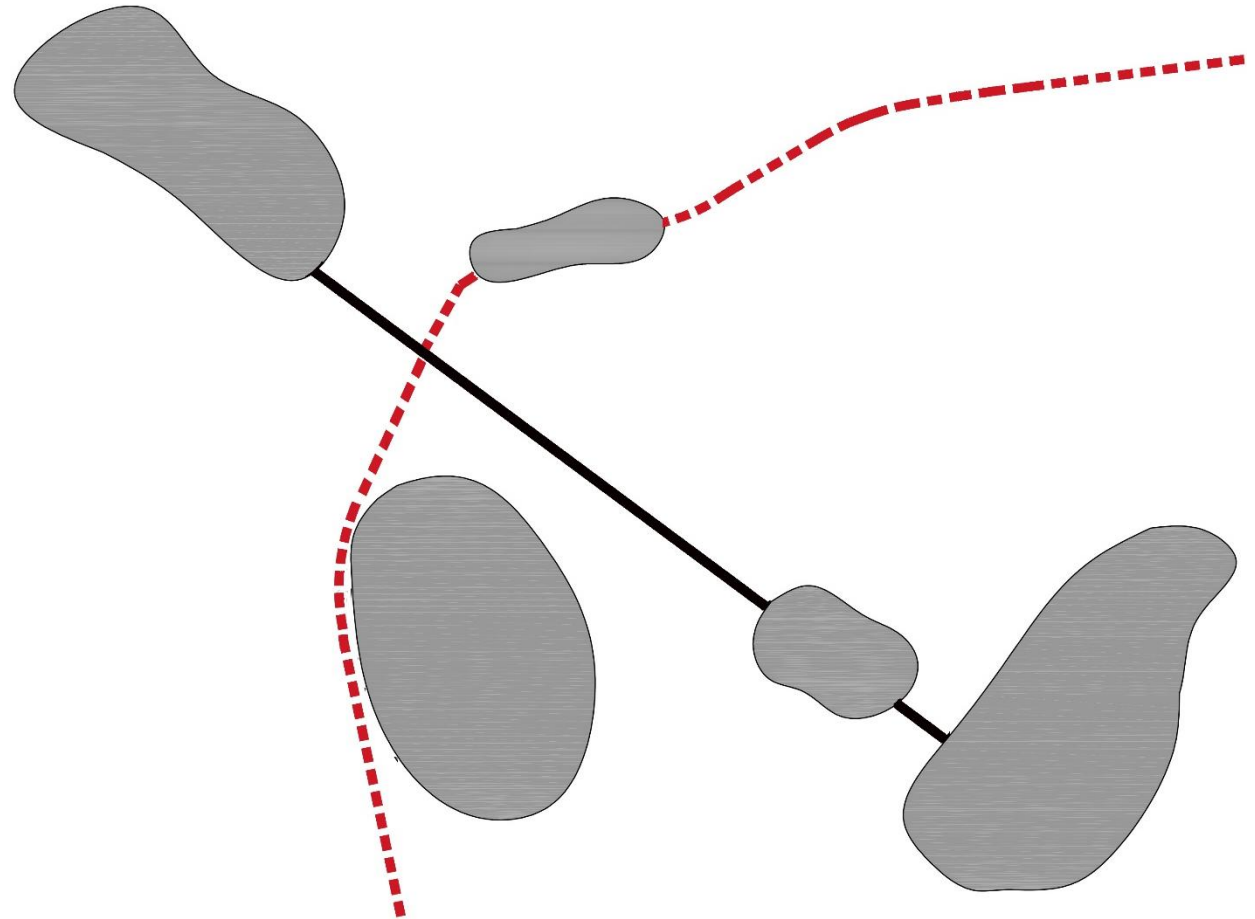
The two urban areas were first connected by a horse line that was later transformed into a tram line. Today this corridor is a primary vehicular road that embeds a historical value.



CORRIDORS

- Historic
- Cultural

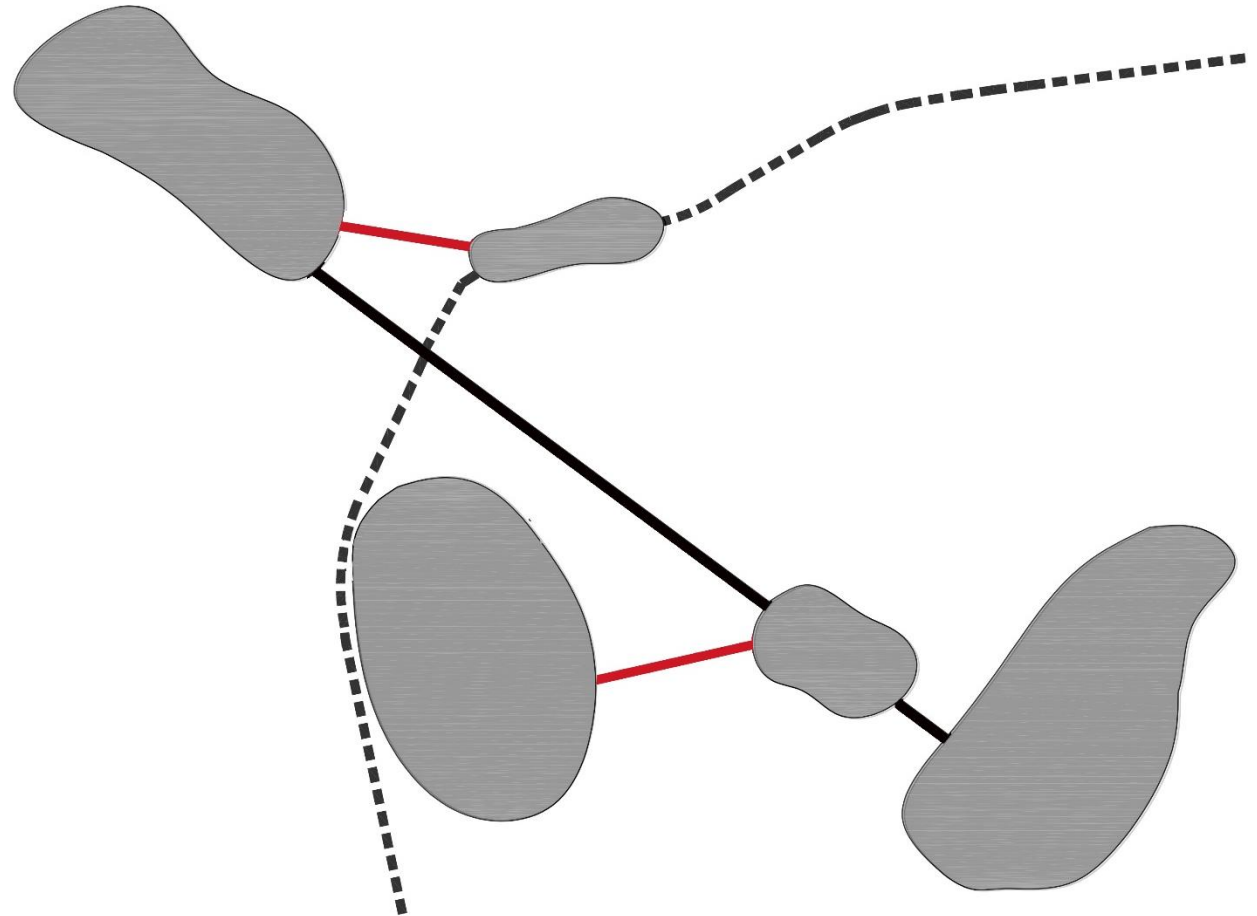
During the French mandate a train rail was established to link the coastal cities in Lebanon. This rail also linked Tripoli to Syria and Turkey.



CORRIDORS

- Historic
- Cultural
- **Functional**

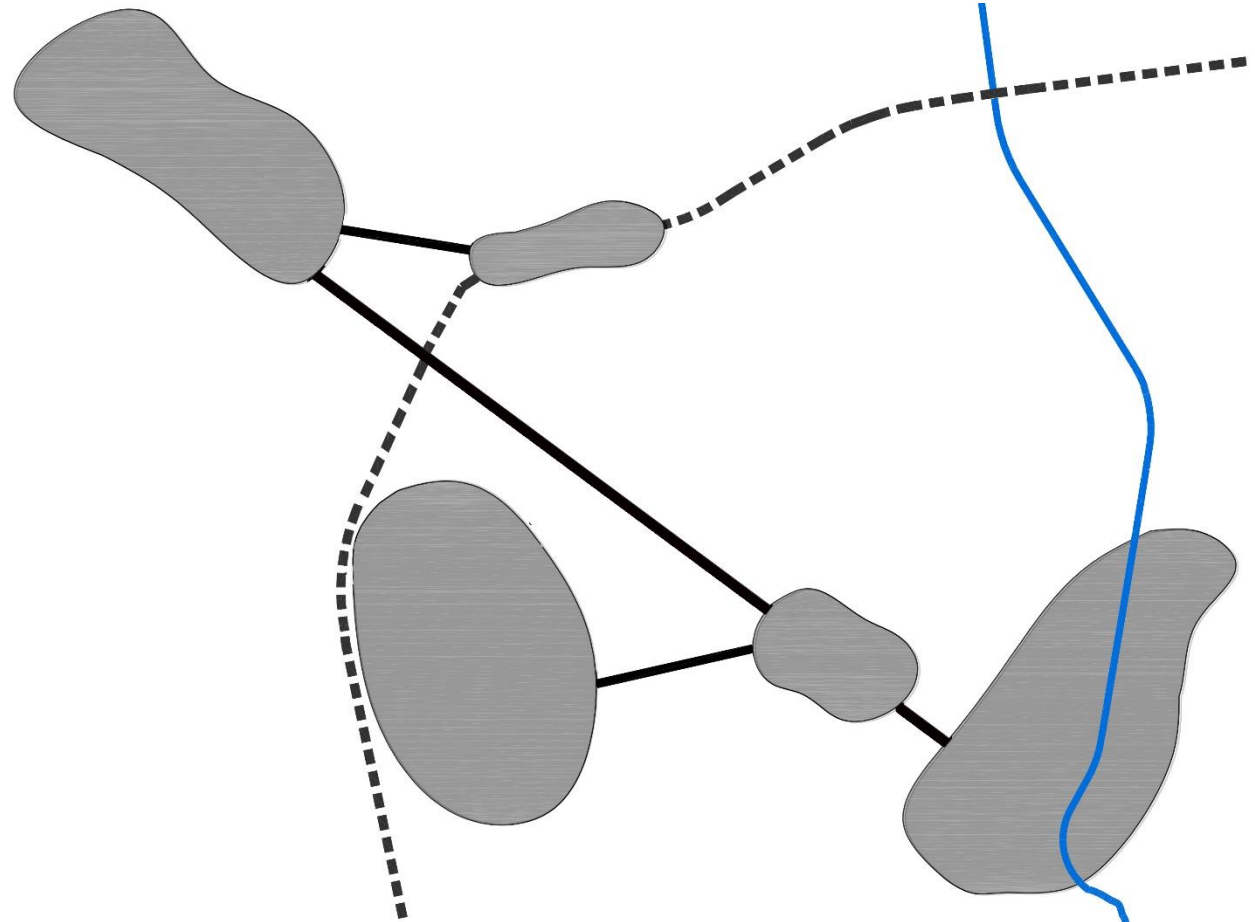
Corridors could be functional to achieve continuity in the network structure.



CORRIDORS

- Historic
- Cultural
- Functional
- **Ecological**

The Abu Ali River corridor that flows in the Mamluk core of Tripoli has ecological, cultural, and social value.



CORRIDORS

- Historic
- Cultural
- Functional
- Ecological
- **Visual**



Policy Recommendations

UNESCO provides guidance on the application of the HUL at international level. It is up to governments to implement it within the local policy framework (Veldpaus & Pereira Roders, 2013).

1. Map resources (natural, cultural, and human)
 2. Reach Consensus on what to protect
 3. Assess Vulnerability
 4. Integrate above in urban development framework
 5. Prioritize actions
 6. Establish local partnerships
- (UNESCO,2011).

Policy Recommendations

- 1. Map resources natural, cultural, and human**
- 2. Reach Consensus on what to protect**
- 3. Assess Vulnerability**
- 4. Integrate 1,2,3 in urban management
- 5. Prioritize actions
- 6. Establish local partnerships

The first three stages would help identify existing development processes and the heritage assets that need to be preserved, and that will form the structural components of the cultural heritage network.

Nodes	Source		
Heritage by designation	Official heritage listings		
Heritage by appropriation	Site Surveys	Social Media	Historical Records

Policy Recommendations

1. Map resources natural, cultural, and human
2. Reach Consensus on what to protect
3. Assess Vulnerability
- 4. Integrate 1,2,3 in urban management**
- 5. Prioritize actions**
6. Establish local partnerships

The fourth and fifth stages could be built on the basis of the network theory by developing local policies recommendations that would facilitate such an application.

- Define the scale of the Network (city scale, national scale, regional scale)
- Define for each scale the structural characteristics of patches and corridors such as, the minimum patch area, patch density, the number, length, and density of corridors.
- These criteria should be identified depending on the overall planning objectives and strategy. For example, if the network prioritize pedestrian connectivity on vehicular connectivity, or if the network relies on visual connectivity. Moreover, these decisions will lead to further implications on buildings rules and regulations.

Conclusion

The HUL addresses the broader urban context and its geographical setting. It calls for a clear understanding of the tangible and intangible heritage, and different processes contributing to the character of the place.

Landscape ecology offers the Patch-Corridor-Matrix conceptual model for the study of patterns and processes in landscapes.

This presentation proposed the application of ecological network model for cultural heritage conservation.

The complexity of urban contexts offers different challenges in the development of networks (Identification of patches that need to be preserved, corridors, and network typology).

The procedure should be made up of a sequence of analyses and evaluations that are driven by a GIS supported assessment of several indices/models as to identify the most suitable network for the target objective.