Cultural-Historic landscapes of Europe
The landscape perception perspective

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OUTLINE

- The Landscape Convention, from a perception perspective
- What is landscape perception?
- Visual landscape assessment
- The VisuLands framework
- The advantages of using different data sources, what is included in the INSPIRE Annexes and what is not.
- Conclusions
The European Landscape Convention – from a perception perspective

- Landscape (ELC definition): An area, *as perceived by people*, whose character is the result of the action and interaction of natural and/or human factors
- Landscape perception at the heart
- Landscape change, monitoring landscapes
- All landscapes, everyday and extraordinary
- Public wishes and involvement, landscapes are important to people
Landscape perception

- Vision vs visual perception

- Perception is the process of attaining awareness or understanding of sensory information
  - Which elements we focus on vs elements we can see
  - A conscious experience

- Visual perception implies both viewing and evaluating the view in relation to function
Landscape perception

- Related to human functioning and behaviour
  - Information processing theory (Kaplan and Kaplan, 1989)
  - Prospect-refuge theory (Appleton, 1975)

- Related to personal interests and context
  - Affordances
  - Landscape in the eye of the beholder

- Perceived landscape beauty
Landscape perception studies

- Environmental psychology
- Preference studies
- Eye tracking

Which landscape elements do we focus on in a given situation, or when asked a certain question e.g. restorativeness, stewardship, land cover classification
Visual landscape assessment

- Assessing the landscapes that we perceive
- Key aspects of visual landscapes, which elements, attributes and qualities is it that people perceive
- There are numerous environmental indicators in use in landscape analysis and planning, including indicators for measuring visual landscape expression
- Many indicators have been "adopted" by scientific fields far from their origin (e.g. indicators borrowed from landscape ecology for use within landscape aesthetics)
Visual landscape assessment

● ..but how do visual indicators relate to perception?

● we need to know what indicators indicate
  → theory-based indicators rather than applying what’s available

● Linking visual indicators to landscape aesthetic theory → the VisuLands framework
The VisuLands framework

- A conceptual framework for assessing landscape visual character using indicators

AIMS:

- Provide a theory-based framework for visual landscape assessment for researchers and planners

- Predict and analyse the visual effects of landscape change
BUILDING A CONCEPTUAL FRAMEWORK

- Literature review comprised of
  - Academic literature, guidelines & handbooks, policy documents

- main approaches
  - professional
  - environmental psychology
  - landscape preferences

- underlying theory
  - humanistic, cultural, ethics & professional knowledge-based
  - evolutionary theories
BUILDING A CONCEPTUAL FRAMEWORK

- Identified 9 key concepts describing visual landscape structure
  - Stewardship, naturalness, complexity, coherence, disturbance, visual scale, historicity, imageability, and ephemera


VisuLands project

- Visualization Tools for Public Participation in Managing Landscape Change
- EU funded project with partners in 6 European countries
- Conceptual framework development with input and feedback from the VisuLands partners including End User group
# Nine key aspects of visual landscapes

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stewardship</strong></td>
<td>Sense of order and care, perceived human care through active and careful management</td>
</tr>
<tr>
<td><strong>Coherence</strong></td>
<td>Unity of a scene, repeating patterns of colour and texture, correspondence between land use and natural conditions</td>
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<tr>
<td><strong>Disturbance</strong></td>
<td>Lack of contextual fit and coherence, constructions and interventions.</td>
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<tr>
<td><strong>Historicity</strong></td>
<td>Historical continuity and historical richness, different time layers, amount and diversity of cultural elements</td>
</tr>
<tr>
<td><strong>Visual scale</strong></td>
<td>Landscape rooms or perceptual units: their size, shape and diversity, degree of openness.</td>
</tr>
<tr>
<td>Concept</td>
<td>Description</td>
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<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td><strong>Imageability</strong></td>
<td>Qualities of a landscape present in totality or through elements; landmarks and special features, both natural and cultural, making the landscape create a strong visual image in the observer, and making landscapes distinguishable and memorable.</td>
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<tr>
<td><strong>Complexity</strong></td>
<td>Diversity, richness of landscape elements and features, interspersion of pattern</td>
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<tr>
<td><strong>Naturalness</strong></td>
<td>Closeness to a preconceived natural state</td>
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<tr>
<td><strong>Ephemera</strong></td>
<td>Change with season and weather.</td>
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</tbody>
</table>
Hierarchical Structure Linking Indicators to Theory

Concept

Dimension

Landscape attribute

Indicator
# The VisuLands framework

<table>
<thead>
<tr>
<th>STEWARDSHIP</th>
<th>Sense of care</th>
<th>Upkeep</th>
<th>Sense of order</th>
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</thead>
<tbody>
<tr>
<td>Sense of care</td>
<td>Upkeep</td>
<td>Sense of order</td>
<td></td>
</tr>
<tr>
<td>Man made structures: Buildings Linear features (fences, paths, hedgerows, edges)</td>
<td>Vegetation</td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Condition/maintenance of man-made structures; buildings, linear features</td>
<td>Presence of weeds</td>
<td>%Abandoned land and stage of succession</td>
<td>Management frequency</td>
</tr>
</tbody>
</table>
Data sources

- All indicators in the VisuLands framework are assessed in relation to available data sources; land cover, orthophotos, photographs and field surveys.
# Data sources – VisuLands framework

<table>
<thead>
<tr>
<th></th>
<th>Land cover</th>
<th>Aerial photographs</th>
<th>Landscape photographs</th>
<th>Field studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open area indicators</td>
<td></td>
<td></td>
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<tr>
<td>Example of basic data</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>processing</td>
<td></td>
<td></td>
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<tr>
<td>Proportion of open land</td>
<td>% of open land</td>
<td>% of open land</td>
<td>% of open land</td>
<td>Proportion of open land</td>
</tr>
<tr>
<td>Patchiness of open areas</td>
<td>Number of open patches</td>
<td>Number of open patches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of open patches</td>
<td>Area measurement of open patches</td>
<td>Area measurement of open patches</td>
<td></td>
<td></td>
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<tr>
<td>Shape of open patches</td>
<td>Shape index</td>
<td>Shape Index</td>
<td></td>
<td></td>
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<tr>
<td>Viewshed size</td>
<td>Size of viewshed</td>
<td>Size of viewshed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewshed shape</td>
<td>Shape index</td>
<td>Shape Index</td>
<td>Classification of shape (1-3)*</td>
<td>Classification of shape (1-3)*</td>
</tr>
<tr>
<td>Depth/width of view</td>
<td>Length of radius of view</td>
<td>Length of radius of view</td>
<td>Estimation of depth of view (1-3)**</td>
<td>Estimation of depth of view (1-3)**</td>
</tr>
<tr>
<td>2. Obstruction of the view</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>indicators</td>
<td></td>
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<tr>
<td>Density of obstructing objects</td>
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<td></td>
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</tr>
<tr>
<td>Degree of visual penetration of vegetation</td>
<td>Proportion of vegetation with different levels of visual penetration (1-4)**</td>
<td>Proportion of vegetation with different levels of visual penetration (1-4)**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* e.g. 1 = one large open area; 2 = split open area; 3 = patchy open area; 4 = e.g. 1= short; 2= medium; 3= long; 4= e.g. 1= blocked; 2= dense; 3= semi-open; 4= open

** e.g. 1= low; 2= medium; 3= high
Landscape visual assessment and INSPIRE

Annex II themes

- Elevation, terrain data (Digital Terrain Model) and surface data (Digital Elevation Model).

- Land cover data

- Orthoimagery
Annex III themes

- Buildings
  - condition, nature, height, size
- Land use, boundaries
- Production and industrial facilities
  - particularly related to visual disturbance
- Agricultural and aquacultural facilities
  - nature of facility, kind of production
- Habitats and biotopes
  - classifications and site descriptions
    (ecological aesthetic?)
- Species distribution
  - ephemera, landscape experience
- Energy resources
  resource type, quantification
Landscape visual assessment and INSPIRE

Land cover data

- Scale relevant for perception
- Level of detail
  - linear features, e.g. stone fences, tree rows
  - unambiguous classification
  - meaningful categories in terms of perception
    (current project using eye tracking identifying such categories)

→ Orthoimagery often valuable supplement to land cover data
Landscape visual assessment and INSPIRE

- Some aspects of landscape perception requires other data sources than the ones offered by INSPIRE

- Landscape photos and field studies are necessary supplements

- Surveys in specific areas and contexts may be necessary

- Airborne laser scanning, forest inventories - position, species, height and crown size at individual tree level
  → Valuable for visual landscape assessment
Experiences from applying the VisuLands framework

- Uneven distribution/availability of indicators (may INSPIRE help?)
- Interrelationships and intertwined indicators, some are opposites some re-enforce each other
- Suitability of different data sources depends on purpose of application (monitoring, scenario assessment, scale)
- Sensitivity to changes in indicators differs between groups of respondents
Experiences from applying the VisuLands framework

- Numbers were helpful in communicating scenarios e.g. VisuLands respondents said they missed numbers to support the scenarios
- Data availability important limitation
- Indicator sensitivity varies
- Importance of scale
- Land use classification schemes and level of detail determine indicator values
Landscape visual assessment and INSPIRE

- Although the use of indicators in visual landscape assessment is very common, it is important to remember that many of the indicators applied are more or less directly from other scientific fields.

- Important to link back to landscape aesthetic theory to understand what indicators indicate.

- What does it mean in terms of people’s landscape perception?
Landscape visual assessment and INSPIRE

- European Landscape Convention takes a comprehensive approach to landscapes
- Treating the whole and complex landscape as a sum of its elements or separate attributes as expressed through indicators is a simplification
  - Essential to be aware of the limitations
  - Aim for integration

- Further studies necessary identifying the relationship between what people see (what we can measure) and what they perceive
Thank you for your attention!
The VisuLands framework in planning (1)

How to implement in planning process

- Impact assessments (the visual part)
  - VisuLands framework a useful tool for planners
    Many indicators GIS based, easily implemented
  - Available information, linked to e.g. Arealis, Norge Digitalt, WMS-tjenester fra Skog og landskap, Naturbase and other map based internet sources.
  - Combine different planning focuses, culture, environment, aesthetics etc
  - The hierarchical structure offers the opportunity to apply the framework on different levels of abstraction
The VisuLands framework in landscape planning (2)

- Monitoring of landscape change
  Rate of change, type of change, impacts of change
  e.g. Analysis of historical change, maps, orthophotos or photos

- Scenario development
  - predicting visual effects

- Communicate change

  Visualisations/
  Virtual reality
  - e.g. Climate change effect on snow or land cover,
  reaforestation,
  short rotation forests
Implementation of the VisuLands framework so far

- VisuLands application in study areas (indicator level)
  - research projects and EIAs
  - national landscape monitoring program (Sweden)
- VisuLands scenarios and visualisations (indicator level)
- Useful in different contexts; rural, urban
- Inclusion of accessibility indicators