

Ecology

ENPL 336

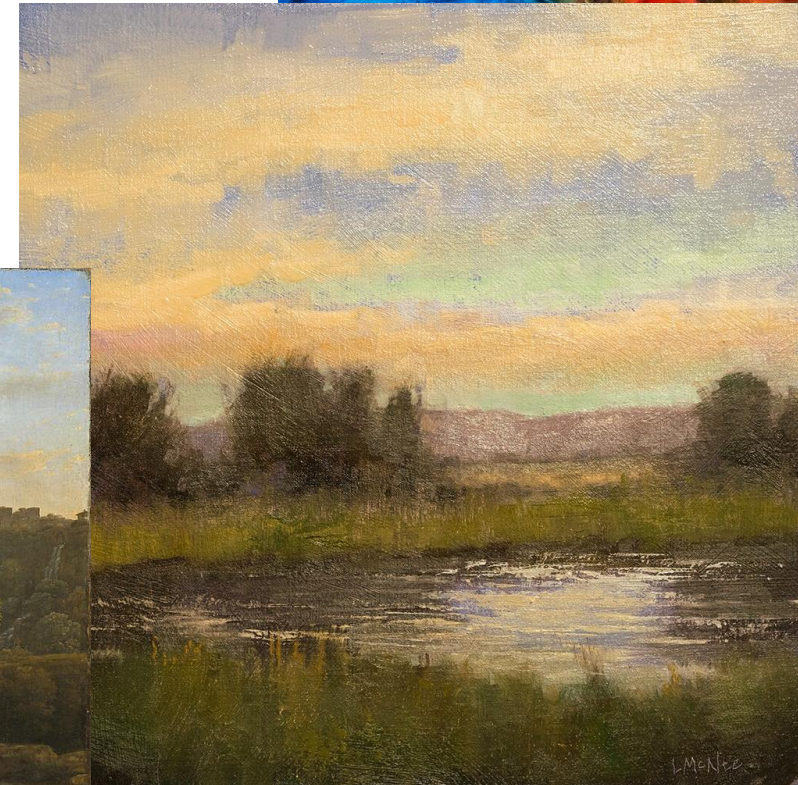
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Perception

- Natural scenery
- Cultural
- Aesthetic
- Physical landform
- Meinig, 1979 describe landscape as:
 - nature, habitat, artifact, system, problem, wealth, ideology, history, place and aesthetic
- This apply to meaning of landscape in many languages
Pasage,Lansachft

Artist' Landscape

- Paintings outdoor landscape
- Natural scenes, human life , meditation



What is landscape ecology

- **Landscape ecology** is the study of landscape structure, function and change of the landscapes
- **Landscape structure** refers to “the spatial relationships among the distinctive ecosystems;”

Natural small pond heterogeneous structure, decaying matters, plants,

- **landscape function** refers to “the flows of energy, materials, and species among the component ecosystems;”

movement of small animal,

landscape change refers to “the alteration in the **structure** and **function** of the **ecological** mosaic over time” (Forman and Godron, 1986)

after a while you will notice changes water turn green, slimy animals appear algae

Landscape from ecological perspective

- Agricultural landscape
- Fields, hedgerows, roads, dirt roads,
- Ecosystem were interaction of organisms in a given place with their nonliving environment



Landscape elements

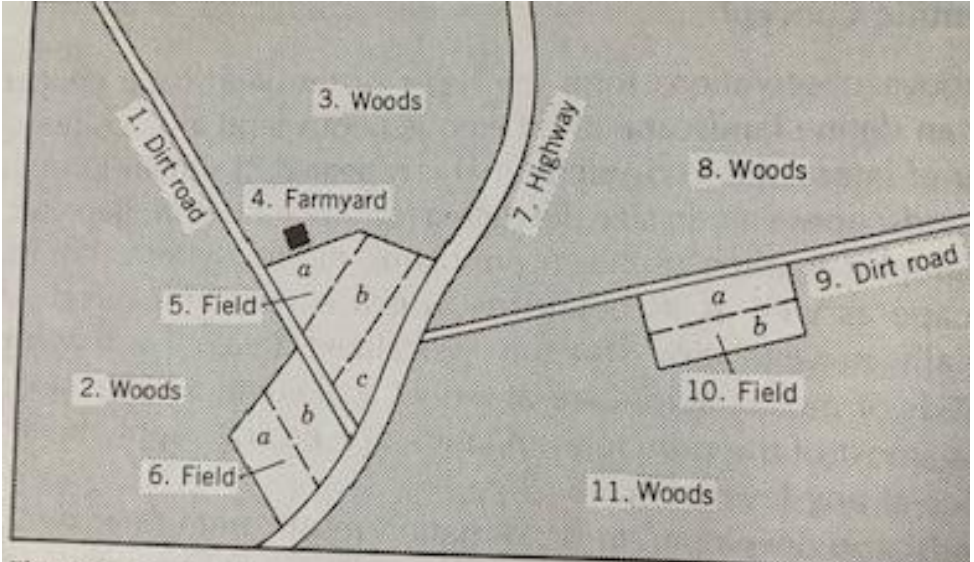


Figure 1.5 Landscape elements and tesseras. Five types of landscape element are present—woods, dirt road, highway, farmyard, and field. There are 11 specific landscape elements (numbered). Tesseras (a, b, and c) are visible within the fields.





Related concepts of landscape

- Watershed area: is the area drained by stream or river and its tributaries
- Region: area determined by its climatic, physiographic, biological, economic, social and cultural characteristics
- Ecosystem and biogenesis
- Scale

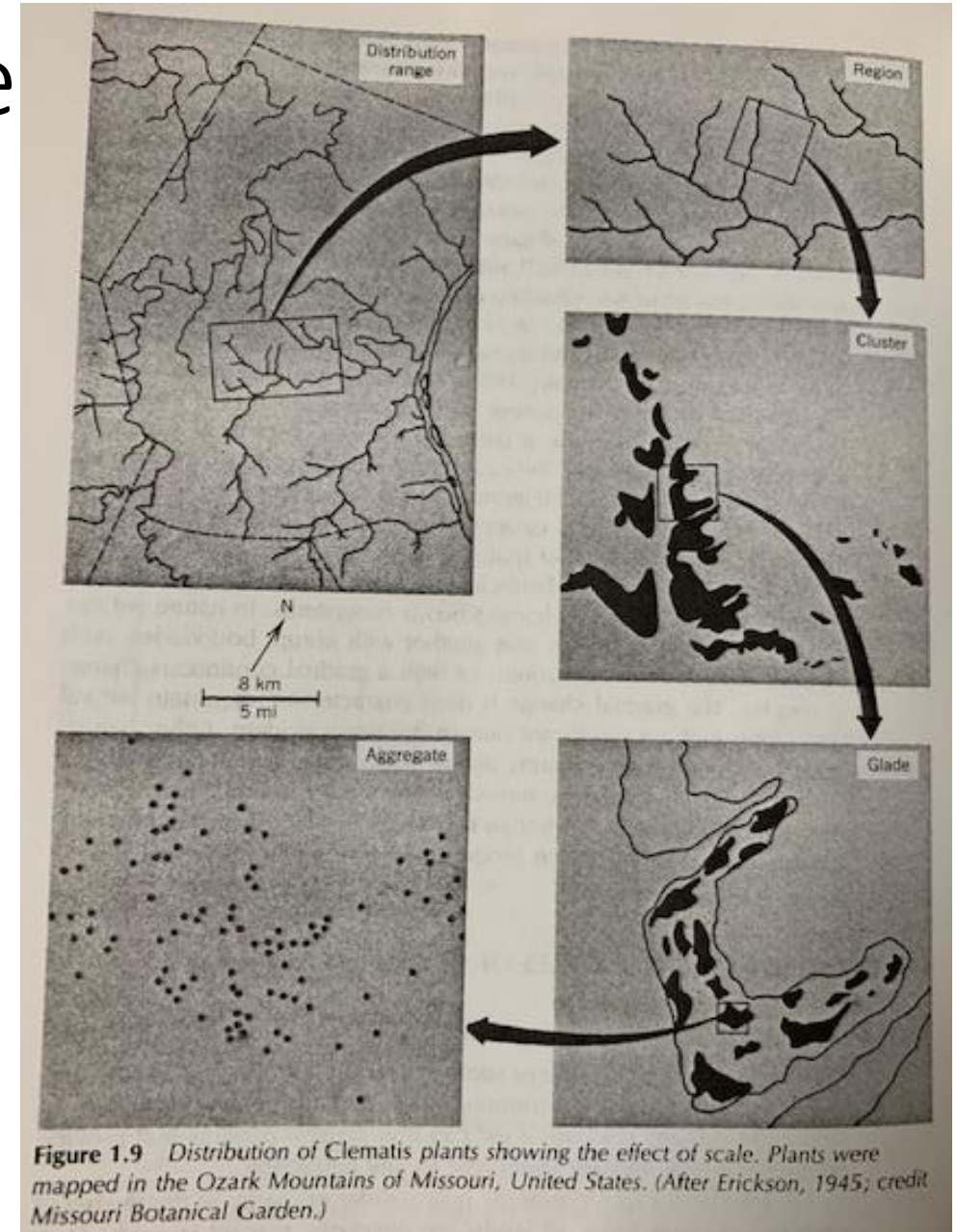




Photo Courtesy of ARIJ

Part of Artas's village agricultural lands.

Principles of landscape ecology

- Landscape structure and function principle
- Biotic diversity principle
- Species flow principle
- Nutrient redistribution
- Energy flow
- Landscape change
- Landscape stability

Emerging of landscape ecology

- Root of landscape ecology could be traced in any period of history, many scientist has contributed to the foundation of landscape ecology.
- 60's pioneers of geographers and biogeographers interpreted the landscape as being composed of landscape elements (biotopes and ecotopes)
 - **Biotope:**a region uniform in environmental conditions and in its populations of animals and plants for which it is the habitat
 - **Ecotope:** all parts in a locality, physical, geological and biological
- Landscape ecology is credited to C. Troll, 1939,1950, 1960 (morphology, classification, change)
- C. sauer 1925,"the morphology of the landscape"
- J.B. Jackson, "reading the landscape. An appreciation of W. G. Hoskin" in Meinig,1979 interpretation of ordinary landscapes analysed Landscape structure as influenced by human culture.
- Lynch,1960 the image of the city explained the structure and change in the urban landscape
- Concepts of landscape function or landscape dynamics received less attention, Troll talked about them
- Naveh and Liberman 1984
- Forman and Godron,1986

- Landscape ecology
geography : Protection and management

ecology

relationship between organisms and their habitat

interaction between organisms

Ecological Concepts

1. Physical Environment

- Climate
- Soil

2. Aquatic environment and marine environment

3. Population:

- percent of population per unit area of habitat **density**, carrying capacity of the environment (the maximum number of individuals or biomass that that particular environment that support
- competition, predation,

4. Evolutionary

- **Adaptation** gradual change
- **speciation** changes through time lead to formation of new species
- **mutation** (change irradiation or chemicals)

Ecological Concepts

5. Ecological communities

- Spatial structure of community
 - **community**, assemblage of species populations at a particular place and time, there is interaction between species
 - Species **composition** (what particular species are present)
 - Species **diversity or richness** how many species are present
 - **Dominance** which species are most abundant and by how much
 - **Rare** species,
 - **Ecotone** overlap between two zones is narrow and composed of species of two sides intermixed

Ecological Concepts

6. Ecological niche and species diversity

- ecological niche is the functional species in a community

7. Succession

- Disturbance, bare area, plant and animal colonize, over time species replace one another until the community consists primarily of species which can successfully reproduce where they are, that, is a Climax community (grass, herbaceous plants, shrubs, trees. **Directional species replacement is called succession**)
- Cyclic succession
- Point succession

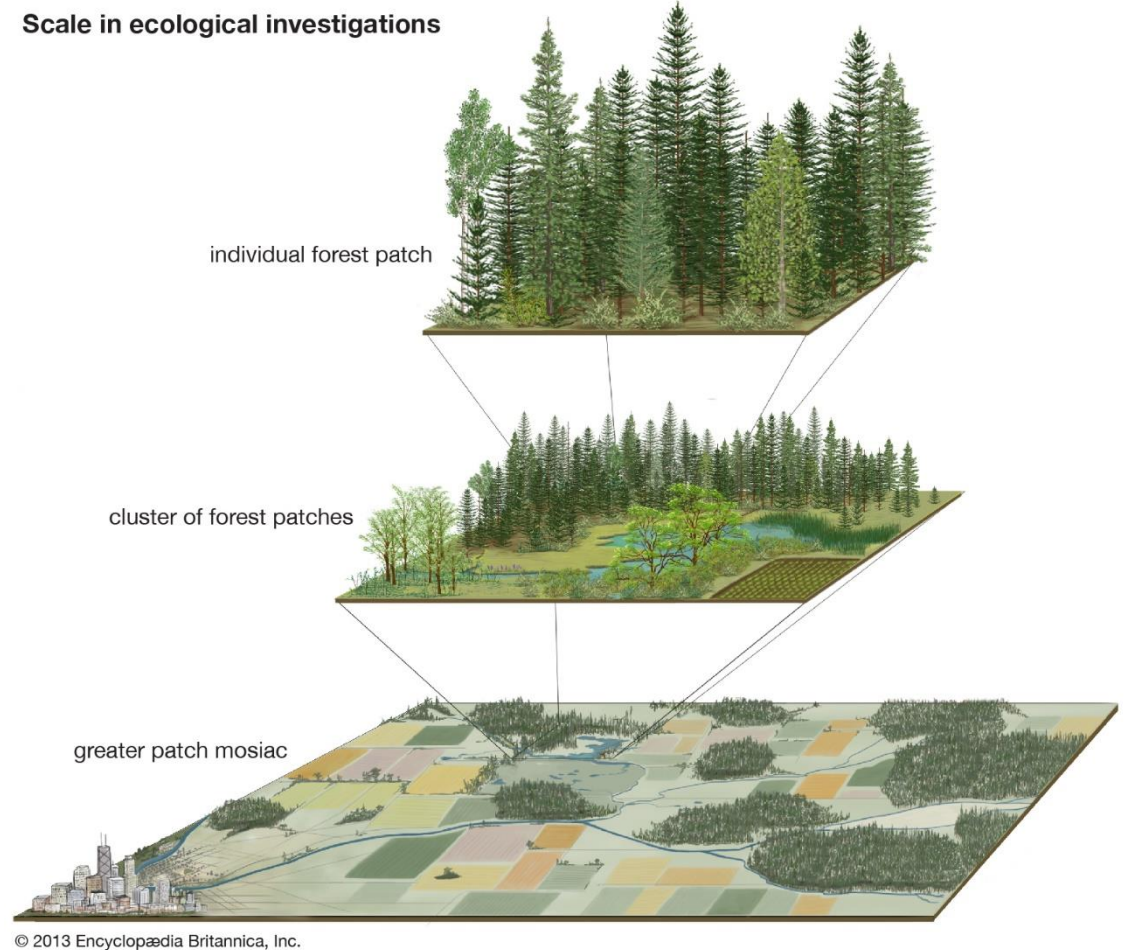
Ecological Concepts

8. Energy and matter in ecosystem

- Energy
- Food chain

Landscape structure

- Patches, edge
- Matrix
- corridors



Patches, matrix, corridor

- Patch: nonlinear surface area differing in appearance from its surrounding.
- Patches vary in size, shape, type, heterogeneity, and boundary characteristics
- Patches are often embedded in a matrix
- Matrix: is the most extensive and most connected landscape element type present, which plays the dominant role in the landscape functioning. It is a landscape element surrounding a patch.
- Some patches could be lifeless or with small organisms, Rocky area. Soil, paved area, buildings..etc
- Corridor: a linear surface area differing in appearance from its surrounding.

