Ecosystems within urban regions: The built environment

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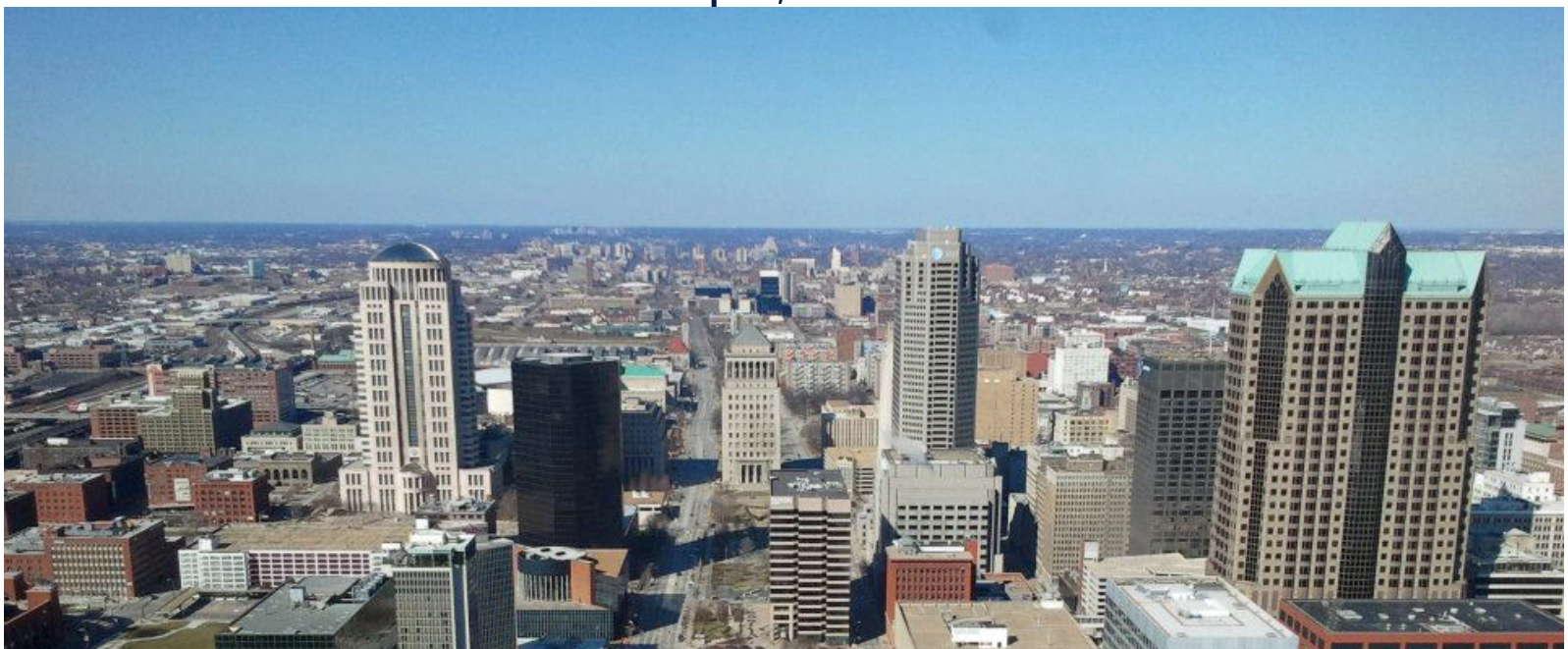

Introduction

- Walls
- Roofs
- Transport infrastructure
- Sewerage systems

Walls

- Serves as habitat in urban setting
- Organisms found on top or bottom primarily
- Surprising levels of biodiversity
  - 226 plant species growing on walls in Durham UK (Shimwell 2009)
  - 37 invertebrate species living on flood defense walls in London (Hoggart et al. 2012)
- Factors that affect carrying capacity:
  - Dimensions
  - Building Material
  - Age
  - Pollution
- Living walls

Roofs

- Habitat for birds
- Limited amount of plants and other organisms
- Living roofs increasing in frequency
  - Often simulate brownfields
  - High biodiversity

Terminology	*Definition*
Green roof	Usually refers to a planted living roof and is the most common term applied, though sometimes confusion has arisen when ‘green’ is used in the environmental sense, such as a roof with solar panels may be considered ‘green’ due to its energy saving capability
Brown roof	Extensive green roofs that attempt to simulate brownfield conditions and use often use resource-poor substrates such as gravel or rubble to encourage the establishment of species that are often displaced by more competitive species
Ecoroof	An alternative for both ‘green roof’ and ‘brown roof’ generally used to refer to roofs that have been planted as extensive roofs for ecological (rather than aesthetic or recreational) purposes. Often used to avoid the idea that green roofs are in fact green and covered with lush vegetation (which many are not, but still provide habitat)
Living roof	Any vegetated roof system; a generic term for roofs designed to promote natural or planted vegetation, and used to avoid the use of the term ‘green’ or ‘brown’. Sometimes simply referred to as a ‘vegetated roof’
Intensive living/green roof	A ‘roof garden’ where the purpose is mainly recreation or aesthetics in the same way as an ordinary garden. Such roofs will have deeper soils, be frequently used and require regular maintenance, and may support a wide range of horticultural plants
Extensive living/green roof	A roof mainly created for supporting biodiversity or providing other environmental benefits, and which is not intended to be used frequently by humans. Usually contains a thinner layer of soil or substrate and after initial construction requires minimal maintenance and is essentially left to its own devices (including natural plant colonisation)
Green facade	Mainly refers to climbing plants such as ivy that are encouraged to grow up and along the walls of buildings (mainly on a wire or trellis framework) to form a green covering, though the roots of the plants

Green Roof

Eco Roof

Living Roof

Green Facade

Roads

- Act as transportation corridors
- Verges
  - Strip of land running beside road
  - High biodiversity for limited space
  - Limited number of verges in urban settings
    - More intensely managed
- Road surfaces offer limited opportunities as habitat

Railways

- Similar to roads
  - More than 1,000 plants and species were recorded in Germanys urban railways
- Underground railroads
  - Mosquitoes
  - issues unknown

Infrastructural trees

- Trees are usually planted along side roads,streets, pedestrian areas, canals and riversides
- Infrastructural trees Cons:
  - infrastructure damage from roots and branches growth, blocking the view, spread of plant diseases, contributes to allergens, and fall on objects.
- Infrastructural tree pros
  - Ecological
- Diversity
  - 50-70% percent of trees were from the same genera (3-5)
  - larger habitat and the prevention of tree diseases

Canales

- Artificially created or modified
  - Designed for: irrigation/water supply, or transportation
- Support aquatic organisms:
  - Plants, diatoms, algae, macroinvertebrates, fish mammals and birds
- Urban canals are often polluted
  - Often lead to high levels of viruses
  - Bacteria could potentially get humans sick

Sewerage systems

- Sewers
  - Exists under urban complexes
  - In some cases creating small urban rivers
- Mostly known for pest:
  - Cockroaches, rats, ninja turtles, and mosquitoes
- New species
  - Earthworms from Eastern Africa

Questions

Groups of 2-3

1. What are the main similarities and differences between urban green spaces and build environment?
2. Have you seen a living roof or wall? Why is their popularity growing in urban areas?
3. What factors would you need to consider when planning a planting campaign?
4. Why are sewerage and canal systems relatively under-explored as ecosystems?

Cool Roofs

- Your roof and the environment -- why green is the new black: Hunter Legerton at TEDxCharleston

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Thank You!
Questions?