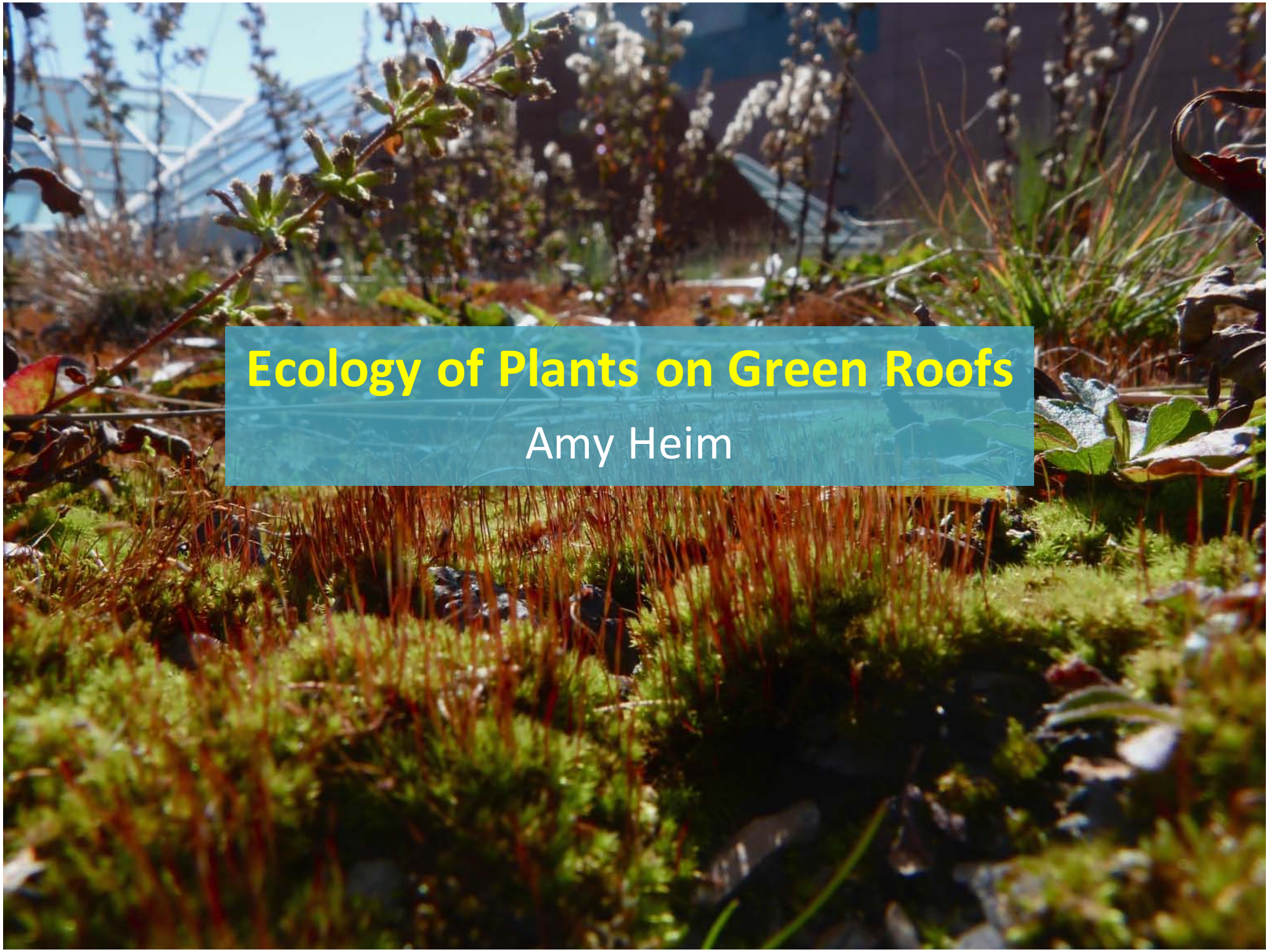


Ecology of Plants on Green Roofs

Amy Heim

Extensive Green Roof

Extensive Green Roof

Species Selection

- Drought
- High Wind
- Extreme Temperatures

Extensive Green Roof Plant Types

-

Succulents

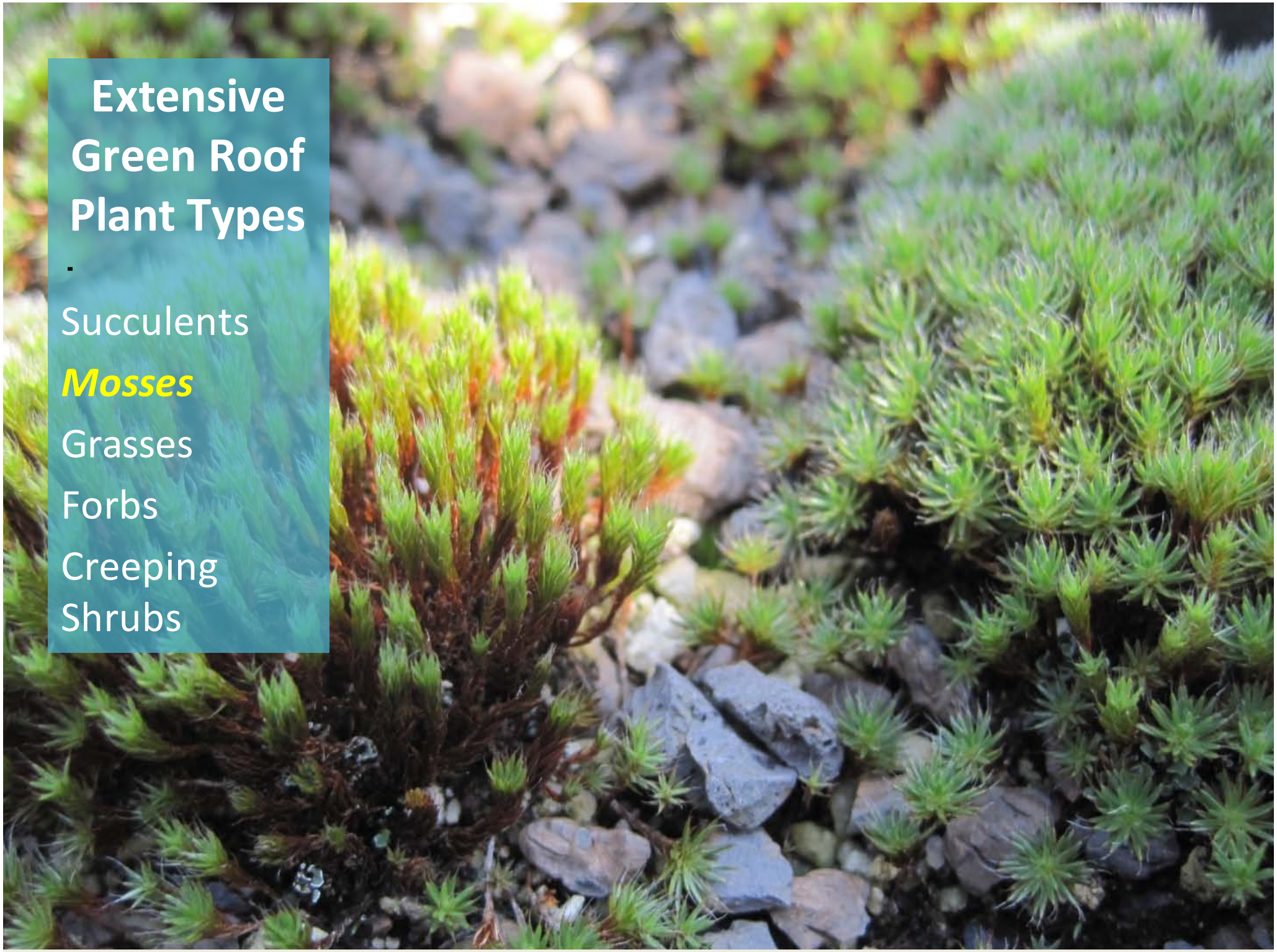
Mosses

Grasses

Forbs

Creeping Shrubs

http://news.uns.purdue.edu/images/%2B2009/green-roof-plants.jpg


Extensive Green Roof Plant Types
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Extensive Green Roof Plant Types
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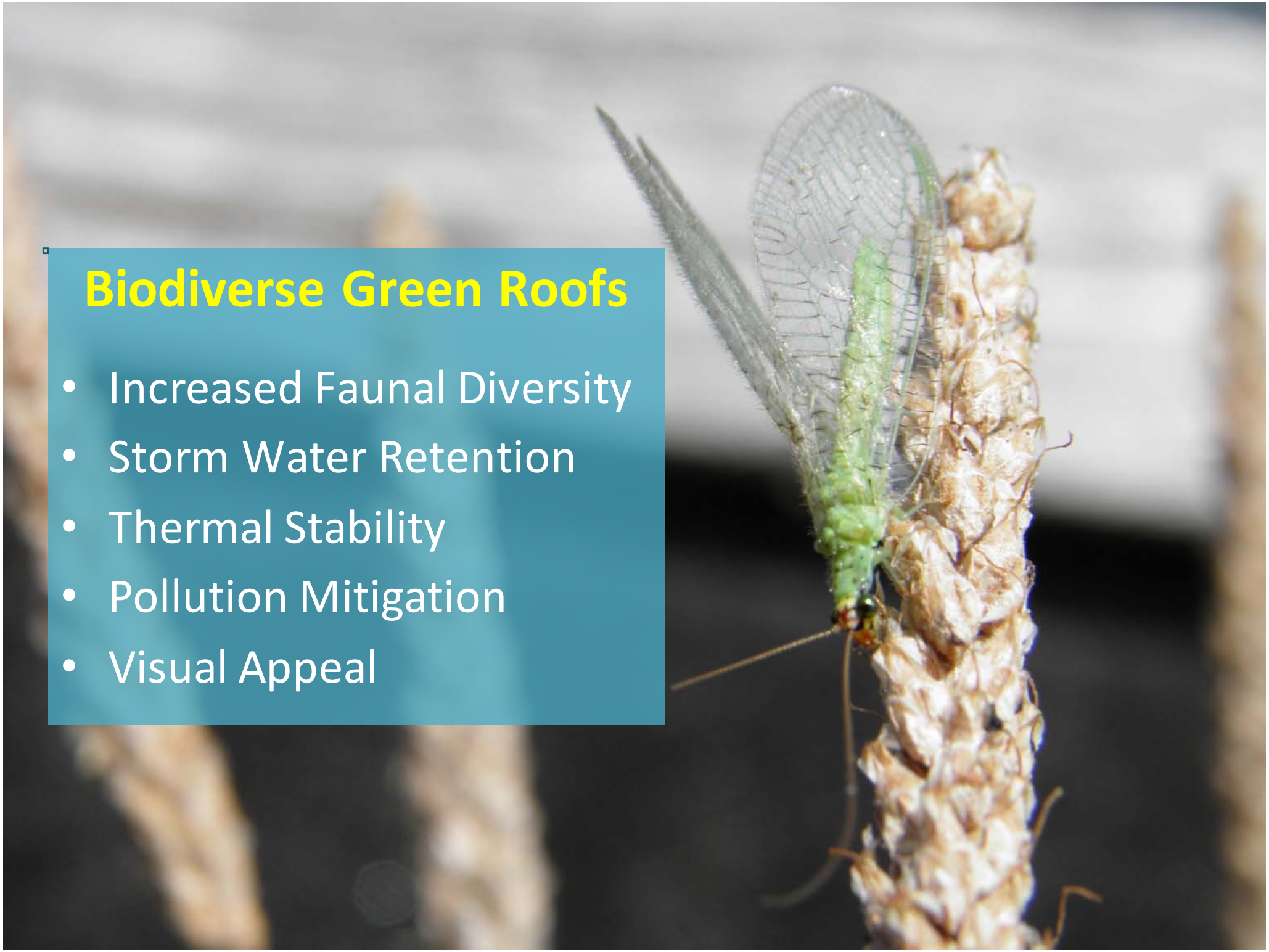
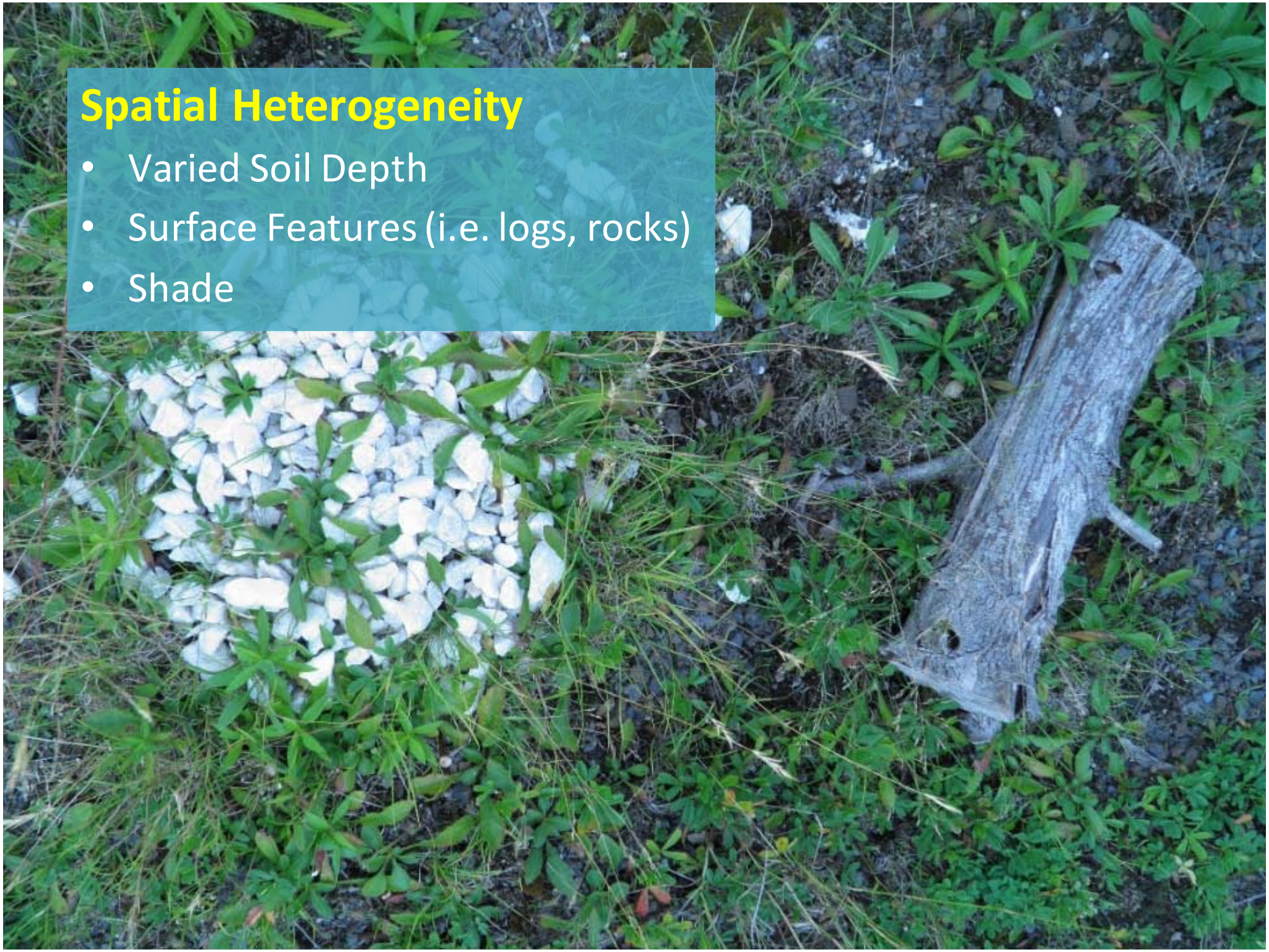


Biodiverse Green Roofs

- Increased Faunal Diversity
- Storm Water Retention
- Thermal Stability
- Pollution Mitigation
- Visual Appeal


Coexistence
Spatial Heterogeneity
Species Complementarity


Spatial Heterogeneity
• Varied Soil Depth
• Surface Features (i.e. logs, rocks)
• Shade

Species Complementarity

Heterogeneity of Resource Acquisition

Species Complementarity

Heterogeneity of Resource Acquisition

Species Complementarity

Temporal Heterogeneity

Interspecies Facilitation

https://www.desertmuseum.org/programs/ifnm_cactusgallery.php

Interspecies Facilitation

Competition – Favorable Conditions

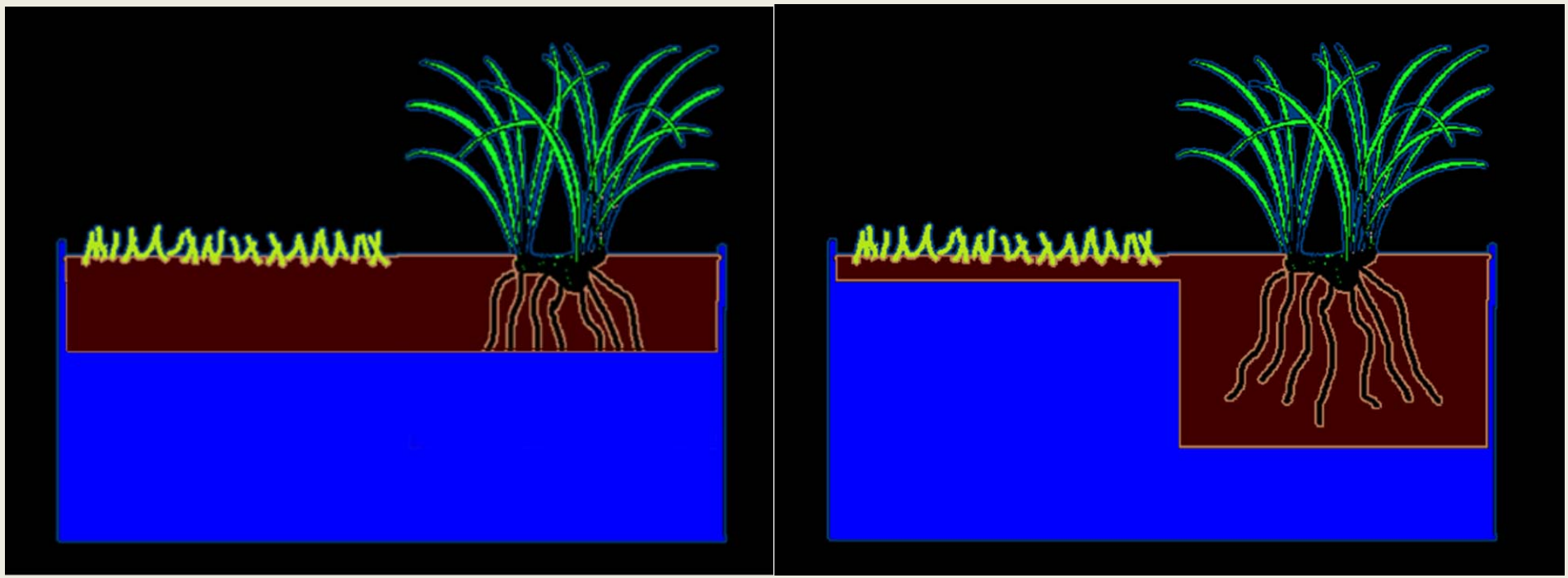
Facilitation – Unfavorable Conditions

Green Roof Research

Study 1 – Mixed Soil Depth

Study 2 – Facilitation

Key Treatments

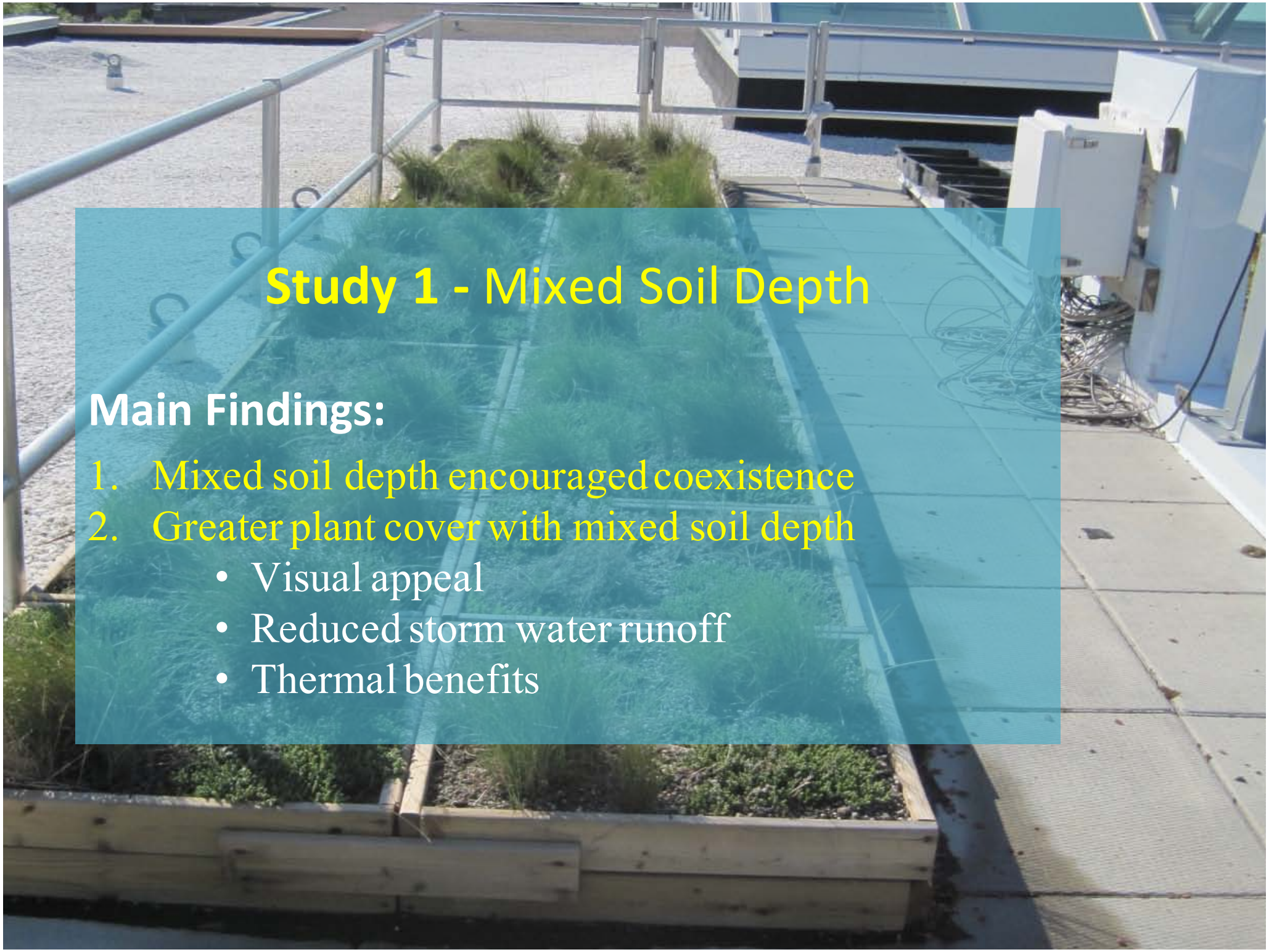


10cm - Homogeneous = 5/15cm - Heterogeneous

Plant Species

Sedum acre

Festuca rubra



Study 1 - Mixed Soil Depth

Main Findings:

1. Mixed soil depth encouraged coexistence
2. Greater plant cover with mixed soil depth
    - Visual appeal
    - Reduced storm water runoff
    - Thermal benefits

Present Heterogeneity Experiment

Study 2 - Facilitation

Forb

Target Species

- Less drought tolerant than facilitators
- Strong performance in terms of ecosystem function

Lichen

Moss

Bunch Grass

Study 2 – Interspecies Facilitation

Main Findings:

1. No facilitation observed
2. Using Species with different resource requirements resulted in coexistence

    Moss/lichen/fake plant = successfully coexisted

    Bunchgrass/conspecific = competition

Conclusions

- **Principles observed in the natural environment can encourage coexistence on a green roof**
- **Multiple coexistence techniques can be used on one green roof**
- **Biodiverse green roofs can improve ecosystem services**

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Questions?