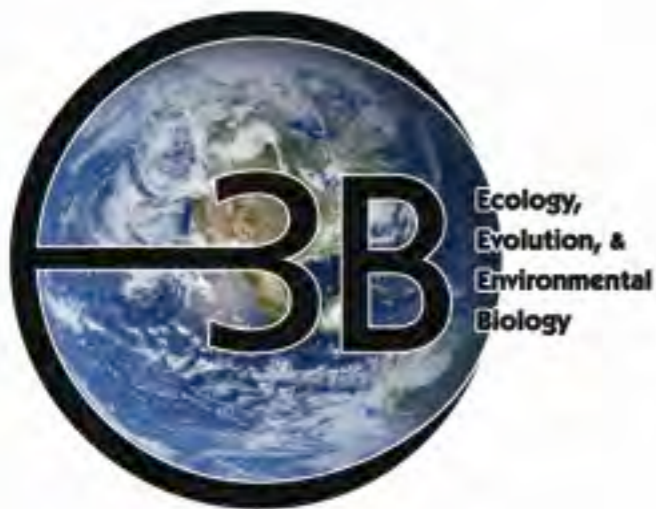


# Plant Ecology on NYC Green Roofs: Ecosystem benefits

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Ecology, Evolution, and Environmental Biology  
Columbia University



How do green roof biotic communities change  
in time and space?

What controls the structure and function of  
biotic communities on green roofs?

How will design decisions influence those  
patterns and functions?





Image © 2008 DigitalGlobe  
Image © 2008 New York GIS  
Image NASA  
Image © 2008 TerraMetrics

# Model Communities: Local Grasslands

# Rocky Summit Grassland

Throughout Hudson  
Highlands

Rocky summits and  
exposed rocky slopes

Bear Mountain State  
Park, Black Rock Forest

S3 - Edinger et al. 2002



Image:TNC

# Rocky Summit Grassland



*Deschampsia*



*Danthonia*



*Carex*

# Rocky Summit Grassland

*Pycnanthemum*



*Lespedeza*



*Cunila*



*Solidago*



*Lysimachia*

# Hempstead Plains



Image: Friends of Hempstead Plains

Nassau County,  
central Long Island

Historically 60,000 acres  
(24,300 ha)

<< 1% remains in historic  
vegetation

GI, SI Edinger et al. 2002



# Hempstead Plains



*Schizachyrium*



*Sorghastrum*



*Panicum*

# Hempstead Plains

*Eupatorium*



*Solidago*



*Asclepias*



*Baptisia*



*Rubus*



Fieldston Lower Roof - September 2011  
4 years since initial planting

# Experimental Green Roofs on Recreation Centers



City of New York  
Parks & Recreation



Lost Battalion Hall  
Recreation Center, Queens

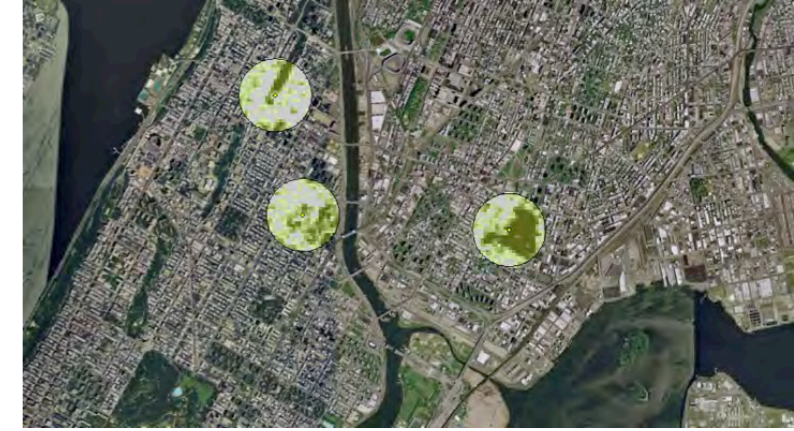


# Spontaneous vegetation on green roofs



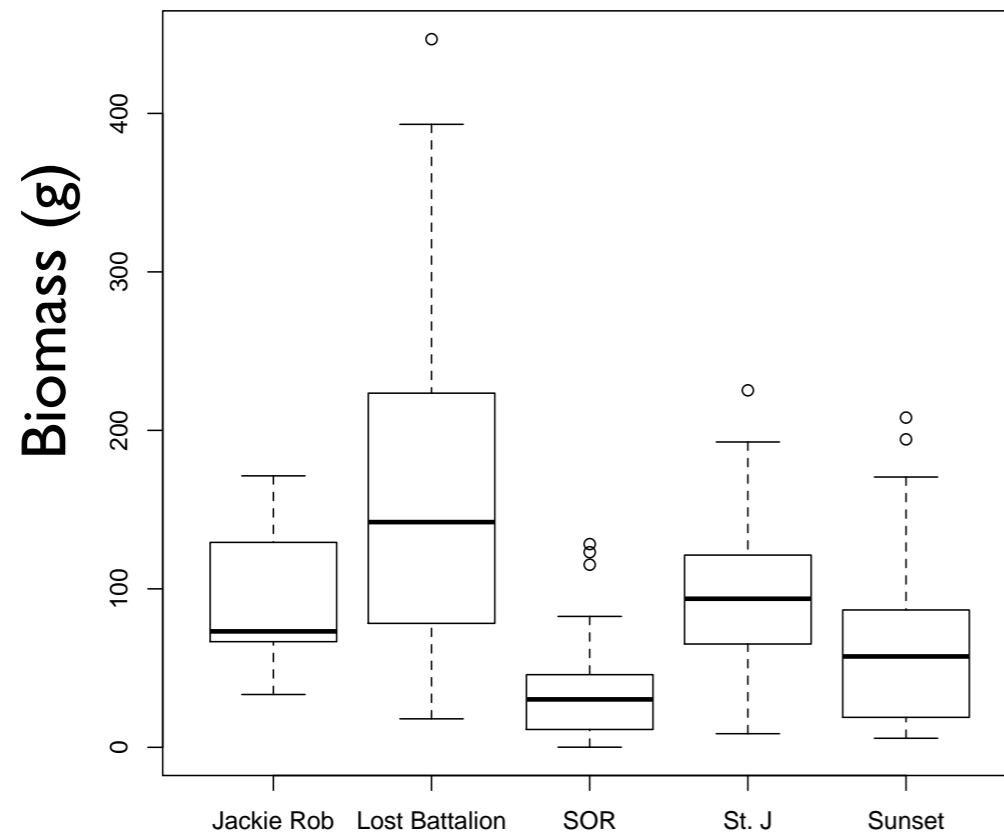
Becca Rohrer - E3B

- How do roofs with identical starting conditions vary in the development of vegetation?
- What plants colonize green roofs?

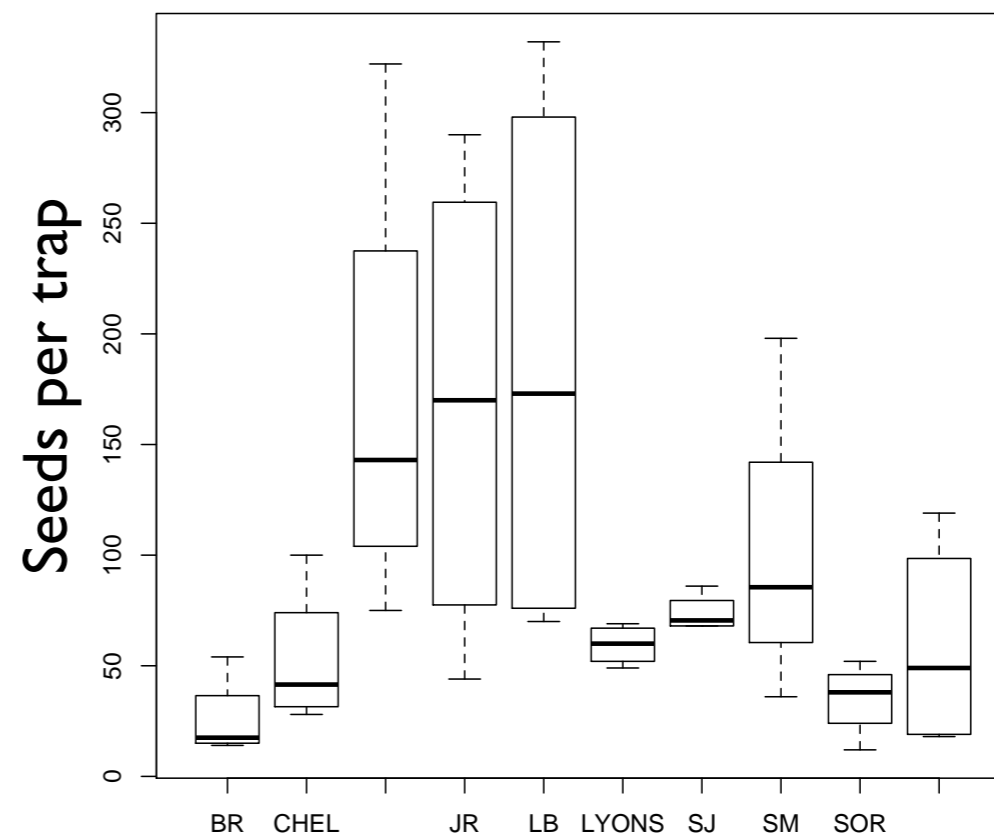


Landscape analysis

Biomass of colonists



Seed traps



# Hydrologic Functions of Green Roof Vegetation

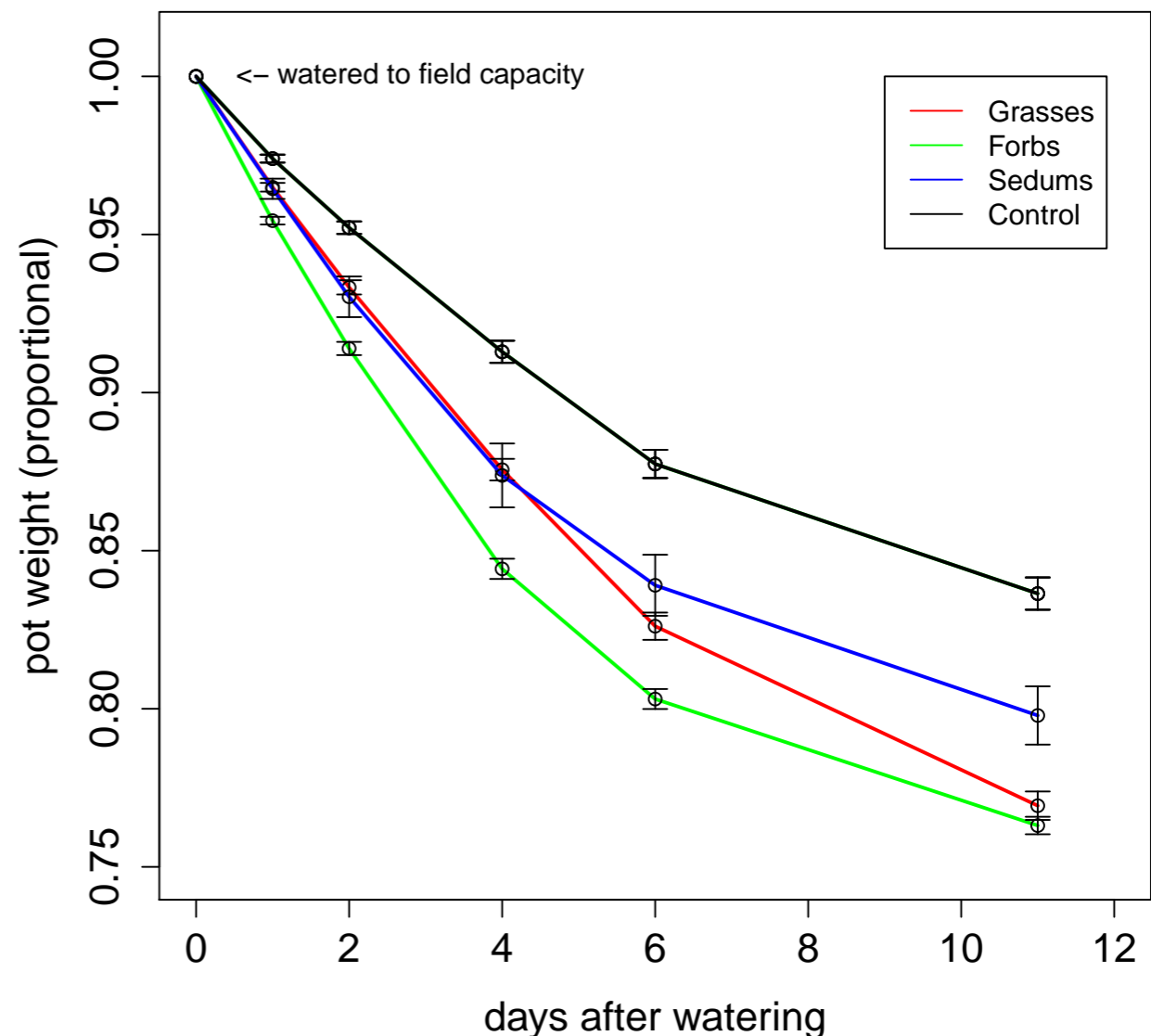


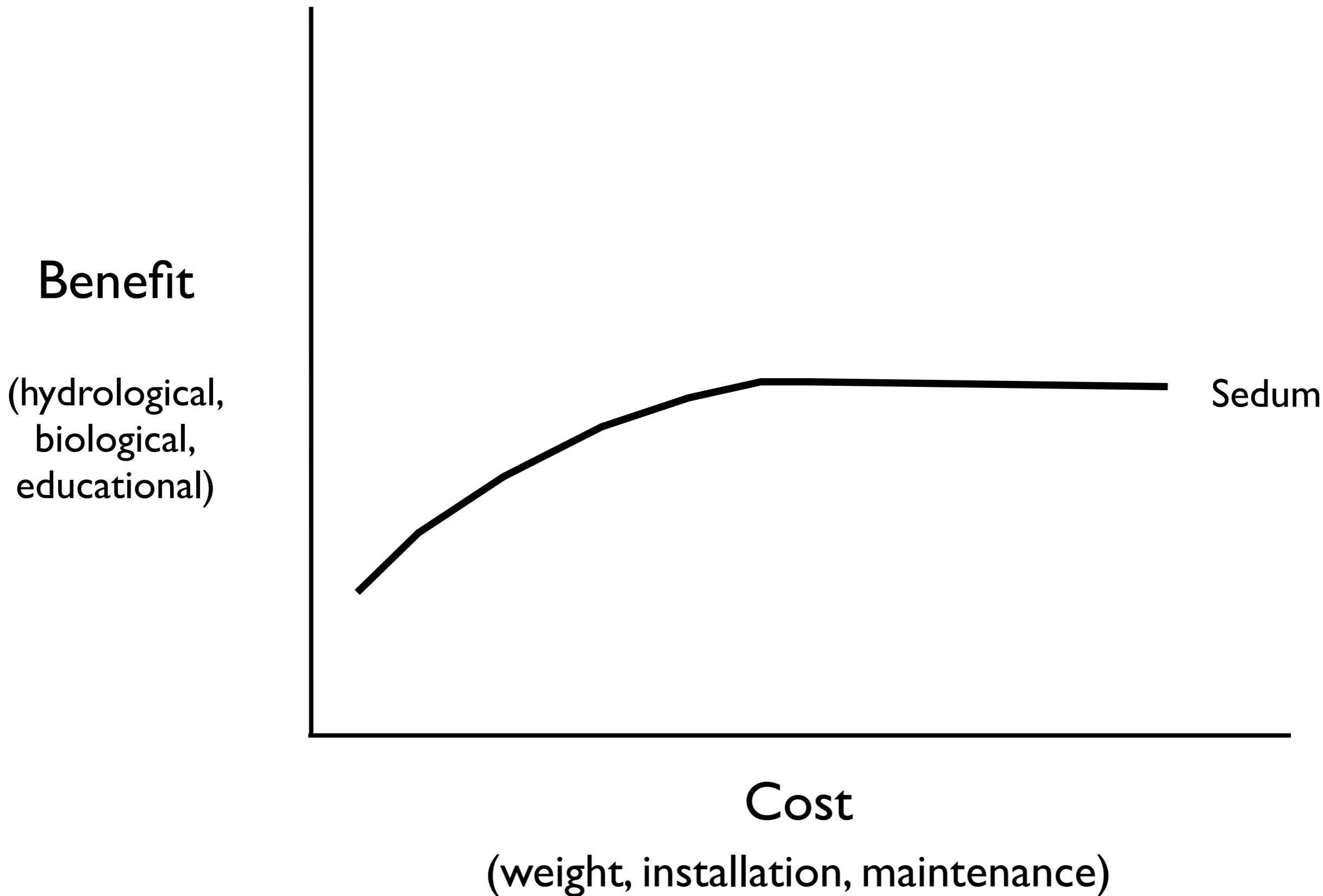
Trevor Granger - E3B

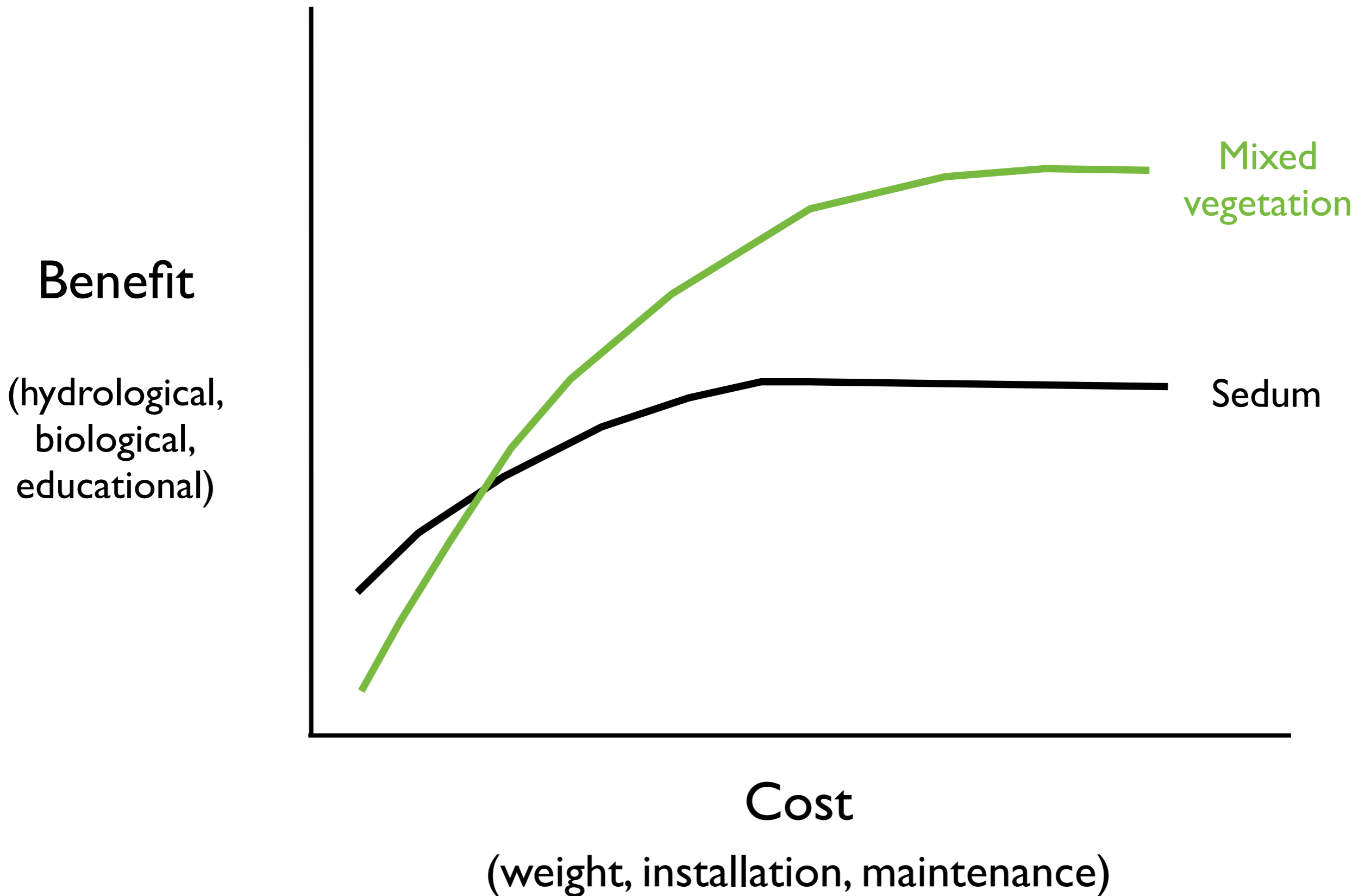


- Estimating evapotranspiration through water loss
- Measuring stomatal conductance directly

Moisture Draw-Down by Growth Form









# Future Directions

- Evaluate a much broader range of plant species and communities for green roof applications
- Evaluate interactions between vegetation and water flux and water quality in the greenhouse, mesocosms, and extensive roofs
- Compare assembly of biotic communities as a function of starting conditions and location
- Examine “soil” development
- Evaluate role of green roofs in connecting other green spaces and supporting urban biodiversity