A photograph of a person, Emily Walker, wearing a purple shirt and grey pants, bending over on a green roof to collect pollen into a white bag. The roof is covered with low-lying vegetation and has some white patches. In the background, there are trees and buildings under a cloudy sky.

# Bee diversity and pollen foraging on native planted green roofs in Halifax

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Ecology of Plants in Communities Lab  
@EPICLundholmLab



# *Apis mellifera*

Floral  
generalist

Social,  
perennial





# Wild Bees of Nova Scotia

*Bombus*



*Augochlorella*



*Andrena*



*Nomada*



*Hylaeus*



*Lasioglossum*



*Osmia*

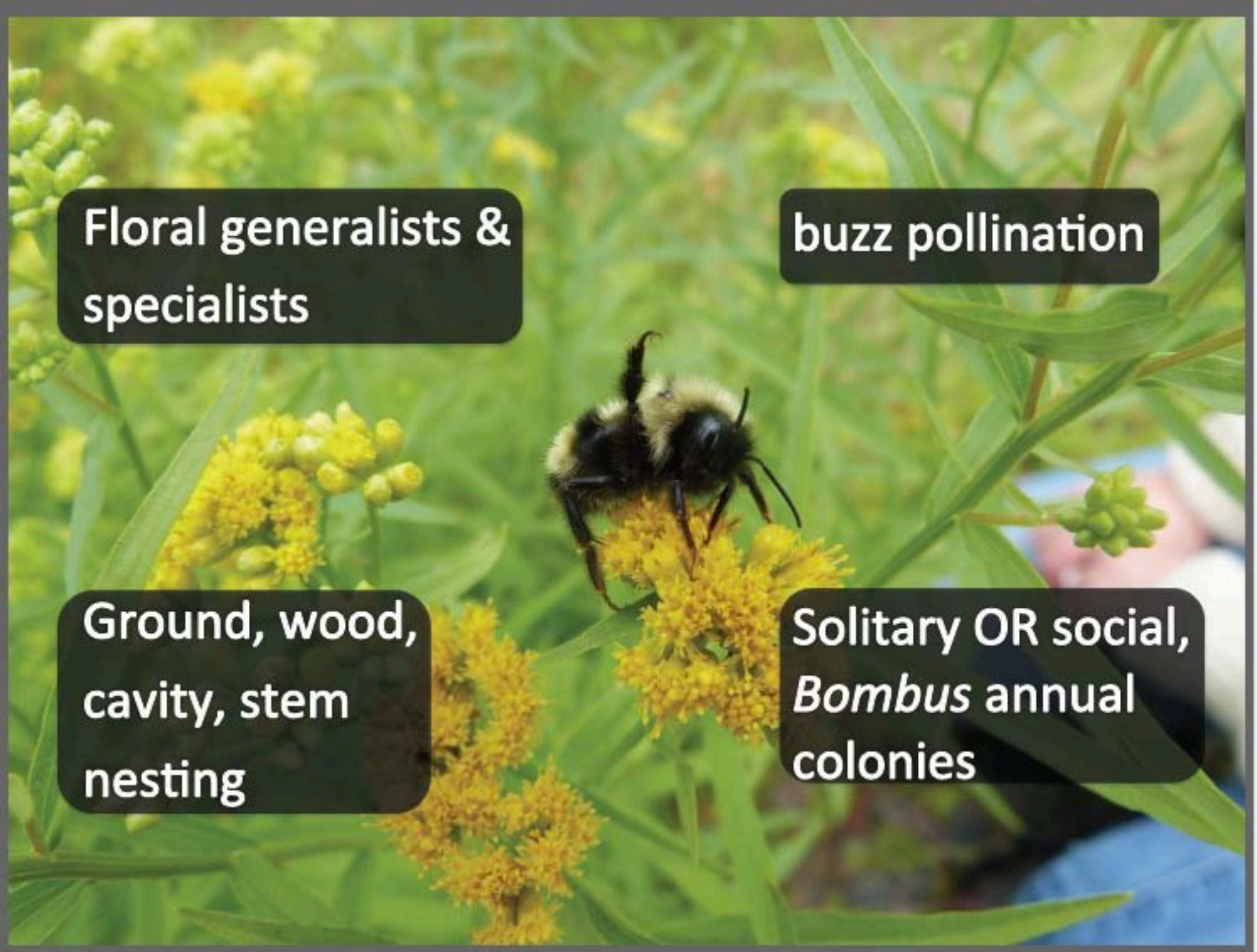


*Halictus*



All images from Discoverlife.org



A close-up photograph of a bumblebee with black and yellow fur, perched on a cluster of small yellow flowers. The background is a soft-focus green, suggesting foliage. Four black text boxes with white text are overlaid on the image.

Floral generalists & specialists

buzz pollination

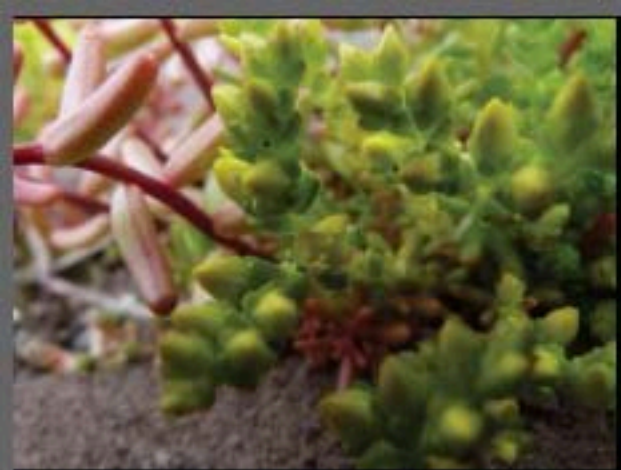
Ground, wood, cavity, stem nesting

Solitary OR social,  
*Bombus* annual colonies





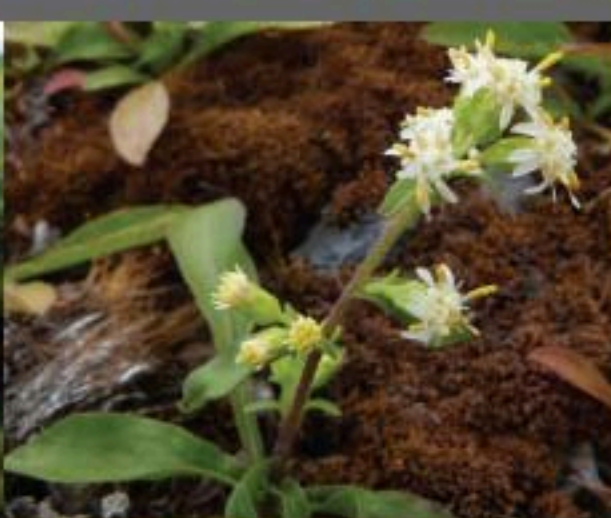
























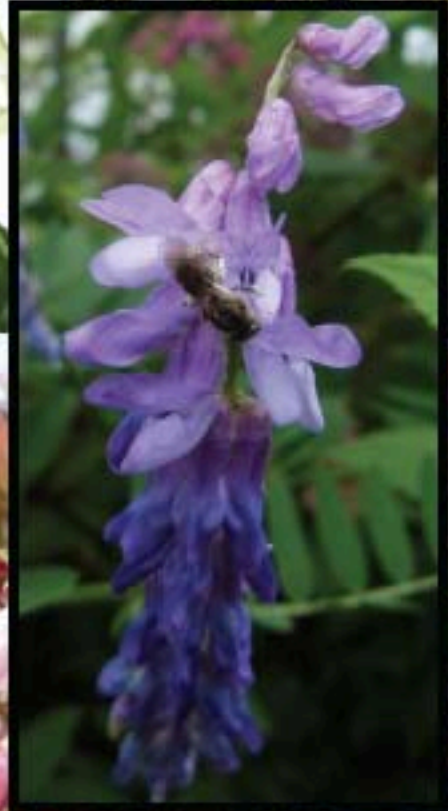
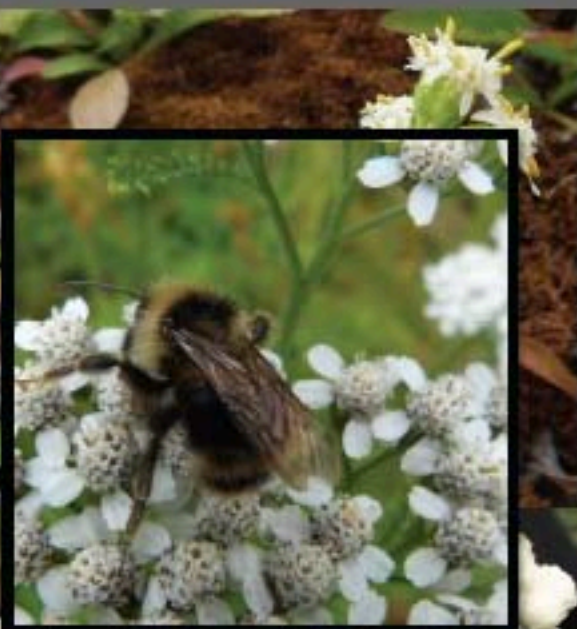


















**Energy**



**Reward? Trap?**





Photo: Wishouse, 2015





Photo: Wishouse, 2015





Photo: Wishouse, 2015



# Research Project

Are the same bees present on the barrens and on native-planted green roofs?

Are they collecting similar pollen?















































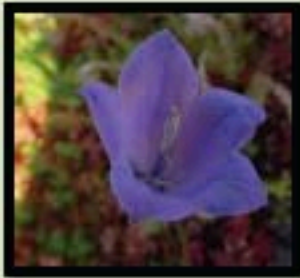
# Results

- Many bees in barrens, few on green roofs
- Big bees in barrens , small on green roofs 
- Many bee species in barrens, few on green roofs
- Many pollen types in barrens, few on green roofs



# Pollen Loads: Green Roofs

Campanula  
14%



Solidago  
33%

Trifolium  
28%



## Species $\leq 5\%$ Roofs

Hosta

Viburnum-type

Rosa

Taraxacum-type



## Species $\leq 5\%$ City

Hosta

Viburnum-type

Borago

Mentha-type

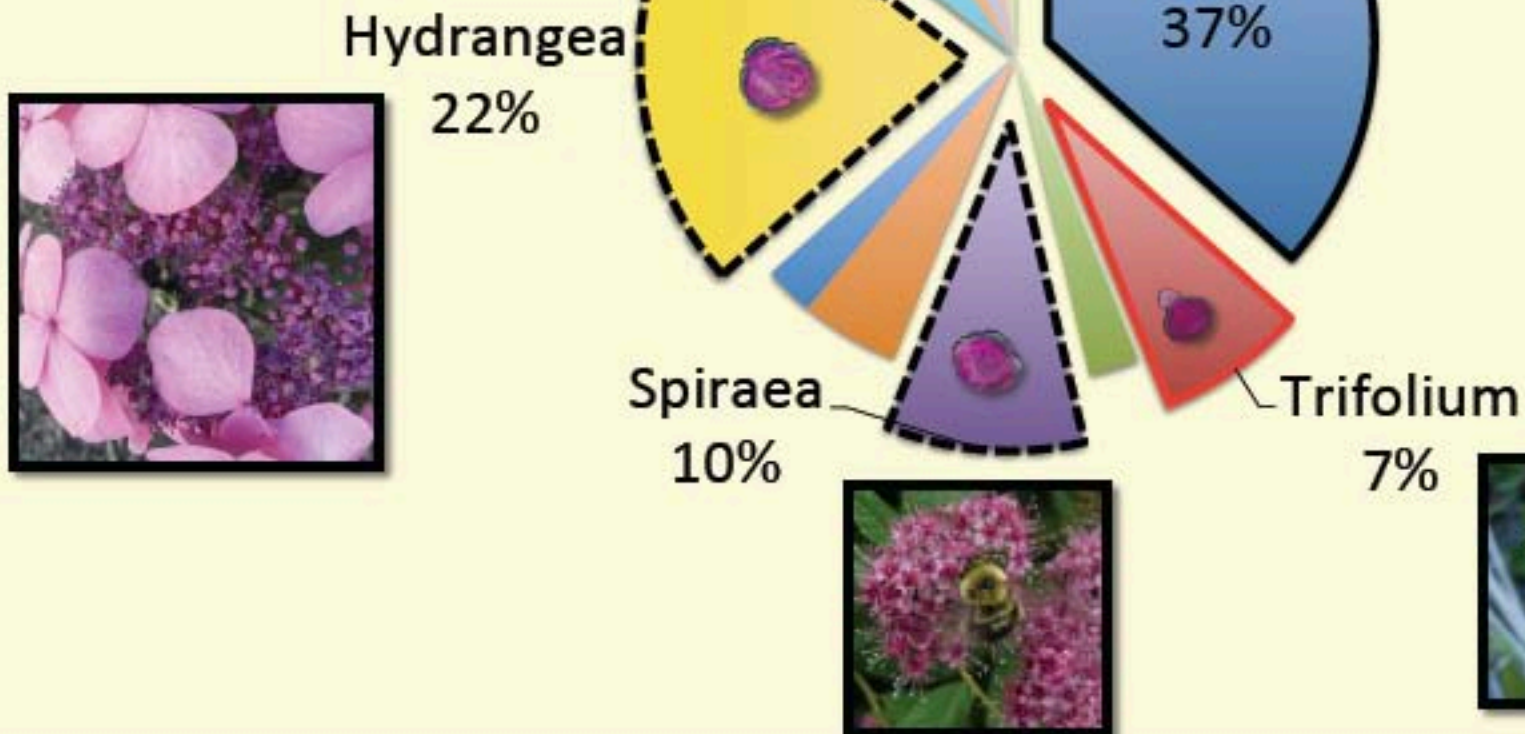
Hypericum

Taraxacum-type

Prunella

Solanum

## Pollen Loads: City





# Pollen Loads: Barrens

## Species $\leq 5\%$ Barrens

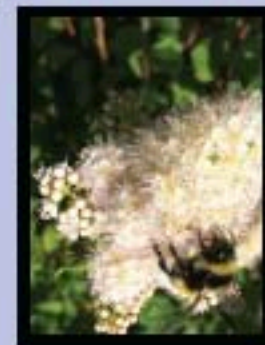
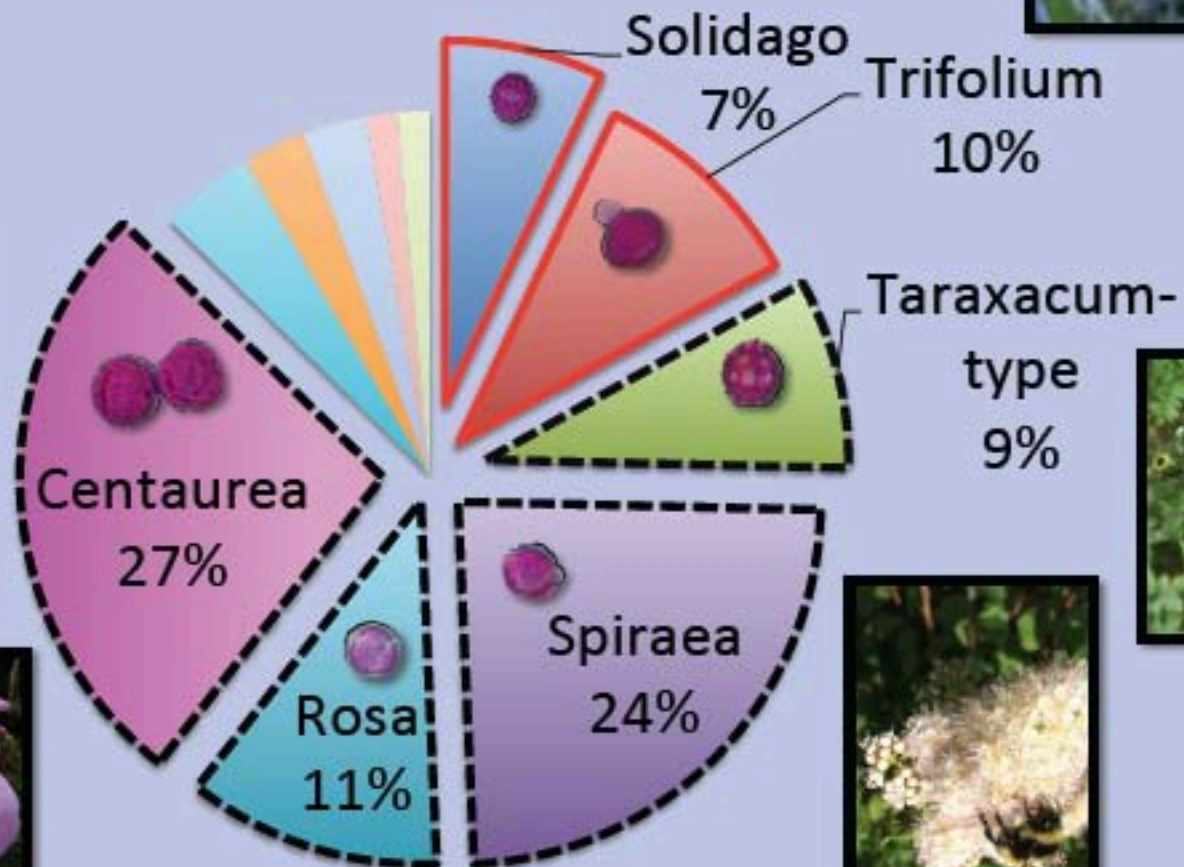
Gaultheria

Plantago

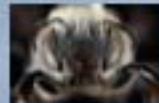
Rubus

Daucus

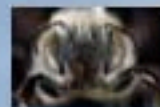
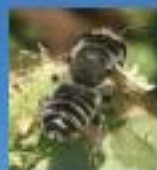
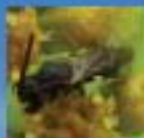
Urtica-type(?)







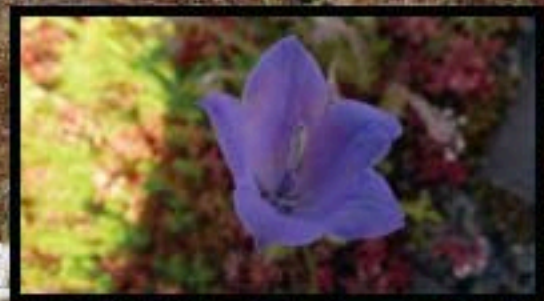
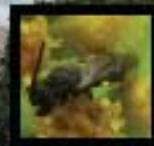
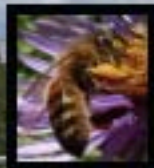
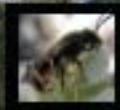














## Conclusion

- Bees use green roof floral resources
- Usage patterns differ from source habitat, more similar to city
- More native forage could be provided on GRs
  - Target resource poor periods – spring and late fall



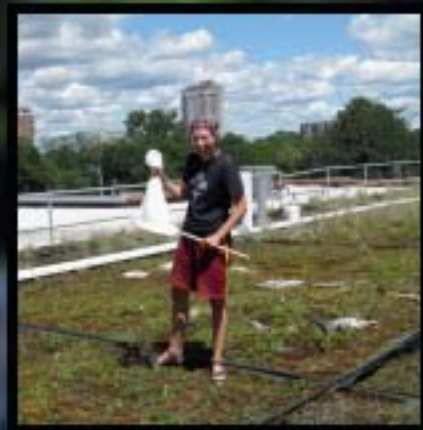
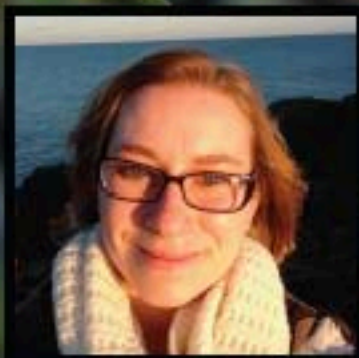


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