

Practicing Applied Urban Ecology in Massachusetts

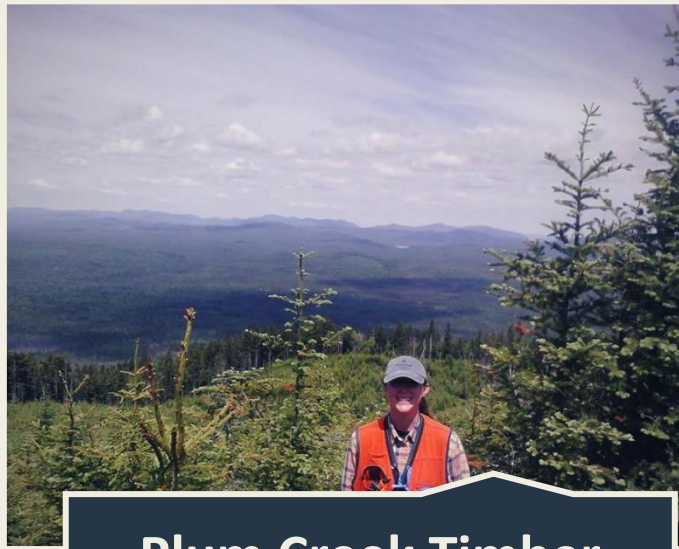


2023-05-16
Erica Holm

What brings **me** here today?



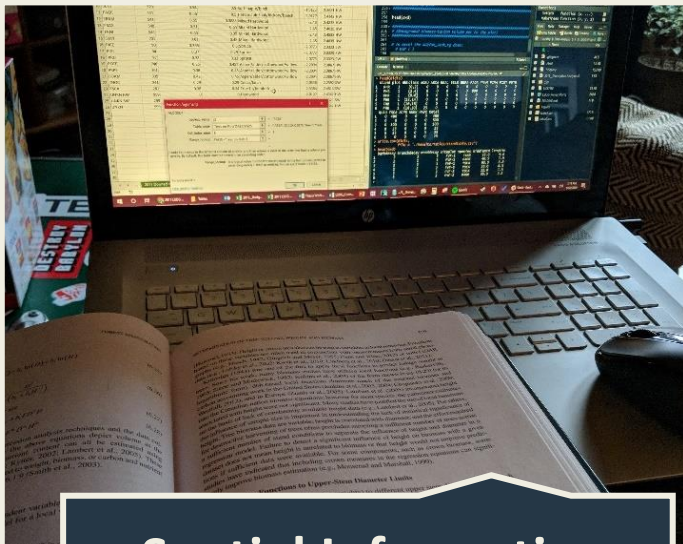
**UNH
(BSc 2012-2016)**



**Plum Creek Timber
(Weyerhaeuser)**



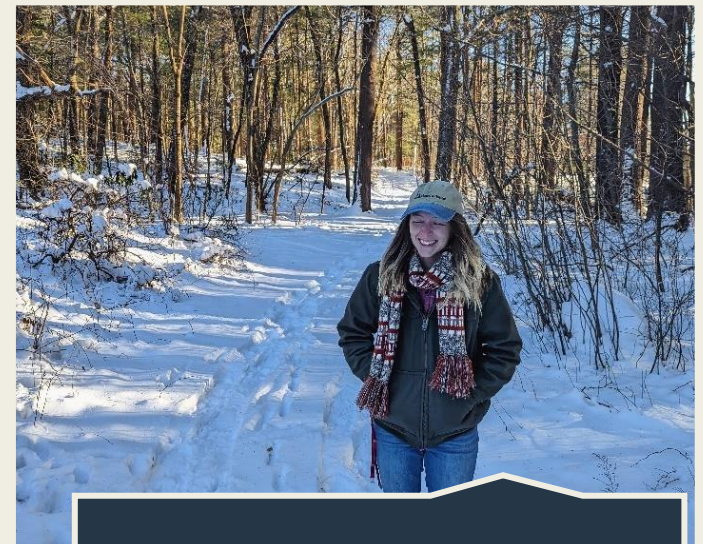
**UNH
(MSc* 2016-2019)**



**Spatial Informatics
Group**



**Emerald Necklace
Conservancy**



Mass Audubon



Least Tern © Nancy Orbe

Mass Audubon

- Mission: to protect the nature of Massachusetts for people and wildlife
- Founded in 1896
- 160,000 members
- 14,000 volunteers
- Over 40,000 acres protected

Action Agenda Go Wild! Goals

Goal 1



Protect and Steward
Resilient Landscapes

Goal 2



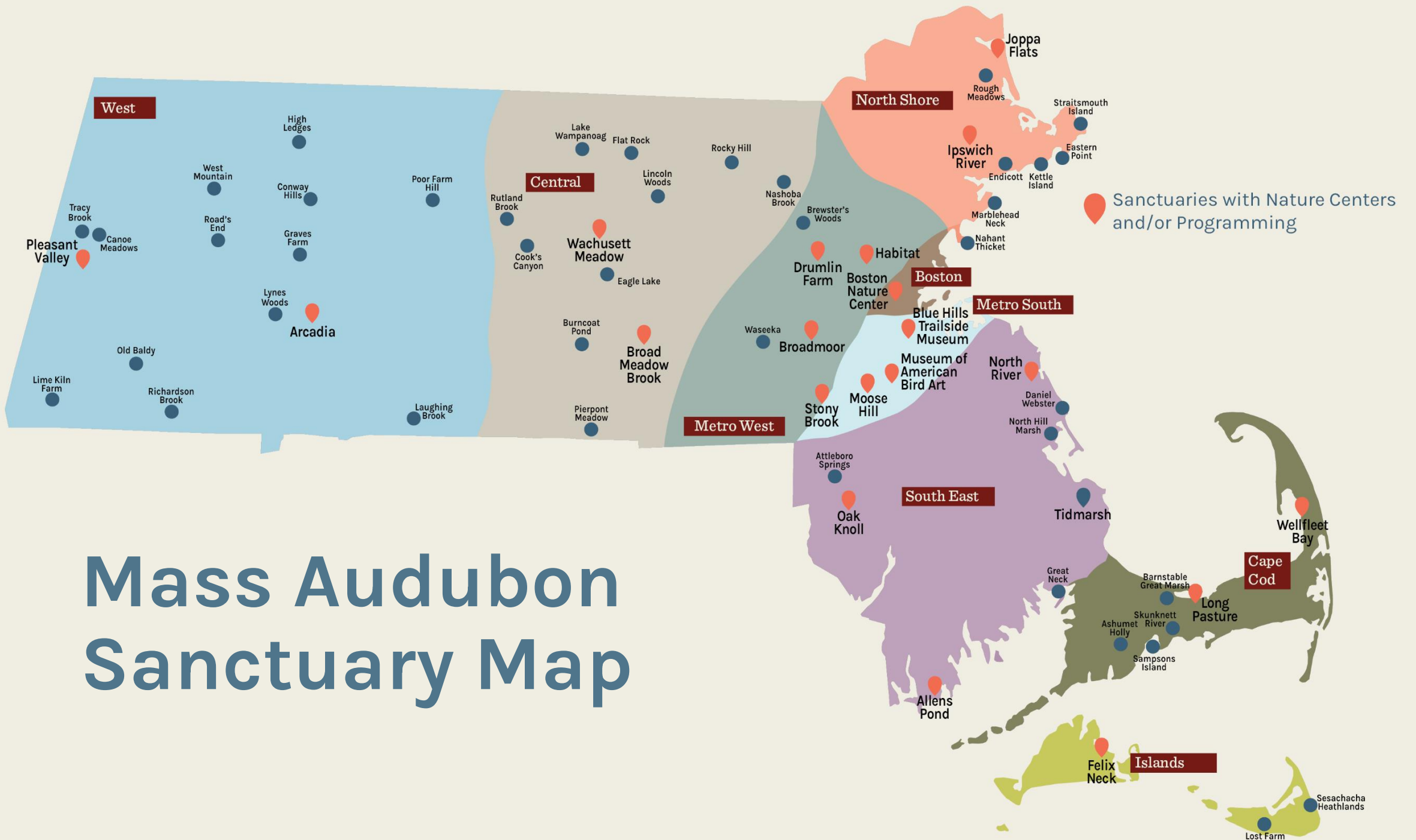
Advance Inclusive and
Equitable Access to
Nature

Goal 3



Mobilize to Fight
Climate Change

2021 - 2026



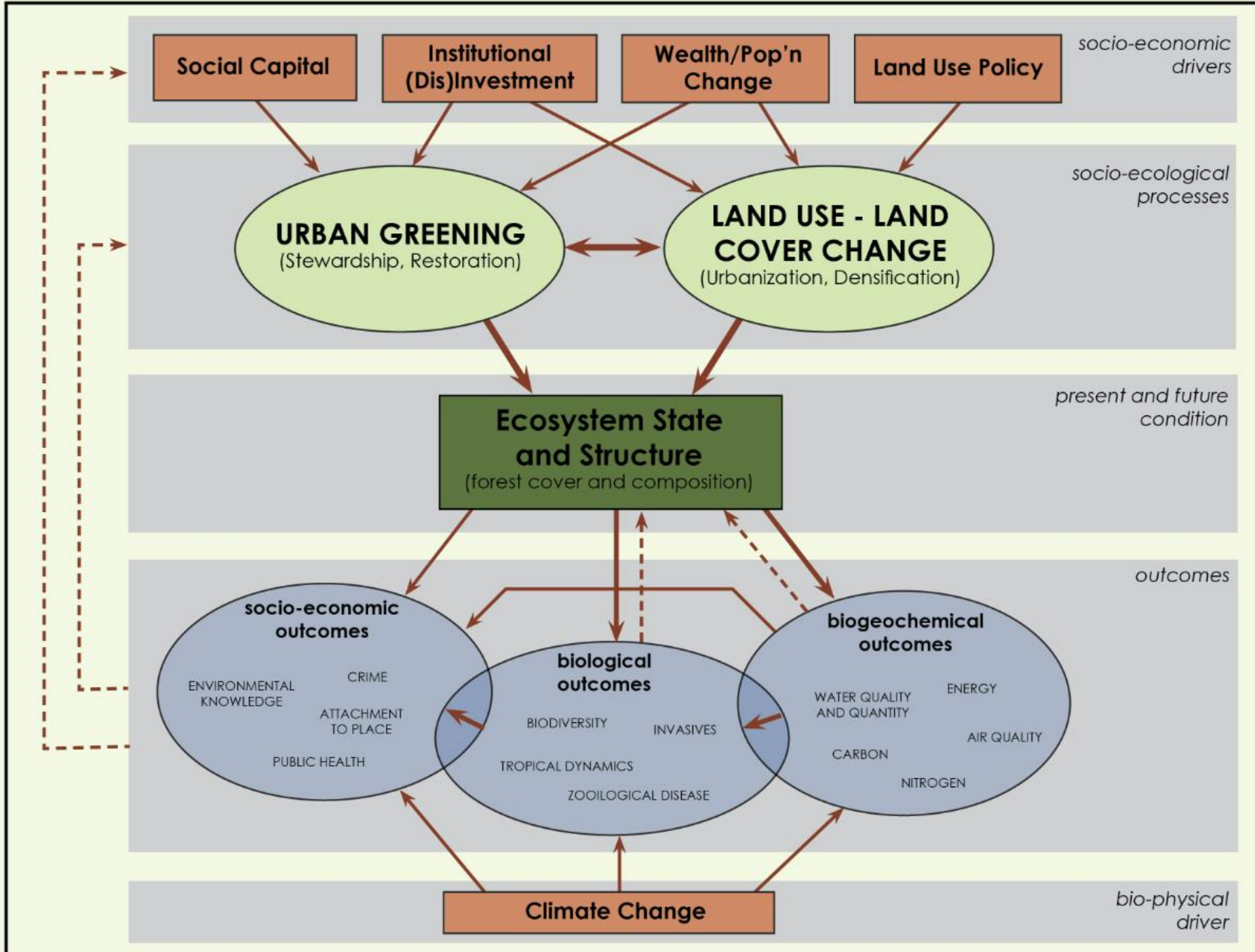
Mass Audubon Sanctuary Map

What is **urban ecology**?

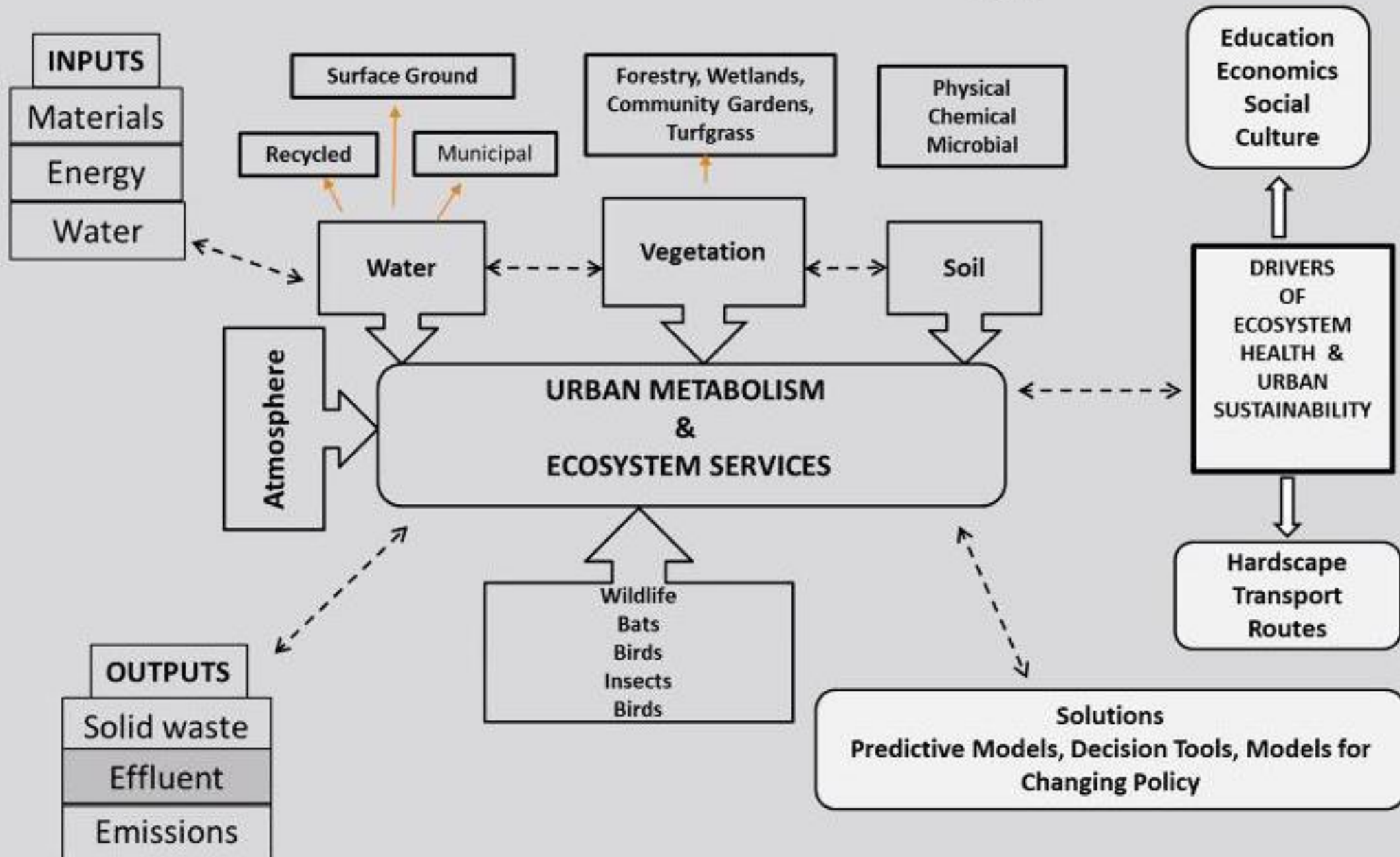
Urban Ecology

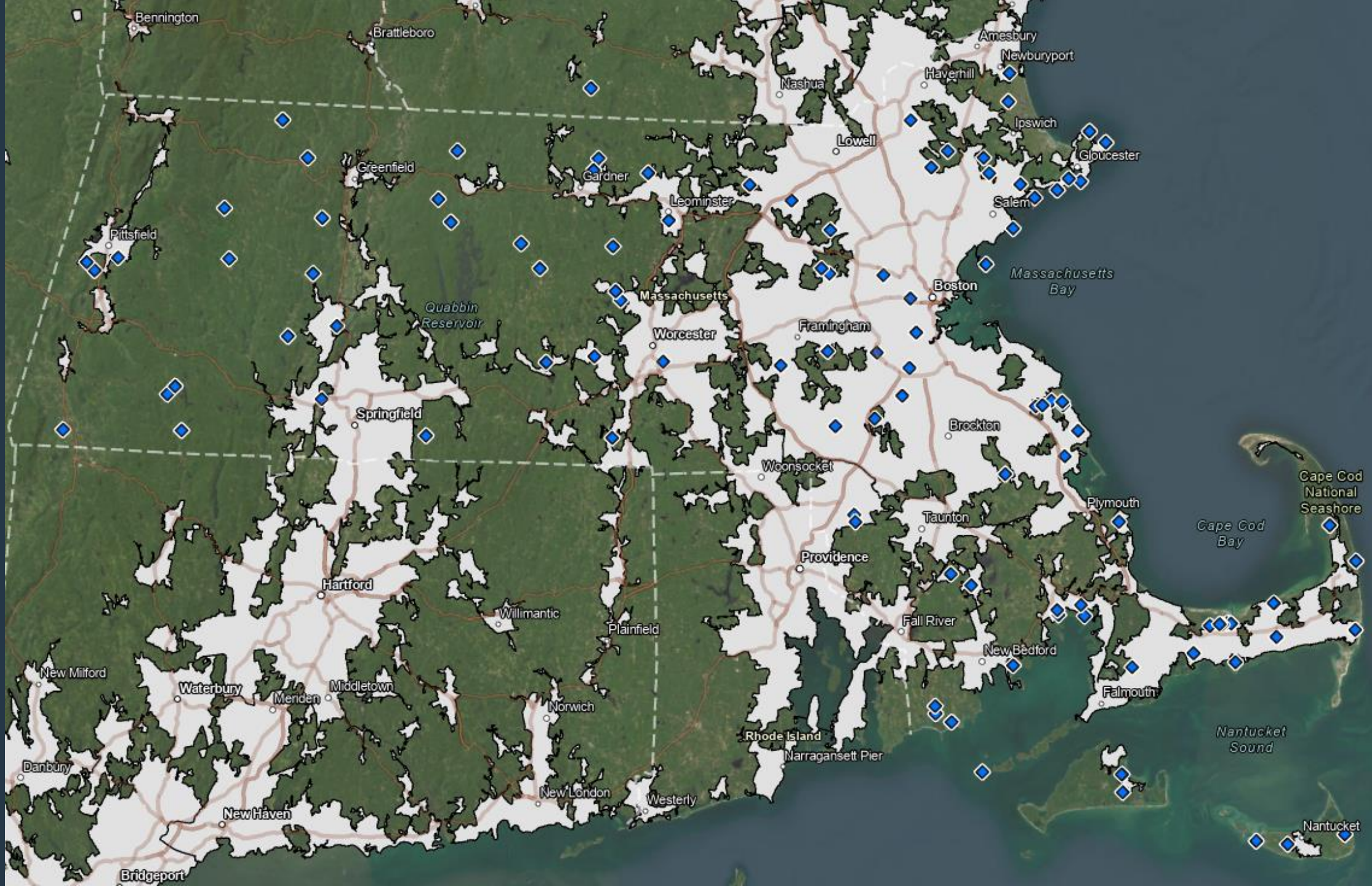
Urban ecology integrates both basic (i.e. fundamental) and applied (i.e. problem oriented), natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems.

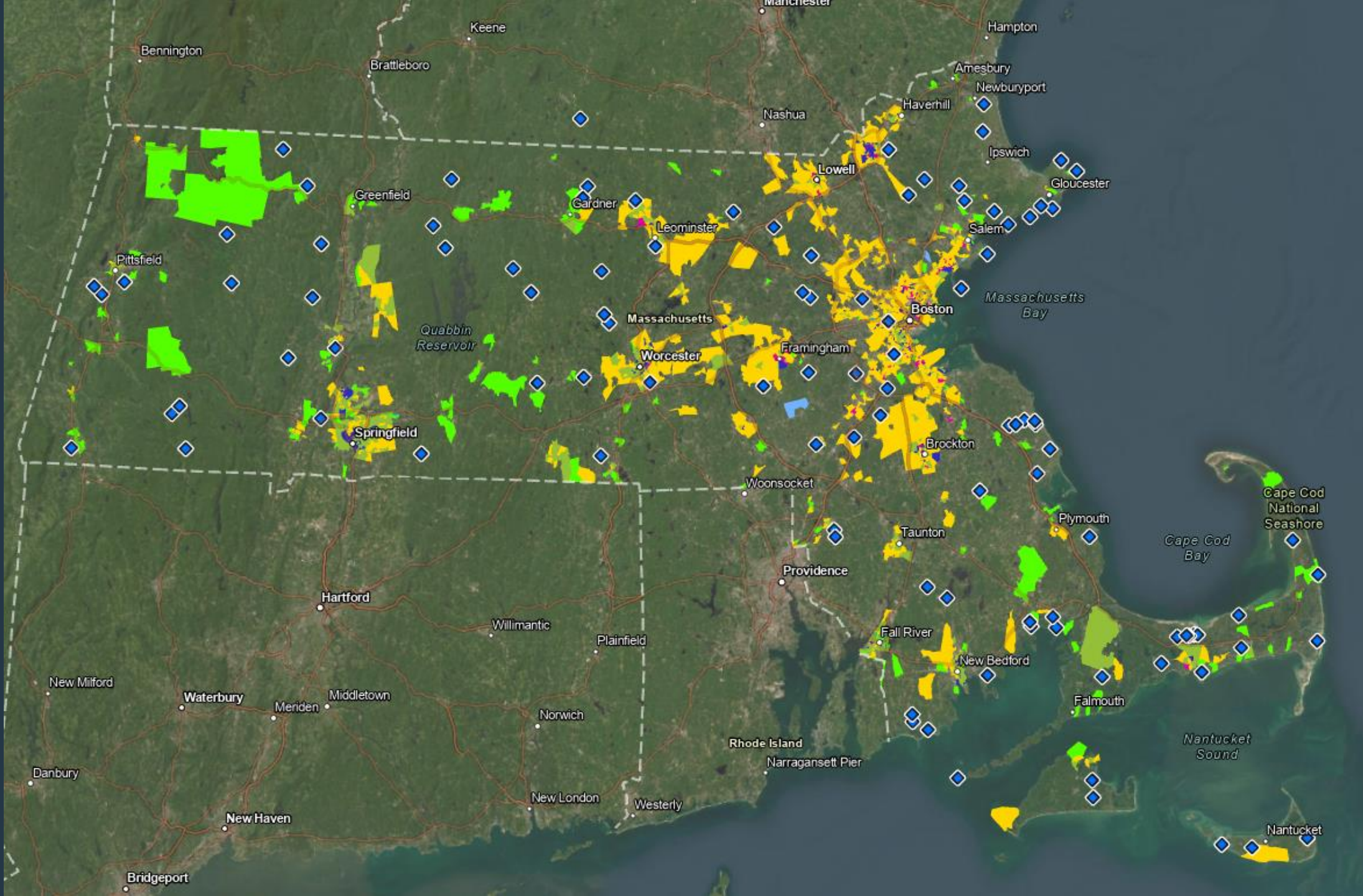
McDonnell, M. J. 2011. The history of urban ecology: an ecologist's perspective. Pages 5–13 in J. Niemelä, J. H. Breuste, T. Elmqvist, G. Guntenspergen, P. James, and N. E. McIntyre, editors. *Urban Ecology: Patterns, Processes, and Applications*. Oxford University Press, Oxford, UK. <<https://doi.org/10.1093/acprof:oso/9780199563562.003.0002>>. Accessed 31 Aug 2022.



What is Urban Ecology?







Urban Ecology

- Is it really:
 - emerging?
 - different from natural?
 - possible to define in just one way or another?
- What is a city? What is science? What is urban?
- How does one practice this science, or come to consider oneself an urban ecologist?

MacGregor-Fors, I. 2011. Misconceptions or misunderstandings? On the standardization of basic terms and definitions in urban ecology. *Landscape and Urban Planning* 100:347–349.

The word **urban** is not synonymous with **environmental justice**.

Both concepts should be explored and increasingly understood by **urban ecologists** and the **communities** they live and work in.



Urban Ecologist

- Conservation Science Department
- Nature in the City and more
 - Listen + engage with urban residents
 - Conserve, restore + improve urban green spaces
 - Research + practice urban ecosystem science
 - Partner across sectors + disciplines
 - Support participatory and community science in urban areas



Boston Nature Center



1909



8.3. The hospital buildings at Pierce Farm as seen from the Walk Hill side, in a photograph from the 1909 Annual Report. *Courtesy of the City of Boston Archives.*

1938



1955



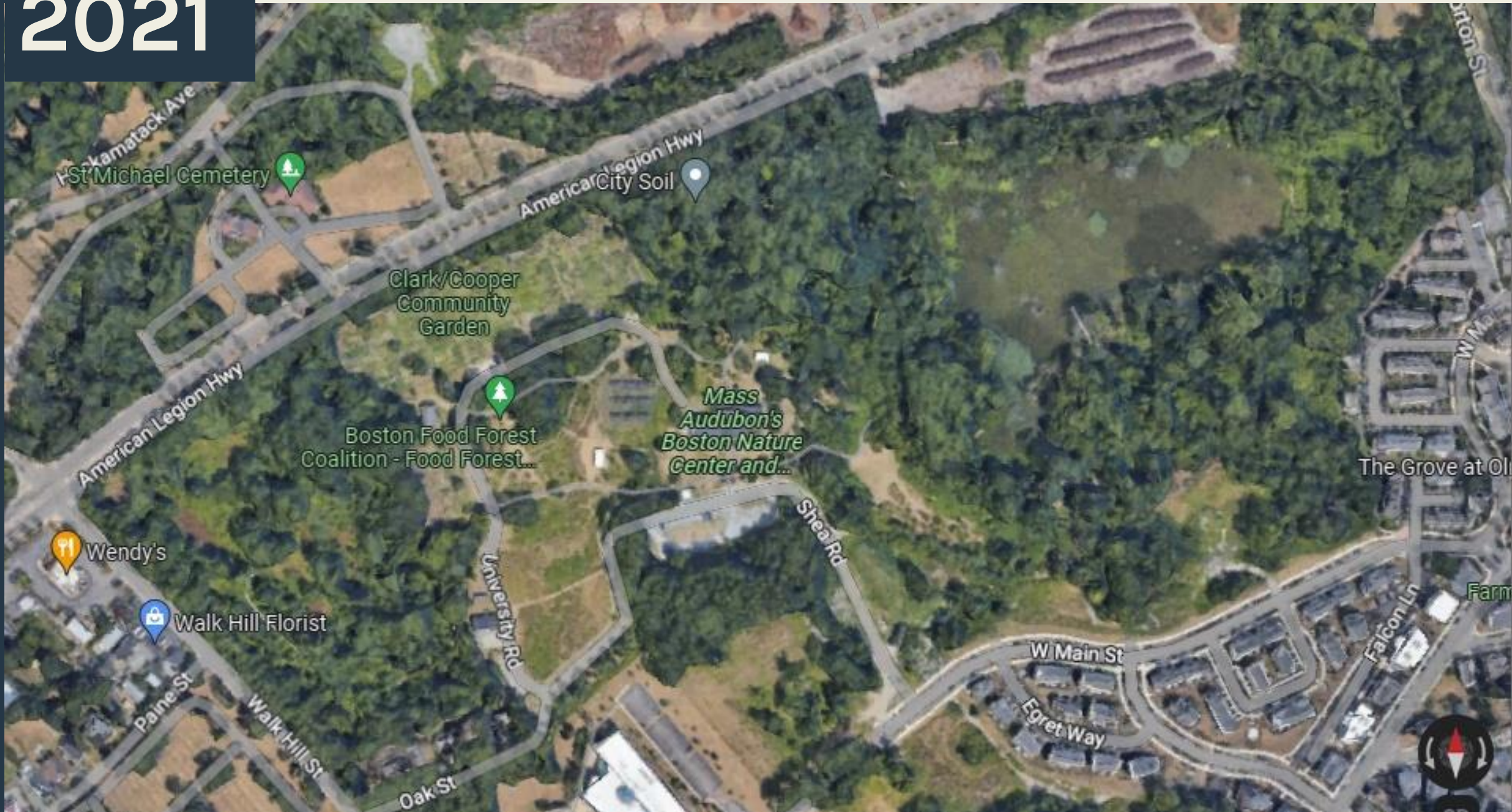
1995



2005



2021



NOW

George Robert White Environmental Conservation Center

First net-zero,
carbon neutral
City-owned
building

Geothermal

Education space
– preschool,
camp, field trips

Public trails



NOW

Lots of heterogeneity, competing uses, and work to do

Table 3. BNC Wildlife Sanctuary General Cover Types.

<u>Cover Type</u>	<u>Area (Acres)</u>
Wetlands	16.5
Cattail Marsh	5.7
Wet Meadow	4.3
Shallow Marsh Meadow or Fen	0.9
Riparian (wetlands along stream)	3.0
Shrub Swamp	2.6
Uplands	31.0
Shrubland	10
Woodland	15.5
Cultural Grassland	5.5
Other Land Uses	13.2
Buildings, Parking, Lawns	3.0
Community Garden	5.5
Compost Facility	4.7



NOW

Lots of heterogeneity, competing uses, and work to do





Urban Ecologist

- Urban Forest Plans
- Open Space and Recreation Plans
- Grants in urban ecology
- Networking and learning
 - Urban Ecology Collaborative
 - Community Coalitions
 - Researching special topics
 - Rodenticides
 - Urban wildlife conflict
 - Urban forestry
 - Community/participatory science





Early Career Opportunities

Willow Tree Youth Leaders Program

- Based at Boston Nature Center
- 3-year, paid afterschool/weekends

Environmental Fellowship Program

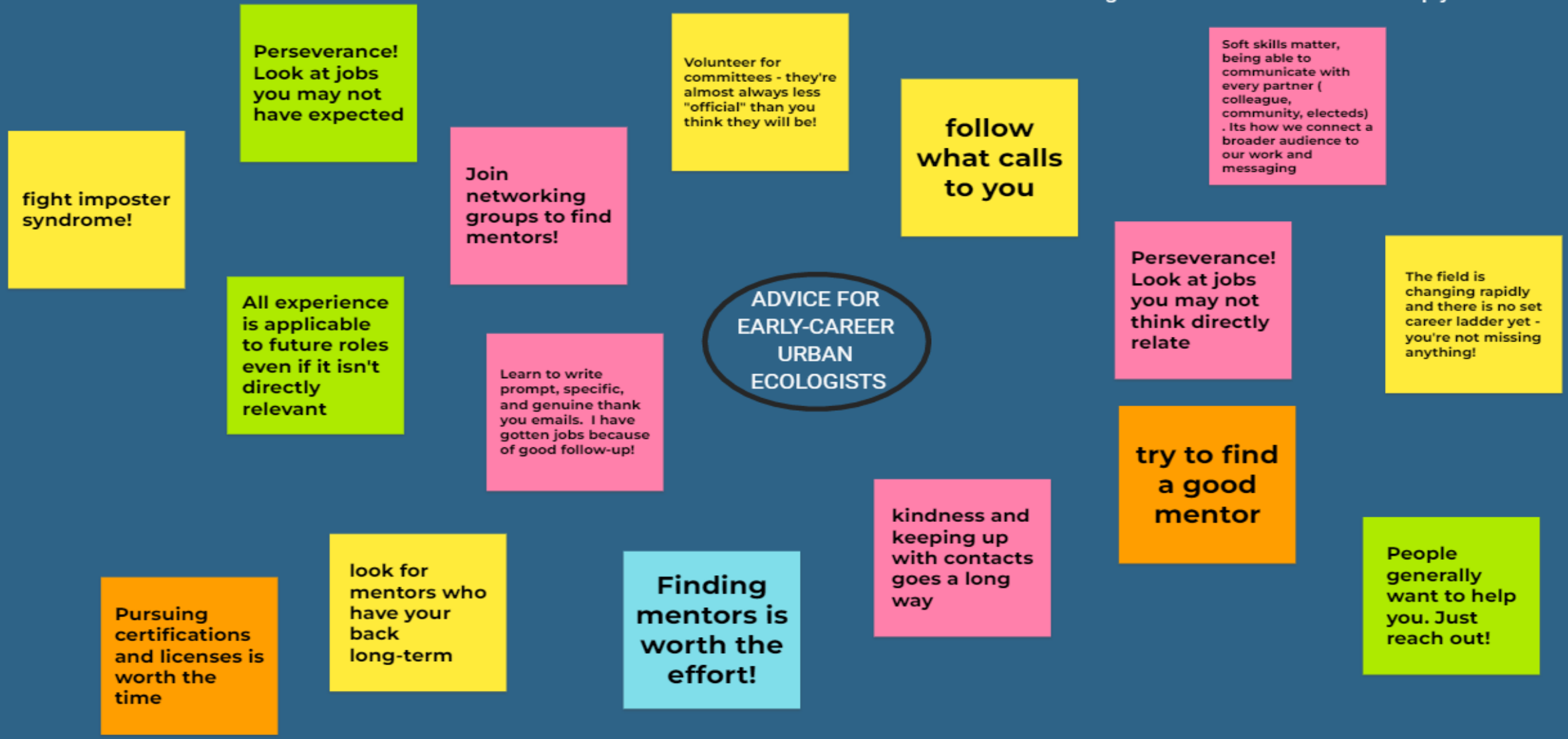
- 14-month, paid fellowship program (\$50-55k)
- 300+ applicants for 5 positions in 2022

Massachusetts Climate Corp

- 10-week, paid summer research (\$18-25/hr)
- 2 crew leaders, 8 crew members in 2023



What did you wish you had known when starting out?
What strategies did you use or do you recommend to build a career?
What can the next generation learn/do to most help you or the field overall?



Boston **urban forestry Alliance
for tree canopy on private land**



Response to City of Boston Tree Planting and Maintenance Program Request for Proposals

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Spring Planting Pilot Kickoff Event

Tree Planting Demo

- Two individual sugar maples, 7 gallon size
- Detailed demonstration of planting
- Demonstration of what homeowners would typically need to do to plant & maintain trees

Microforest Planting

- 333 plants in total, of 33 native species
- PowerCorpsBOS, Mayor Wu help plant
- Small trees planted densely to grow canopy and reforest barren land rapidly

Tree Giveaway

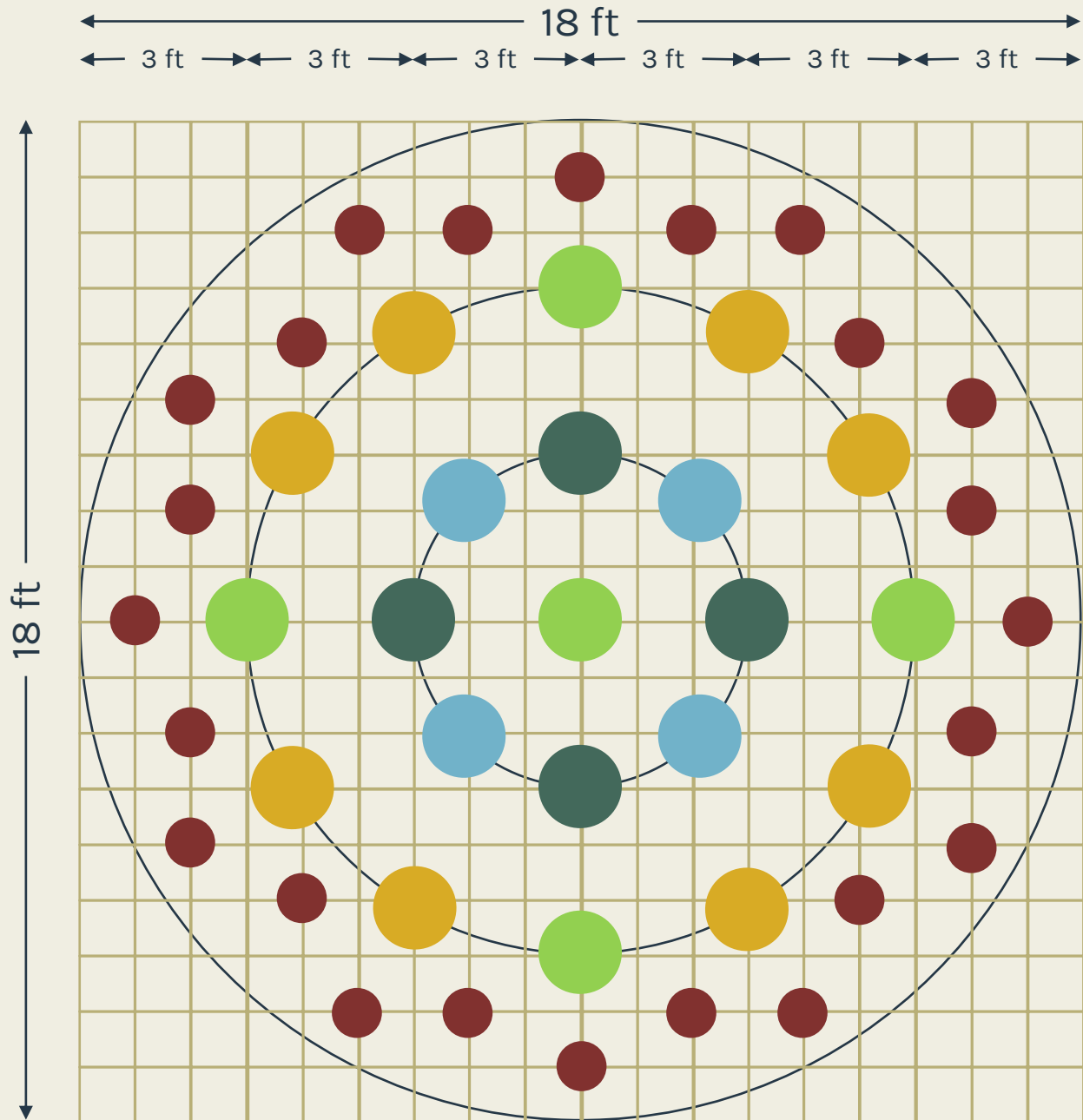
- Speak for the Trees to administer giveaway
- Folks taking a tree agreed to follow-up visits and check-ins from the Alliance
- European hornbeams



2019 Tree Canopy at the Boston Nature Center – southern boundary canopy lost in 2023



Microforest: Initial Design



MIYAWAKI SUPERCLUMPS

Adapted from <https://www.plantnovatrees.org/create-a-mini-forest>

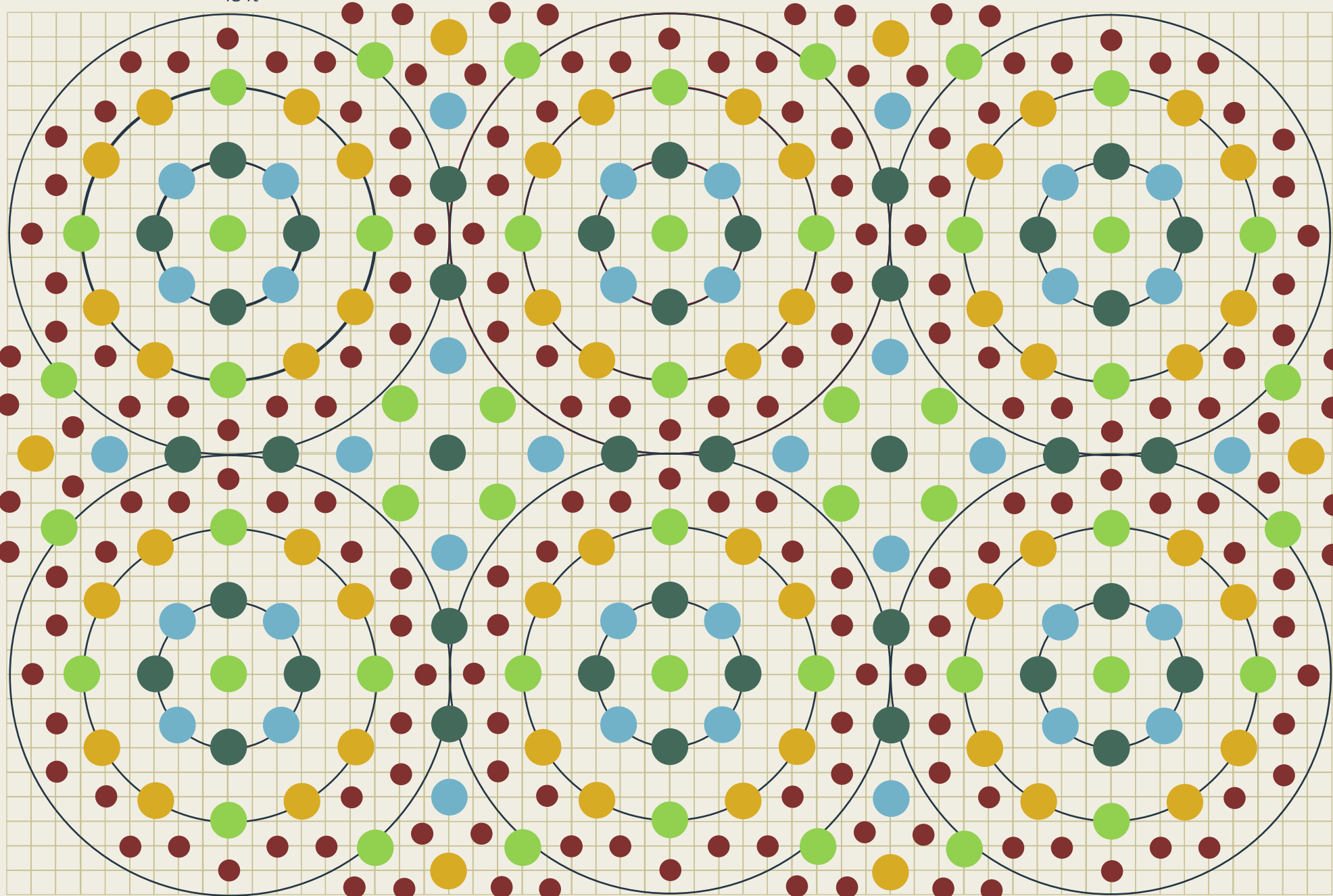
- native perennial (n=24)
- native shrub (n=8)
- native fast-growing tree species (n=5)
- native understory tree species (n=4)
- native climax canopy tree species (n=4)

1 base pattern = 45 plants total, 13 trees, 21 if including shrubs






18 ft diameter circle =
254 sq ft or 24 m²

A little under 2 plants per square meter in this adapted design

18 ft



54 ft x 36 ft
1,944 sq ft

6 SUPERCLUMPS		
	perennials	180
	shrubs	54
	fast-growing	50
	understory	38
	canopy	40
	TOTAL	362

128 true trees
182 trees if
including shrubs

family	species	common name	function	form	size/lat	grows	lifespan
Aceraceae	Acer saccharum	sugar maple	climax canopy tree	tree	60'-100'	slow	long
Juglandaceae	Carya ovata	shagbark hickory	climax canopy tree	tree	60-90'	slow	long
Fagaceae	Castanea dentata	American chestnut	climax canopy tree	tree	35'-115'	fast	long
Fagaceae	Quercus bicolor	swamp white oak	climax canopy tree	tree	50'-100'	fast	long
Aceraceae	Acer rubrum	red maple	fast-growing tree	tree	60'-75'	fast	short
Betulaceae	Betula populifolia	gray birch	fast-growing tree	tree	20'-40'	fast	short
Pinaceae	Larix laricina	tamarack	fast-growing tree	tree	40'-80'	fast	moderate
Salicaceae	Populus grandidentata	bigtooth aspen	fast-growing tree	tree	50'-75'	fast	short
Rosaceae	Prunus serotina	black cherry	fast-growing tree	tree	40'-80'	fast	moderate
Rosaceae	Prunus virginiana	chokecherry	fast-growing tree	tree	15'-30'	fast	short
Annonaceae	Asimina triloba	paw paw	understory tree	tree	10'-40'	slow	short
Oleaceae	Chionanthus virginicus	fringe tree	understory tree	tree	12'-25'	slow	short
Cornaceae	Cornus florida	flowering dogwood	understory tree	tree	20'-30'	moderate	short
Magnoliaceae	Magnolia virginiana	sweetbay magnolia	understory tree	tree	40'-60'	moderate	moderate
Lauraceae	Sassafras albidum	sassafras	understory tree	tree	24'-75'	moderate	moderate
Rosaceae	Aronia melanocarpa	black chokeberry	shrub	shrub	6'-15'	moderate	short
Rhamnaceae	Ceanothus americanus	New Jersey tea	shrub	shrub	3'	slow	moderate
Clethraceae	Clethra alnifolia	sweet pepperbush	shrub	shrub	16'	moderate	moderate
Myricaceae	Comptonia peregrina	sweet fern	shrub	shrub	2'-5'	slow	moderate
Betulaceae	Corylus americana	American hazelnut	shrub	shrub	6'-12'	moderate	short
Ericaceae	Gaylussacia baccata	black huckleberry	shrub	shrub	30'-60'	slow	long
Pteridaceae	Adiantum pedatum	northern maidenhair f	perennial	fern	8"-30"	moderate	moderate
Aristolochiaceae	Asarum canadense	wild ginger	perennial	wildflower	4"-8"		
Campanulaceae	Campanula rotundifolia	harebell	perennial	wildflower	4"-15"		
Cyperaceae	Carex pensylvanica	Pennsylvania sedge	perennial	grass	6"-12"		
Primulaceae	Dodecatheon meadia	eastern shooting-star	perennial	wildflower	6"-20"	moderate	short
Papaveraceae	Sanguinaria canadensis	bloodroot	perennial	wildflower	6"-24"		
Saxifragaceae	Tiarella cordifolia	foamflower	perennial	wildflower	6"-16"		

Microforest: Implementation

2022
Oct 12



2023
Apr 04



2023
May 04



2023
May 08



2023
May 09



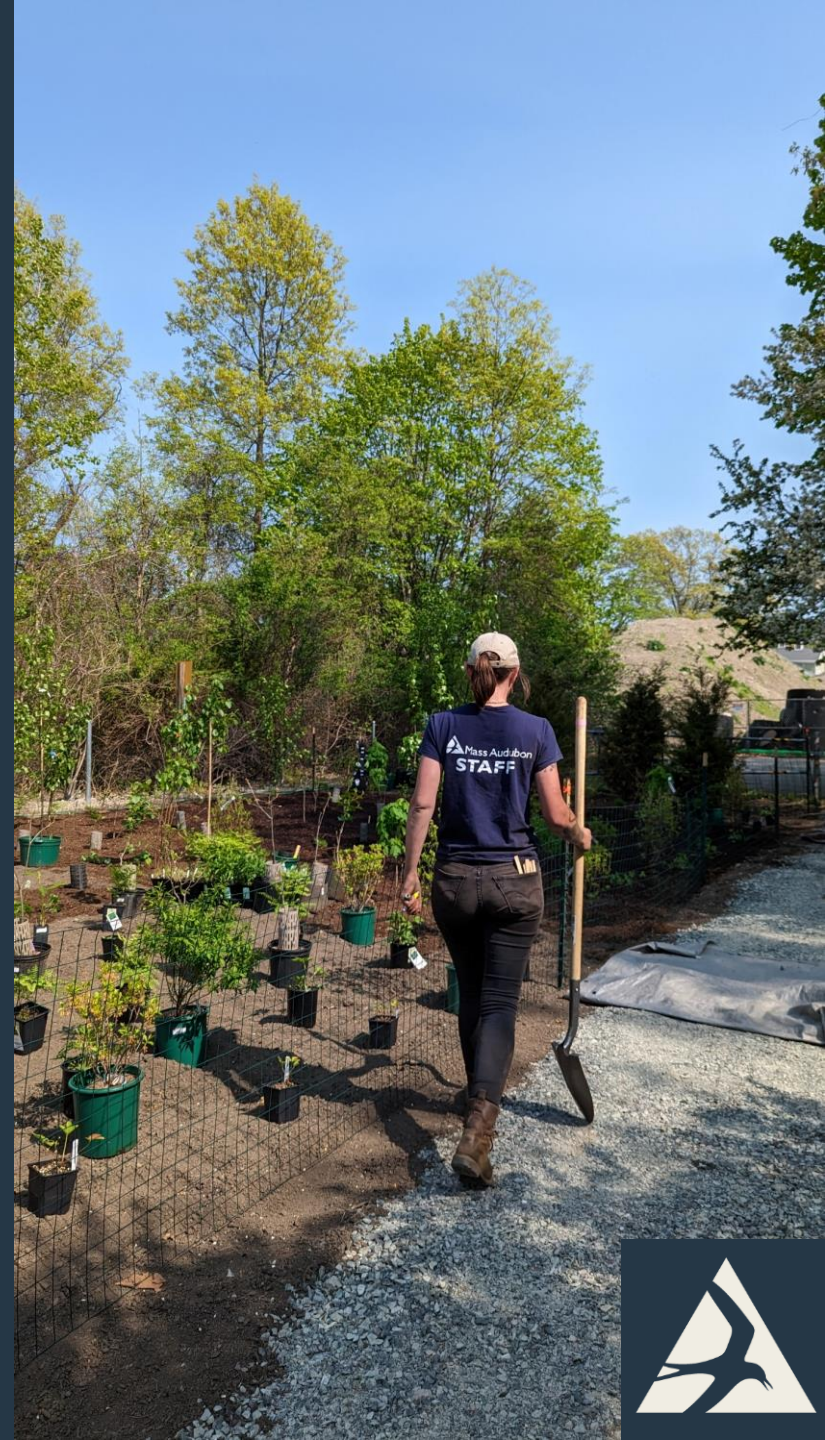
2023
May 09



2023
May 10



2023
May 10



2023
May 12



2023
May 12



2023
May 12



Where can you **learn more?**



Follow-Up Resources

Boston Nature Center



Boston Nature Center & Wildlife Sanctuary

A Healing Landscape

City of Boston PowerCorps Program

Pollinator-Friendly Solar Meadow Visual Timeline

2023 Greater Boston Area City Nature Challenge

Massachusetts Climate Corps



Follow-Up Resources



Applied Urban Ecology

[Urban Ecology Collaborative on YouTube](#)

[Urban Waters Learning Network](#)

[Urban Wildlife Information Network](#)

[Urban Bird Treaty Cities Program](#)

[Boston Biodiversity Consortium](#)

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Thank You!



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