

# Planting Trees for Energy Conservation in Concord, New Hampshire

Miriah King & Tracey Lesser  
Department of Natural Science



## Background

Urgency for cooling strategies is rising as the effects of climate change increase.

Planting trees in Concord improves the environment and reduces the need for air conditioning.

This action counteracts the urban heat island effect while passing many benefits to future generations.

## Advantages of Becoming a Tree Guardian

Numerous economic and environmental benefits can be gained from planting trees in the city. Some of the many advantages of becoming a tree guardian are listed below. [1], [2] & [4]

- Lower energy costs by 15-35% using less a/c
- Reduce carbon emissions from power plants
- Decrease wind
- Absorb storm water runoff to prevent erosion
- Mitigate storm damage
- Support local businesses
- Support local ecosystems & promote biodiversity
- Lower anxiety
- Improve physical & mental health
- Decrease sun damage
- Benefits increase as mature trees appreciate in value
- Increase shade & privacy
- Increase property values by 3-15% with more curb appeal
- Decrease air & noise pollution

## Adaptation Methods

As Granite Staters find ways to adapt, there are a variety of cooling strategies being utilized around the globe. Some popular options include planting shade trees and increasing surface albedo with light colors or mirrors that reflect the sun's heat instead of absorbing it.



(Photo courtesy of Meer)

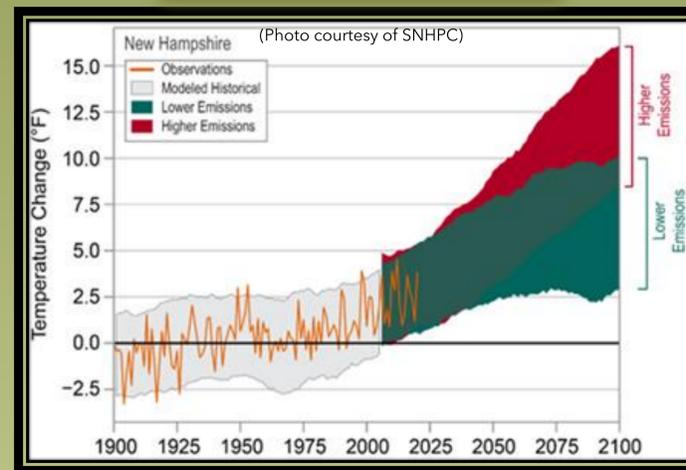
Reflective mirrors made from 100% recycled material cool roofs in Southern California



(Photo courtesy of NASA)

White surfaces lower temperatures by up to 40°F in Queens, NY

## Climate Trends



Carbon emissions influence the rate of temperature changes. Higher emissions lead to temperatures rising faster, along with the demand for electricity. [2]

## Next Steps

Analyze soil by checking drainage & the soil map [3]

Determine optimal tree type for your property (**recommendations on bottom**)

Survey the yard and surroundings for the best planting locations

Research sun & water preferences of your specific tree

Visit a local garden center to purchase a young plant

Schedule time to water & check on your tree investment

Plant	Light Preference	Soil Preference	Water Preference	Salt Tolerance	Carbon Tolerance	Cold Tolerance	Average Max Height	Other Considerations	Notes
<b>Red Maple</b>	Full sun or partial shade	Prefers moist, slightly acidic, tolerates most soil types	Medium to High	Medium	High	High	40-60' ★	Maples grow fast - vulnerable to cold & pests during first 2 years - few insects or diseases can destroy them once fully grown	Large - branches can spread up to 40' wide - vivid, red autumn colors - extremely adaptive and low maintenance
<b>Silver Maple</b>	Full sun or partial shade	Prefers moist, well-drained soil	Medium to High	Medium	High	High	60-80' ★	Grows fast - can live over 100 years - high carbon absorption capability - tolerates flooding	Large - susceptible to wind breakage without pruning - shallow roots may interfere with underground pipes
<b>Balsam Fir</b>	Full sun or partial shade	Prefers moist, acidic and well-drained	Medium to Low	Medium	Medium	High	40-50' ▲	Balsam Fir grows slowly - can live 80 years - some are more susceptible to pests / diseases - be cautious of over-watering	Plan heights can vary - Abies balsamea is a slow growing evergreen - White & Fraser Firs are low maintenance - increase privacy while decreasing noise pollution
<b>Eastern Hemlock</b>	Both shade and sun tolerant	dry or moist, well-drained, tolerates rocky or sandy	Medium to High	Medium	Medium	High	80-100' ▲	Eastern Hemlock grows slowly - can live over 800 years - dense canopy maintains moisture	Heavy evergreen - attracts wildlife, mature plants block winter wind - should not be planted near power lines
<b>Northern Red Oak</b>	Tolerates full sun and shade	Tolerates dry, acidic, sandy and moist	Medium to High	High	High	High	60-90' ★	Oaks grow fast - can live over 200 years - susceptible to pests in early years - very salt tolerant	Quercus Rubra is large with red fall foliage & acorns that attract wildlife - solid lateral roots - shouldn't plant too close to house - fire resistant
<b>Bur Oak</b>	Tolerates shade and sun	Tolerates most soil types	Medium to High	High	High	High	15-20' ★	Grows fast - start providing shade right away - vulnerable to early disease in first 2 years - solids absorbs carbon well	Usually wider than tall - low maintenance - fire resistant - reduces pools caused by flooding - prevents storm erosion
<b>Yellow Birch</b>	Tolerates shade and sun	Moist, rocky and acidic soils	High	High	Medium	High	60-80' ★	Grows 1-2' per year - can live up to 300 years - not prone to invasive pests - tolerant of road salt	Named for yellowish peeling bark - some require pruning - absorbs storm water - cones attract wildlife / enhance diversity
<b>Eastern Red Cedar</b>	Full sun	Prefers well-drained, but tolerates most soil types	Medium to Low	High	Medium	High	30-40' ▲	Slow to moderate growth rate - more prone to pests if planted in shade or over saturated soil - drought and salt tolerant	Eastern Cedar's crown spreads 8-15' - Juniperus virginiana is a low maintenance evergreen that blocks winter winds - berries attract birds
<b>Gray Dogwood</b>	Prefers some shade & some sun	Prefers well-drained to dry soils	Medium to Low	High	High	High	10-20' ★	Can form dense thickets - some Dogwood varieties are prone to invasive species - drought sensitive - handles salty conditions and absorbs carbon well	Attractive white flowers and berries turn purple in autumn - Cornus Florida is a low maintenance bush - attracts pollinators
<b>Chinese Juniper</b>	Intolerant of shade	Tolerates dry but prefers well-drained, acidic soils	Low to High	High	High	High	5-15' ▲	Juniperus chinensis comes in a variety of shapes and sizes - disease & drought resistant - prefers bright light - withstands adverse conditions including salty cities	Chinese Juniper is not a NH native, but it is prone to success in urban environments as an evergreen that blocks winter winds, evergreen shrub that produces berries
<b>Rhododendron Bush</b>	Tolerates shade and sun	well-drained, acidic soils	Medium	Medium	High	High	10-20' ★	Grows fast 1-2' per year - blooms can last up to 2 months - bush can live for hundreds of years - forms dense thickets - roots will rot in sandy soil	Rhododendron maxima is a large evergreen shrub with showy, colorful flower displays in spring, the leaves hold oils containing antioxydants - attracts pollinators
<b>Lilac Bush</b>	Full sun	and/or alkaline soil, tolerates moist	Medium to High	High	High	High	6-12' ★	Grows fast 1-2' per year - can live 100 years - attractive & hearty - few pests or diseases can destroy - ok to plant near salted driveway	Low maintenance - flowers bloom after about 4 years with a heady fragrance - Syringa vulgaris is the purple lilac / full state flower

## References & Acknowledgements

[1] Akbari, H., Susan, D., Dorsano, S., Huang, J., & Winnett, S. (Eds.). (1992). Cooling our communities: A guidebook on Tree Planting and light-colored surfacing. U.S. Environmental Protection Agency, Office of Policy Analysis, Climate Change Division.

[2] SNHPC. (2024, January 2). *Climate Data and Impacts*. Southern New Hampshire Planning Commission. <https://www.snhpc.org/environmental-energy-planning/climate-resiliency/pages/climate-data-and-impacts>

[3] University of California (2017). SoilWeb. SoilWeb: An Online Soil Survey Browser from the California Soil Resource Lab. <https://casoilresource.lawr.ucdavis.edu/gmap/>

[4] Valeras, A. (2023, July). Nature is a remedy for stress. *Forest Notes: New Hampshire's Conservation Magazine*, (314), 8-9.

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Maple Fir Hemlock Oak Birch



Cedar Dogwood Juniper Rhododendron Lilac