forest farming

Cultivating understory plants and mushrooms under a forest canopy

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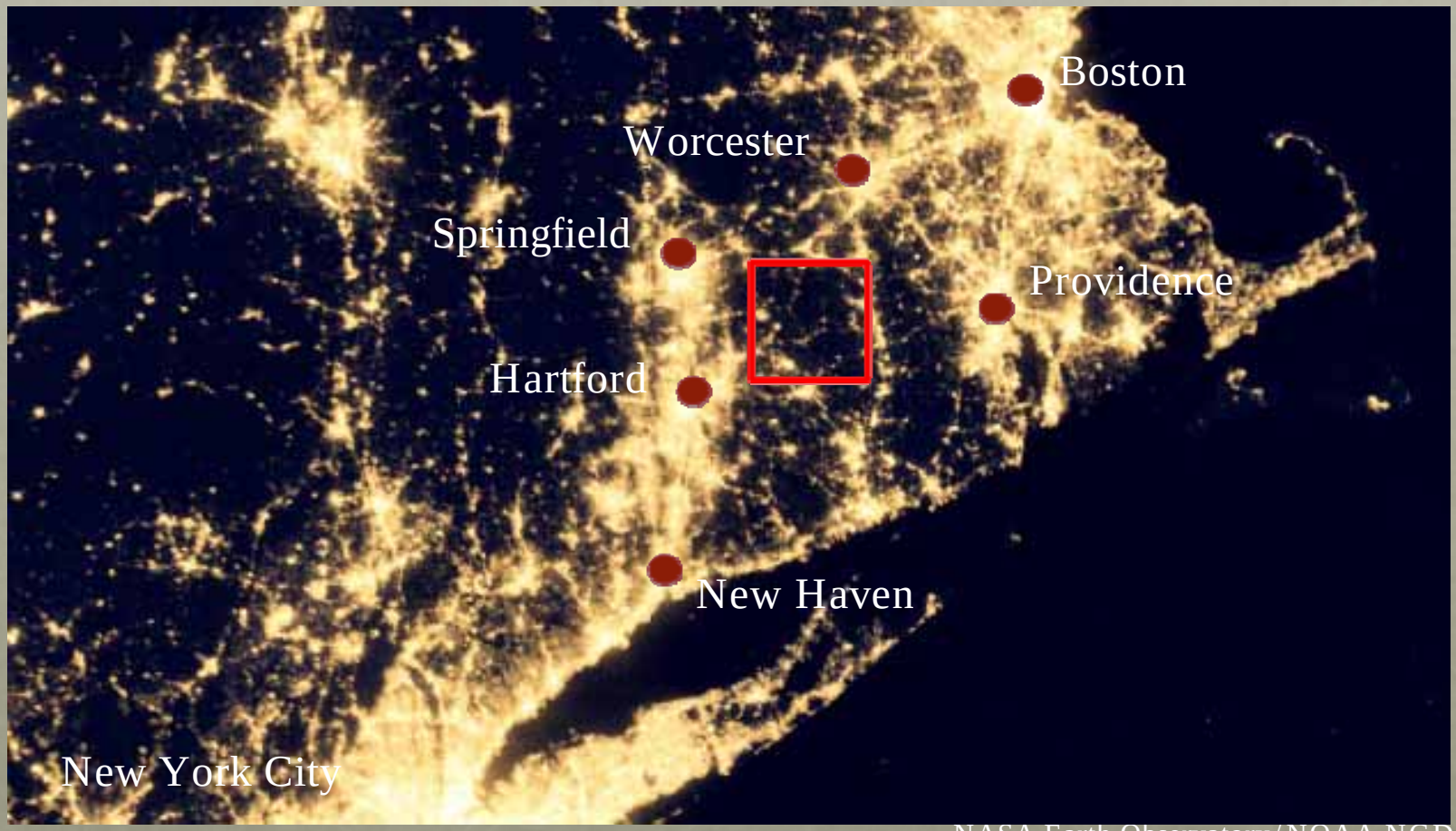
Outline

- Yale Forests and Quiet Corner Initiative
- What is forest farming
- American ginseng
- Ramps
- Shiitake mushrooms
- Implementation
- Questions

Yale Forests

- 11,000 acres in CT, VT, NH
- Yale-Myers (8,000) in northeast CT
  - Sustainable forest management, research, education
- Quiet Corner Initiative
  - Outreach with surrounding landowners
  - Conservation, education, sustainable forest management
  - Client projects for students
  - Demonstration sites at Yale-Myers

Why the Quiet Corner?



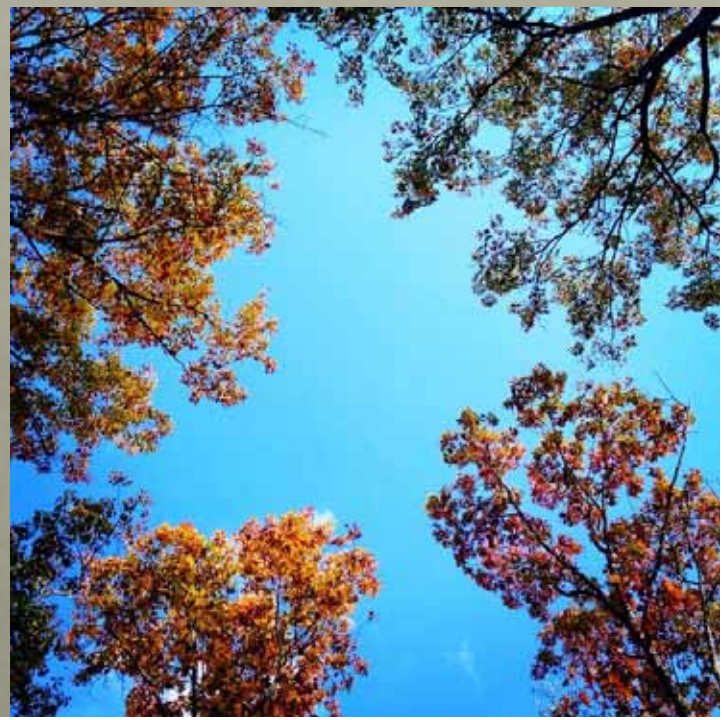
NASA Earth Observatory/NOAA NGDC

Agroforestry at yale-Myers

- Demonstration sites for Quiet Corner Initiative
- Forest Farming
  - Sugarbush planted with ginseng, ramps, blue cohosh, shiitake mushroom logs
- Forest Orchard
  - 1 cleared acre
  - Mix of traditional New England orchard trees and less common trees
  - Apples, peaches, pawpaws, persimmon, nut trees, berries etc.

forest farming

- Intentional cultivation of plants, mushrooms or other non-timber forest products (NTFPs)
- Not wildcrafting or collecting from the wild
  - Plant population decreases
- Canopy manipulation for light
- Multiple year time frames



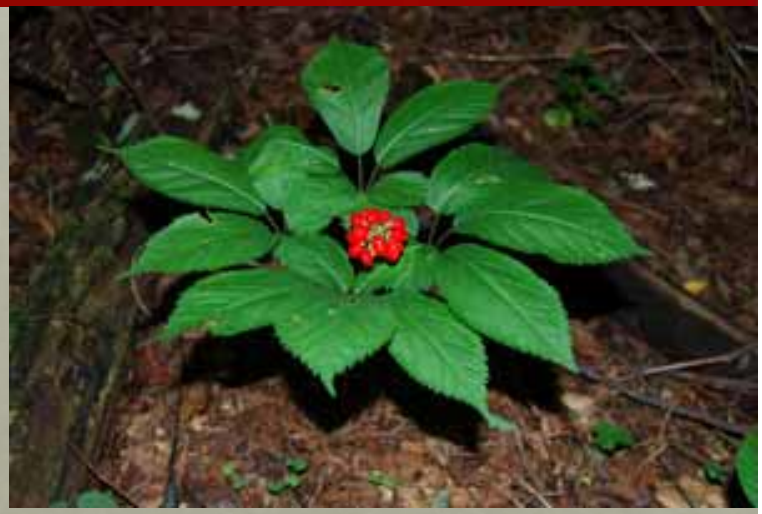
NTFP Examples

- Plants (edible/medicinal)
  - American ginseng
  - Ramps (wild leek)
  - Black cohosh
  - Goldenseal
  - Bloodroot
  - Ferns
- Mushrooms
  - Shiitake
  - Oyster
  - Lions Mane
- Other products
  - Pine straw (mulch)
  - Pine cones (ornament)
  - Mountain Laurel (ornament)
  - Maple syrup

considerations

- Is there a market for the product?
  - Crop plan and business plan
- Time Frame
- Do we have an accessible and appropriate site?
  - Accessibility
  - Security (ginseng!)
  - Site classification (ecology, indicator species)
- Do we need to manipulate light levels?
  - Shade tolerance
  - Thinning

American ginseng



- *Panax quinquefolius*
- Medicinal herb in Chinese medicine
- Exported since 1700's
- Types of American Ginseng
  - Field cultivated (raised beds, artificial shade, 3-4yr) $
  - Woods cultivated (grown in forest, tilled beds, 6-9yr) $$
  - Wild simulated (untilled in forest soil, 9-12yr) $$$
  - Wild (collected, prohibited or strictly regulated)

American ginseng

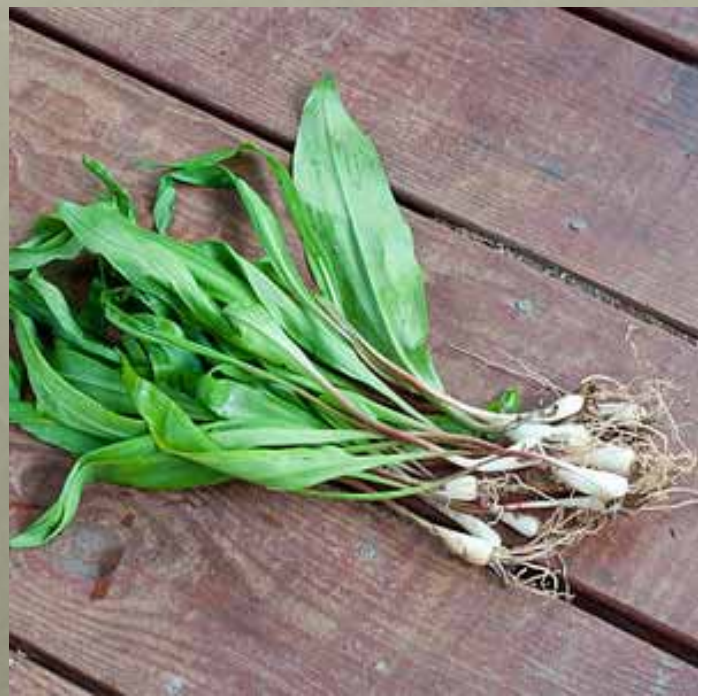
- Site
  - Cool, moist, well drained
  - Calcium rich forest soils
  - High organic matter
  - 5-20% grade, N, NE to S SW slope (VT, ME, Canada)
- Canopy
  - High shade (tall canopy, no overtopping shrubs), up to 25% light
  - Mesic deciduous
  - Indicator Species: sugar maple, white ash, shagbark hickory, tulip poplar, trillium, hepatica, maidens hair fern etc.

American ginseng

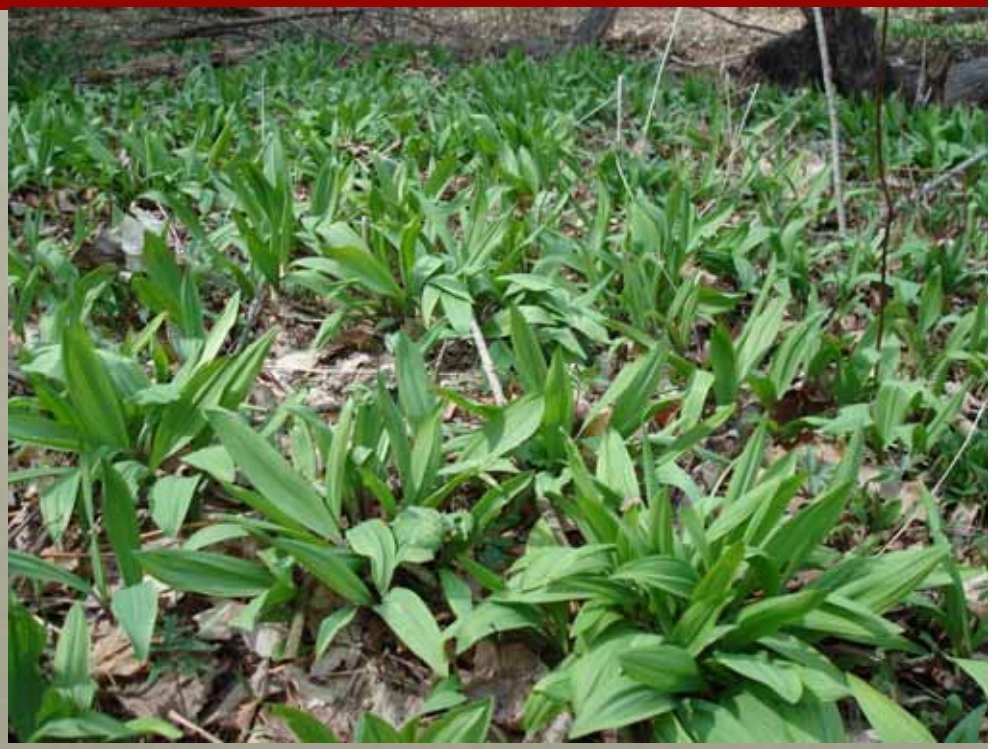
- Planting
  - Seeds (cheaper, longer establishment)
    - Stratified seeds
    - Broadcast v. rows, ½ to 1 in. soil, rake leaves atop
  - Rootlets 1-3yr old (pricier, faster harvest)
- Maintenance
  - Weeding
  - Slugs, deer (fencing?)
  - Thinning ginseng depending on spacing

Ramps

- *Allium tricoccum*
- Wild leek
- Edible, restaurants, farmers markets etc.
- Spring ephemeral



Ramps



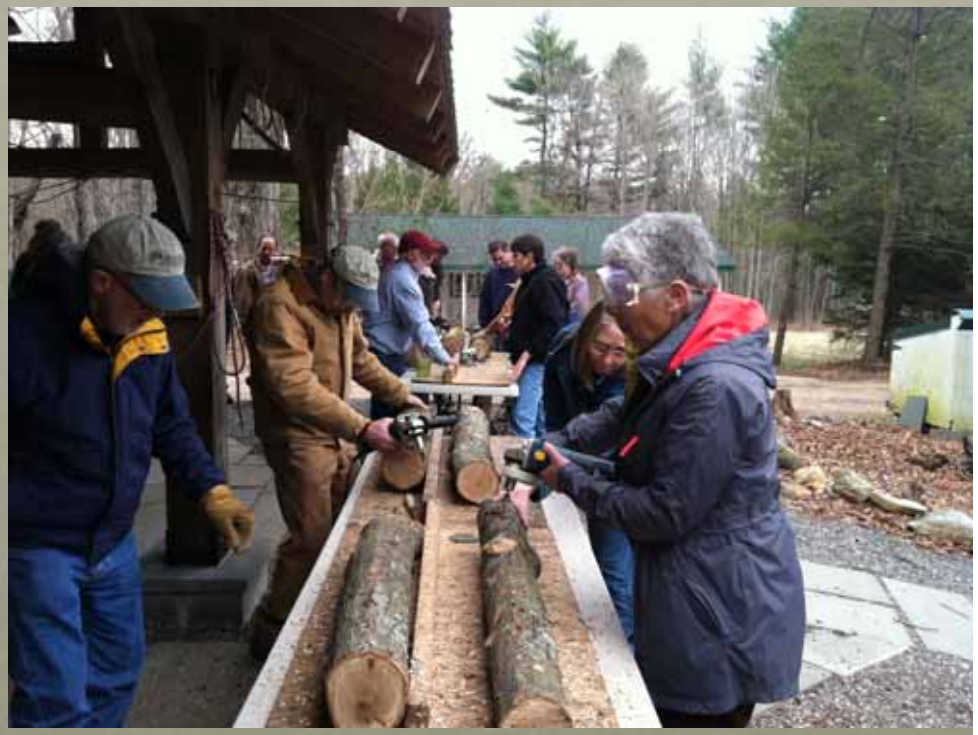
- Site
  - Moist, well drained
  - Often north face, but less finicky than ginseng
- Canopy
  - Deciduous (ephemeral)
  - Can be dense (ephemeral)
- Indicator species
  - Sugar maple, hickory, tulip poplar, white ash, oak
  - Trillium, trout lily, hepatica, Solomon's seal etc.

r amps

- Planting
  - Seeds
    - 1/8 to ¼ in. deep
  - Bulbs
    - 2” deep 4-6” apart
    - Vegetative propagation (can transplant)
- Harvest
  - Right after leaves begin turning yellow (bulb size)
  - Can also harvest just leaves

mushrooms

- Where will you get the logs?
- Where will you stack the logs?
- Timing
- Process
  - Harvest logs (late winter)
  - Inoculate (spring)
  - Stack (spring/summer)
  - Harvest (summer/fall year 2)

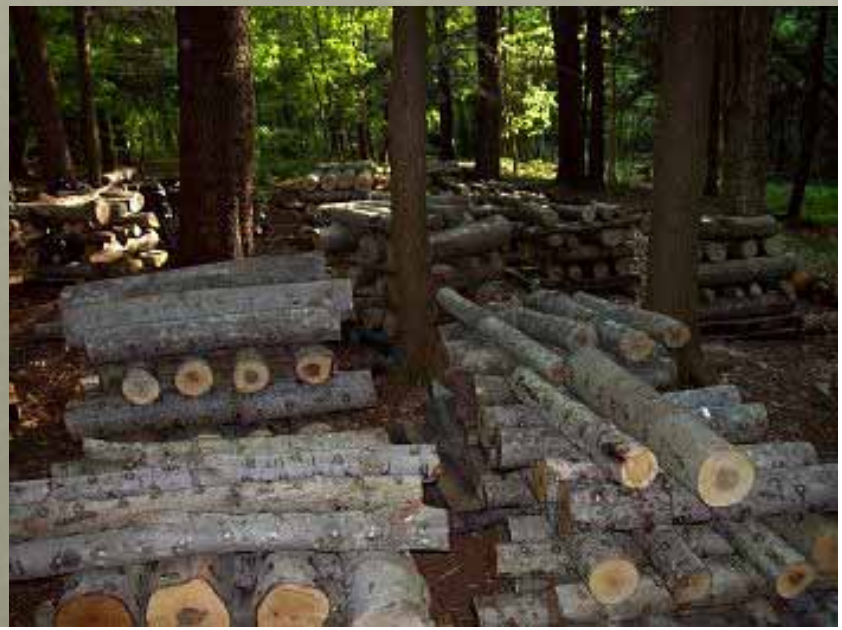


mushrooms

- Log substrate
  - 4-6” diameter
  - 3-4’ long (manageable to carry)
  - Red or white oak is best, beech, sugar maple, American hornbeam, hophornbeam also good alternatives
  - **Fresh** logs, late winter before bud-swell and loose bark
- Log procurement
  - Crown thinning (remove less vigorous trees)
  - Tops from winter harvest (slash)
  - Cut your own (forest mark)

mushrooms

- Inoculation
  - Store log 3-6 weeks before inoculation
  - Drill holes (angle grinder best)
  - Add spawn (plug or sawdust)
  - Wax over holes and ends (depending)
- Stacking/Yard
  - Various methods
  - Location
    - Year round shade (conifers)
    - Near water to force fruiting



Protecting the woods

- Trees have roots in surface of soil
  - Level of soil disturbance
- What is growing there now?
  - Rare understory species present?
- Fencing
- Accessibility, frequency of use

Forest farming & land trusts

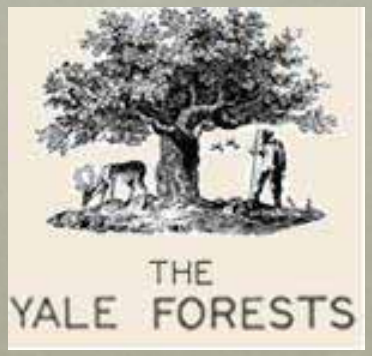
- Workshops for landowners (Quiet Corner Initiative)
- Cut your own logs similar to cut your own firewood
  - Marked by forester
- Pile slash after harvest in an accessible spot
- Leasing plots
  - Mushroom log yard near water and conifers
  - Use a forester to find appropriate sites for understory edibles and medicinals
- Light requirements of understory crop & thinning
- Accessibility
- Pilot project before scaling up?

resources

- Technical resources:
- Cornell Extension (Ken Mudge), mushrooms
- USDA Agroforestry Center (Jim Chamberlain), understory edibles and medicinals

Thank You


EASTERN CONNECTICUT FOREST LANDOWNERS ASSOCIATION
Wolf Den
Land Trust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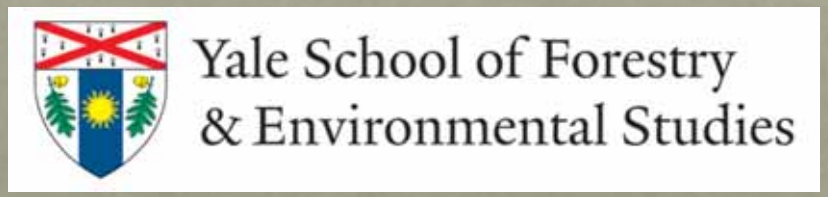
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