

# Forest Health and Sustainable Forest Stewardship in Rhode Island



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# Silvics, Ecology, and Forest Development

- **Silvics:** ecological characteristics of each tree species (how a species grows and what it requires to thrive)
  - Soil: moisture, nutrients, depth, structure
  - Sunlight: tolerance of shade/competition (just like garden plants!)
  - Growth: rate, form, habit, height, etc.
  - Regeneration: seed distribution, requirements for germination, etc.

# Silvics, Ecology, and Forest Development

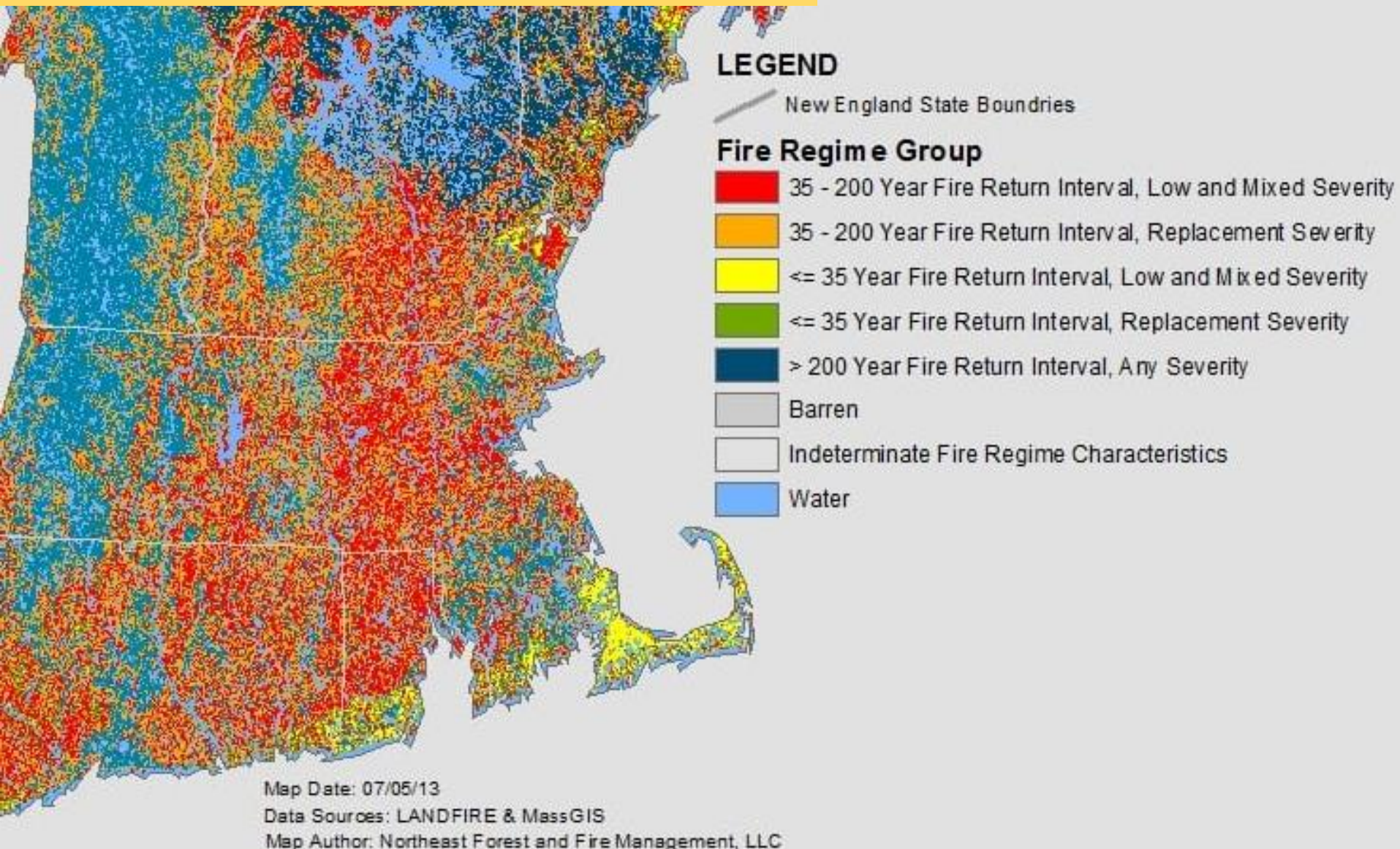
- Forest Development is driven by two phenomena:
  - Succession
  - Disturbance

# Disturbance, Succession and Forest Development

- Severe disturbance (stand replacement) →
- Early succession → scrub/shrub → young forest →
- Intermediate succession/intermediate forest →
- Canopy closure & mature forest →
- Old forest (not necessarily old growth forest)



# Disturbance Regimes







ME DACF



Brose et al 2014

UMN Extension

## Succession & Forest Development

- Disturbance Dynamics in Oak-Hickory Forests:
- Moderate shade tolerance (declines with age)
- Moderate fire tolerance + sprouting response



A photograph of a forest with tall, slender trees and a dense, green undergrowth. The text is overlaid on the lower half of the image.

# Fire-Intolerance ^ The Shade-Tolerance Problem

























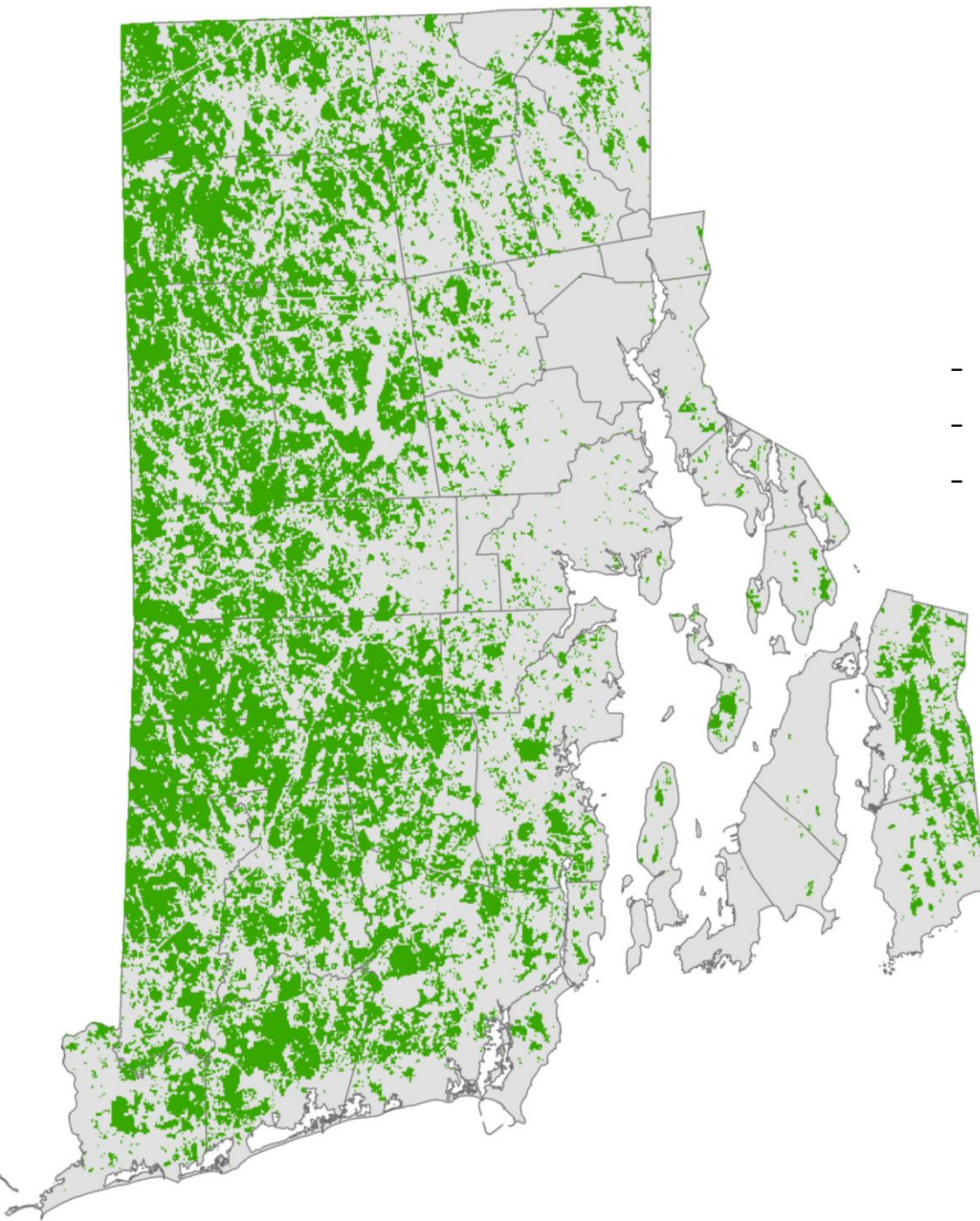
What about RI's other forests?





Cornell U





## Continuously Forested Areas (1939-2020)

- Typically harvested several times
- Private lands component
- Threats:
  - Development
  - Invasive pest & plants
  - Novel diseases
  - Climate change





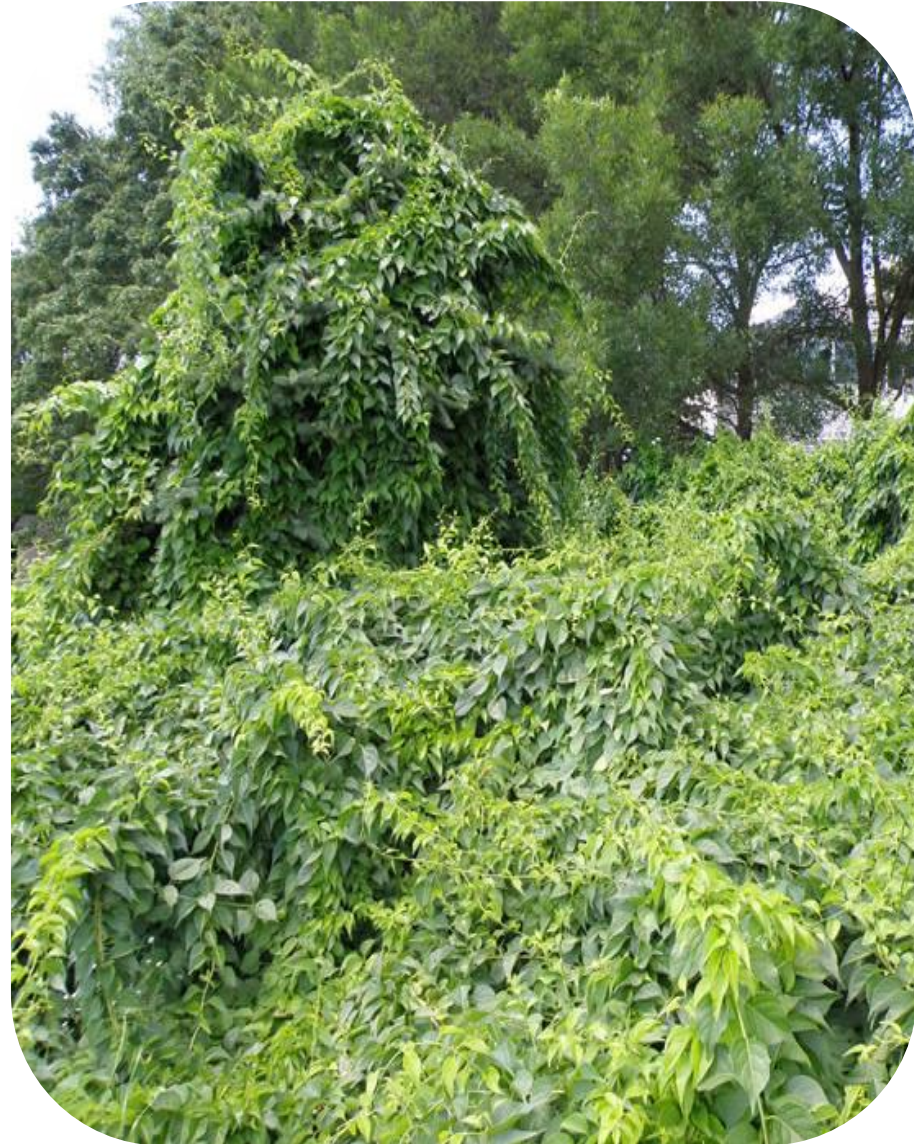
CT Post

Science 360 News



# Invasive Plant Species

- Early colonizers (favored by disturbance)
  - Grow in monoculture
- Early leaf-out & late senescence
- Abundant, persistent fruits
- Nutritionally poor
- Difficult to eradicate





W PA Conservancy

## Japanese Barberry *Berberis thunbergii*

- Spoon-shaped leaves
- Spines (ouch!)
- Oblong, red, dangling berries
- Common landscaping plant
- leaf-out early in Spring
- Takes over moist, rich sites
- Monocultures prevent new seedling and understory growth
- Encourages tick populations





“It’s not a problem in my yard”





# Burning Bush

## *Euonymus alatus*

- Corky “wings” along branches
- Beautiful red leaves in the fall
- Prolific oblong red berries with red/orange “husks”
- Common landscaping plant
- Takes over moist, rich sites
- Shade-tolerant
- Easy to pull or dig up
- Can grow in monoculture
- Outcompetes native understories





“It’s not a problem in my yard”





Mass Audubon

## Glossy Buckthorn

### *Frangula alnus*

- Tall, spindly shrub or small tree
- Glossy leaves, smooth margin
- Prolific round berries along stem (green darkening to black)
- Common in rich, moist woodlands
- Shade-tolerant
- Berries spread by birds
- Easy to pull or dig up
- Can grow in monoculture
- Hotspots in Coventry, eastern WG
- Outcompetes native understories





VA Native Plant Society



NC Extension



Minn Dept of Ag





VT Invasives

# Oriental Bittersweet

## *Celastrus orbiculatus*

- Aggressive, woody vine
- Leaves with rough margin
- Prolific red berries with orange husks at leaf nodes
- Common on old farm sites
- Takes over field/forest edges
- Berries spread by birds
- Difficult to control
- Can grow in monoculture
- Outcompetes native edge species



**Asian bittersweet**  
***Celastrus orbiculatus***



**American bittersweet**  
***Celastrus scandens***





Northern Ontario Plant Database





GoBotany

## Tree-of-heaven *Ailanthus altissima*

- Long, compound leaves
- Glands at the base of leaflets
- Smells like rotten PB when crushed
- Hard to kill – resprouts when cut or mowed
- Common along roadsides, train tracks, industrial sites
- Tolerates poor growing conditions; grows large in better conditions
- Sap contact can cause myocarditis, other heart symptoms





Penn State



National Park Service





NY Invasive Species Council

# Garlic Mustard

## *Alliaria petiolata*

- Heart-shaped, toothy leaves
- Bright green
- Pretty white flowers!
- Smells like garlic & herbs
- Prefers rich soils, but not required
- Tolerates shade very well
- Grows in monoculture
- Outcompetes native spring flowers
- Delicious in 2<sup>nd</sup> year (especially as pesto or a green lamb sauce)









NY ISC

## Japanese Stiltgrass *Microstegium vimineum*

- Monoculture prevents seedlings, understory plant growth
- Vivid green
- Can reach above knees in height
- Seeds set in August; DO NOT MOW after seed set
- Seed viable for 7 years
- Small infestations can be pulled (must keep pulling for 7 years)
- Can mow after June, before August
- Large infestations should be treated with **pre-emergent** (7 y) or grass-specifics





Penn State Extension

NY ISC









The New York Times

USDA - APHIS





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