

# Non-native Invasive Species and Forest Health

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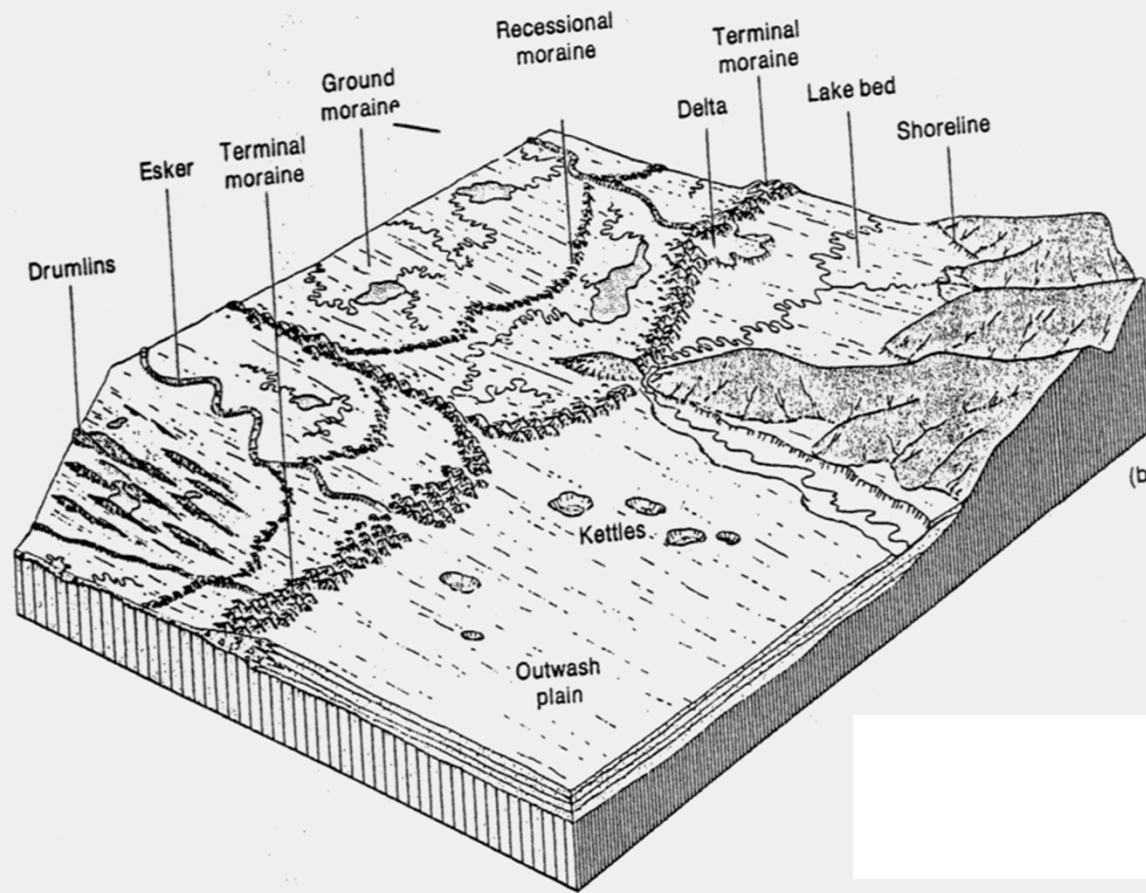
**The Forest Ecosystem is  
dynamic, always in  
transition,  
changing continuously.**



# Forces that drive changes in the forest:

## 1) Climatic Conditions:

From Ice Age to present temperate condition:  
13,000 to 14,000 years.





# Forces that drive changes in the forest:

## 2) Periodic Extreme Weather Events:

**Ice Storms**

**Droughts**

**Wind**

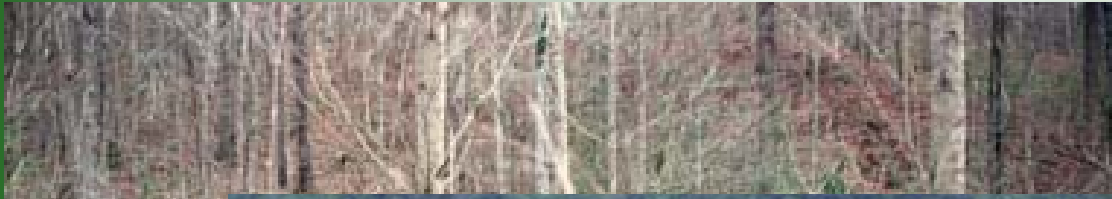
**Hurricanes**

**Tornadoes**



# Forces that drive changes in the forest:

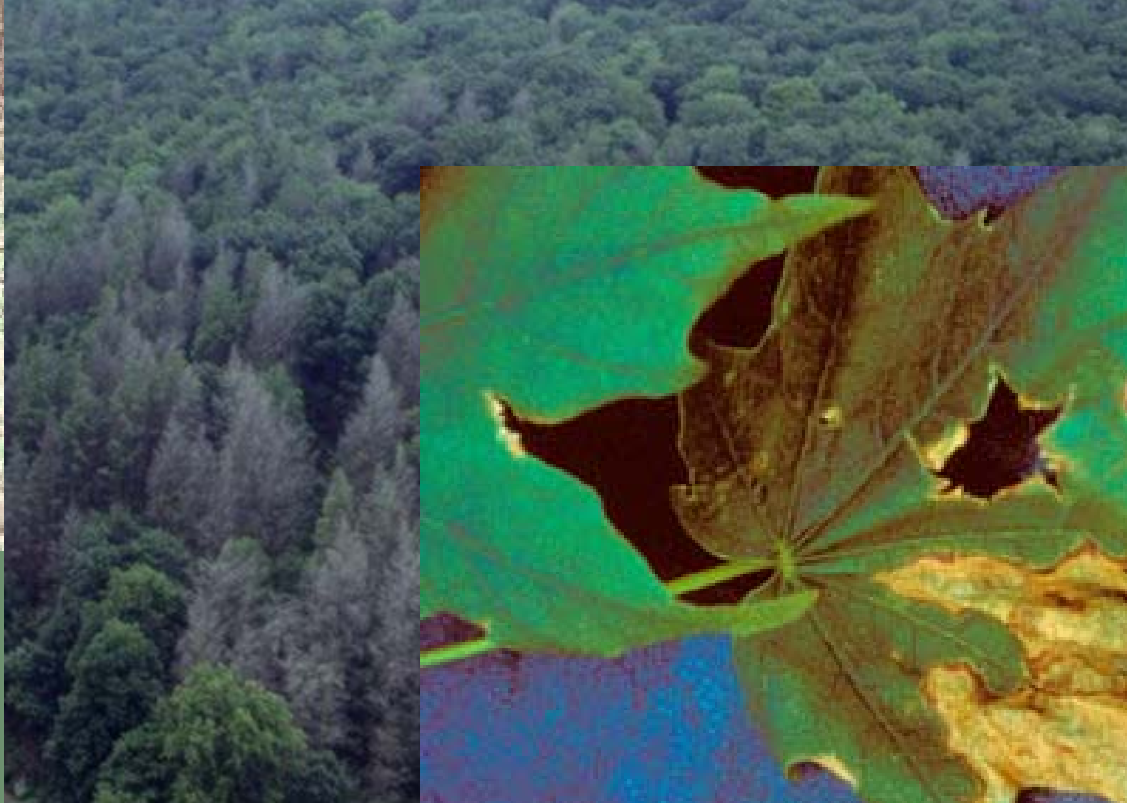
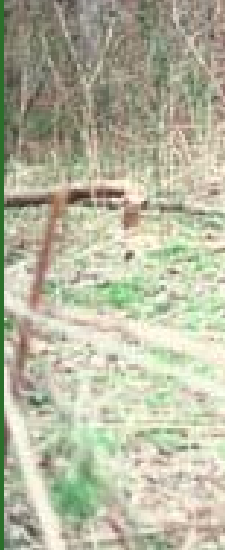
## 3) Biotic Impacts:



**Wildlife (Beaver, Deer)**

**Insects**

**Diseases**



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# **Forces that drive changes in the forest:**

## **4) Human Impacts:**

**Human arrival to New England:**

**10,000 years Before Present (B.P.)**

**Fire was used extensively for habitat manipulation**

**Native American Agriculture begins 1,000 years B.P.**





# The Northeast Landscape

**Widespread clearing for agriculture  
by Europeans 150 years B.P.**





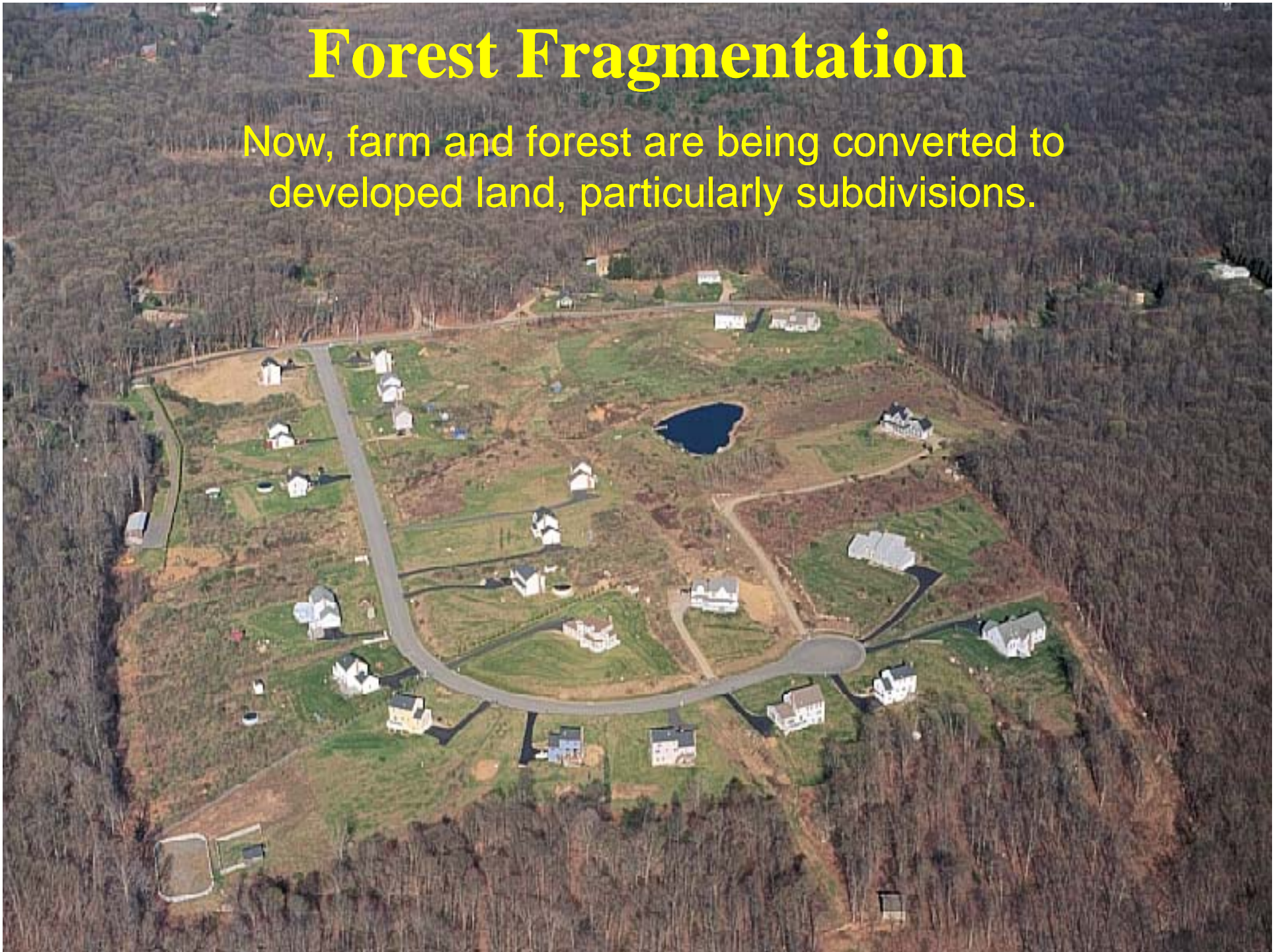
# Harvesting & Over Harvesting





# Forest Fragmentation

Now, farm and forest are being converted to developed land, particularly subdivisions.





# Fragmenting the Forest Landscape

**Reduces economic  
benefits of forest**

**Reduces wildlife habitat  
and biodiversity**

**Reduces recreational  
opportunities**

**Compromises  
clean air and water**





# Non-native Invasive Species and Forest Health



# **"The Tens Rule"**

**10% of Introduced Species Escape!**

**10% of the Escaped Species Become Established!**

**10% of the Established Species Become Invasive!**

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# Time Lag Phenomenon

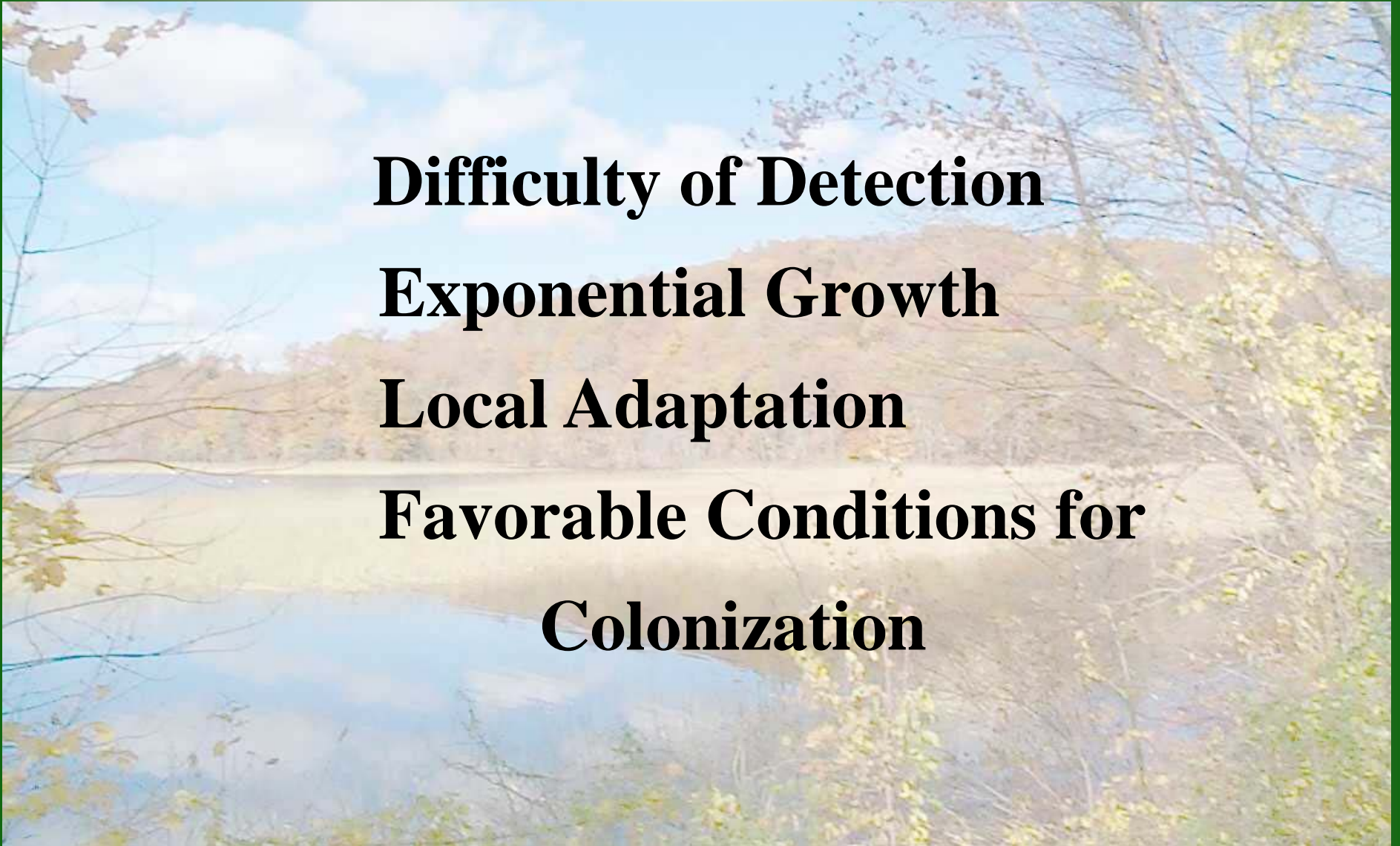
**Difficulty of Detection**

**Exponential Growth**

**Local Adaptation**

**Favorable Conditions for**

**Colonization**



**“Non-Native Invasive Insects and Diseases have had a Major Impact on Forest Health and Composition”**



**Chestnut Blight:** Entered the US from Japan in 1876 on ornamental Japanese Chestnut trees. First discovered at the Bronx Zoo in 1904.



# Gypsy Moth:

**Imported from France and accidentally released in Medford Mass. in 1869. First discovered in Connecticut in 1905.**





# Gypsy Moth:

Effects can be widespread.



# Gypsy Moth:

**Fungal and Viral diseases have  
Biological controls do exist. became important control  
mechanisms!**





## **Dutch Elm Disease:**

**an Asian fungus that was  
accidentally imported into  
the US in the 1930's.**









## **Hemlock Woolly Adelgid:**

**Originated in Japan and first appeared in Virginia in 1921 discovered in Connecticut in 1985.**







## **Hemlock Woolly Adelgid:**

**Beetles from Japan and China are being imported to help control adelgids.**

**Are we creating another problem?**



## **"Non-Native Pest Alert"**

**Asian Longhorn Beetle**

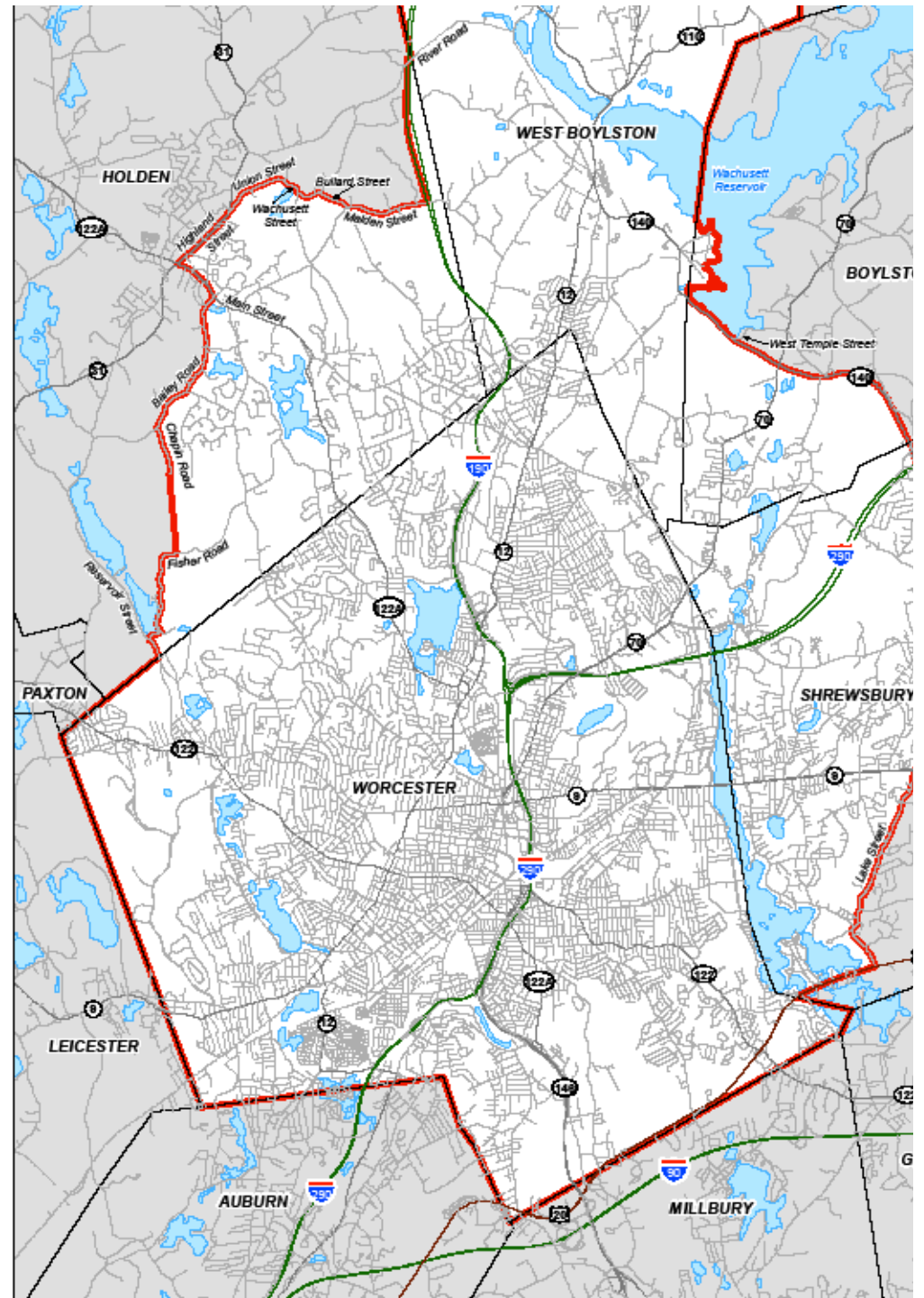
**discovered in Brooklyn and Amityville, N.Y. in 1996.**





# HISTORY

- 1996 Brooklyn, Bronx, Queens & L.I. New York
- 1998 Chicago, Illinois
- 2002 Jersey City, New Jersey
- 2003 Ontario, Canada
- 2004 Carteret, New Jersey
- 2007 Staten Island & Manhattan, N.Y.
- 2008 Worcester, Massachusetts
- 2010 Boston, Massachusetts







China, Korea, & Taiwan



# FAVORED HOST TREES

- Maples
- Horsechestnuts
- Birches
- Willows
- Elms
- Poplars
- Sycamores





## **"Non-Native Pest Alert"**

**Smaller Japanese Cedar Longhorn Beetle  
discovered in Milford, Connecticut in 1998.**





# **"Non-Native Pest Alert"**

**Emerald Ash Borer**  
**discovered in Michigan in 2002.**





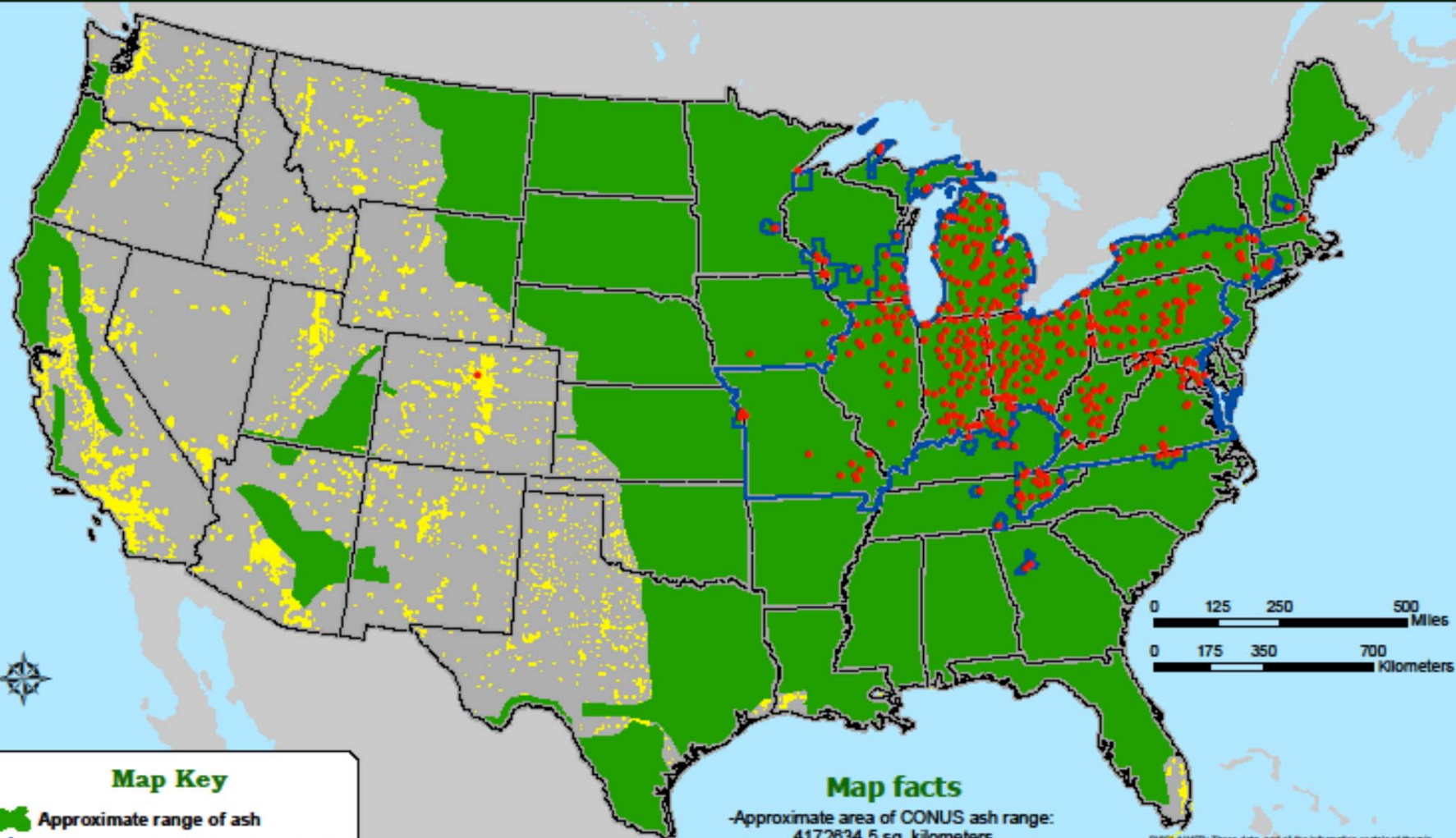


United States  
Department of  
Agriculture

# Cooperative Emerald Ash Borer Project

Approximate range of ash species in the Contiguous U.S.  
with EAB positives and Federal quarantines

January 2, 2013



## Map Key

- Approximate range of ash
- Federal EAB quarantine boundaries
- Potential urban ash locations
- Initial county EAB detection

Map ash ranges reproduced from  
USDA Forest Service source map

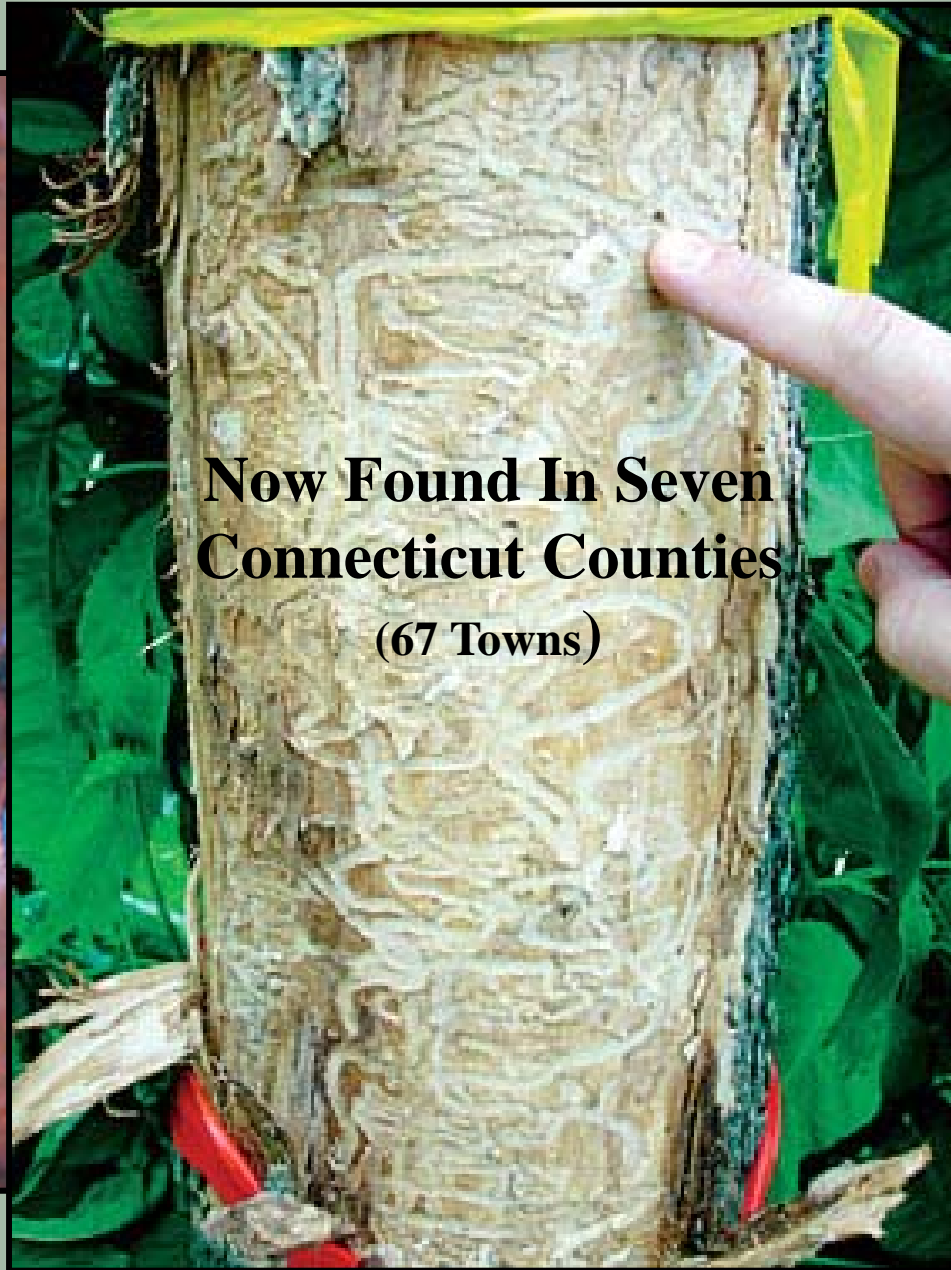
## Map facts

- Approximate area of CONUS ash range:  
4172634.5 sq. kilometers
- Area of U.S. Federal quarantine:  
1133262 sq. kilometers
- Total area of counties where EAB is present:  
655658 sq. kilometers

DISCLAIMER: These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act (18 U.S.C. 1905), the Privacy Act of 1974, as amended (5 U.S.C. 552a), the Freedom of Information Act (5 U.S.C. 552), the confidentiality provisions of the Food Security Act of 1985 (7 U.S.C. 2276), Section 1019 of the Food, Conservation, and Energy Act of 2008 (7 U.S.C. 6791), and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

# "Non-Native Pest Alert"

**Now Found In Seven  
Connecticut Counties  
(67 Towns)**











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# DON'T MOVE FIREWOOD

Our forests are threatened by nonnative insects that can kill large numbers of trees. Three recently introduced insects—emerald ash borer, Asian longhorned beetle, and Sirex woodwasp—are wood-infesting species that can be transported long distances in firewood. Once transported into new areas, these insects can become established and kill local trees. We must **STOP THE SPREAD** of these insects and protect our forests and trees.

## How you can help:

- Leave firewood at home—do not transport it to campgrounds or parks.
- Use firewood from local sources.
- If you have moved firewood, burn all of it before leaving your campsite.



Inset photo: Asian longhorned beetle larva (courtesy of Thomas B. Denholm, New Jersey Dept. of Agriculture; [www.forestryimages.org](http://www.forestryimages.org))

# HELP STOP INVASIVE PESTS

For more information, visit the following Web sites:  
[www.emeraldashborer.info](http://www.emeraldashborer.info)  
[www.na.fs.fed.us/fhp](http://www.na.fs.fed.us/fhp)  
[www.aphis.usda.gov/ppq/ep](http://www.aphis.usda.gov/ppq/ep)



USDA Forest Service  
Northeastern Area  
State and Private Forestry  
NA-PR-02-06  
April 2006  
[www.na.fs.fed.us](http://www.na.fs.fed.us)

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# **"Non-Native Pest Alert"**

## **Asian Gypsy Moth**



## **"Non-Native Pest Alert"**

**Ramorum Blight formally known as “Sudden Oak Death”  
first reported in California in 1995.**





# **Non-Native Invasive Plants and the Forest Ecosystem**

## **Why be concerned?**

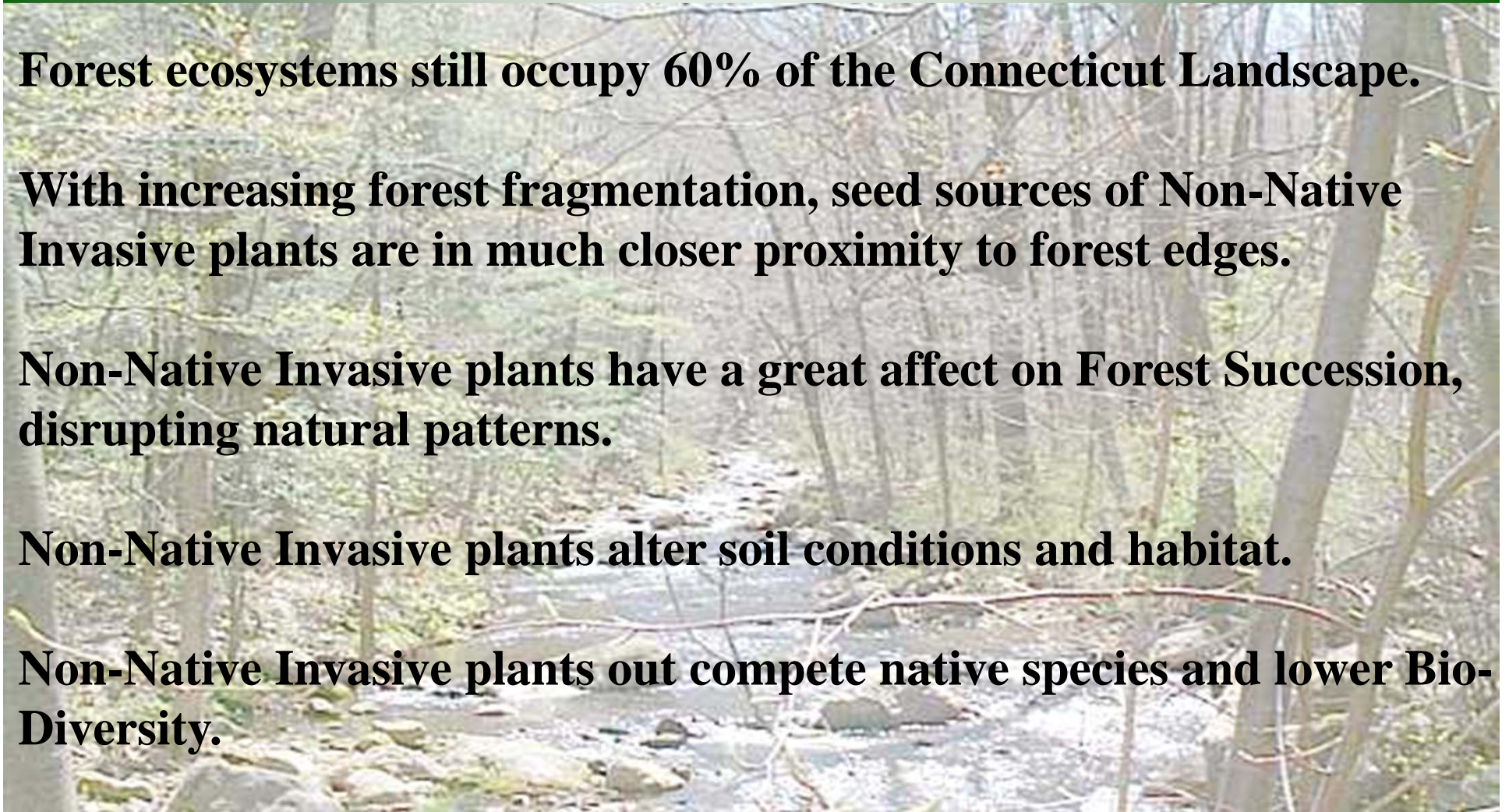
**Forest ecosystems still occupy 60% of the Connecticut Landscape.**

**With increasing forest fragmentation, seed sources of Non-Native Invasive plants are in much closer proximity to forest edges.**

**Non-Native Invasive plants have a great affect on Forest Succession, disrupting natural patterns.**

**Non-Native Invasive plants alter soil conditions and habitat.**

**Non-Native Invasive plants out compete native species and lower Bio-Diversity.**





# Examples of Non-Native Invasive plant species that adversely affect Forest Ecosystems include:

Tree-of-Heaven

Norway Maple

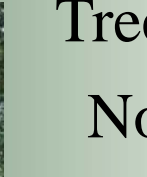
Black Locust

Multiflora Rose

Asiatic Bittersweet

Japanese Barberry

Autumn Olive







## Strategies Include:

**Eradication... New or very localized infestations**

**Control... Established populations**

**Management... Well-established populations**



# Carving Up the Landscape





**INVASIVE?**

