2024 Chautauqua County Envirothon

Forestry

by:

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Northern Hardwood Forest - 1700

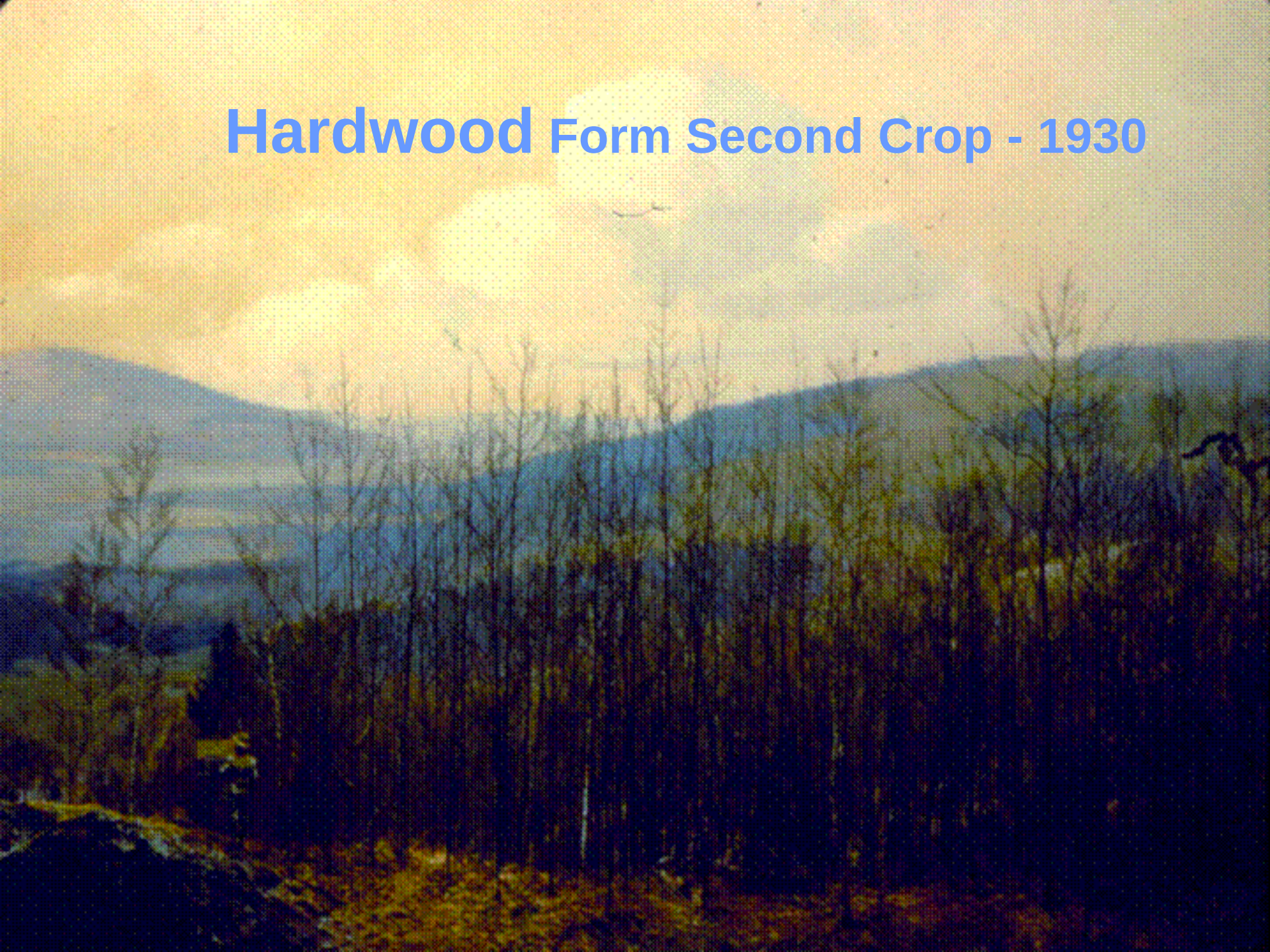

Pioneer Subsistence Farming – 1740

Height of Intensive Farming - 1830

Intensive Farming Abandoned - 1850

First Crop of Old-Field White Pine - 1910


Volunteer Hardwood Regeneration - 1915

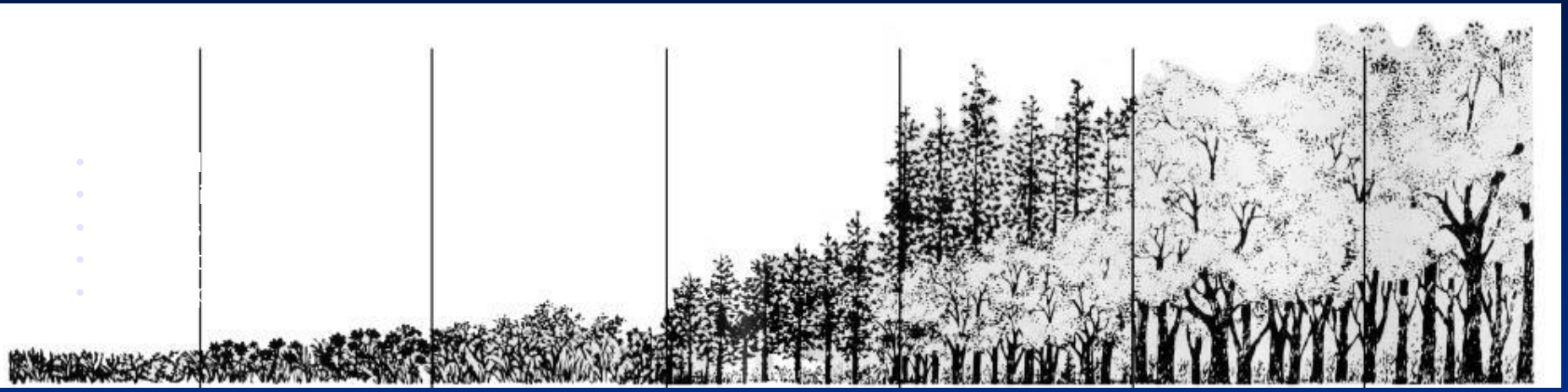

Hardwood Form Second Crop - 1930

1870

Protts Hill,
Newfield, NY

1970

Succession in The North East



1st year Low-growing annual grasses and forbs (ragweed, horseweed & crabgrass, many non-native weeds).

2nd to 5th year Perennial grasses and forbs (asters, goldenrods, Queen Anne.s lace, knapweed and many others).

3rd to 10th year Woody shrubs and shade intolerant tree seedlings invade among perennial herbs and grasses (blackberries & other Rubus species, sumacs, greenbrier)

10th to 20th year Pioneer tree saplings form thickets (Red cedar, pines, locust, aspen or cherries depending on site).

20th to 70th year Short-lived pioneer species gradually replaced by taller and longer lived trees (Tulip tree, ash, Red maple, Black birch, Black gum).

70th to 100+ years. Canopy dominated by long-lived hardwoods (mixed oaks, hickories, maples). Understory of shade tolerant species

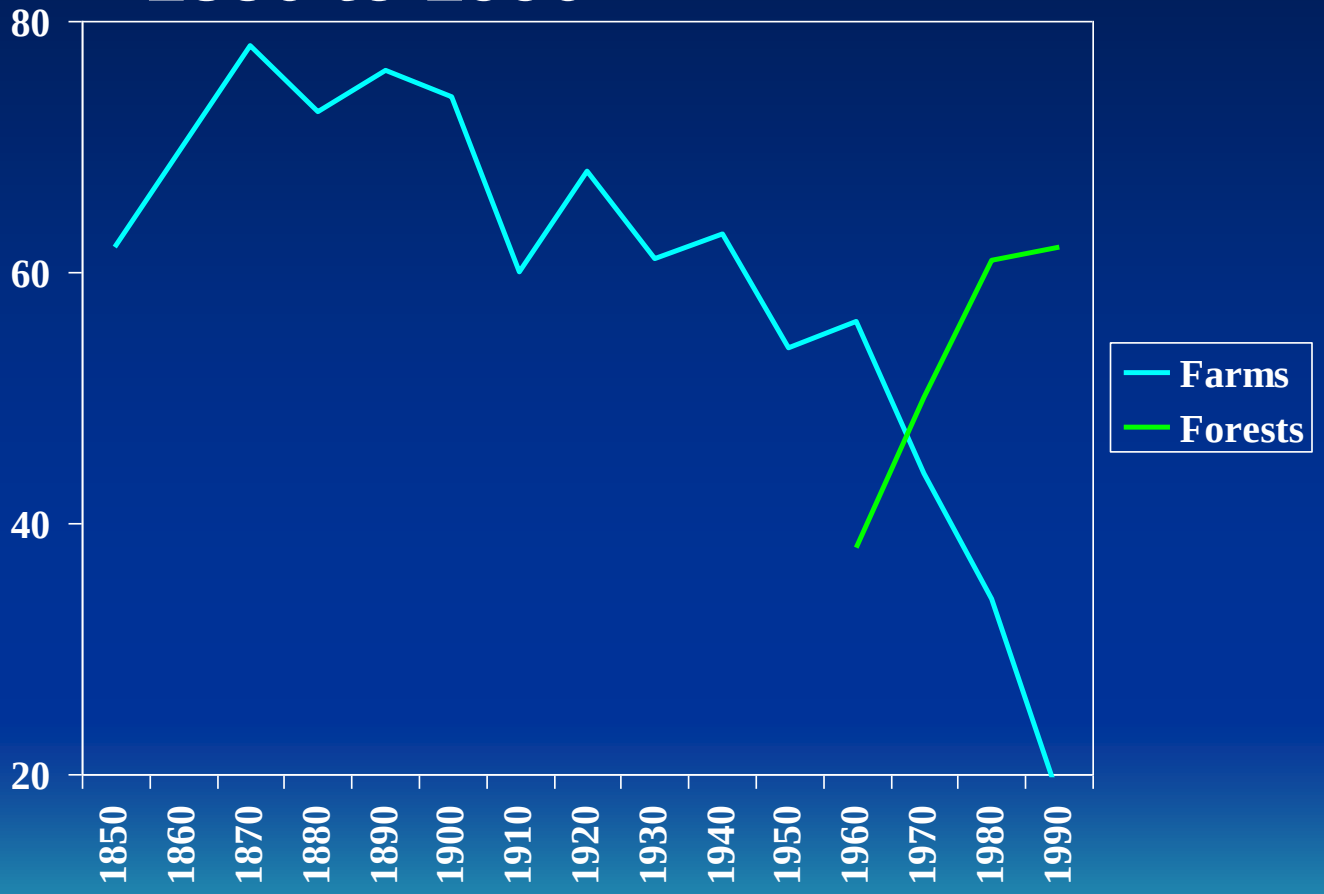
Until the next disturbance Shade tolerant species dominate the canopy and understory (hemlock, sugar maple, beech).

Pioneer Shade-intolerant Species
Which Species of herbs, shrubs and trees dominate depends on location, site history, soil moisture, topography and circumstance.

Moderately Shade Tolerant Species
Canopy trees are all about the same age (± 20years)

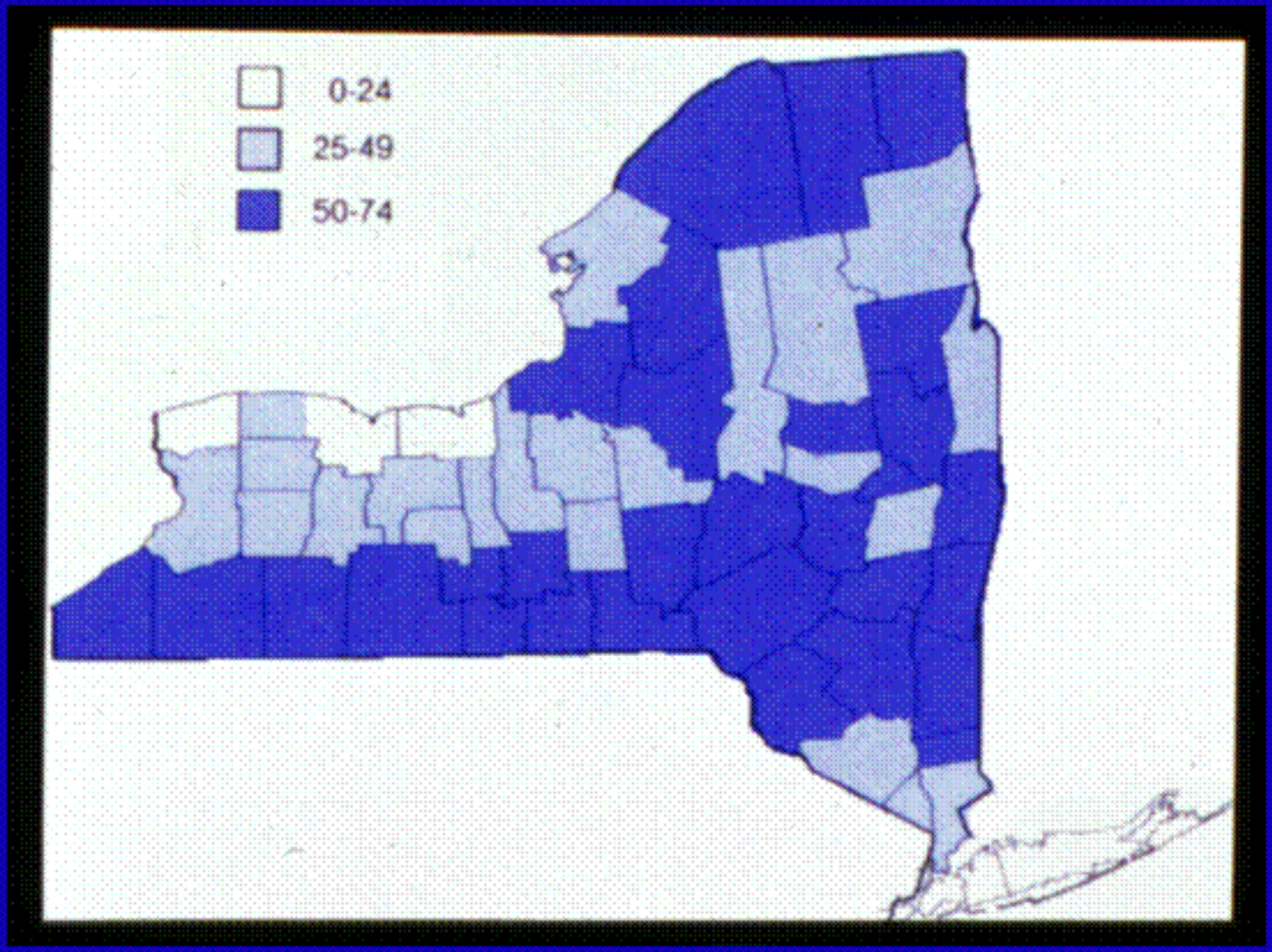
Shade Tolerant species
Gaps from dying trees lead to an uneven age canopy.

Percent of New York State in Farm and Forest, 1850 to 1990




County Boundary for New York State
Forest Patch Size > 5 acres

Commercial Timberland in NY (%)



Tree Identification

- Sugar (Hard) Maple
  - (Acer saccharum)

- Red (Soft) Maple
  - (Acer rubrum)

- Red Oak
  - (Quercus rubra)

- White Oak
  - (Quercus alba)

- Hemlock
  - (Tsuga canadensis)

- White Pine
  - (Pinus strobus)

- White Ash
  - (Fraxinus americana)

- Quaking Aspen
  - (Populus tremuloides)

- Black Cherry
  - (Prunus serotina)

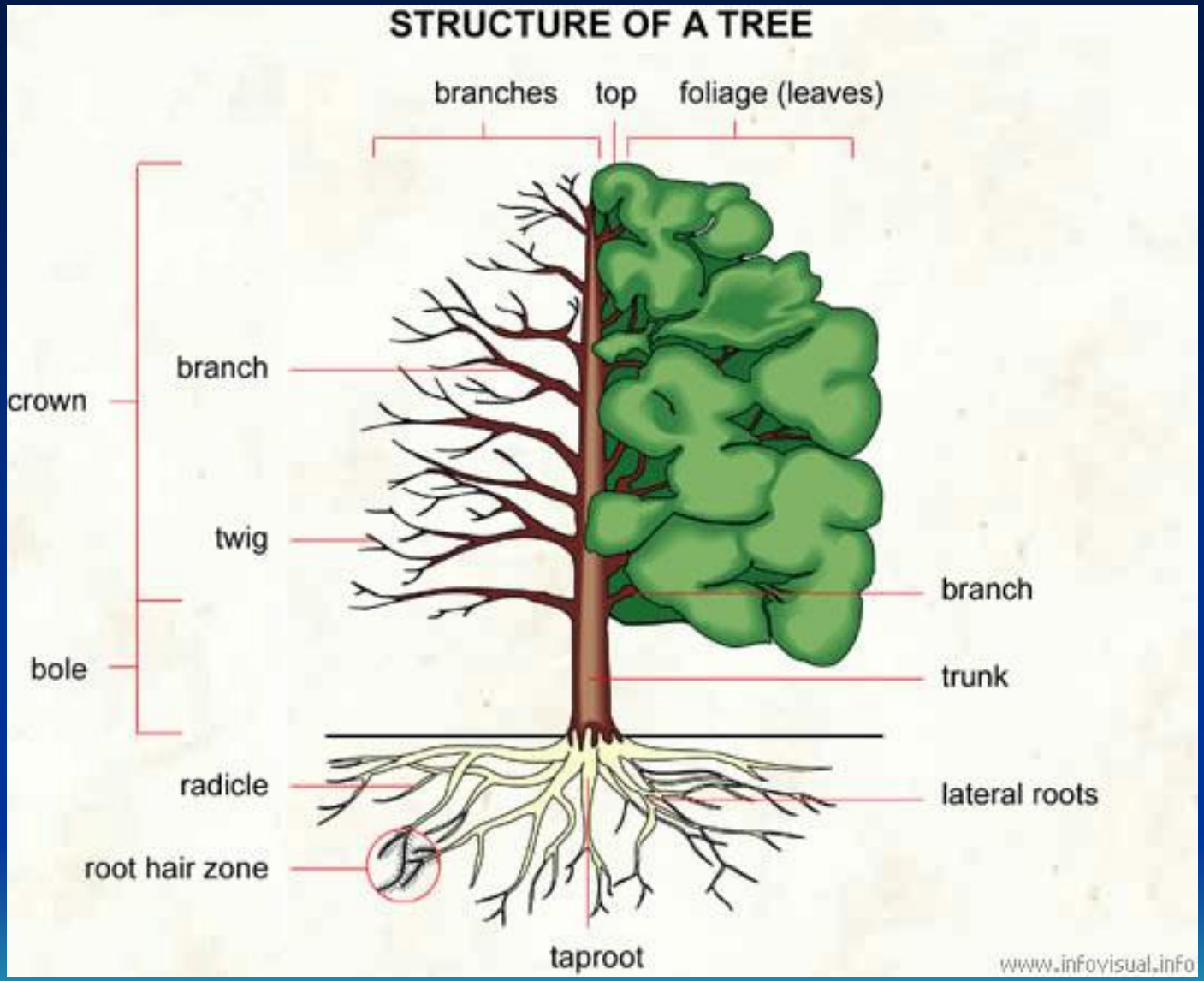
- Black Birch
  - (Betula Alleghaniensis)

- Amercian Beech
  - (Fagus grandifolia)

- Yellow Birch
  - (Betula alleghaniensis)

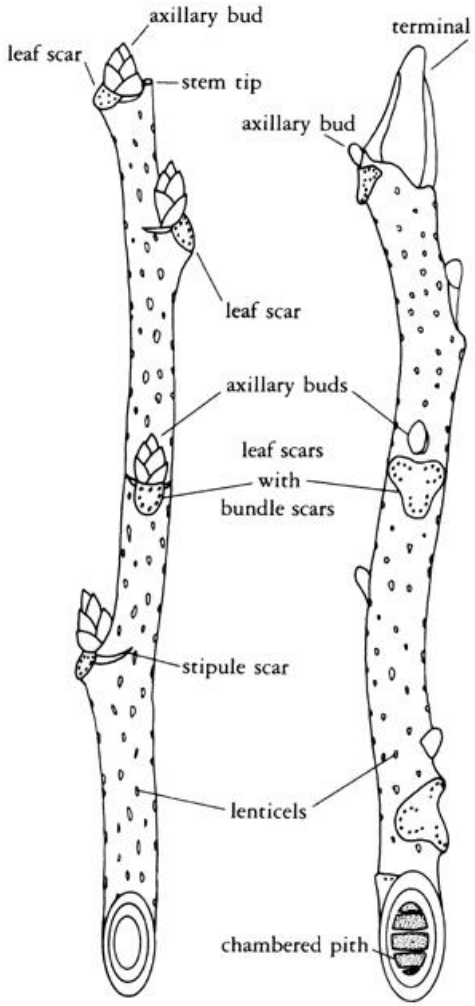
- Shagbark Hickory
  - (Carya ovata)

- Bitternut Hickory
  - (Carya cordiformis)


STRUCTURE OF A TREE
branches
top
foliage (leaves)
crown
branch
twig
bole
radicle
root hair zone
branch
trunk
lateral roots
taproot
www.infovisual.info

Vegetative Structures

DORMANT TWIGS



PITH FEATURES

continuous, diaphragmed

5-angled

triangled

circular

Ecosystem

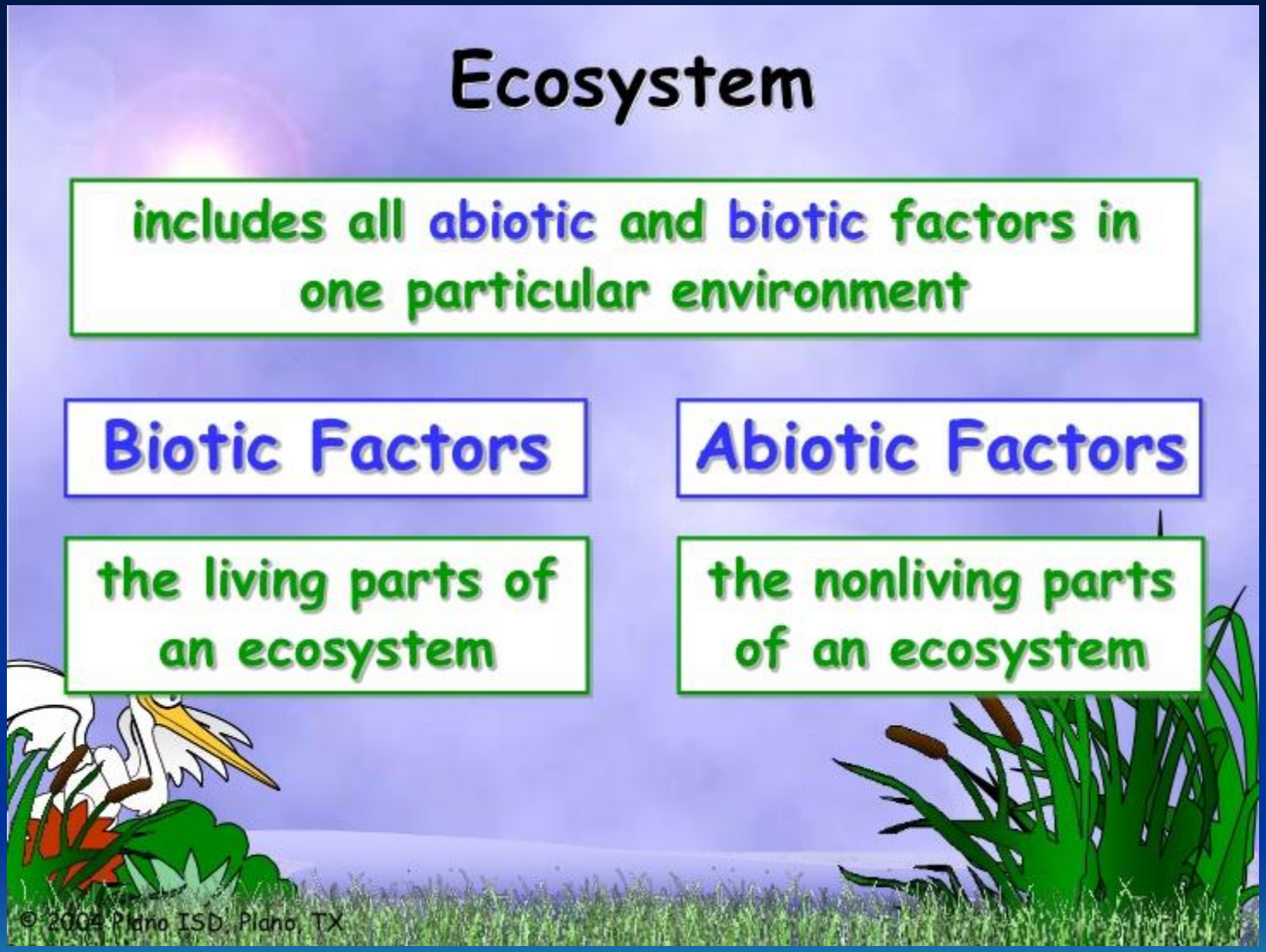
includes all abiotic and biotic factors in one particular environment

Biotic Factors

the living parts of an ecosystem

Abiotic Factors

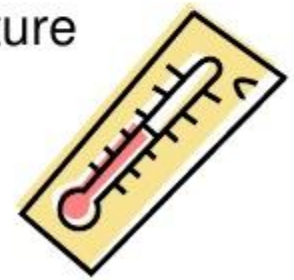
the nonliving parts of an ecosystem



Biotic vs. Abiotic Factors

- Living
- Examples
  - Plants
  - Animals
  - Fungi
  - Bacteria

- Non-Living
- Examples
  - Water
  - Sunlight
  - Soil
  - Air
  - Temperature

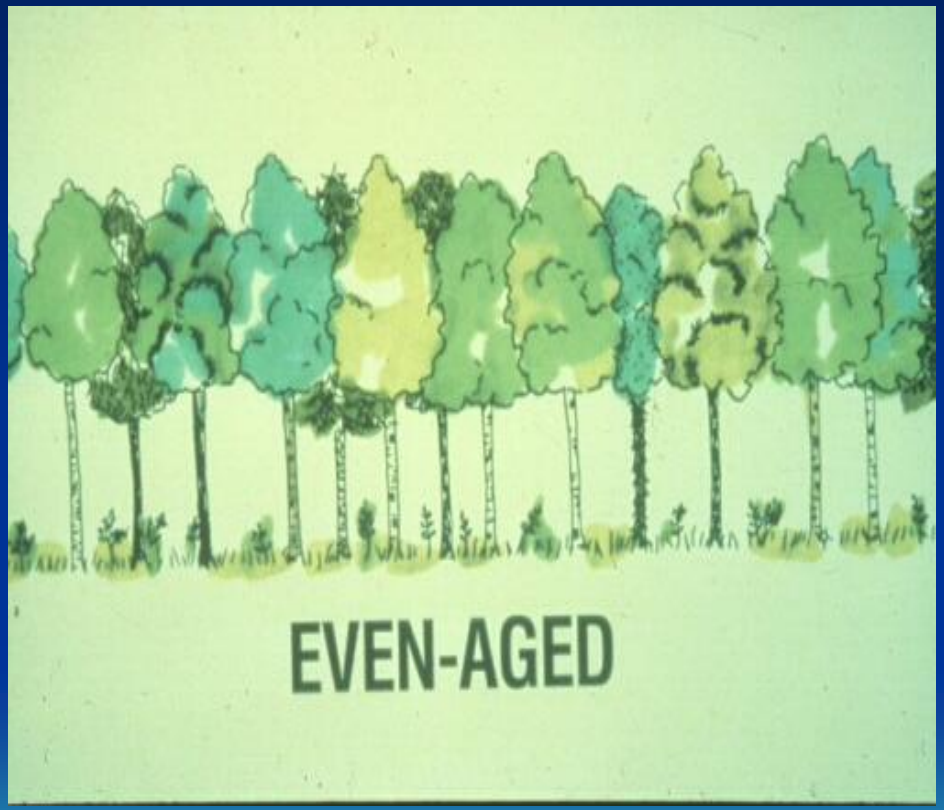


Silviculture & Forest Management

Even Aged vs. Uneven Aged

Even-aged Forests

Forests which are composed of stands in which all the trees in a stand are roughly (within about 20 years) the same age.



Even Aged Stands

Most stands in New York State are even-aged

Abandoned farmlands provided the source for many of the forests we operate in today.

The size of the tree does not determine the age:

- A larger tree is not necessarily an older tree
- A significantly smaller tree may only be a couple of years younger, not a couple of decades

Even Aged Stand

Hancock Timberlands: Cattaraugus Co., t/o Kill Buck.

Note the flagging on either side of the trail

Tree on right side of trail

94 years old – 15” stump diameter

Tree on left side of trail

97 years old – 38” stump diameter

Even Aged Methods

Shade intolerants

- Oak
- Ash
- Cherry

- Harvest Systems
  - Clear cuts
  - Shelter wood
  - Seed Tree

Clearcutting

Trees larger than one or two inches in diameter are generally removed from a site at one time. Some trees will be left within the area to serve wildlife, soil, water, and visual needs. Examples include snags, den trees, and streamside management zones.

Young Forest Initiative

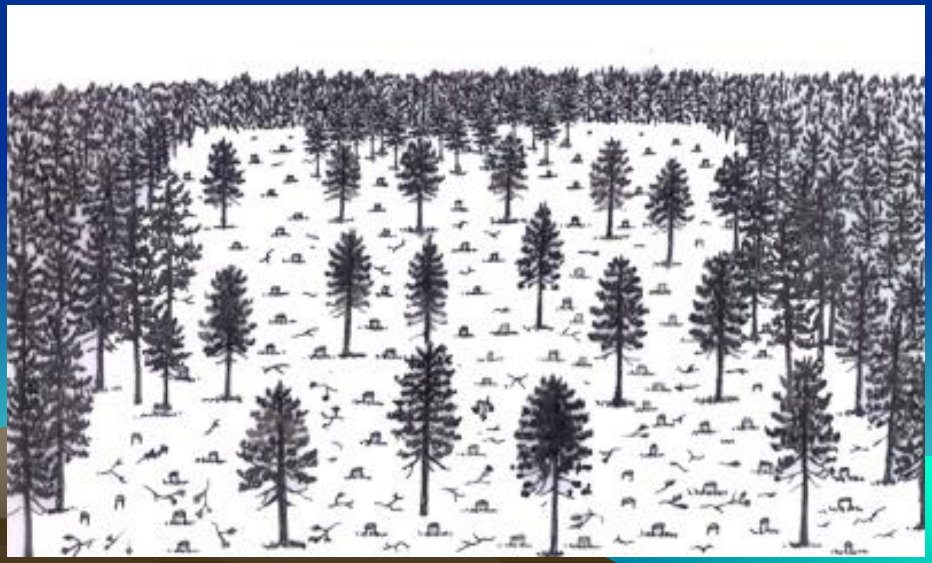
Clearcut

Shelterwood

- Several cuts over a period of up to 10 years
  - Remove over-mature and high-risk trees
  - Create uniform openings in canopy
    - Create favorable conditions for desired species to regenerate
    - Hold second cut for good seed year
  - Overstory removal once seedling regeneration is established

Seed Tree

Most of the trees are removed in one cut, leaving 12 to 15 well-spaced, good seed-producing trees per acre. When needs of other resources are present, such as visual or wildlife, the trees may be left for a longer period or permanently.



Harvest Systems – Even Aged

- Advantages
  - Favors high value, fast growing species
  - Reduces damage to residual stand
  - Lower logging costs
- Disadvantages
  - Unsightly
  - Possible regeneration failure
  - 60-90 years between major harvests

Uneven-aged Forests

Forests that are comprised of stands in which each stand may have three or more well defined age classes

Uneven-aged Methods

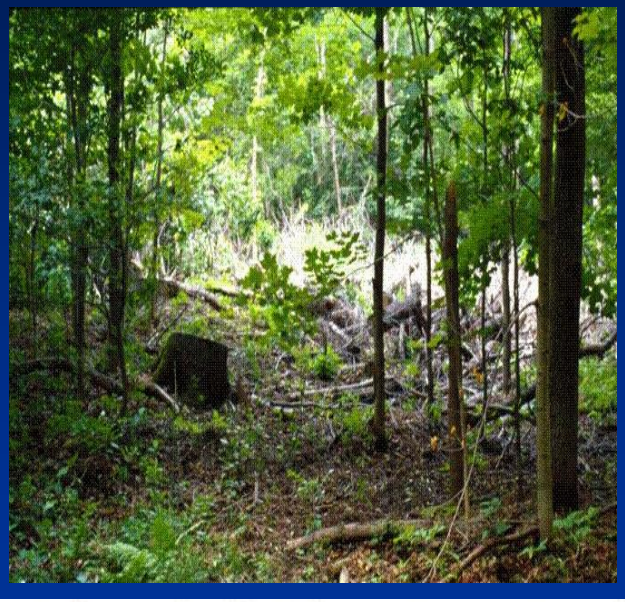
- Single Tree Selection
- Group Selection

Trees Selected Based on:

- Species
- Quality
- Health
- Spacing
- Diameter

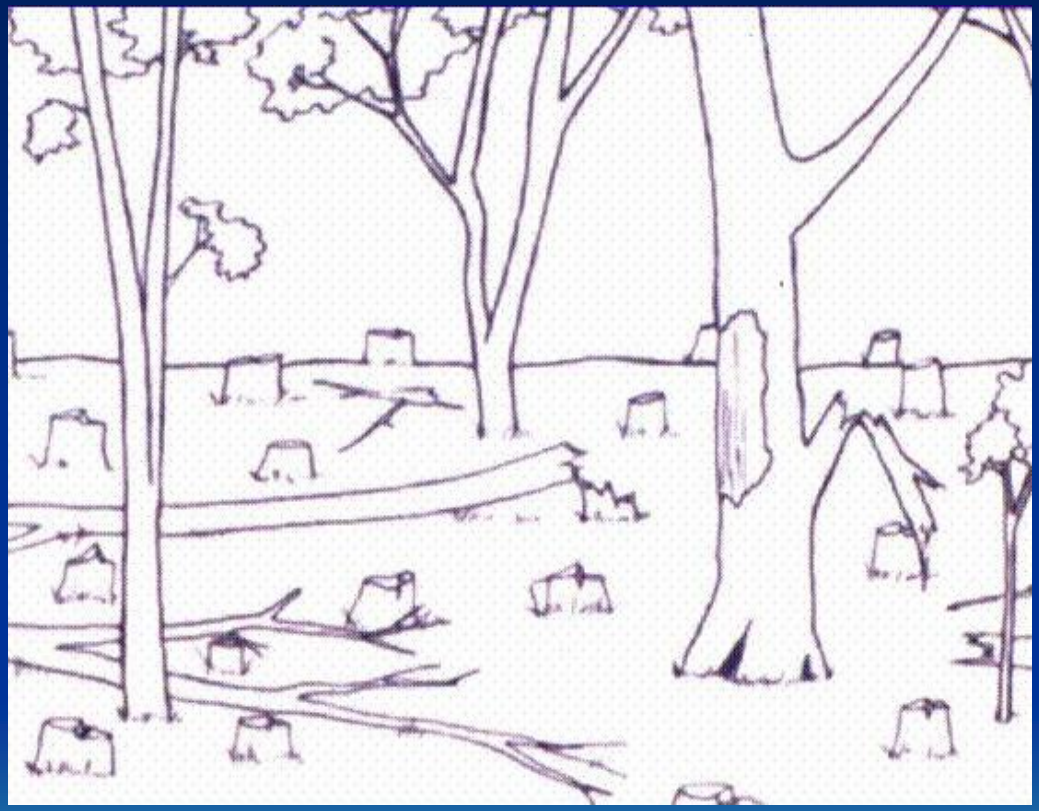
Group Selection

Small groups of trees are cut in ¼ to two acres sizes. This creates larger openings for regeneration of trees that require partial sunlight.



High-Grading

High-Grading removes all but the poorest quality trees, thereby greatly reducing the future timber value of a woodlot.

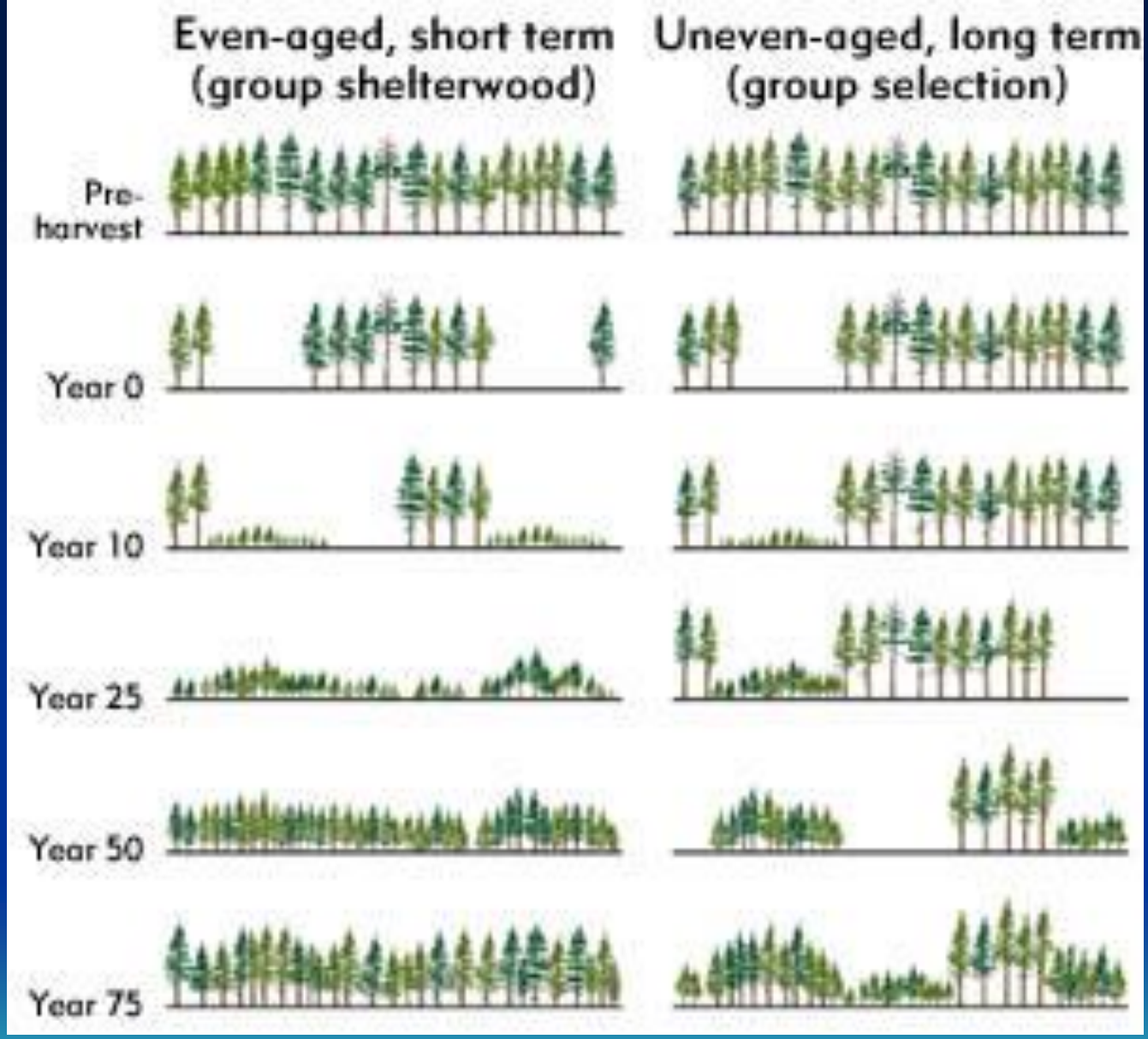


Impacts of Diameter-Limit Cutting

- Removes high value trees
- Concentrates growth on low quality trees
- Loss of control of stand density, and spacing
- Maximizes immediate $ yield
- Decreases long-term $ yield

Harvest System - Uneven aged

- Advantages
  - Continuous forest cover
  - Frequent sales
  - Practical for small landowners
- Disadvantages
  - Damage to residual trees
  - Encourages slower growing trees
  - Higher mgt. Costs


Even-aged, short term
(group shelterwood)
Uneven-aged, long term
(group selection)
Pre-harvest
Year 0
Year 10
Year 25
Year 50
Year 75

Measurements cont.

- DBH = Diameter @ breast height (4.5 feet off ground)
  - Measured with a Biltmore Stick or Diameter tape.

Name _____

HOW TO USE A BILTMORE STICK
FOR DETERMINING TREE DIAMETER

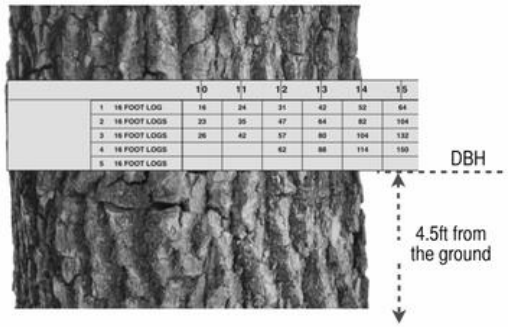
Determine the Diameter of the Tree

Diameters are taken at 4 ½ feet from the ground. *(If a tree is on a slope, stand on the uphill side to measure diameter.)* **This is known as "DBH" (Diameter Base Height).**

Step 1: Hold the side of the stick with the Tree Scale on it **perpendicular** to the tree and **25 inches from your eye**.

Step 2: Line the left edge of the stick up to the left edge of the tree. Then use only your eyes to look at the measurement on the right side. **Keep your head still.**

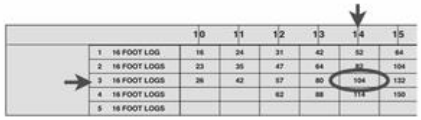
Step 3: Tree diameters are measured in inches. Round up or down to the **nearest whole inch** to get the recorded diameter of the tree.



Determine the Board Foot Volume of the Tree

Use the Tree Scale on the Biltmore stick or a separate Log Rule Table to determine the volume of timber in board feet.

Start on the column with the tree diameter and then read down to the row with the correct number of logs.



DOYLE LOG RULE

DBH	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
10	16	20	23	24	26				
11	24	30	35	38	42				
12	31	39	47	52	57	60	62		
13	42	53	64	72	80	84	88		
14	52	67	82	93	104	109	114		
15	64	84	104	118	132	141	150		
16	77	101	125	143	161	174	186		
17	92	122	152	175	198	214	230		
18	108	144	179	206	234	254	273		
19	126	168	210	244	278	301	324		
20	144	193	242	282	321	348	374	396	417
21	164	221	278	324	370	403	436	462	489
22	185	250	315	368	420	458	497	529	561
23	208	282	356	417	478	521	564	604	643
24	231	314	397	466	536	583	630	678	725
25	256	350	443	522	600	655	710	764	818
26	282	386	489	576	663	727	791	852	912
27	310	425	540	638	735	806	877	946	1015
28	339	466	592	700	807	885	963	1040	1118
29	370	509	648	766	884	970	1056	1144	1232
30	400	552	703	832	961	1055	1149	1248	1346

Measurements cont.

- Tree height – measured to a 10” top or major fork

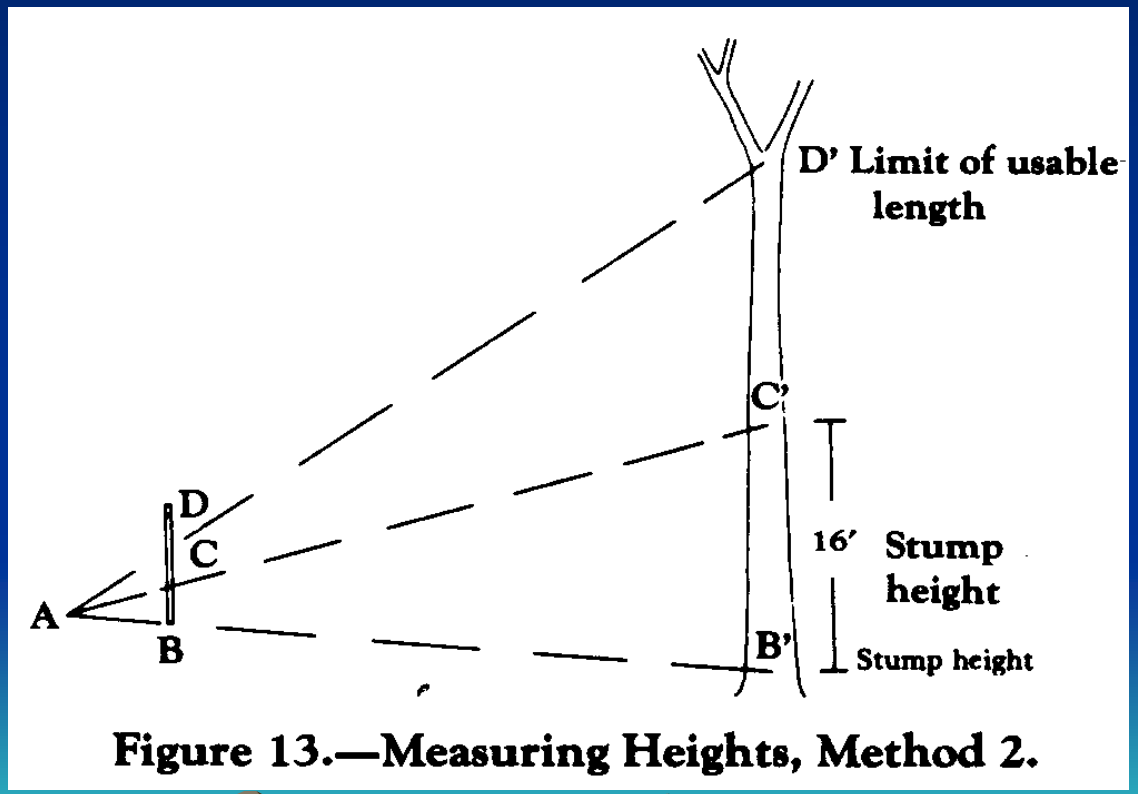


Figure 13.—Measuring Heights, Method 2.

Measurements cont.

Formula for Volume

Diameter of tree x # of 16 foot logs = Volume in board feet

Formula for Standard Cords

4’x4’x8’ = 128 cubic feet

Measurements cont.

- Chain = A unit of length equal to 66’ and composed of 100 links.

- Rick = Is a pile of evenly stacked cordwood, staves, bolts or other short-length wood

Increment Borer

An **increment borer** is a specialized tool used to extract a section of wood from a living tree with relatively minor injury to the tree.

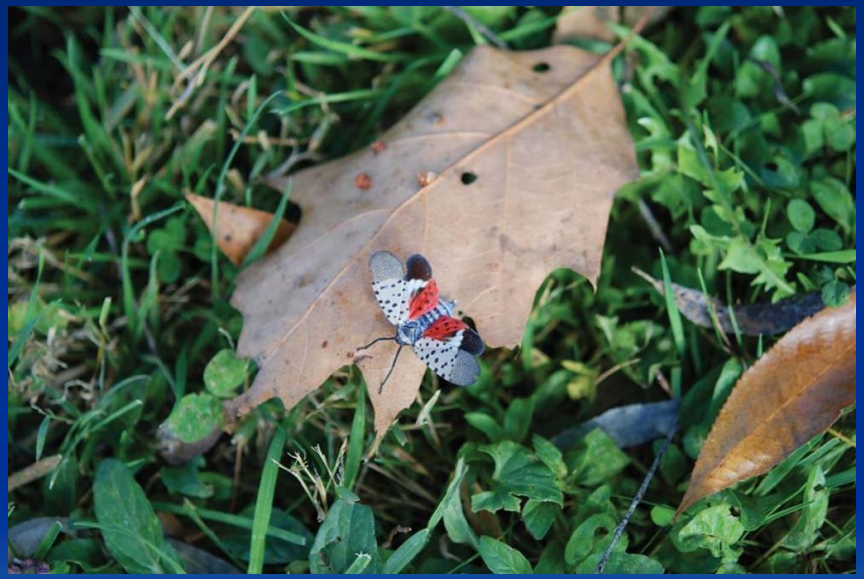
It enables the user to count the rings in the core sample to determine the age of the tree or the growth rate of the tree.

- **A** = The Handle. A metal tube with square slot and clip to allow fixing of the Auger.
- **B** = The Auger. A hardened steel tube with a cutting tip at one end and a square section at the other.
- **C** = The Extractor. A thin steel half-moon blade.

Insects & Diseases

- Defoliators
- Borers
- Bark Beetle
- Foliage Disease
- Root Disease
- Fungal Diseases

Spotted Lantern Fly



Gypsy Moth

Gypsy Moth Defoliation

Gypsy Moth

Pests cont.

E. Tent Caterpillar / Forest Tent Caterpillar

Pests cont.

Spring / Fall
Cankerworm

Pests cont.

White Pine Weevil

Pests cont.

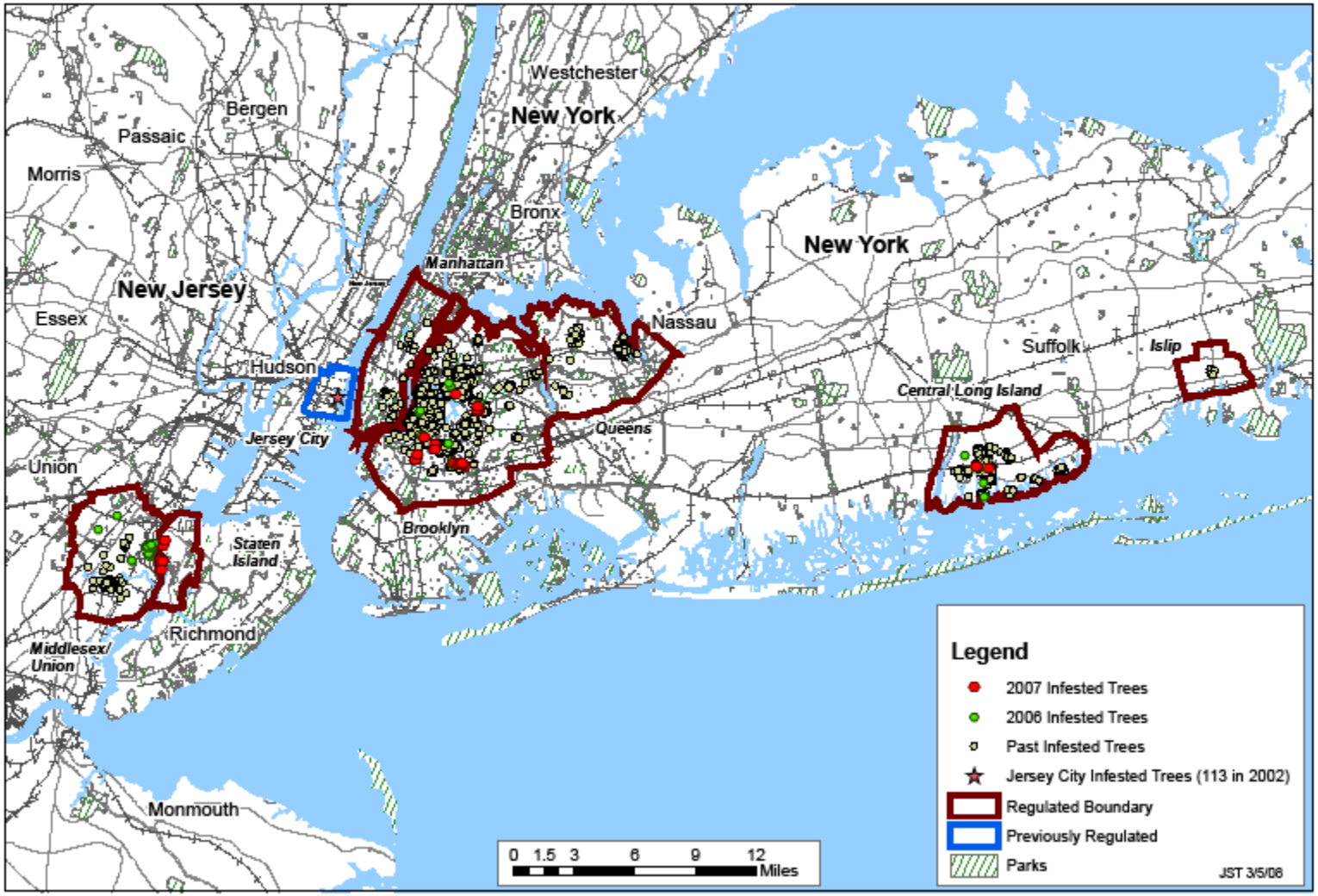
Asian Long horned Beetle

ALB Stages

USDA APHIS

Asian Longhorned Beetle Eradication Program

New York and New Jersey Overview



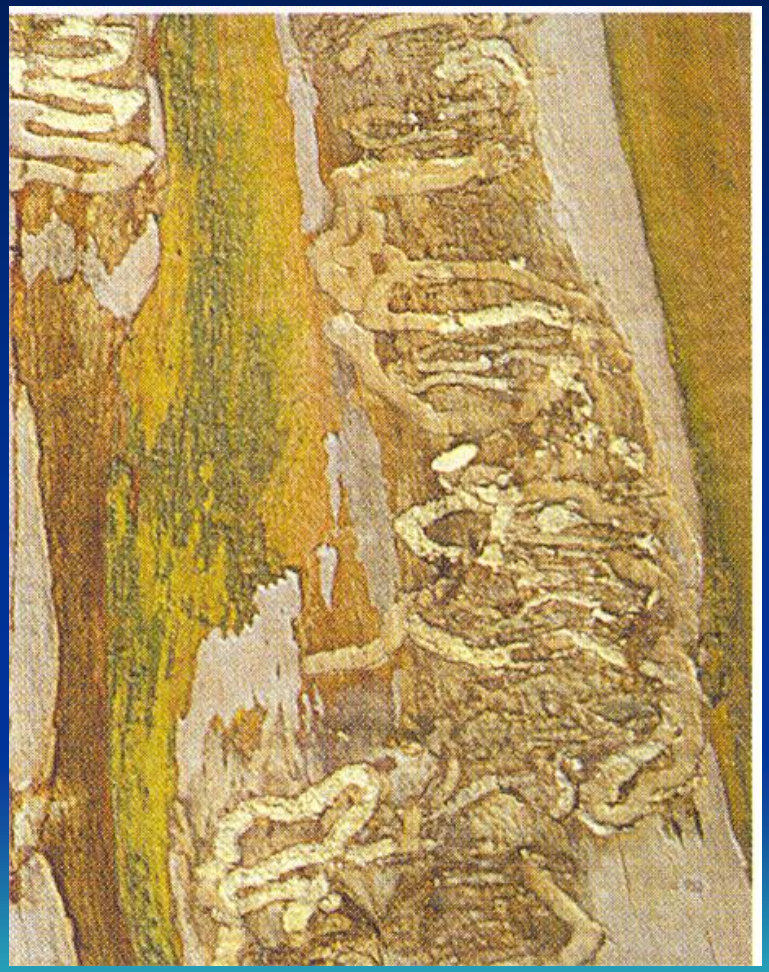
Pests cont.

Hemlock Woolly Adelgid

Pests cont.

Emerald Ash Borer

Emerald Ash Borer Galleries



EAB Woodpeckering

More prevalent on the south side of the tree

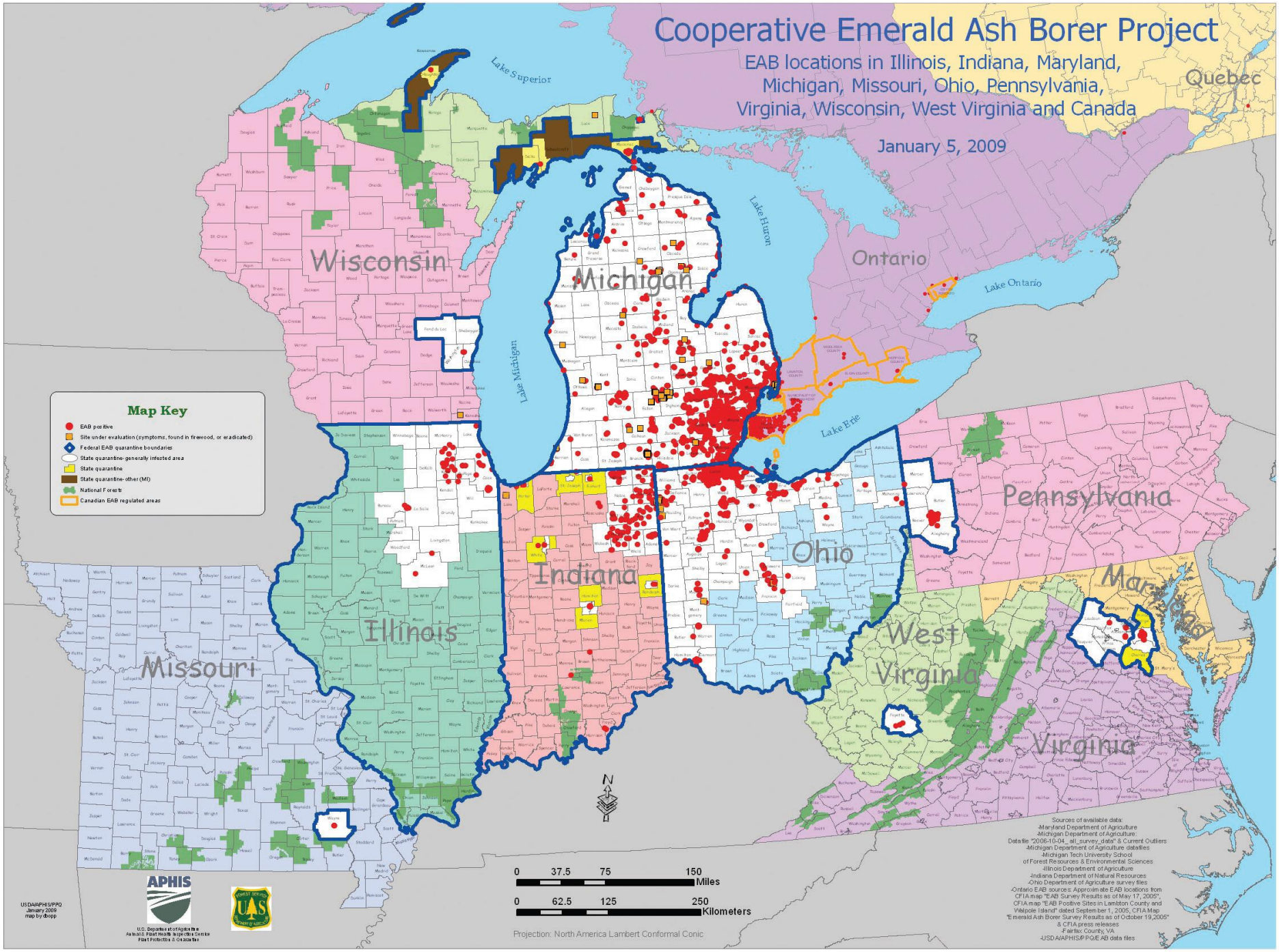
Exit Holes

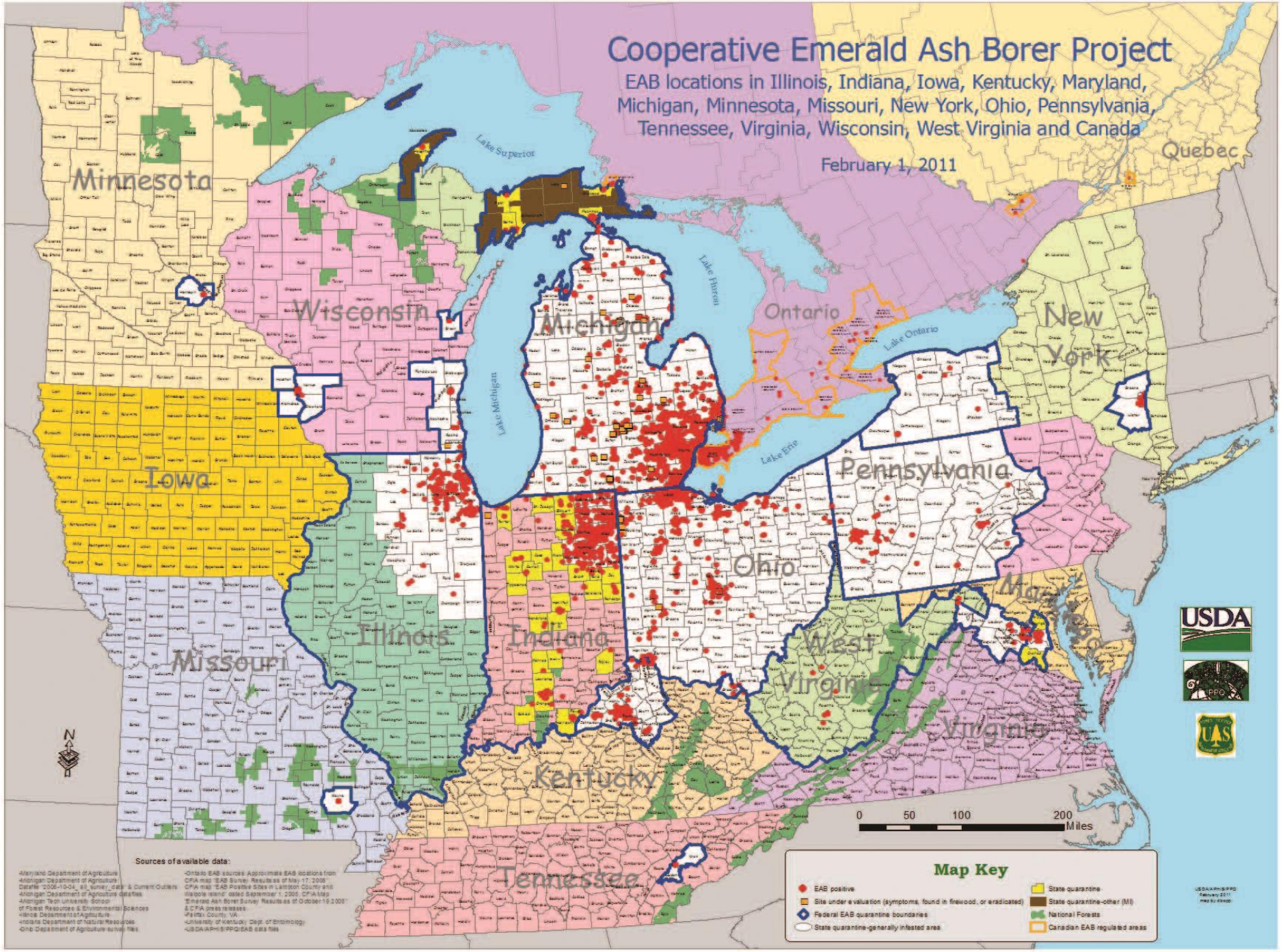
Figure 4. D-shaped exit holes where adult beetles emerged.

Cooperative Emerald Ash Borer Project

EAB locations in Illinois, Indiana, Maryland, Michigan, Missouri, Ohio, Pennsylvania, Virginia, Wisconsin, West Virginia and Canada

January 5, 2009



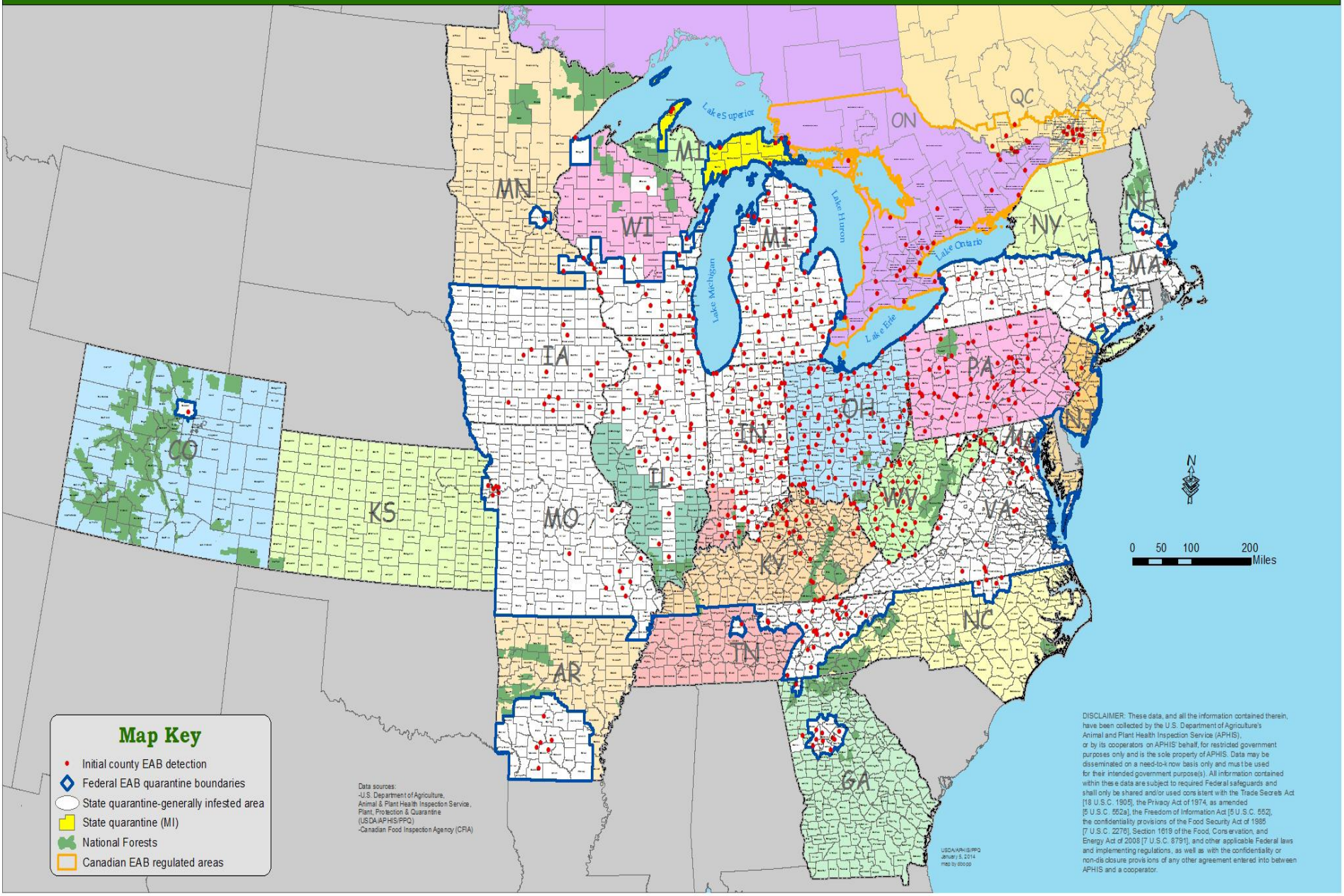

Cooperative Emerald Ash Borer Project
EAB locations in Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin, West Virginia and Canada
February 1, 2011
Minnesota
Wisconsin
Michigan
Iowa
Illinois
Indiana
Ohio
Missouri
Kentucky
Tennessee
Pennsylvania
New York
Ontario
Quebec
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
West Virginia
Virginia
Maryland
N
0 50 100 200 Miles
Sources of available data:
Map Key
EAB positive
Site under evaluation (symptoms, found in firewood, or eradicated)
Federal EAB quarantine boundaries
State quarantine-generally infested area
State quarantine
State quarantine-other (MI)
National Forests
Canadian EAB regulated areas
USDA

USDA United States Department of Agriculture

Cooperative Emerald Ash Borer Project

Initial county EAB detections in North America

January 5, 2015



Map Key

- Initial county EAB detection
- Federal EAB quarantine boundaries
- State quarantine-generally infested area
- State quarantine (MI)
- National Forests
- Canadian EAB regulated areas

Data sources:
-U.S. Department of Agriculture, Animal & Plant Health Inspection Service, Plant, Protection & Quarantine (USDA/APHIS/PPQ)
-Canadian Food Inspection Agency (CFIA)

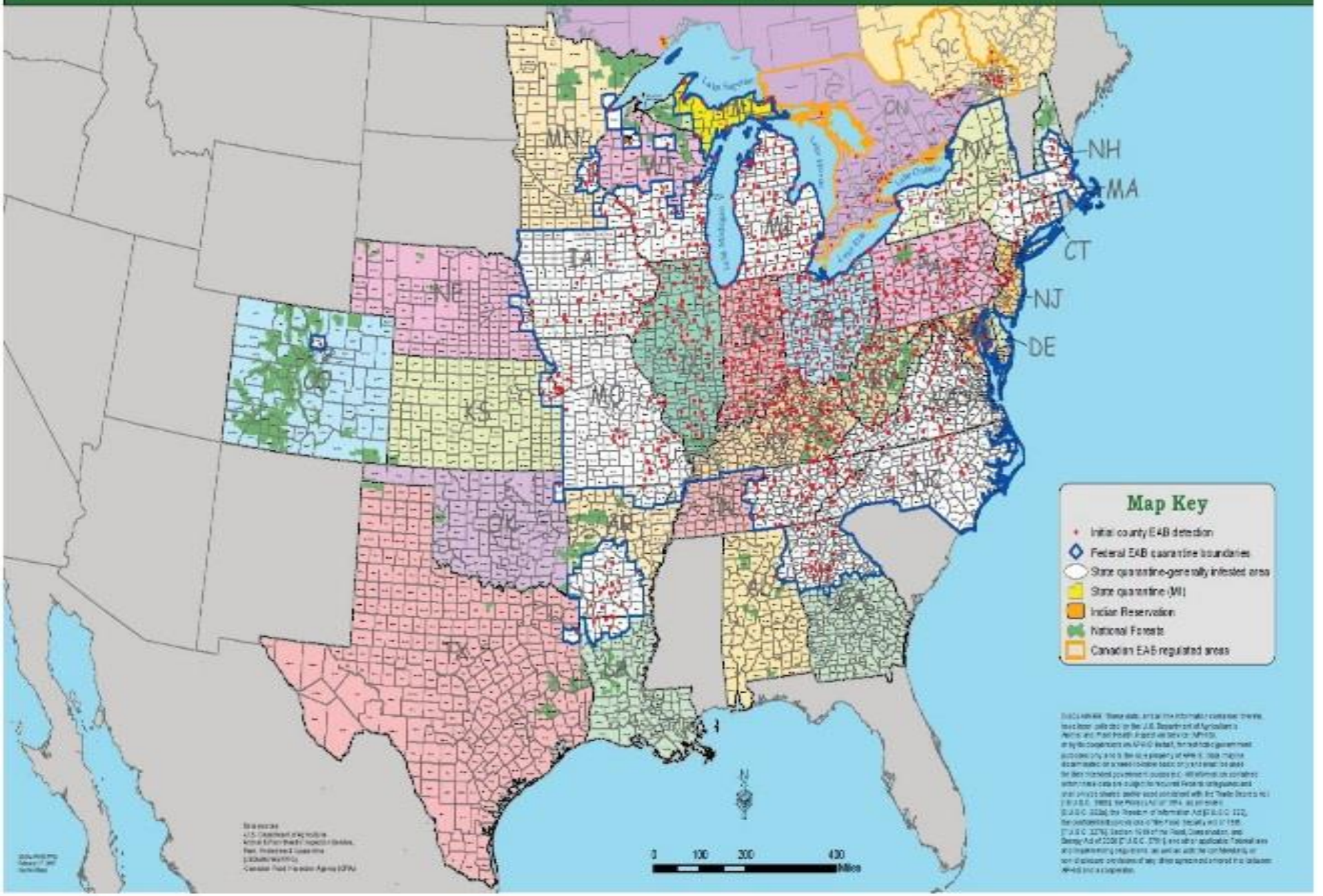
USDA/APHIS/PPQ
January 5, 2014
map by aocpp

USDA United States Department of Agriculture

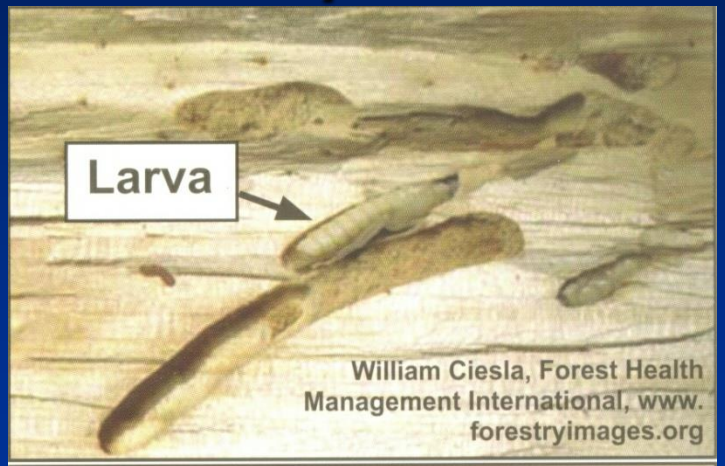
Cooperative Emerald Ash Borer Project

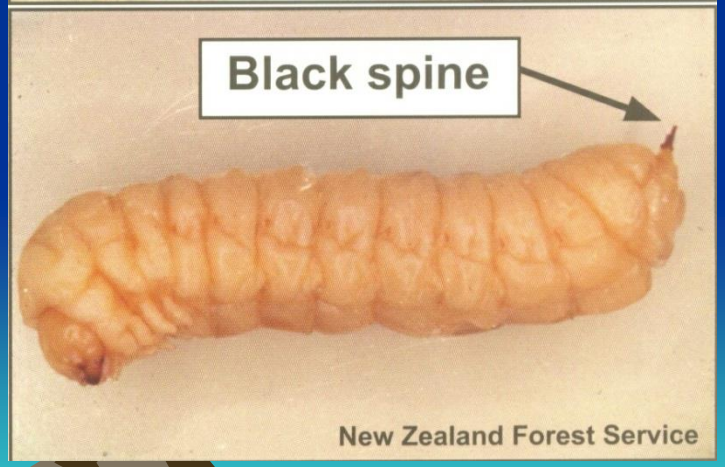
Initial county EAB detections in North America

February 17, 2017



Sirex noctilio
a.k.a
European Wood Wasp





Signs of Sirex

Pests cont.

Call: 1-800-TIPP-DEC

Diseases of trees

Beech Scale

Beech Bark Disease

Dutch Elm Disease

Chestnut Blight

Ash Yellows Disease

Fomes annosus Root Rot

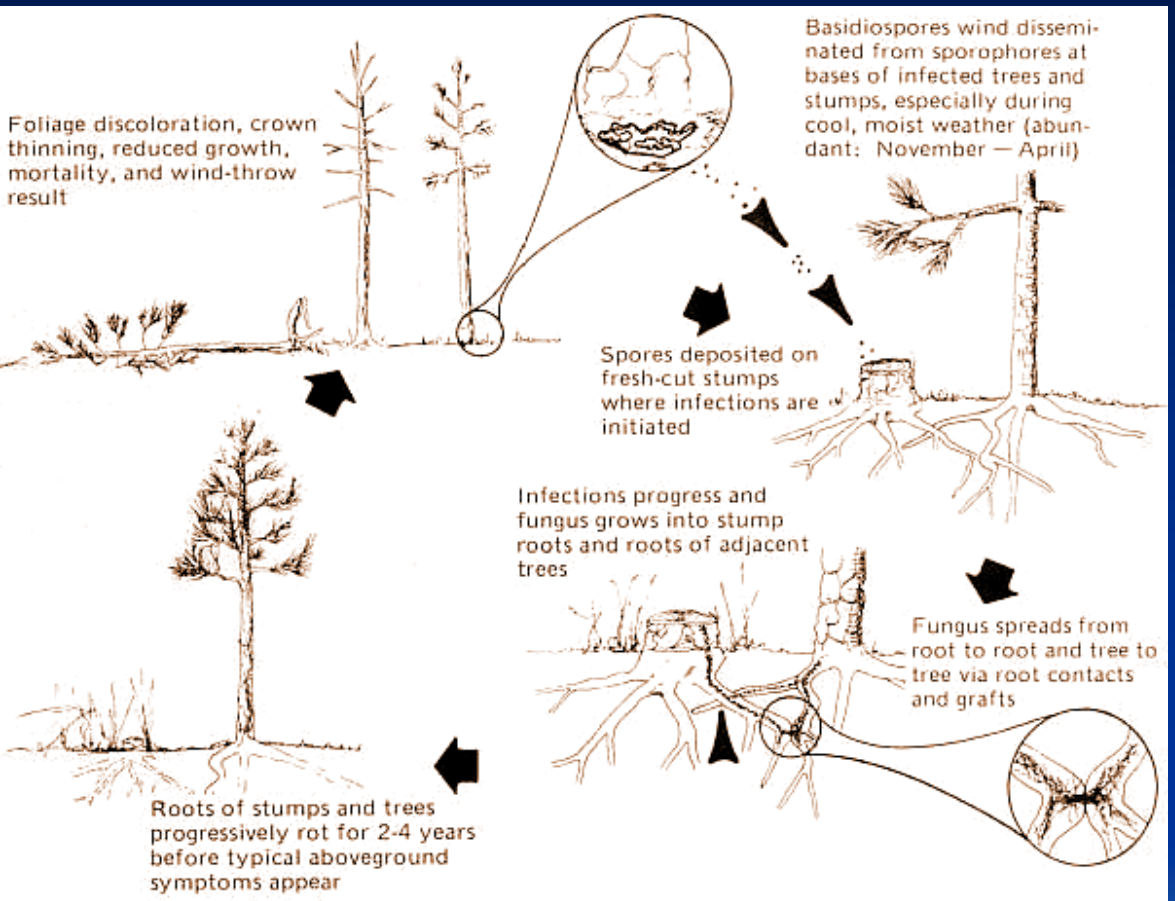


Fig. 17. Generalized life cycle of *Heterobasidion annosum*, the cause of annosum root rot (formerly, *Fomes annosus* — cause of annosus root rot).

Best Management Practices

- BMP's should always be incorporated into any timber harvest. They are design to ensure water quality.

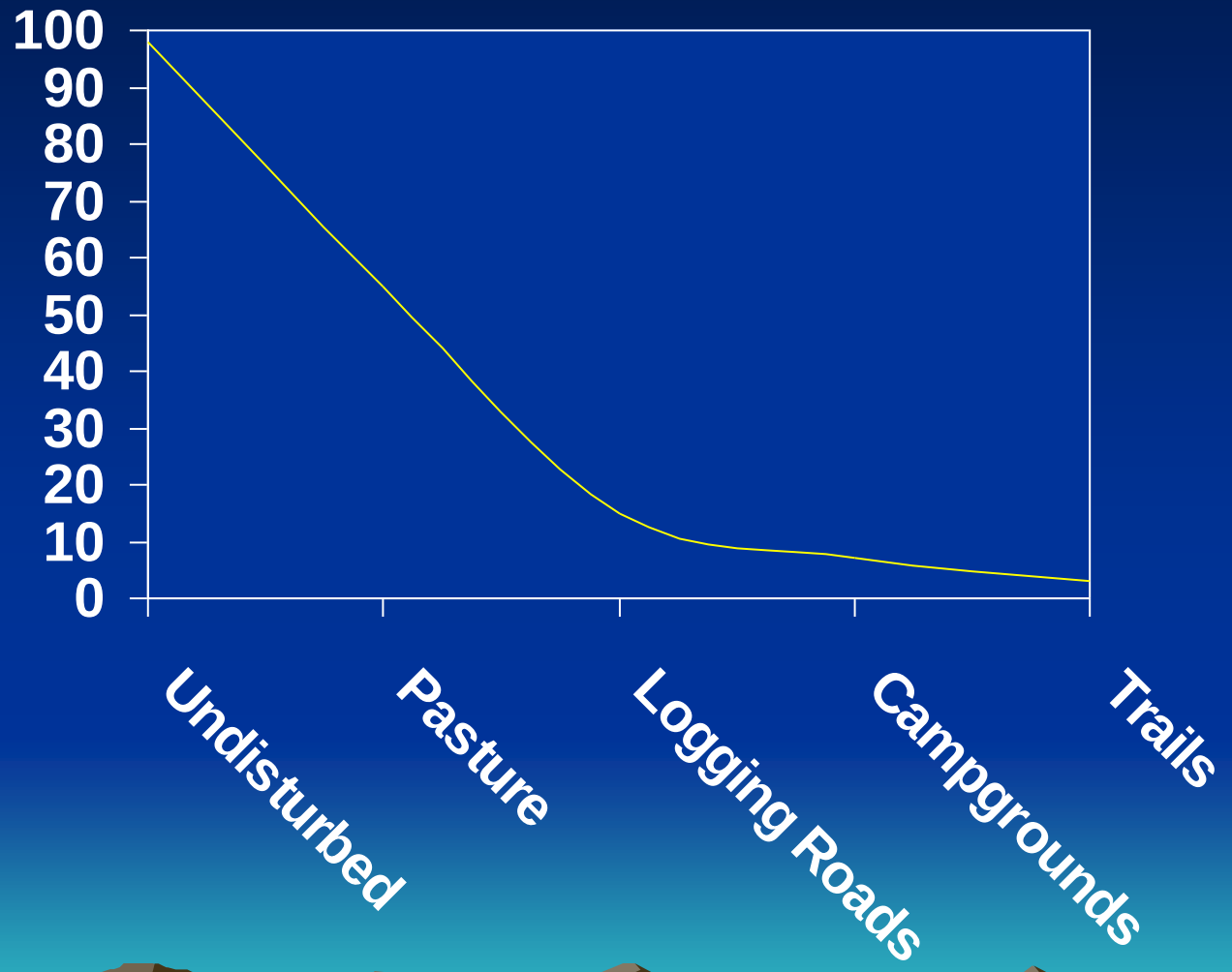
- The following are 2 of the most important BMP's that should be utilized on every job.

Proper methods for the control and dispersal of water on truck roads, skid trails, and log landings to minimize erosion and reduce sedimentation and temperature changes in streams and water bodies.

EPA Defines BMP (1975)

"…a practice…determined…to be the most effective, practicable…means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals."

Rain Infiltration Rates of Soil by Land Use



Potential Problems During Timber Harvesting

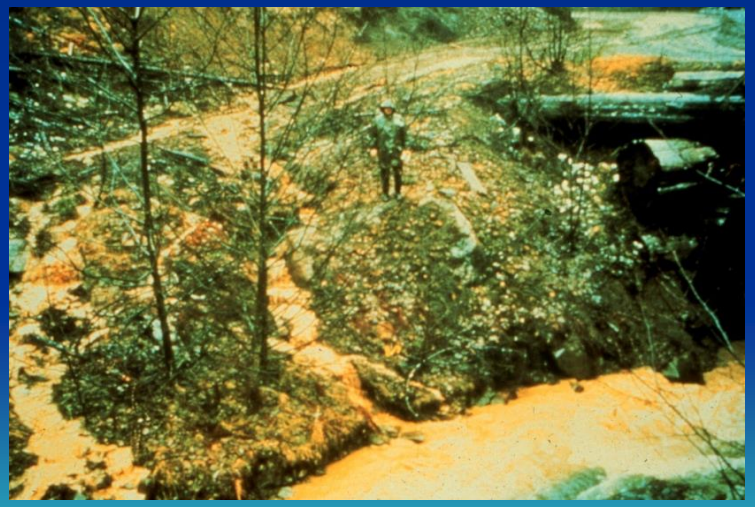
1. Sedimentation
2. Thermal pollution
3. Biogeochemical alteration (nutrient loading)

The Goal of Timber Harvesting BMPs

- Maintain or improve water quality
- Improve production efficiency
- Limit unnecessary costs
- Support Landowner goals

What Causes the Problem?

- Force at impact of water droplets
- Water movement diverted by roads
- Water carries exposed soil

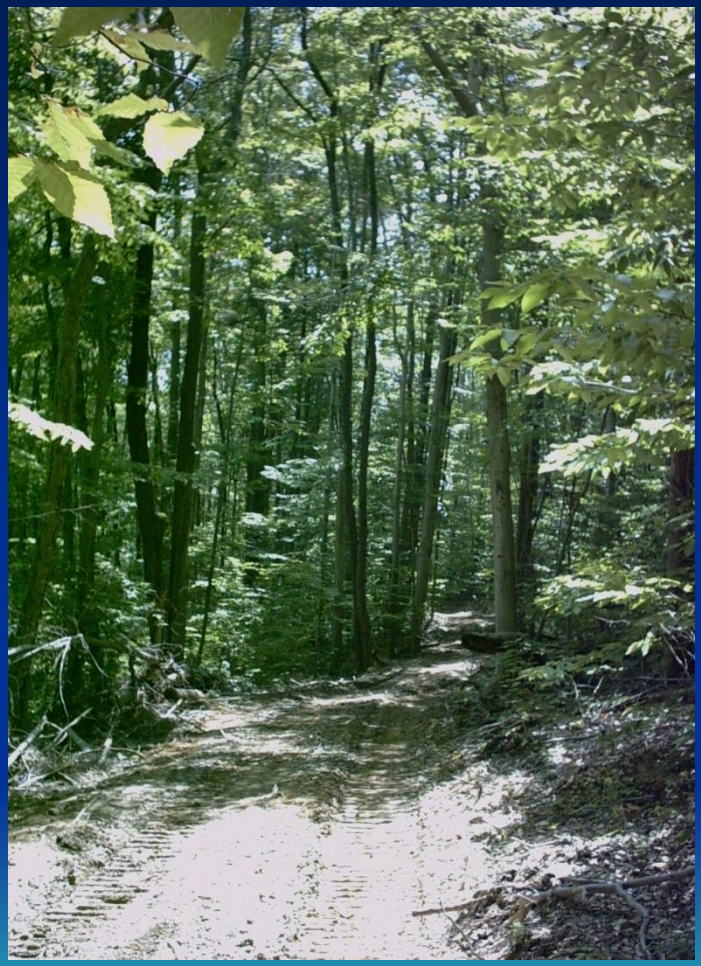


Common Sense Says…..

- Disturb as little soil as possible
- Deal with water in small amounts and when it is moving slowly:

  Force = Mass x Acceleration

- Avoid streams whenever possible
- Put the job to rest



Logging Roads and Trails Should Follow Contours

Portable Skidder Bridge

Take Home Points

- Keep the water off the roads
- Plan for water quality
- Budget for water quality
- Inspect for water quality

Uses of Trees and Wood

- White Ash – Baseball Bats
- Black Cherry – High Quality Furniture
- White Pine/Hemlock – Framing lumber
- Red Oak – Furniture, trim, flooring
- Conifers – Windbreaks
- Hardwoods – Erosion control / watershed protection
- All trees- wildlife habitat

Websites

- www.nysenvirothon.net.
- http://atlas.nyflora.org/
- http://www.dec.state.ny.us
- http://www.dnr.cornell.edu/ext/bmp/