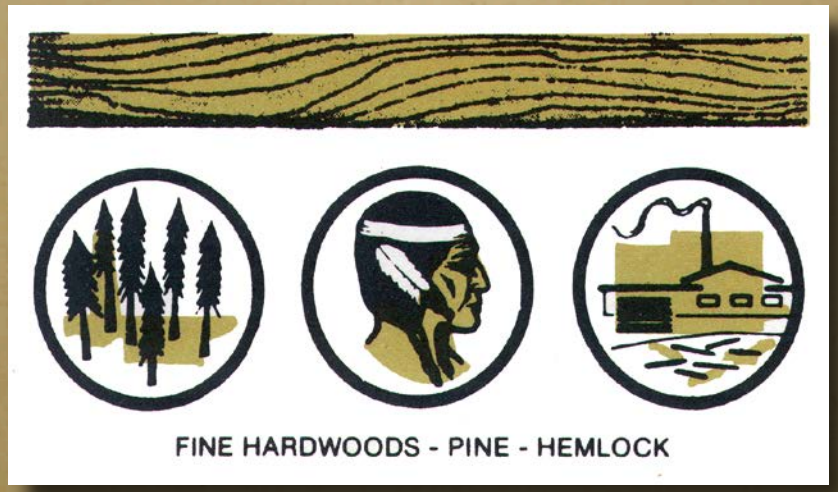
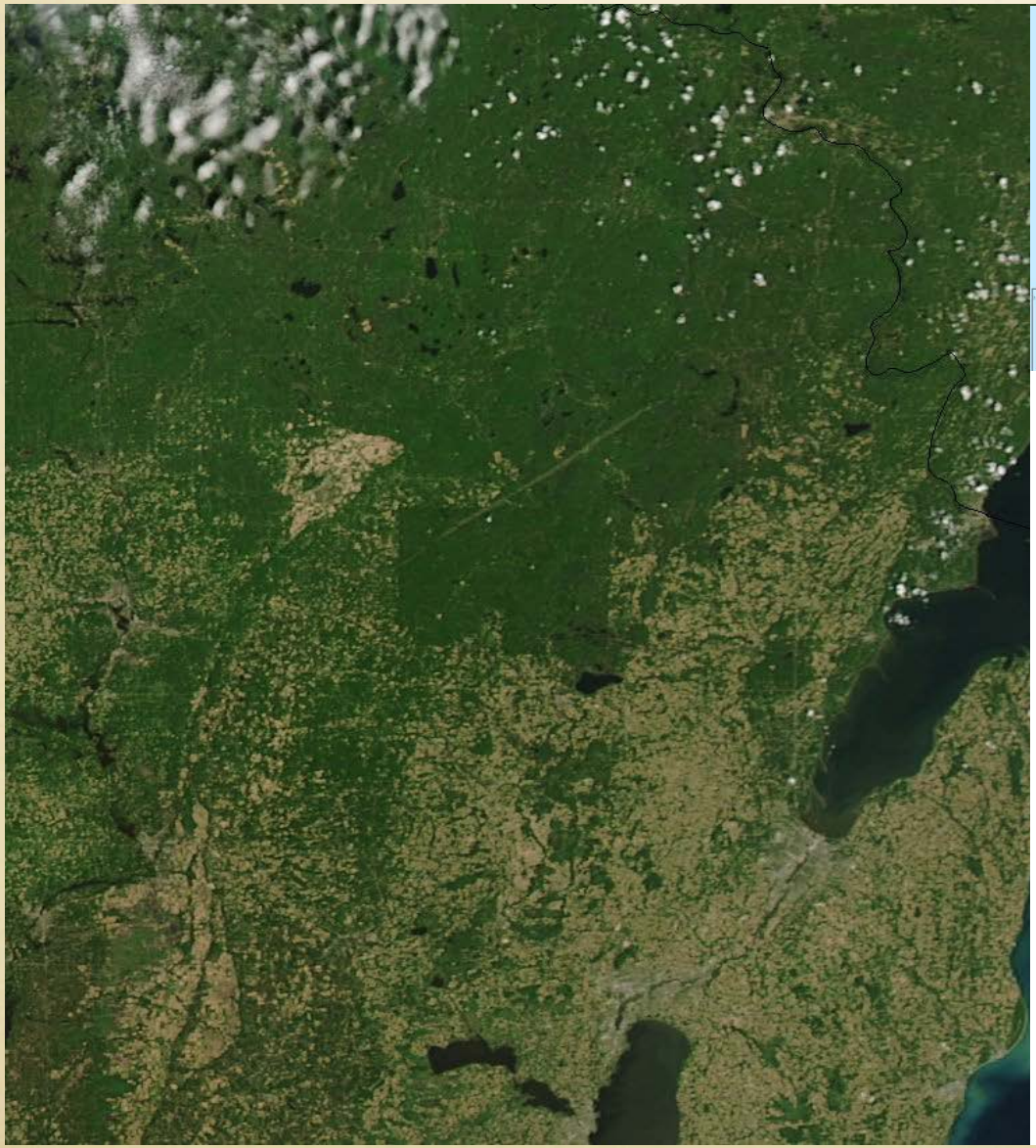
Adaptation to biological invasions: Beech bark disease and emerald ash borer

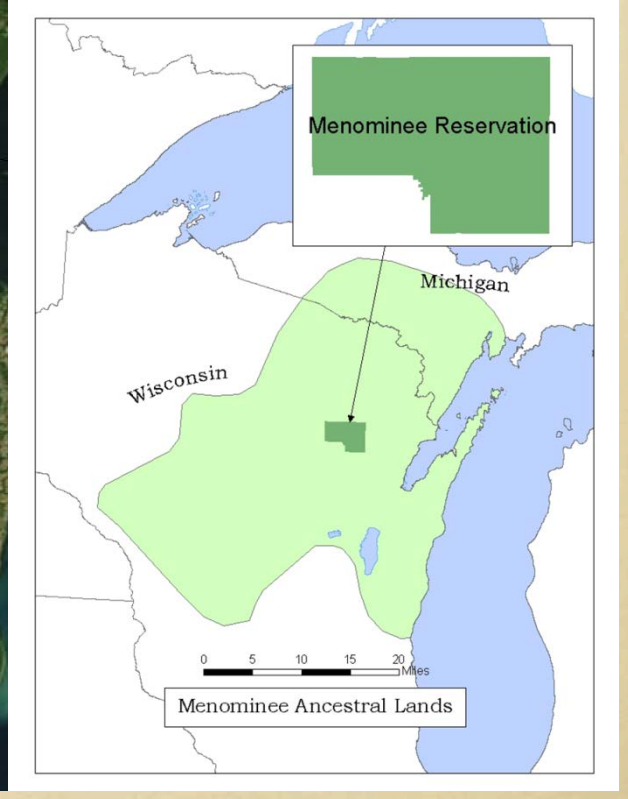


Menominee Tribal Enterprises
Menominee Indian Reservation

Presented by David L. Mausel, Ph.D.
BIA “Partners in action” symposium, Baraboo, Wi 24 June 2015

Menominee Indian Reservation in context



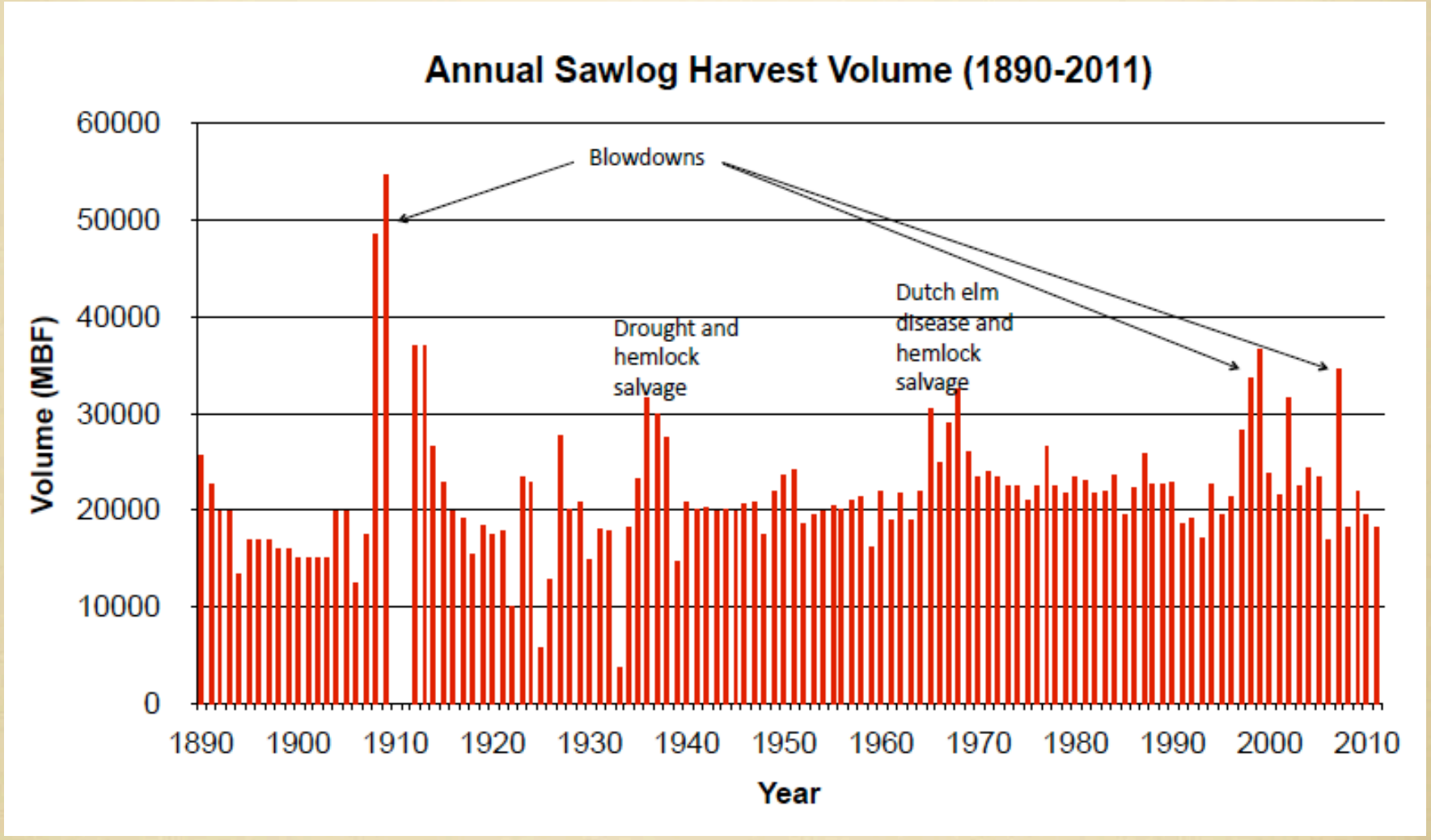


Menominee Indian Reservation, western border

Menominee Indian Reservation, Kinepoway tower

- *….sacredness of the land is their very body, the values of their culture are their very soul, and the water is their very blood* – M. Pecore, forest manager

Start with the rising sun and work towards the setting sun, but take only the mature trees, the sick trees and the trees that have fallen. When you reach the end of the reservation, turn and cut from the setting sun to the rising sun and the trees will last forever - Chief Oshkosh


Annual Sawlog Harvest Volume (1890-2011)
Volume (MBF)
60000
50000
40000
30000
20000
10000
0
Blowdowns
Drought and hemlock salvage
Dutch elm disease and hemlock salvage
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year

Menominee Indian Reservation, Neopit Sawmill


MENOMINEE
TRIBAL
ENTERPRISES
9/12/2011 15:17


5/1/2014 8:03


5/1/2014 8:34

Millworks Division

MTE Forestry Division

- Inventory Department
- Silviculture / Harvest Preparation Department
- Forest Development Department
- Timber Harvest Administration
- Forest Fire Protection
- Forest Health Department

Obstacles to sustainability:

- **Invasive insects, diseases, plants, worms**
- **Natural disturbance (wind, native pests, flooding…)**
- **Fire suppression / wildfire**
- **Climate change**
- Pollution
- Unsustainable logging or grazing or browsing
- Land-use change / fragmentation
- Lack of forest management
- Interactions of all the above

6 Pest management principles

1. **Know thy enemy**

2. **Prevention: <u>Natives</u>: good forest management (diversity, vigor, proper species for habitat type, rapid salvage) <u>Invasives</u>: minimize or eliminate their introduction.**

    1. Stringent inspection services
    2. Eradication schemes ready
    3. IPM systems
    4. Work with international trading partners

6 Pest management principles cont.

3. **Early detection and rapid response**: Natives: detect outbreaks early. Invasives: eradication, slow the spread.

4. **Control**: Minimize spread and impact, when necessary

5. **Monitoring**: Evaluate success of control treatments

6. **Restoration**: Foster resilient forest development, climate change adaptation

History of Menominee Forest Pests

1967

Dutch elm disease

1910 Cadillac, Michigan

2012 Menominee Indian Reservation

History of Menominee Forest Pests

1970

Butternut canker

2012, 1995 Menominee Indian Reservation

History of Menominee Forest Pests

2012

Beech bark disease


USA5045066

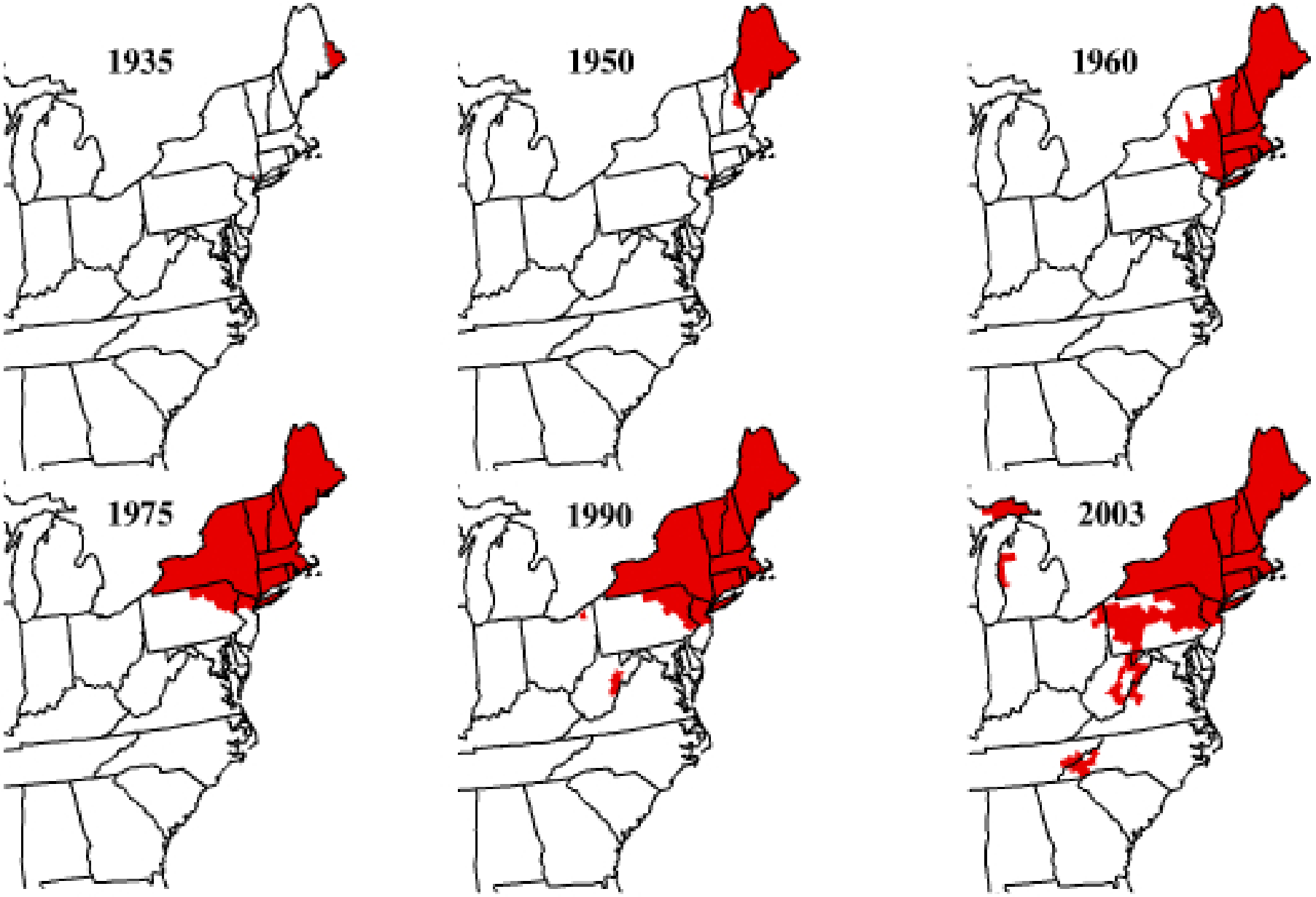
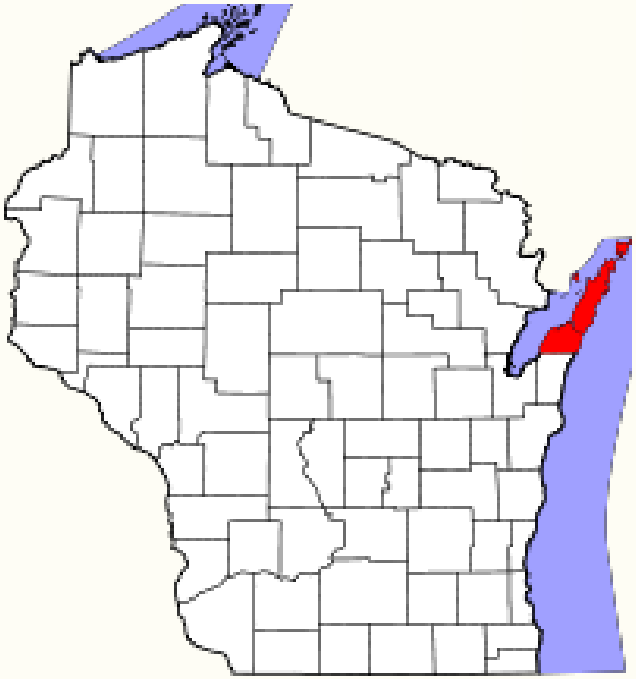


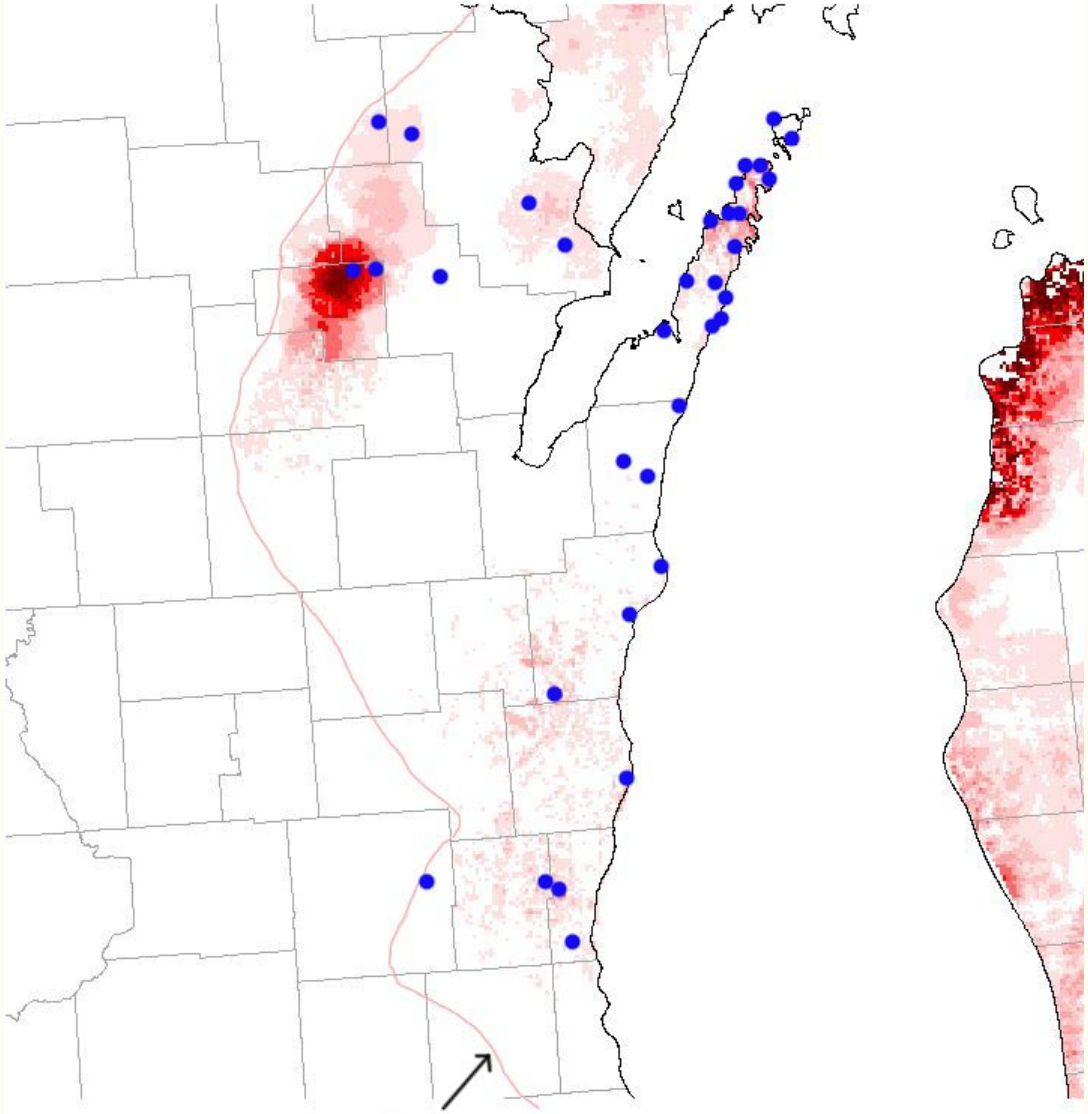
Figure 1. Maps of beech bark disease spread (1935-2003)

Credit: USDA Forest Service

Sturgeon bay, Wisconsin
21 Oct 2009




Menominee Forest, 15 Feb 2012



Approximate western limit
of American Beech distribution

American Beech basal area is shown in red

Beech scale detections are shown in blue


Huntington Forest (SUNY-ESF)
Eagle

Huntington Forest (SUNY-ESF)


10/8/2012 11:35


26/5/2014 8:34


C3
NW Corner

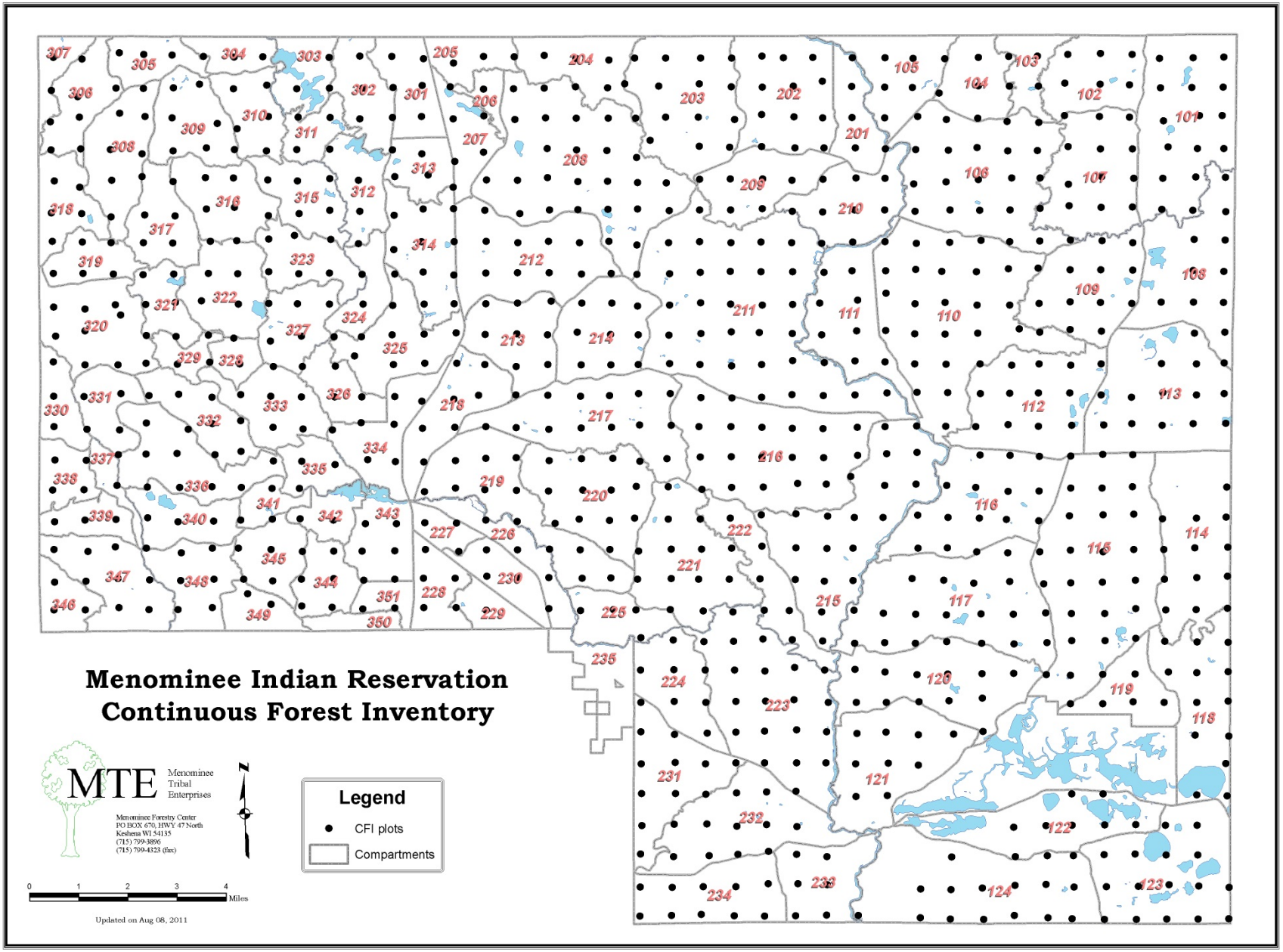
BBD Strategy

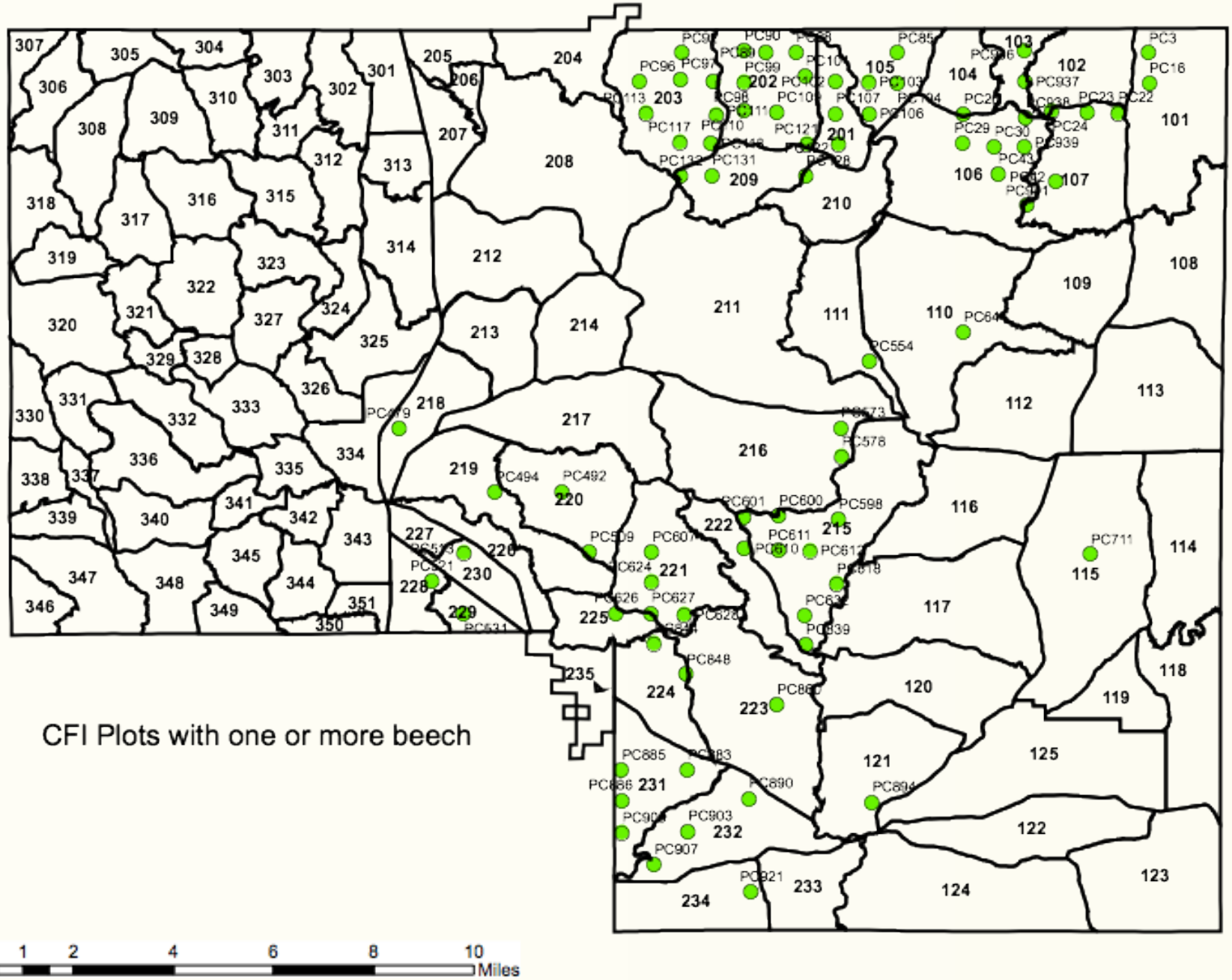
Objective: Reduce timber loss, maintain forest vigor and diversity

1. **Survey**
2. **Modified silvicultural prescriptions**
   - **Sanitation/salvage**
   - **Regeneration control**
   - **Genetic resistance management**
3. Utilization
4. Biological control

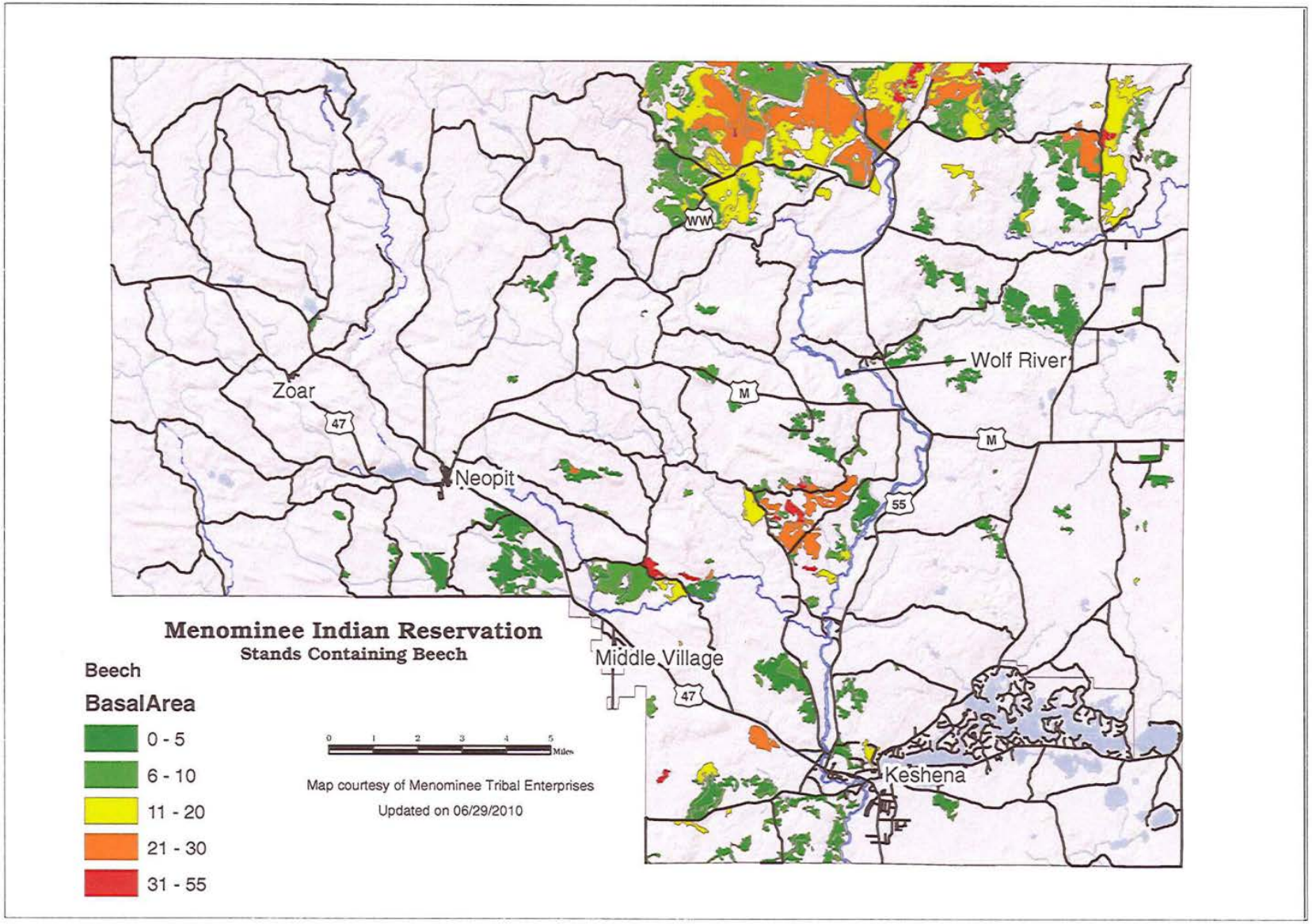
Survey

- To schedule sanitation and salvage cuttings
- CFI plots
- Every 2 yr Scale density
- Canker density
- Crown vigor rating
- Bark characteristics


Menominee Indian Reservation
Continuous Forest Inventory
MTE
Menominee Tribal Enterprises
Menominee Forestry Center
PO BOX 670, HWY 47 North
Keshena WI 54135
(715) 799-3896
(715) 799-4323 (fax)
Legend
CFI plots
Compartments
0 1 2 3 4
Miles
Updated on Aug 08, 2011


CFI Plots with one or more beech
0 1 2 4 6 8 10
Miles

Beech distribution (stand exam data)



Survey results

- 2014 first measurement
- 71 plots (290 beech measured)
- No beech scale observed
- There is time to manage this…

Silvicultural mods: Sanitation/salvage

- **Objective**: Utilize most beech wood and leave some for genetic resistance to appear

- Two strategies:

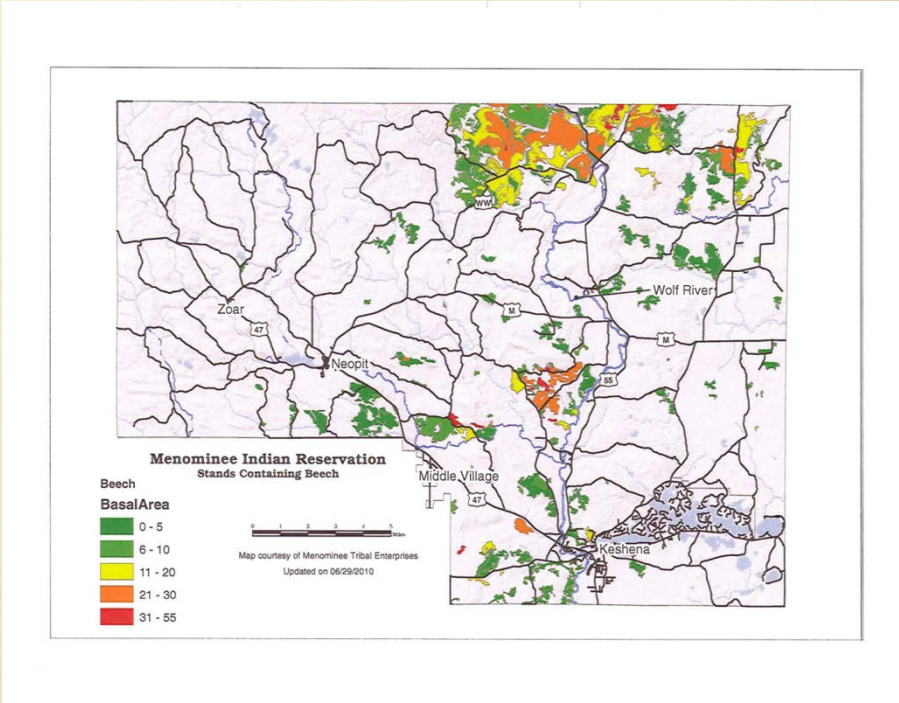
1. Beech resistance and habitat management areas

2. Beech pre-salvage areas

Silvicultural mods: Sanitation cuts

1). Beech resistance and habitat management areas

- Phase 1 of 2 = Sanitation
  - By 2021 (red/orange areas)
  - On ATFD/AFAd habitat types
  - >20 ft./acre
  - Cut all beech >5" DBH
  - But, leave 3-5 sawlogs/acre
  - And 3-5 poles/acre



Silvicultural mods: Salvage cuts

1). Beech resistance and habitat management areas

Phase 2 of 2 = Salvage

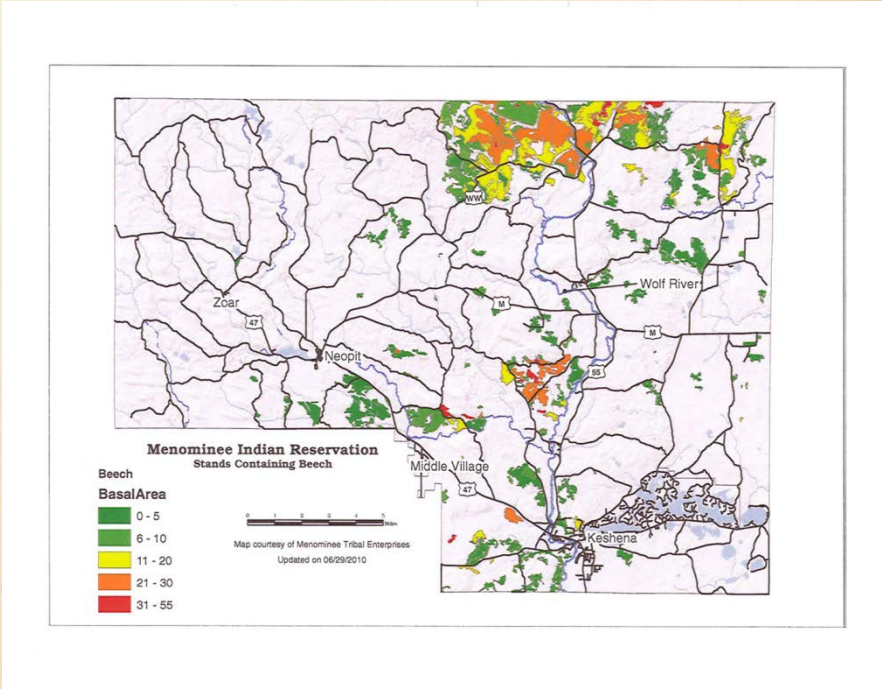
- Harvest all diseased beech
- Leave uninfected trees
- Mark and report resistant trees > 10” DBH
- Buffer resistant trees

Silvicultural mods: Sanitation/salvage

2). Beech pre-salvage areas

Phase 1 and 2 as before:

- Green and yellow areas
- <20 ft. / acre or all other habitat types
- Cut all beech >5" DBH
- But, leave 1 sawlog tree / 2 acres
- And 1 pole / 2 acres



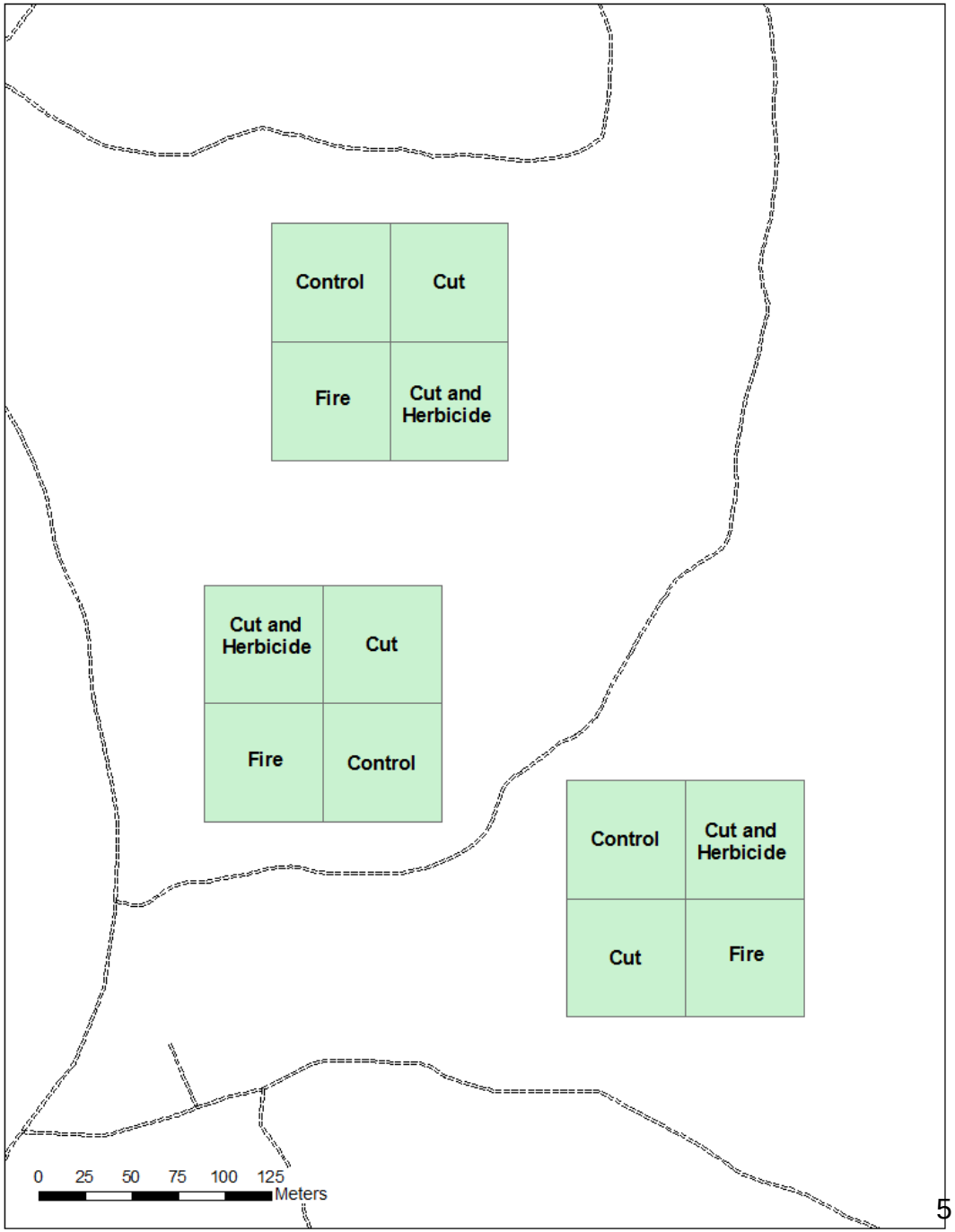
Silviculture – beech regeneration control

Objective: Increase diversity

1. Canopy gaps (60’ diameter)
2. Fire, cutting, and herbicide

Beech Regeneration control experiment

2014/2015




4/16/2015 16:14


4/16/2015 16:56


4/16/2015 14:20


4/16/2015 14:20


4/17/2015 20:29


4/16/2015 15:17


4/16/2015 15:03


A4
NE Corner
Before

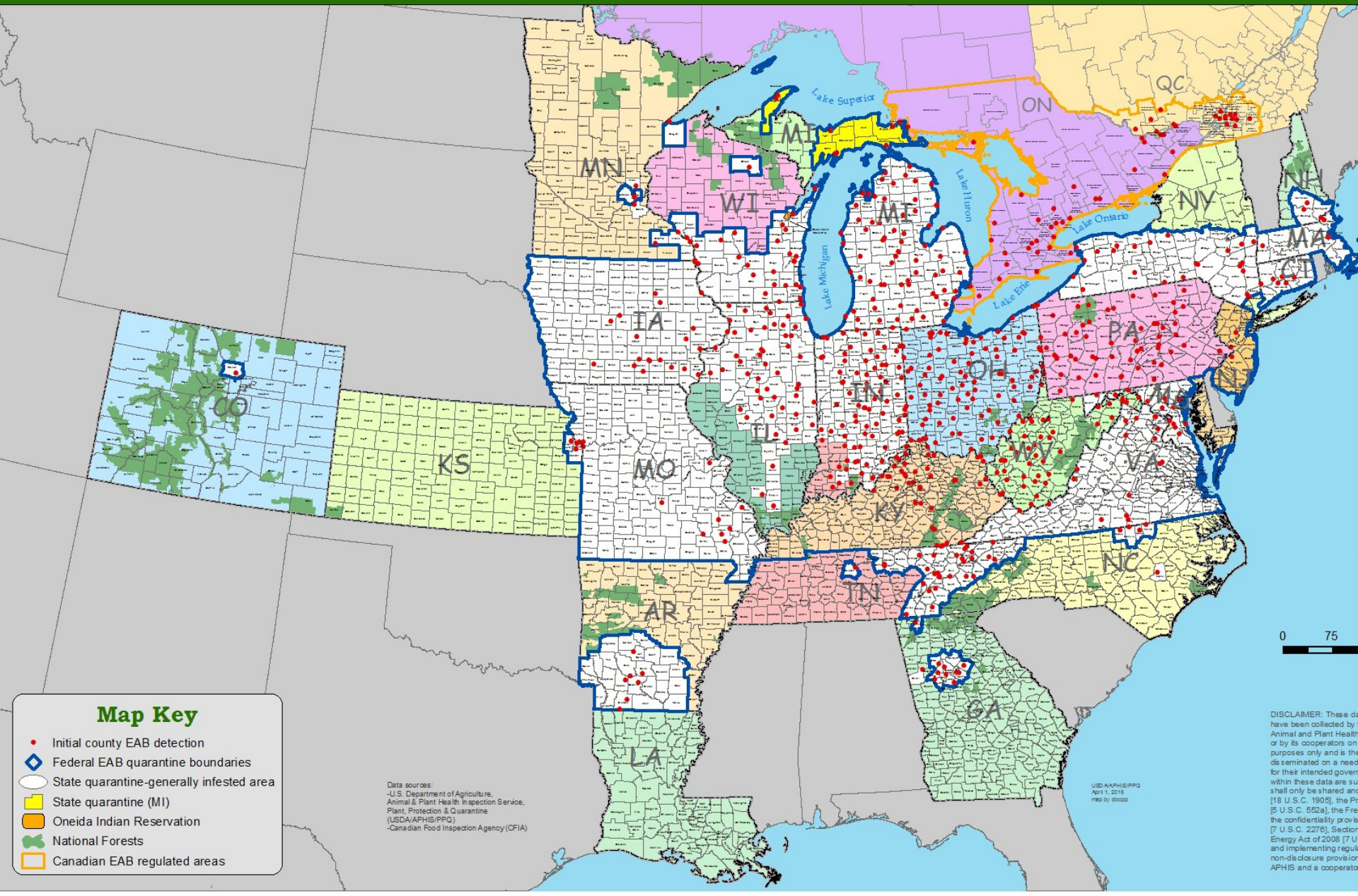

A4
NE Corner
After

Emerald ash borer

United States Department of Agriculture

Cooperative Emerald Ash Borer Project

Initial county EAB detections in North America



Adult beetle

Larvae (under bark)

Branch dieback

Woodpecker feeding

Galleries


Exit hole
5471783

Epicormic sprouts

Michigan


Ohio
UGA5171038


Newburg, Wisconsin
5503352


5503358


EAB in Virginia
5476315

Menominee forest: White, black, and green ash


SENIOR
CLASS OF


13/6/2012 15:40

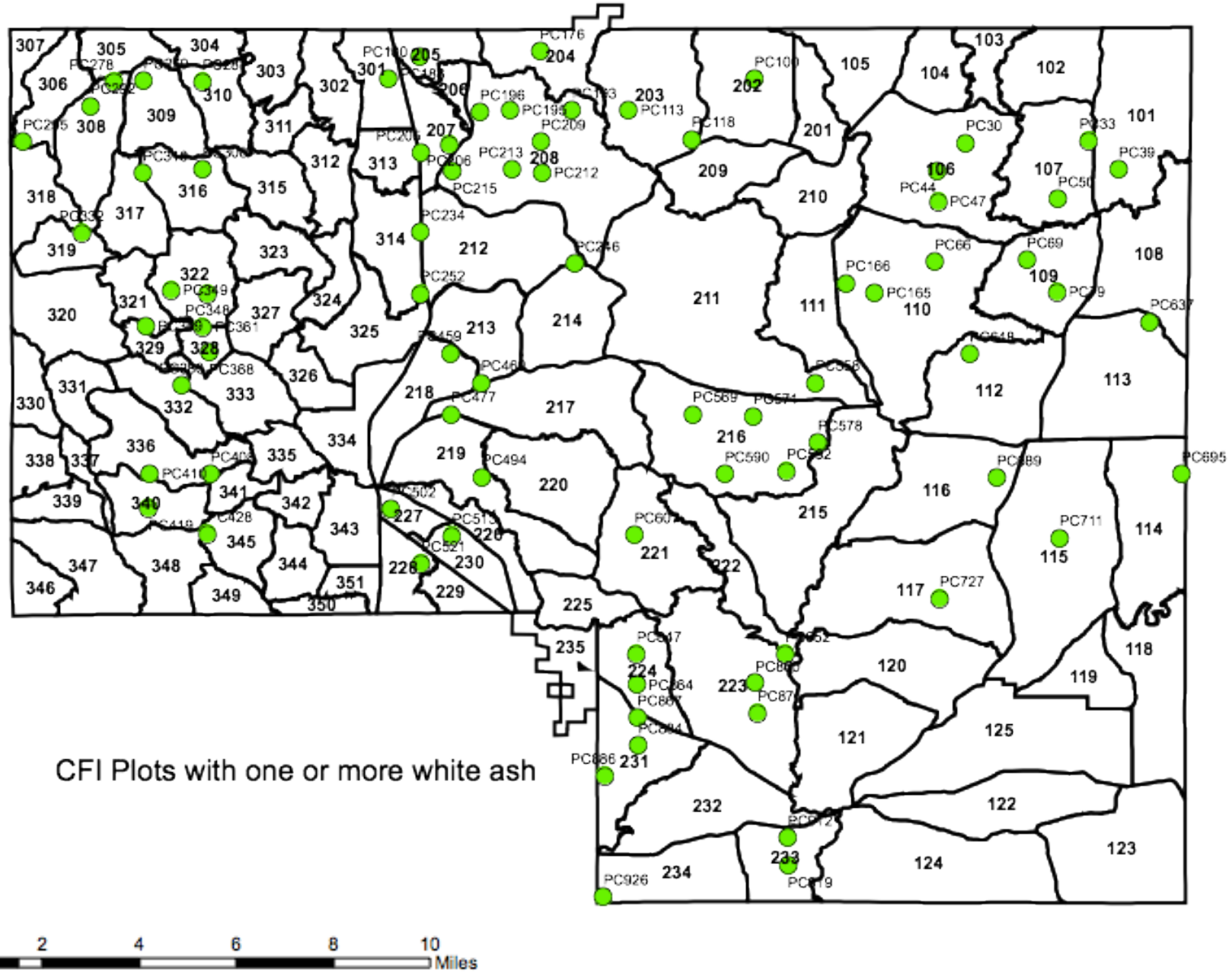
EAB Strategy

Objective: Reduce timber loss, maintain forest vigor and diversity

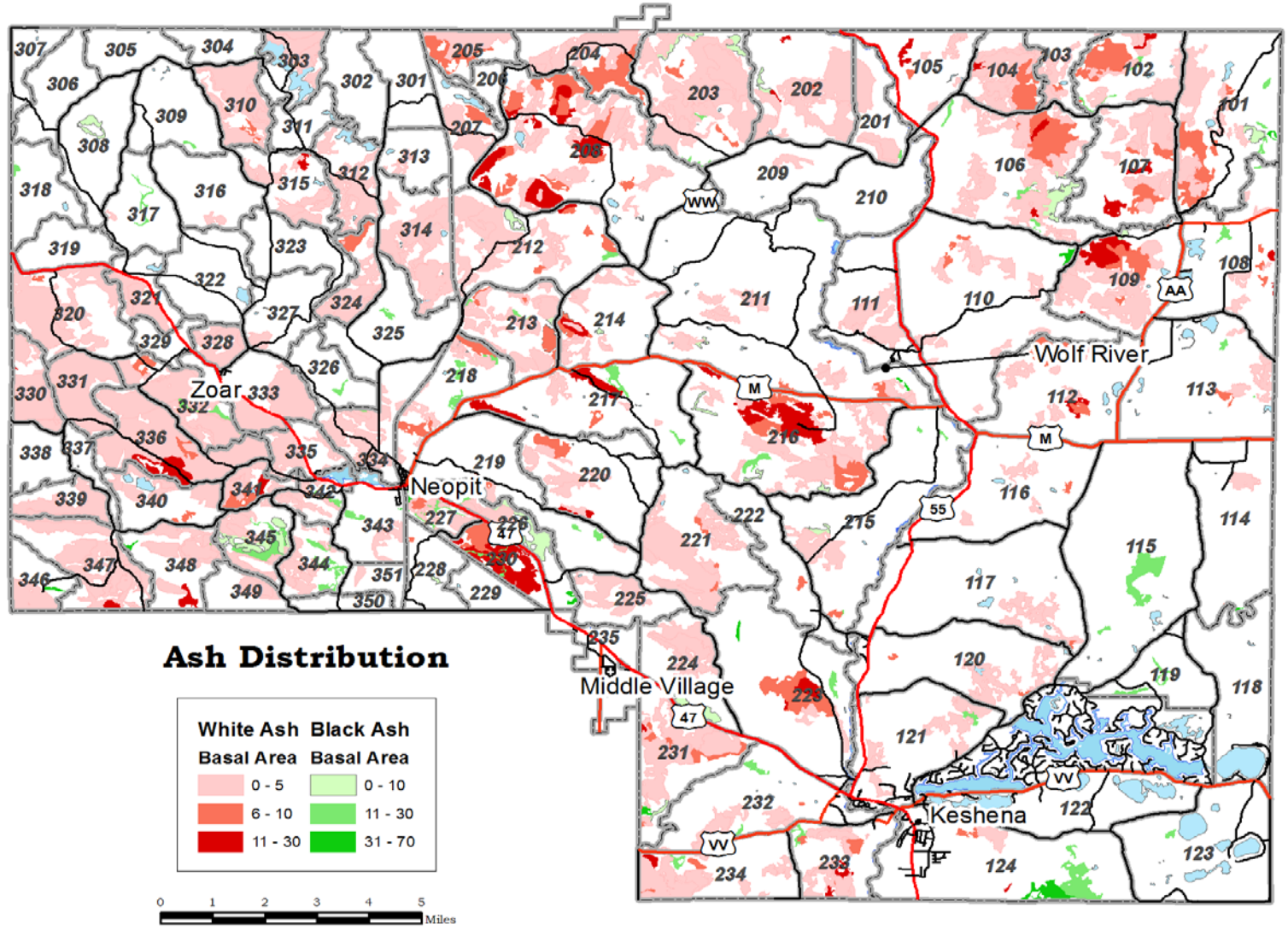
1. **Survey: to schedule sanitation and salvage cuttings**
2. **Modified silvicultural prescriptions**
3. **Genetic preservation**
4. Biological control
5. **Log preservation**

Survey

1. Traps (APHIS)
2. Mill yard inspections
3. Staff training
4. Tree felling
5. CFI plot system this summer

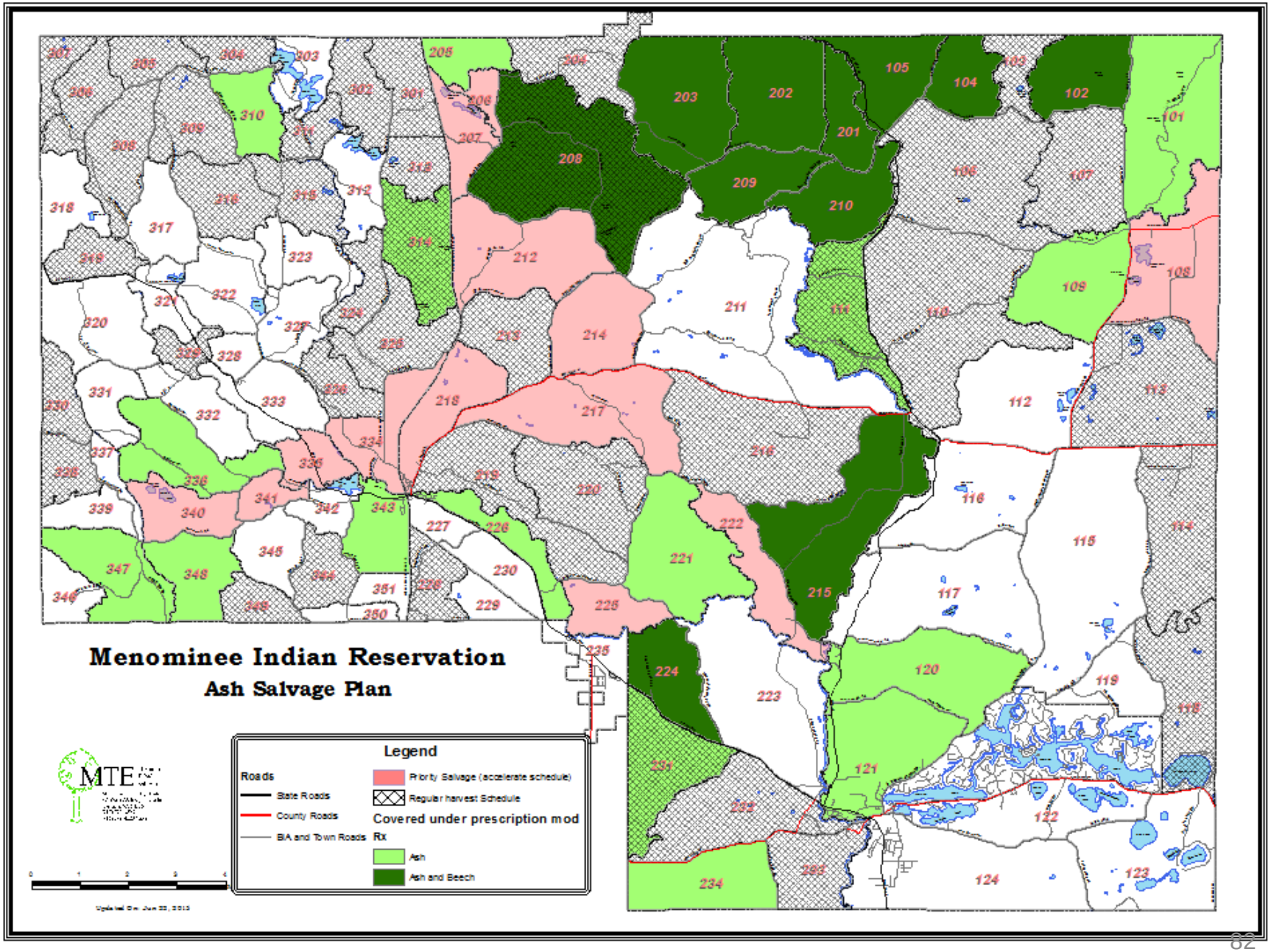

CFI Plots with one or more white ash
0 1 2 4 6 8 10
Miles

Beech distribution (stand exam data)



Silvicultural mods: Sanitation/salvage

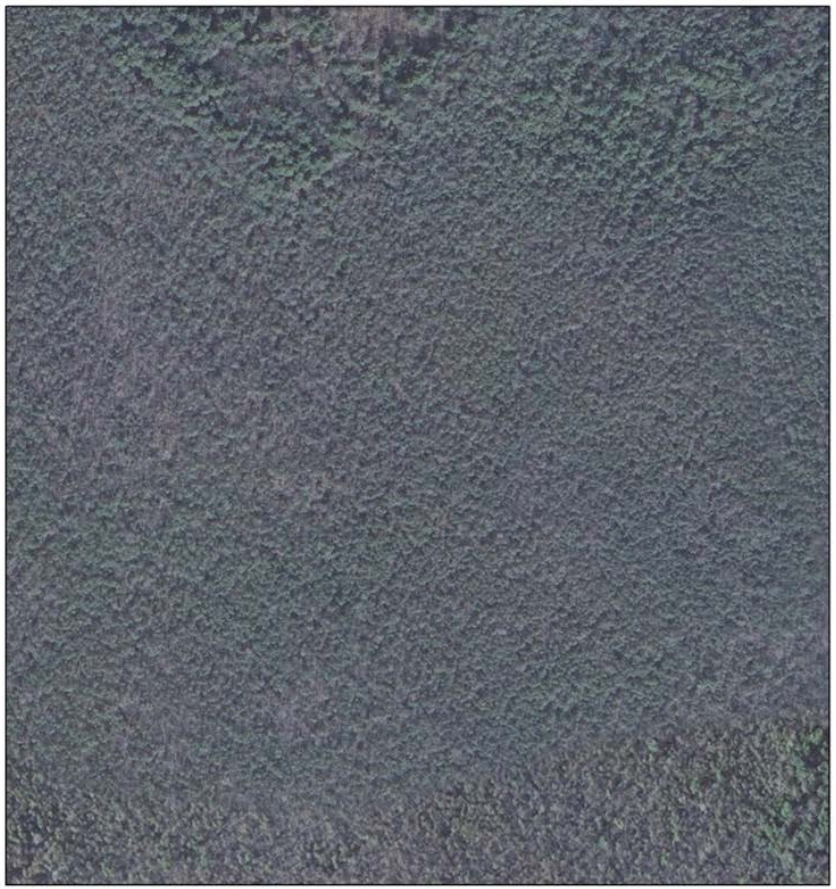
- **White ash**
  - During regular scheduled harvests and reentries
  - Cut all white ash > 5” DBH
  - Foresters anticipate only a fraction of ash will be harvested


Menominee Indian Reservation
Ash Salvage Plan
Legend
Roads
State Roads
County Roads
BIA and Town Roads
Priority Salvage (accelerate schedule)
Regular harvest Schedule
Covered under prescription mod
Rx
Ash
Ash and Beech
MTE

Silvicultural mods: Sanitation/salvage

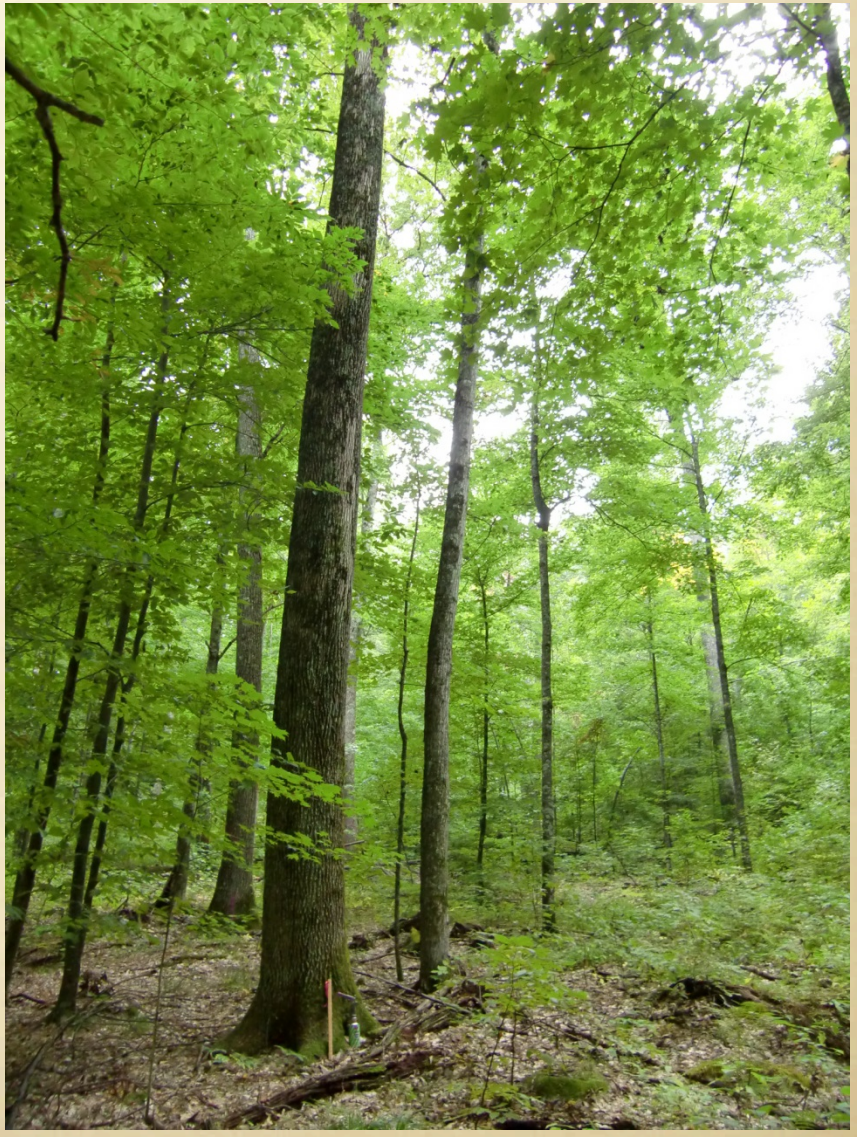
Green and black ash

- Aerial photo analysis of swamp hardwoods in 2014
- Strategy = Mostly do nothing
- Limited silvi. trials under development



Genetic preservation

1. **Seed collection**
   - Needs to be robust sample
   - Especially green ash
2. **Legacy groves**
   - Chemical control (Safari or Tree-age)
   - Up to 20 trees at 5 sites (each species)




S
9/17/2014 11:59

Log preservation

Work with historic preservation and other Menominees on….

1. Kiln drying and storing ash logs and boards

2. Sinking in anoxic conditions

Acknowledgements

- Tony Waupochick (MTE Silviculture)
- Leon Fowler and Derrick White (MTE Forest health techs)
- Paul Crocker and Ron Waukau (MTE Inventory)
- Benny Bowman (MTE Fire management)
- Matt Anderson (BIA)
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