

DEER HERBIVORY AND FOREST REGENERATION

Photo @ Steve Roark
TN State Area Forester



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Overview Questions

1. How are deer impacting forests? Tree regeneration?
2. What data are currently available to assess deer browse impacts to forest regeneration?
3. What information do County Deer Advisory Councils (CDACs) need?
4. How can forest regeneration data collection and analysis be improved to meet future needs?



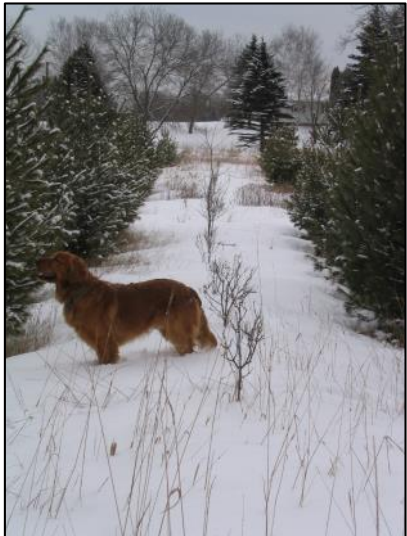
Not just a recent challenge...

“If we in Wisconsin are to be expected to produce forests for the future; if we are to be expected to practice sound forest management and assure our resident wood using industries of an adequate and continuous supply of raw materials, we should immediately take steps to eliminate this greatest of stumbling blocks. And I use the word “greatest” advisably for the appetite of our huge deer herd has now assumed such proportions that it justifies such superlatives.”

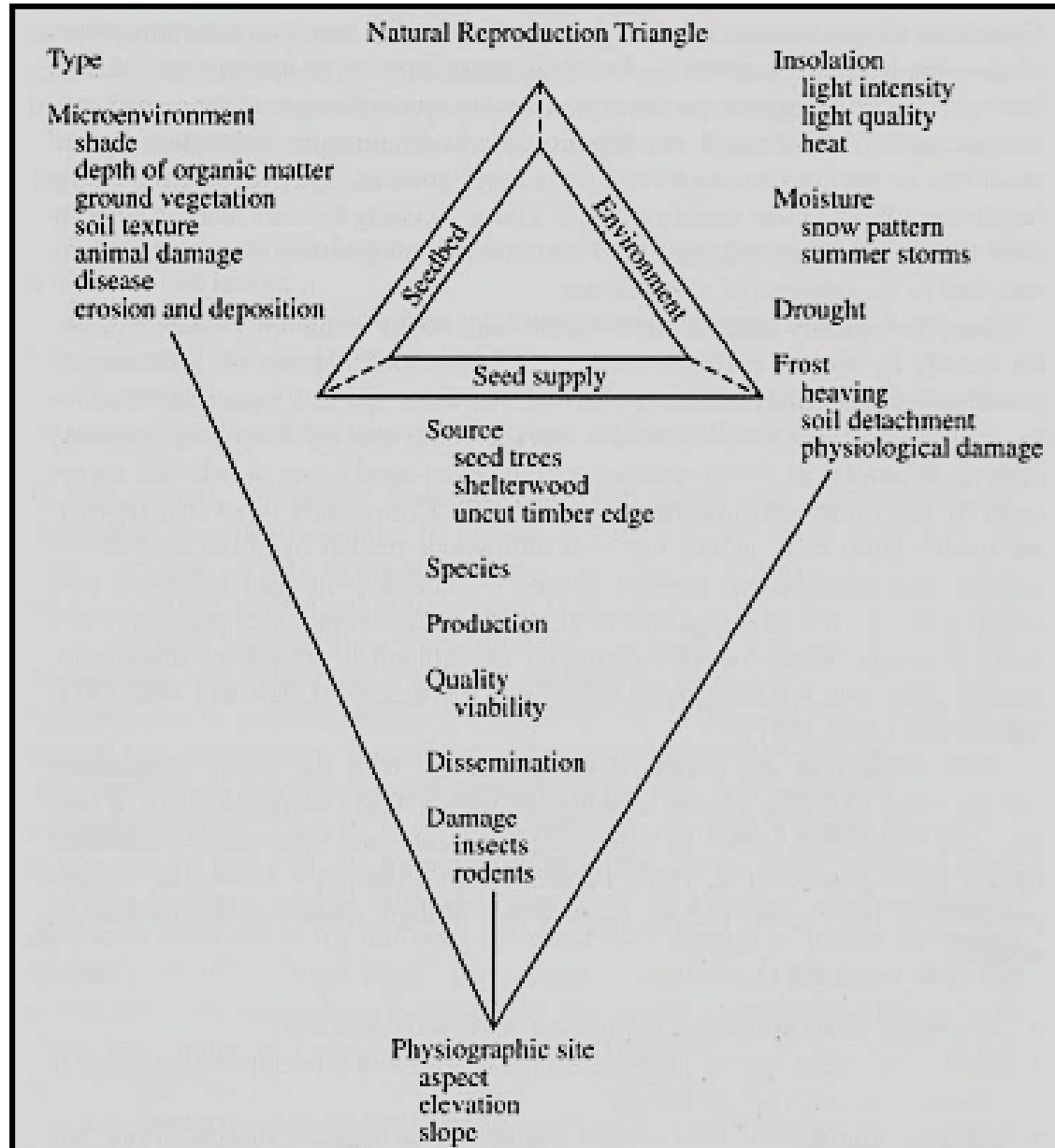
- Wisconsin's Deer Damage to Forest Reproduction Survey - Final Report, 1948

Deer Impacts to Forests

- ❑ Failed or delayed tree regeneration
- ❑ Increase regeneration costs
- ❑ Reduced timber productivity and economic returns
- ❑ Altered composition of tree and plant communities
- ❑ Altered/degraded wildlife habitat



Deer Impacts to Forest Regeneration



Deer Impacts to Forest Regeneration

- Preferential browsing can influence tree composition
- Preferences can vary somewhat
- Preferred species:
 - ▣ **hemlock, white cedar, white pine, maple, basswood, birch, oak, aspen**
- Less preferred species:
 - ▣ **jack pine, red pine, balsam fir**
- Generally not preferred species:
 - ▣ **spruce, beech**



Deer Impacts to Forest Regeneration

- ❑ Reforestation costs increase to ensure adequate composition and stocking
- ❑ Repeated silvicultural treatments
- ❑ Protection of regeneration
 - ▣ Fencing (plastic – \$1.50/ft.)
 - ▣ Tree Shelters
 - ▣ Bud Caps
 - ▣ Repellents



Why is it challenging to accurately assess deer impacts to forest regeneration?

- Browsing damage is not always evident
- Browsing damage is cumulative
- Legacy effects
- Deer not equally distributed across the landscape – high levels of variability
- Regeneration plots and data compilation expensive











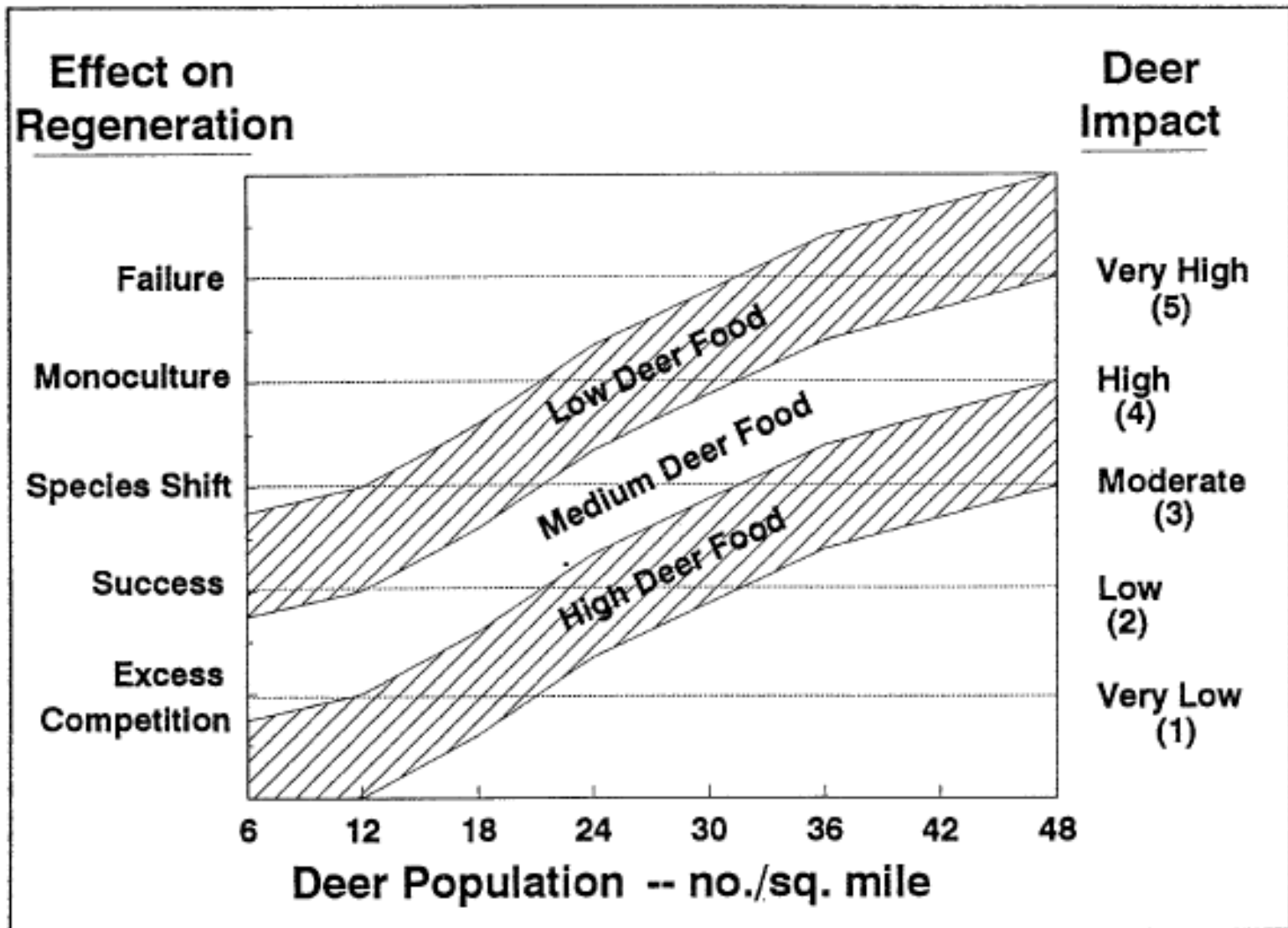


Figure 5. Deer impact index.

Browse Intensity Index

1. **No browse evidence:** No visible browsing evidence.
2. **Low:** Light browsing evidence observed. [1-25% palatable stems browsed]
3. **Medium:** Browsing evidence observed, seedlings present. [26-50% palatable stems browsed]
4. **High:** Browsing evidence common, hedging of stems, and/or seedlings are rare. [51-75% palatable stems browsed]
5. **Very High:** Browsing evidence omnipresent or forest floor bare, severe browse line. [$> 75\%$ palatable stems browsed]
6. **No Woody Palatable Vegetation Present:** No direct browse visible, but most palatable woody plants less than 2 meters tall are absent.

What data are currently available on deer impacts to forest regeneration?

- <http://www.wisconsinforestry.org/initiatives/other/deer-impacts>

Initiatives

- ✓ Current
 - ✓ [Forestry Practices Study](#)
 - ✓ [Forest Economic Summit](#)
- ✓ Other
 - ✓ [Invasive Species BMPs](#)
 - ✓ [Overview](#)
 - ✓ [Forestry BMPs](#)
 - ✓ [Recreation BMPs](#)
 - ✓ [Urban Forestry BMPs](#)
 - ✓ [Rights of Way BMPs](#)
 - ✓ [Woody Biomass](#)
 - ✓ [Historical Archive](#)
 - ✓ [Deer Impacts](#)
 - ✓ [Private Forestry](#)
 - ✓ [Forest Sustainability Framework](#)
 - ✓ [Overview](#)

DEER - IMPACTS ON FOREST ECOLOGY AND MANAGEMENT

White-Tailed Deer Population Impacts Forest Sustainability

The Wisconsin Council on Forestry addresses concerns about the white-tailed deer population affecting the sustainability of forests in Wisconsin. In order to maintain a balance of the ecological and economic conditions, the Council recommends the reduction of the deer herd in Wisconsin. The Council bases its findings on science-based and stakeholder reports.



Overview

- ✓ [Council Position](#)
- ✓ [Letter to the Governor](#)

Deer Research

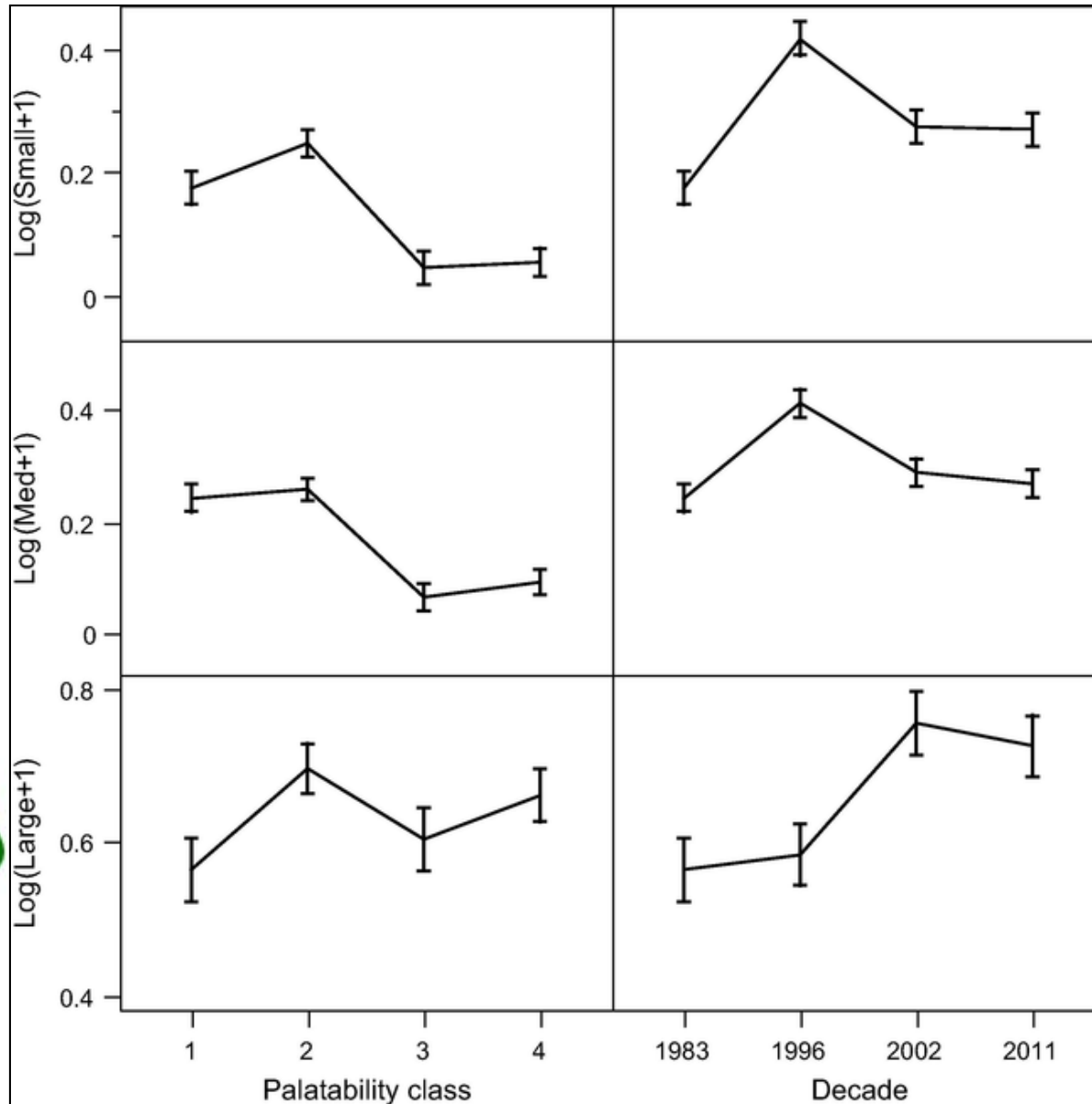
- ✓ [2005 Reforestation \(artificial regeneration\) Survey](#)
- ✓ [2006 Plantation \(artificial regeneration\) Assessment](#)
- ✓ [2006 Natural Oak Regeneration Survey](#)
- ✓ [Exclosures](#)
- ✓ [Presentations](#)
- ✓ [Literature Addressing Impacts Of Deer On Forest Vegetation](#)
- ✓ [Chronology of Wisconsin Deer Hunting](#)
- ✓ [Wisconsin Deer Population](#)



What data are currently available on deer impacts to forest regeneration?

- <http://www.wisconsinforestry.org/initiatives/other/deer-impacts>
- Current research

Bradshaw L., and Waller D.M., 2016. *Impacts of white-tailed deer on regional patterns of forest tree recruitment*. *Forest Ecology and Management* 267, 134-143.



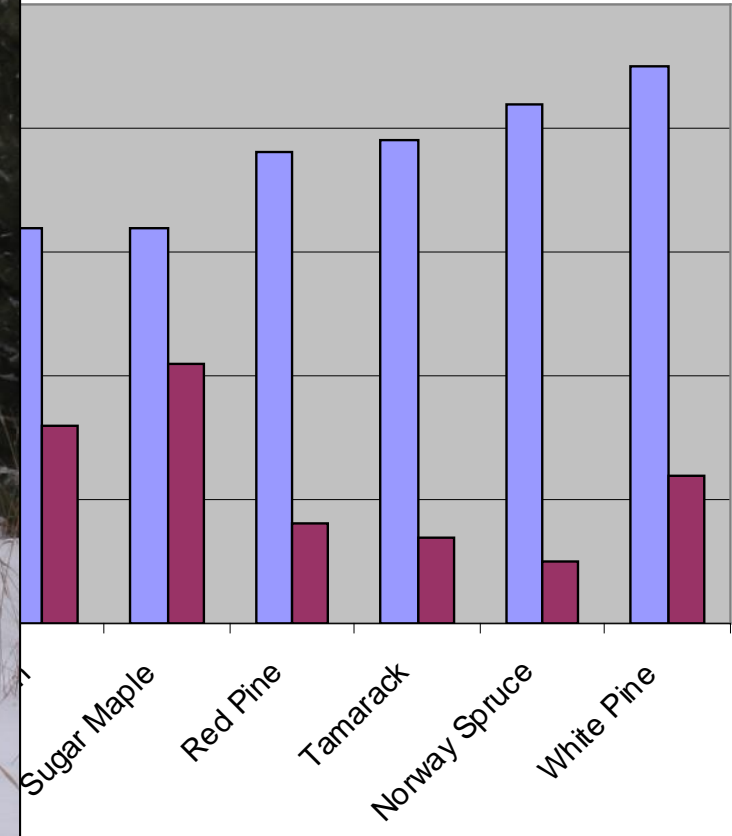
What data are currently available on deer impacts to forest regeneration?

- <http://www.wisconsinforestry.org/initiatives/other/deer-impacts>
- Current research
- Field surveys

CRP Hardwood Plantation Survey - 2006



th in 11 - 16 year old
Mixed Plantations

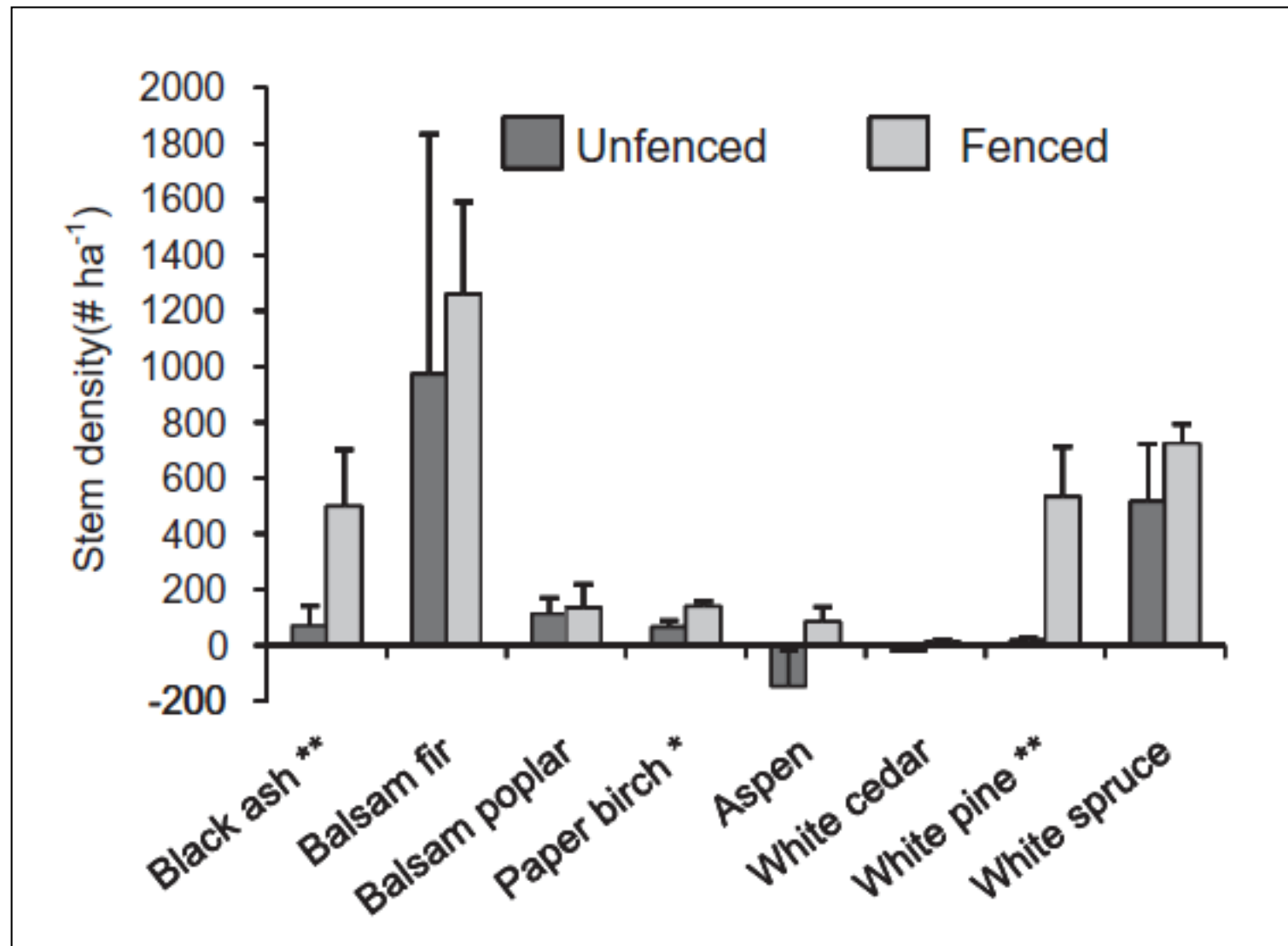


What data are currently available on deer impacts to forest regeneration?

- <http://www.wisconsinforestry.org/initiatives/other/deer-impacts>
- Current research
- Field surveys
- Deer exclosures



White, M.A., 2012. *Long-term effects of deer browsing: Composition, structure and productivity in a northeastern Minnesota old-growth forest.* Forest Ecology and Management 269, 222-228.



□ Others... Holmes and Webster 2011, Fassnacht et. al. 2015, Kern et. al. 2012

What data are currently available on deer impacts to forest regeneration?

- <http://www.wisconsinforestry.org/initiatives/other/deer-impacts>
- Current research
- Field surveys
- Deer exclosures
- Forest Inventory Analysis (FIA) and Wisconsin Continuous Forest Inventory (CFI)
 - Provided tree regeneration density data CDACs at regional level
 - FIA P2+ Protocol – initiated in 2011
 - Based on lessons learned from PA, focus on regeneration height and recruitment and not browse
 - 1/8th of base FIA plots (470), 7 year cycle
 - CFI will add protocol to 1/3rd of plots (1075) in 2017



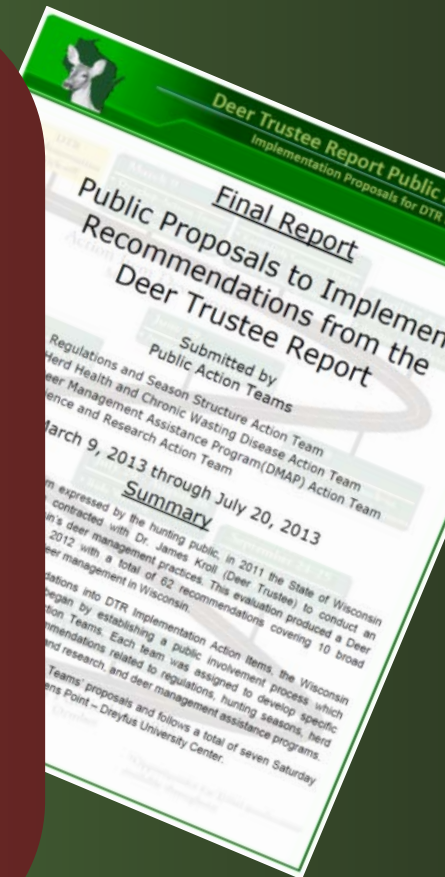
COUNTY DEER ADVISORY COUNCILS

Deer Trustee Report Implementation



60+ Recommendations

- More local involvement
- Increase communication
- More WCC involvement
- Population objectives rather than numeric goals



CDAC Membership

At least 3 members must have deer hunter credentials

Conservation Congress (chair and alternate)

Chippewa Tribe Member - Ceded Territory

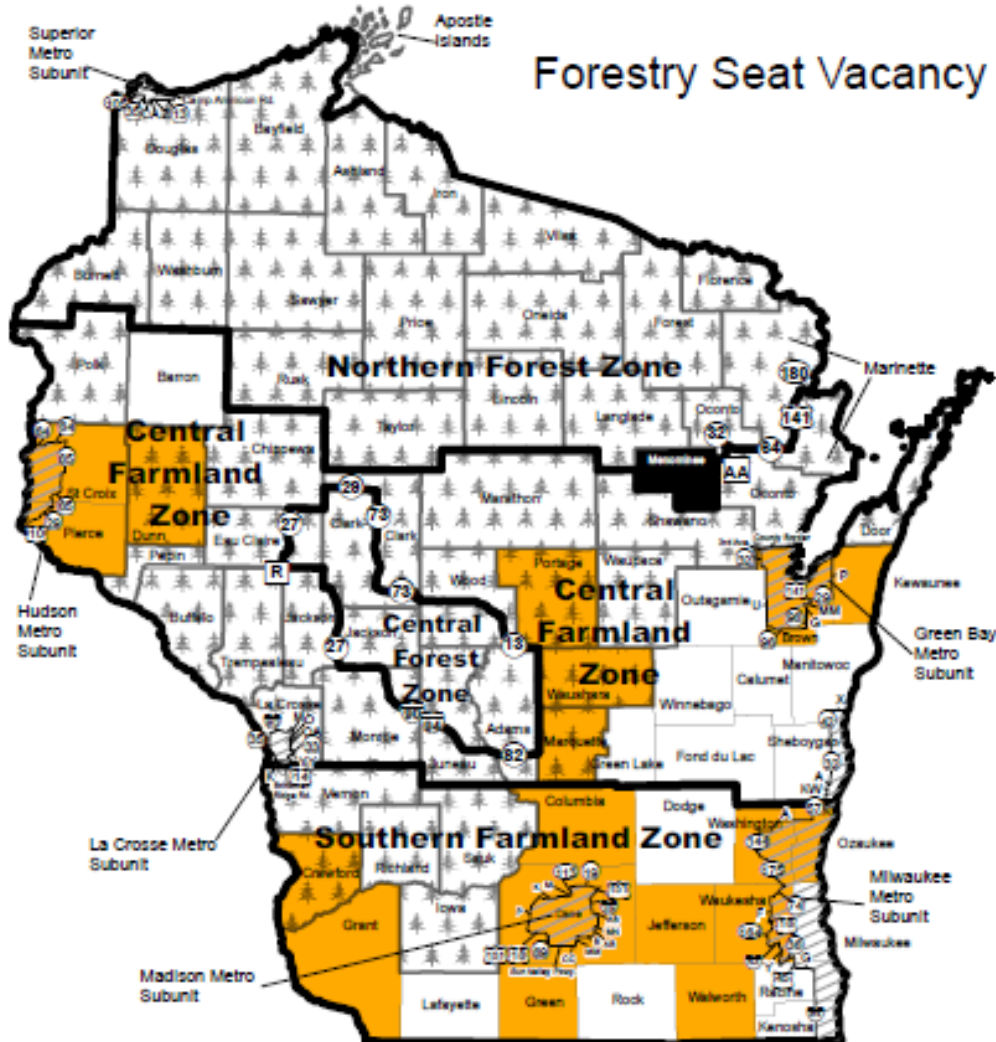
- ▣ Forestry
- ▣ Agriculture
- ▣ Tourism
- ▣ Local hunting club
- ▣ Urban – Metro
- ▣ Transportation
- ▣ DMAP participant

DNR Liaisons:

- ▣ Wildlife
- ▣ Law Enforcement
- ▣ Forestry

County Deer Advisory Councils Vacancies-December 2015

Forestry Seat Vacancy



Legend

- Deer Management Zone Boundary
- ≥30% Forest Cover
- Forestry Seat Vacancy
- County Boundary



CDAC Charter

- ▣ Gather public opinion on deer populations and objectives, antlerless quotas and herd management strategies.
- ▣ Review and consider scientific metrics on deer herd trends, impacts to habitat and agriculture and human-deer interactions.
- ▣ Provide the department with recommendations on deer population objectives and antlerless quotas.

CDAC Metric Information

- 90 page document
- County description
- Deer hunter surveys
- Population statistics
- Herd Health
- Agriculture
- Forest Health
- Human dimensions
- Deer vehicle collisions

County Deer Advisory Council Deer Metrics

Fall 2014

Portage County

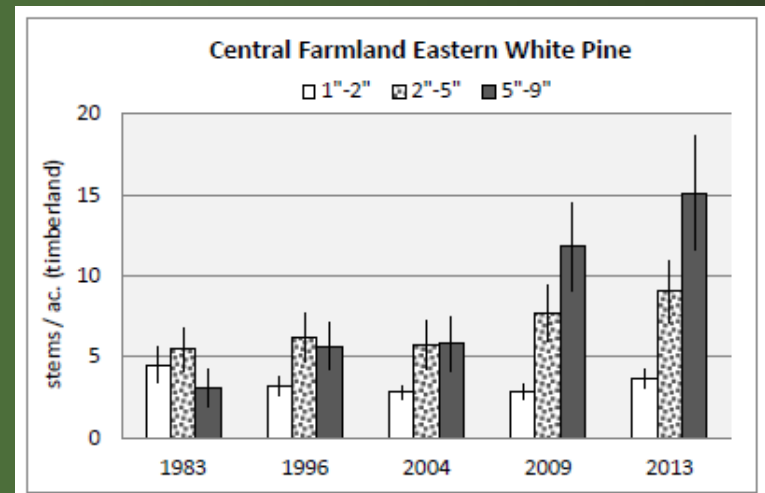
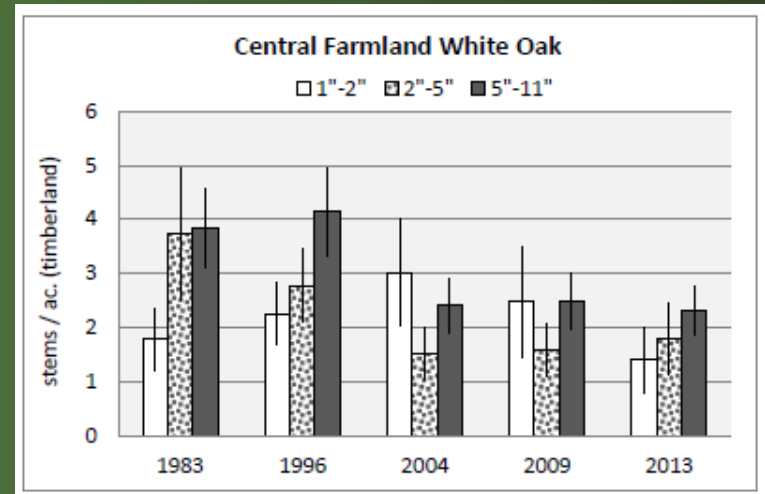


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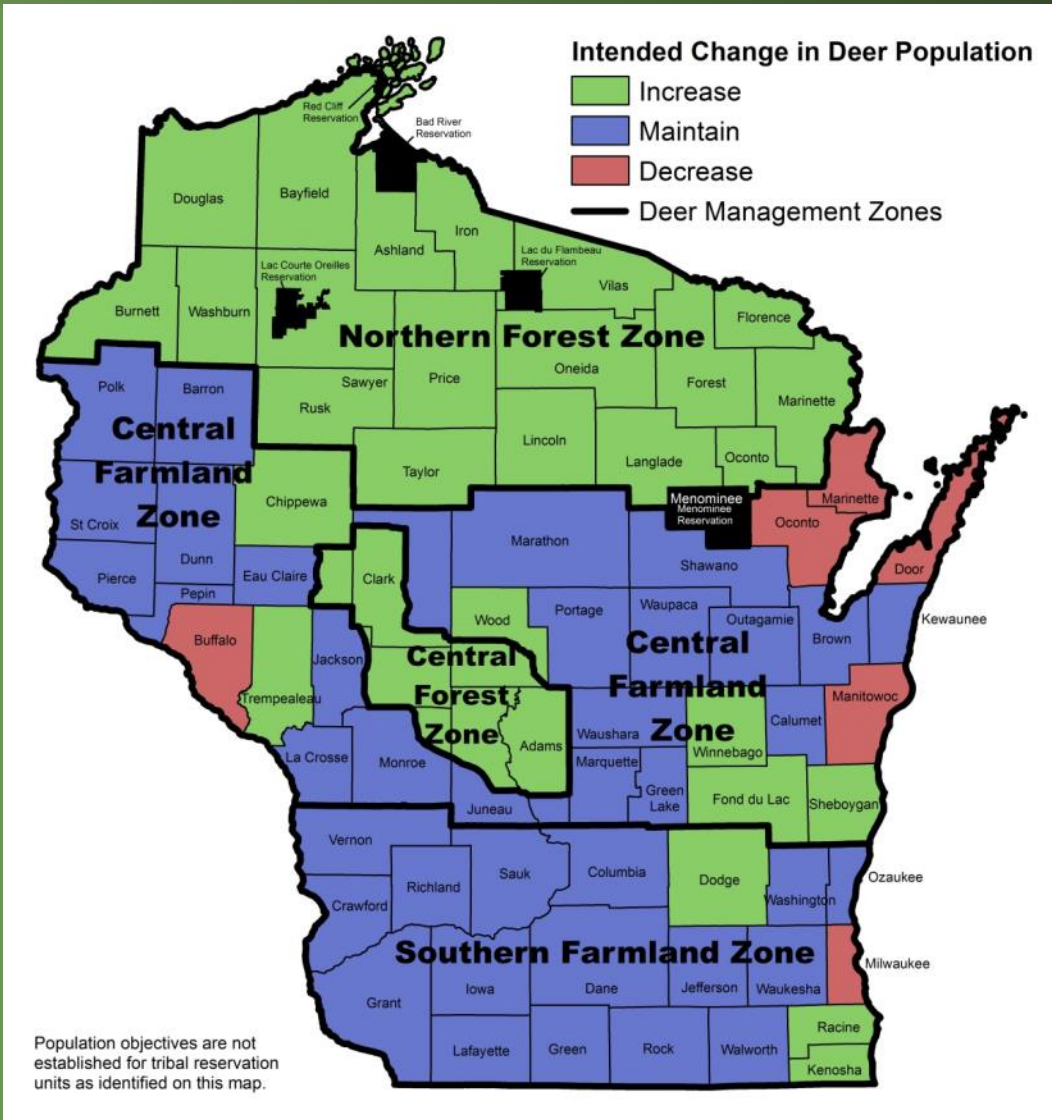


CDAC Forestry Metric

- U.S. Forest Service's Forest Inventory Analysis (FIA)
 - Fixed plots, ~every 2,000 acres
- Stem density & size class
- Inventoried every 7 years
- Only used forested plots
- Focus on important tree species for deer
- Data provided from 1983, 1996, 2004, 2009, and 2013
- Grouped data by region (small sample size at county level)



2015-17 Population Objectives

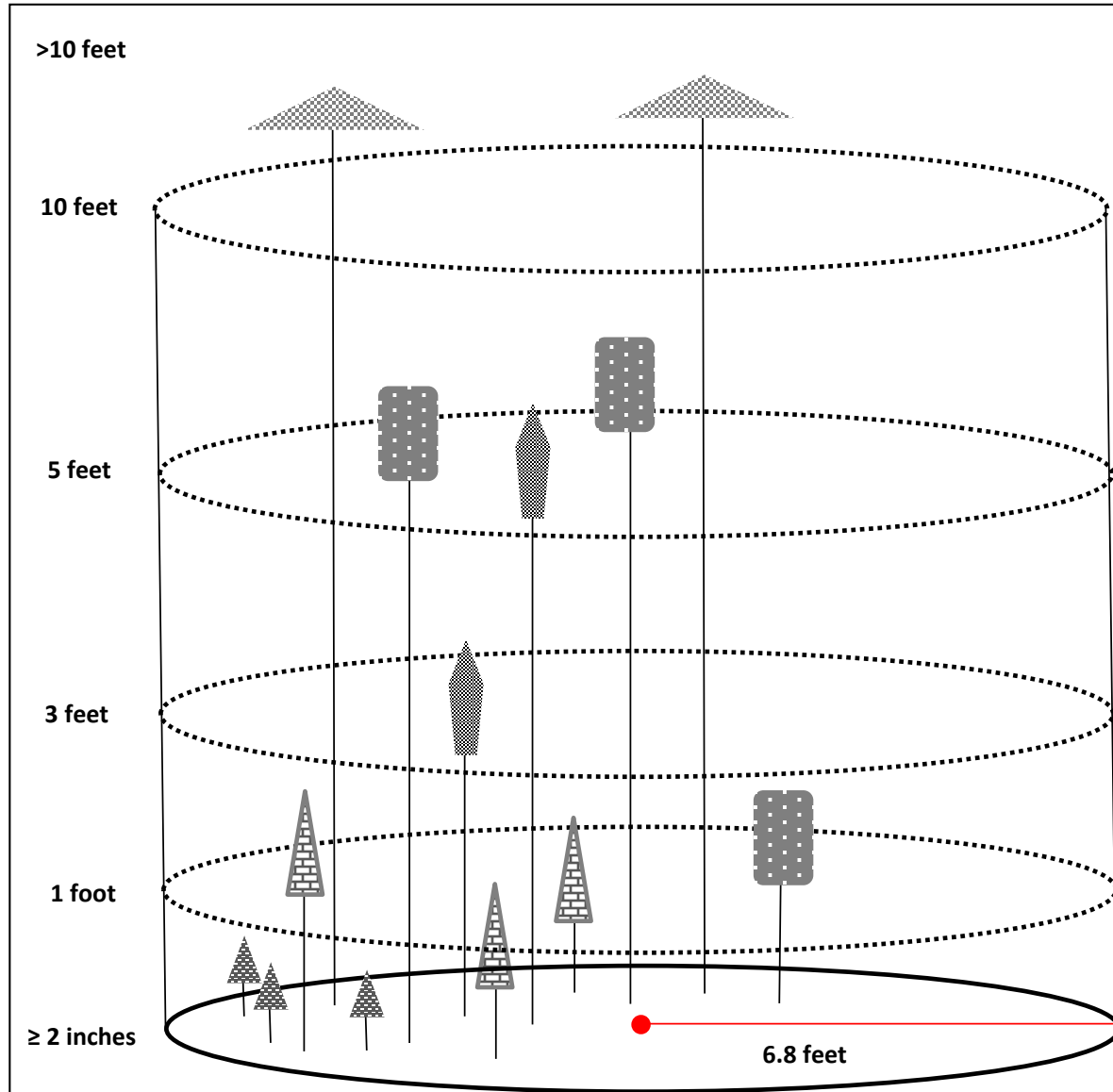


How do we develop deer impact data at a regional and local (County) scale?

- Increase FIA P2+ statistical power = more plots
- Integrate into forester's regeneration checks



Forest Regeneration Monitoring (FRM) – How does it work?



Forest Regeneration Monitoring (FRM)

– What can we learn?

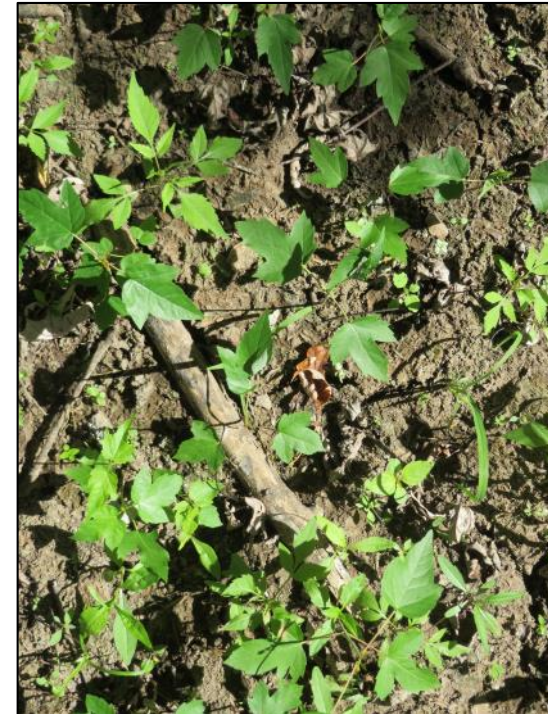
- ❑ Forest regeneration composition and recruitment, by forest type
- ❑ Local and regional variation in deer browse impacts to forest regeneration
- ❑ Future forest growth and productivity
- ❑ Economic impacts of browse?
- ❑ Value of data is in long-term trends



Forest Regeneration Monitoring (FRM)

– What are the logistical challenges?

- Number of plots
 - ▣ 10% sampling error = large # plots
 - ▣ Example – oak/hickory type = 6,400 plots statewide
- Who takes the plots? Partners? Citizen monitoring?
- Majority of plots will need to be on private lands
- Data management and analysis
- Cost
- Training
- Pilot



A photograph of a lush forest floor. The ground is covered with a dense carpet of green ferns and other low-growing plants. The background shows the trunks of trees and more foliage, creating a sense of depth and a vibrant green environment. The lighting is bright, highlighting the various shades of green.

Questions?