Wet Soils
Silviculture & Technology

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Photo R. Slesak

World News

Photo R. Slesak

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World News

Harvesting in black spruce peatlands

No one silver bullet

Montana Timber Products

Outline

- Underlying Characteristics
- Current Practices & Threats
- Case Studies
- Feedback
- What’s next?
- Questions

Uplands with sandy soils different constraints

Contrasting our upland pine sites – there are some big underlying differences

Low nutrient
Low productivity

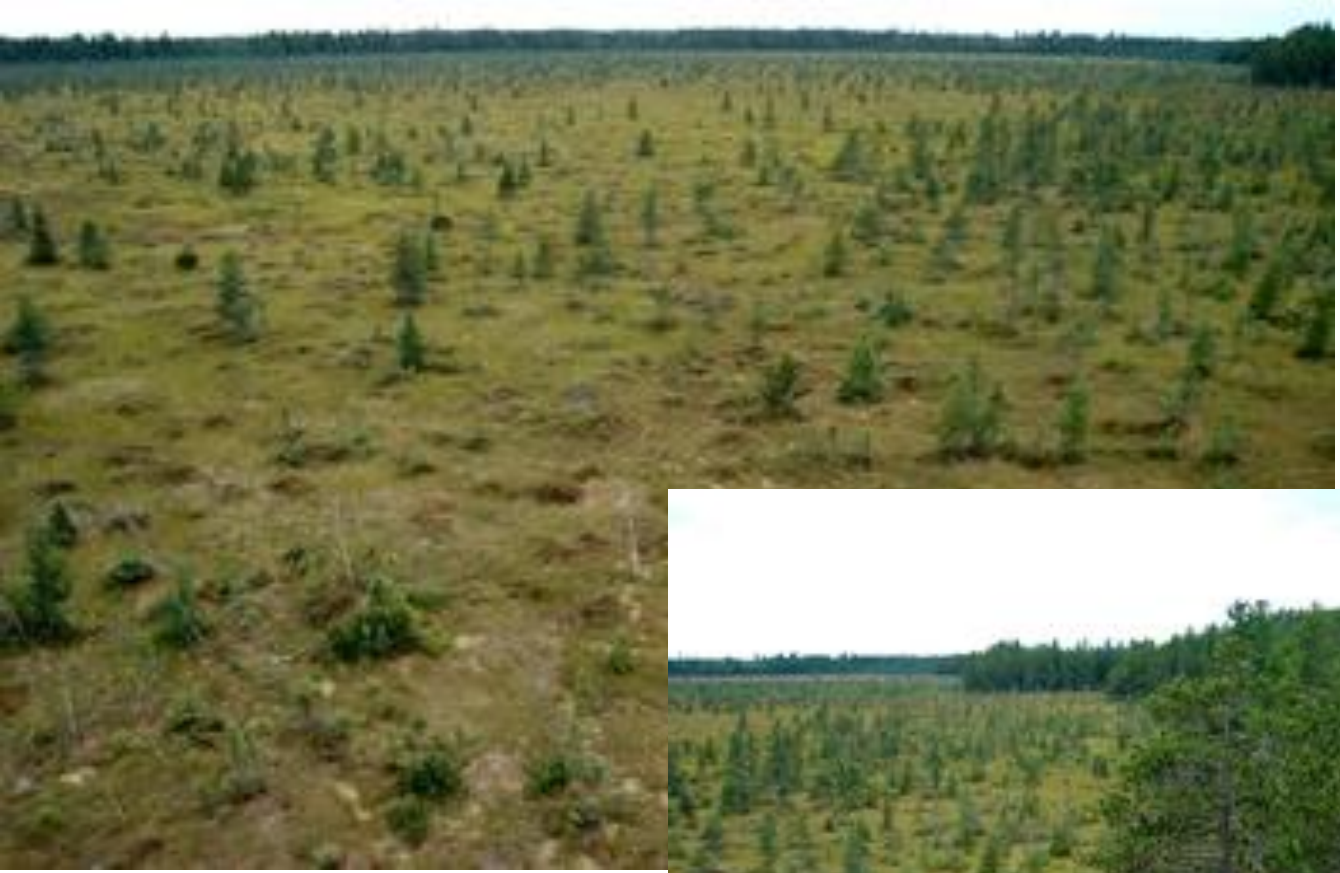

Photo by Joshua G. Cohen

Dan Kraker | MPR News

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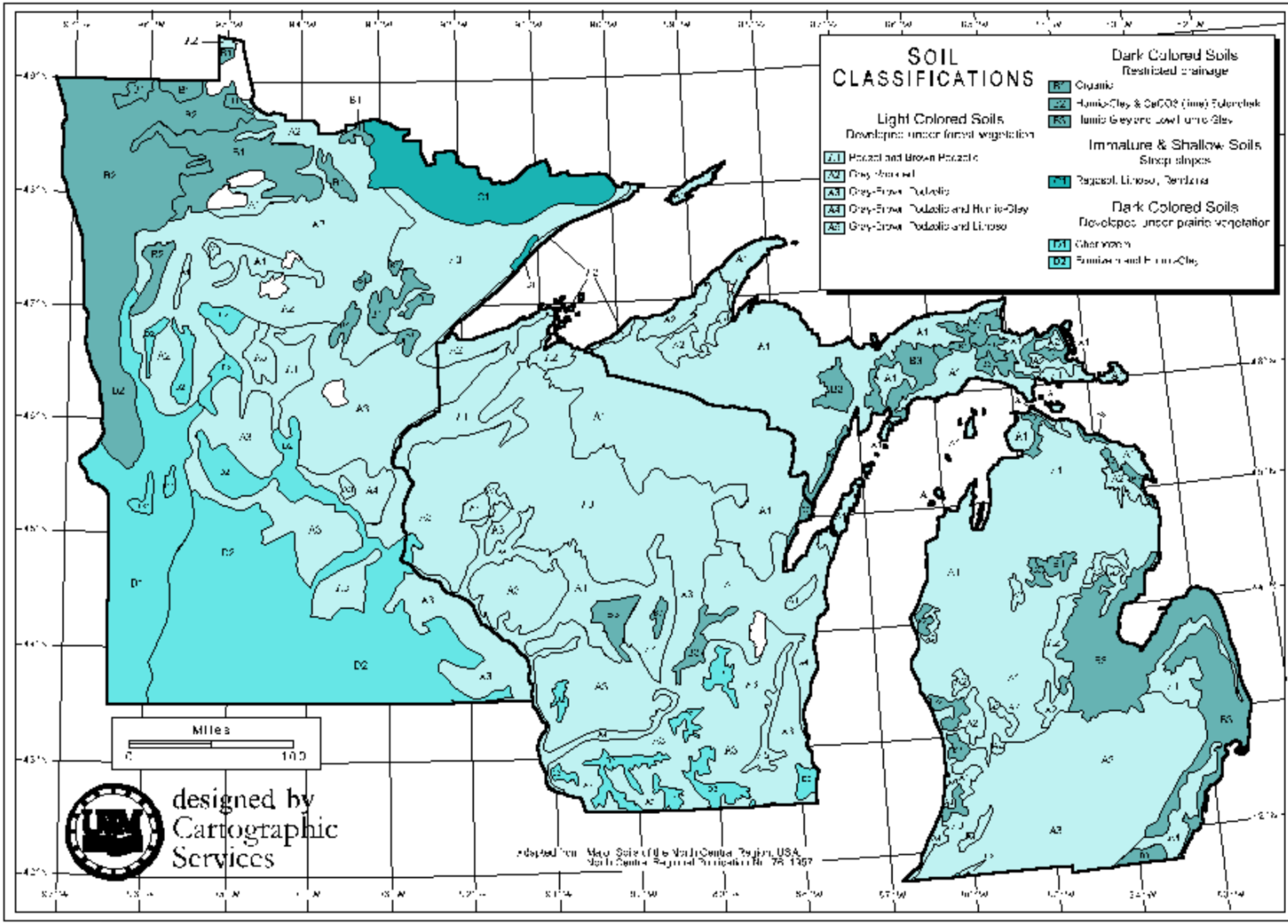
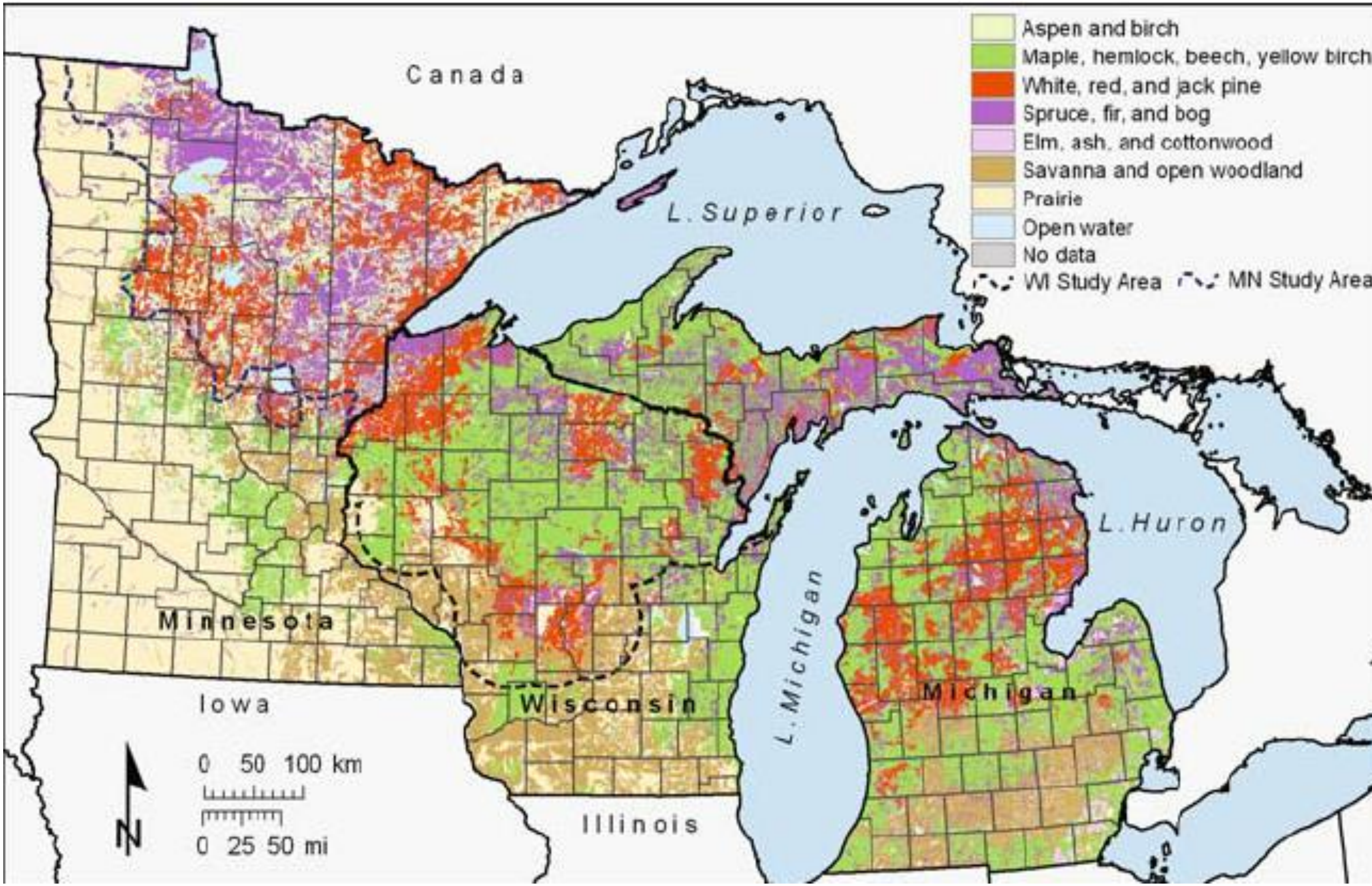


Stearns, Forest W. 1997. Physical environment supporting Lake States Forests. In: Vasievich, J. Michael; Webster, Henry H., eds. Lake States Regional Forest Resources Assessment: Technical Papers. Gen. Tech. Rep. NC-189. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 1-7.

Georgia Tech / Ben Brumfield

Pre-European land cover (1800s) in the Great Lakes region.



Mladenoff et al. 200

DOI: 10.1007/978-0-387-85952-1_8 ·
In book: Recovery of Gray Wolves in the Great Lakes Region of the United States, pp.119-138

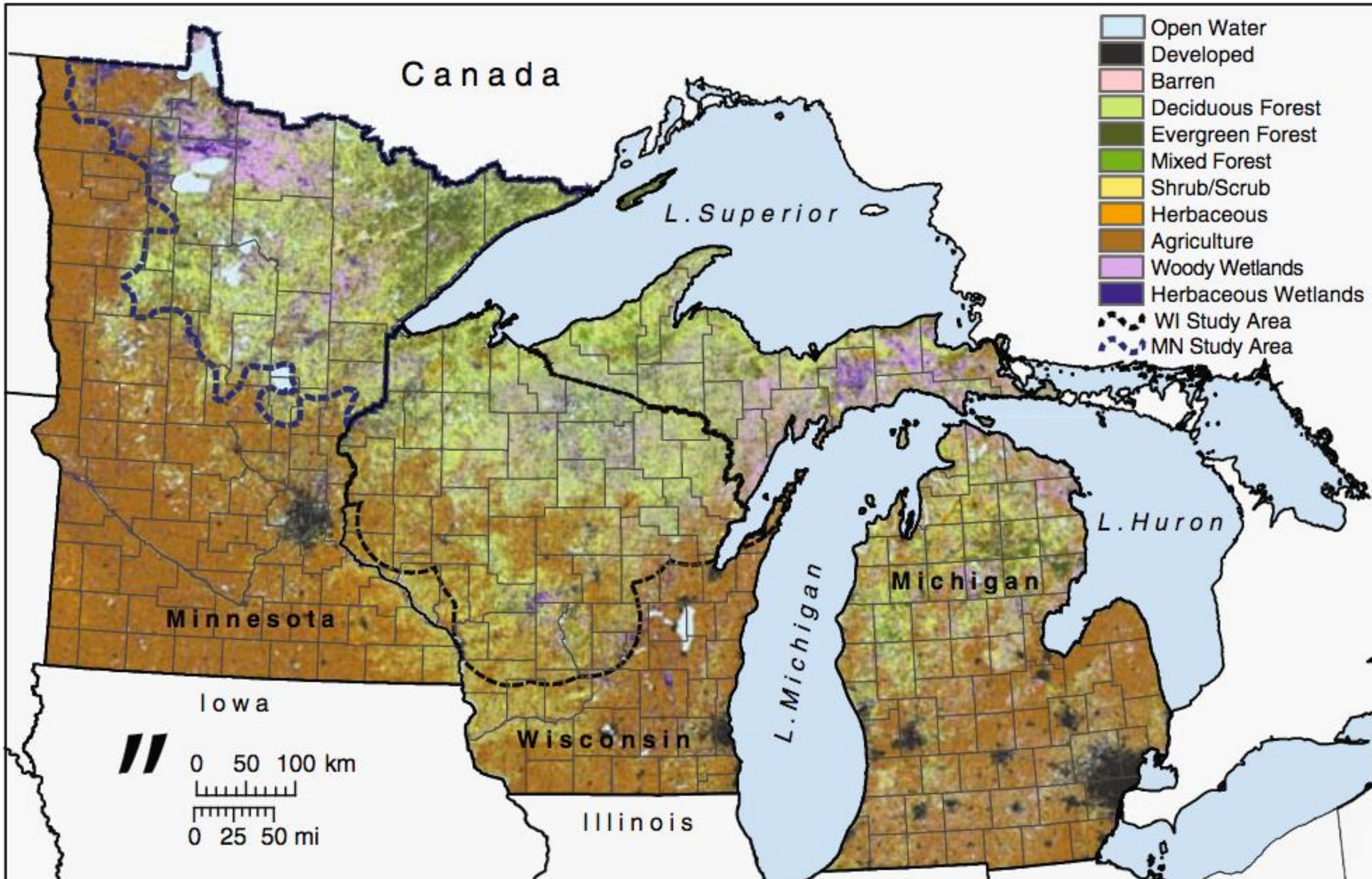


Fig. 8.1 Current land cover in Minnesota, Wisconsin, and Michigan. Data source: USGS National Land Cover Database 2001 (2006). Map created: Forest Landscape Ecology Laboratory, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison. © David J. Mladenoff (*see Color Plate 1*)

Peat great at accumulating carbon not great for working in

Minnesota DNR

Thumb Land Conservancy

Photo: Susan C. Morse

Photo: from the forestry forum

Times are a changing

Super-Sized January Thaw Continues - Few Slushy Inches Tuesday Night - Coldest Inhabited Town on Earth?

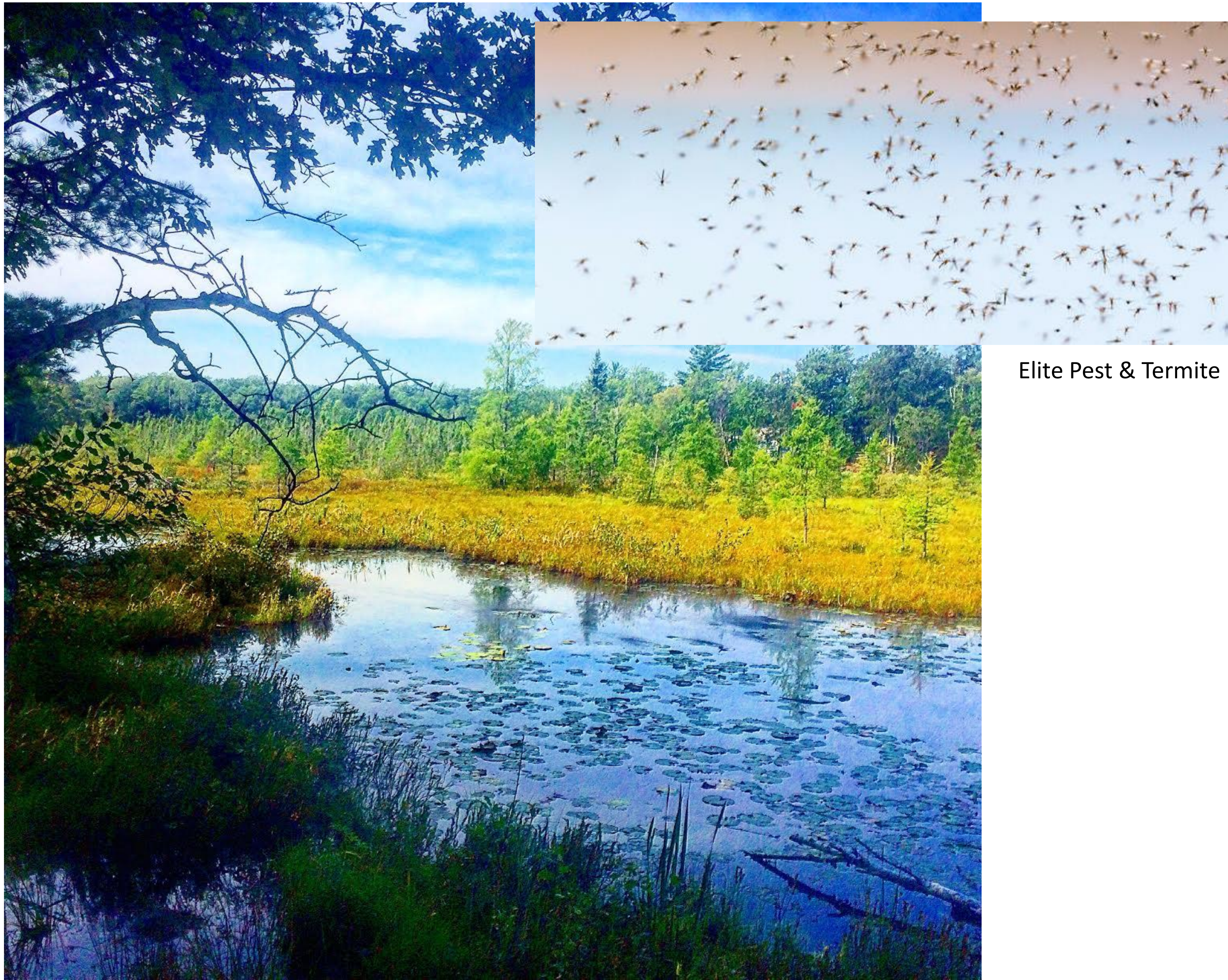
By Paul Douglas | JANUARY 22, 2017 — 10:33PM

4th of 5th Longest January Thaw on Record for MSP

Threats to these forests

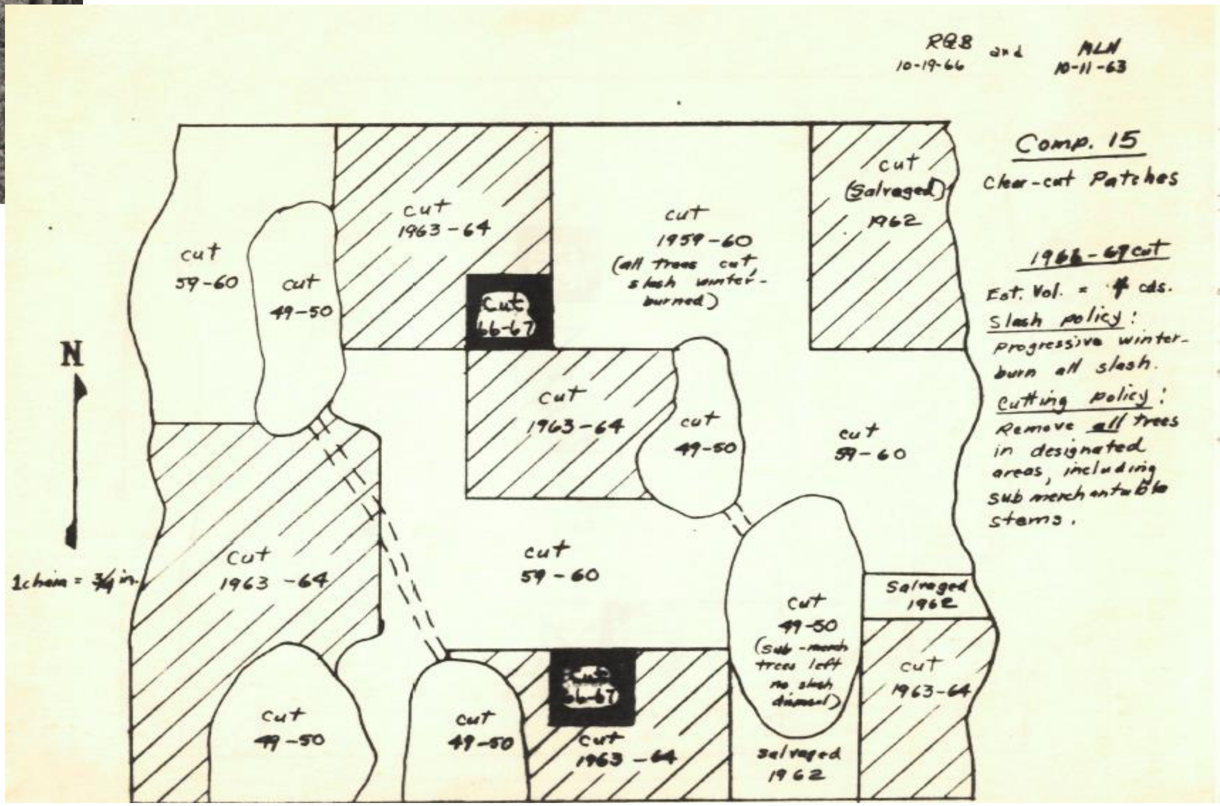
- Forest health
  - EAB
  - Eastern larch beetle
  - Dwarf mistletoe
- Climate change
  - Shifting seasons, shorter winters
  - Increased stress, potentially increasing fire
- Shifting hydrology

Understudied systems



Elite Pest & Termite

Big Falls Experimental Forest



Previous Results

Fig. 1. This mortality at the Big Falls Experimental Forest includes both uprooting and mainstem breakage.

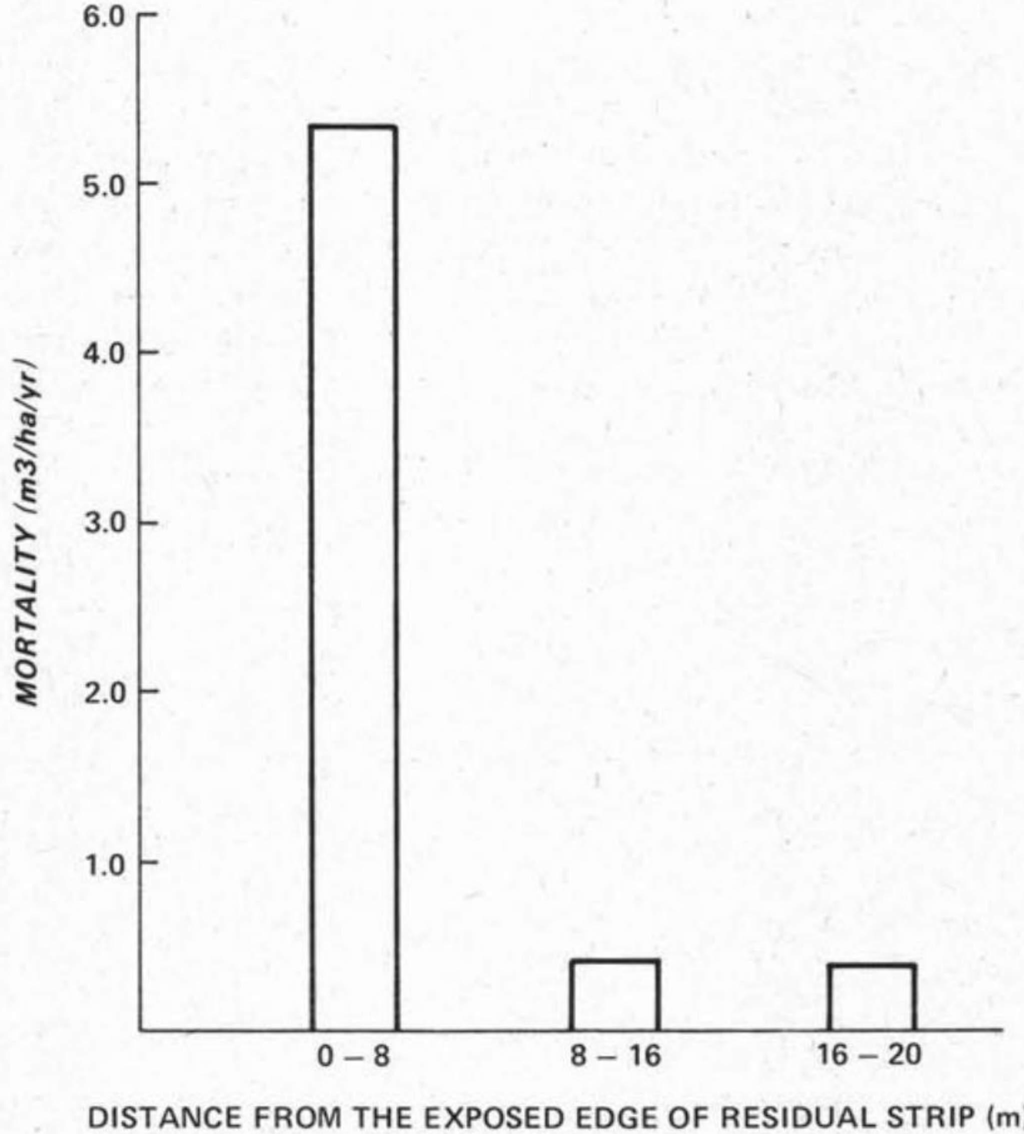


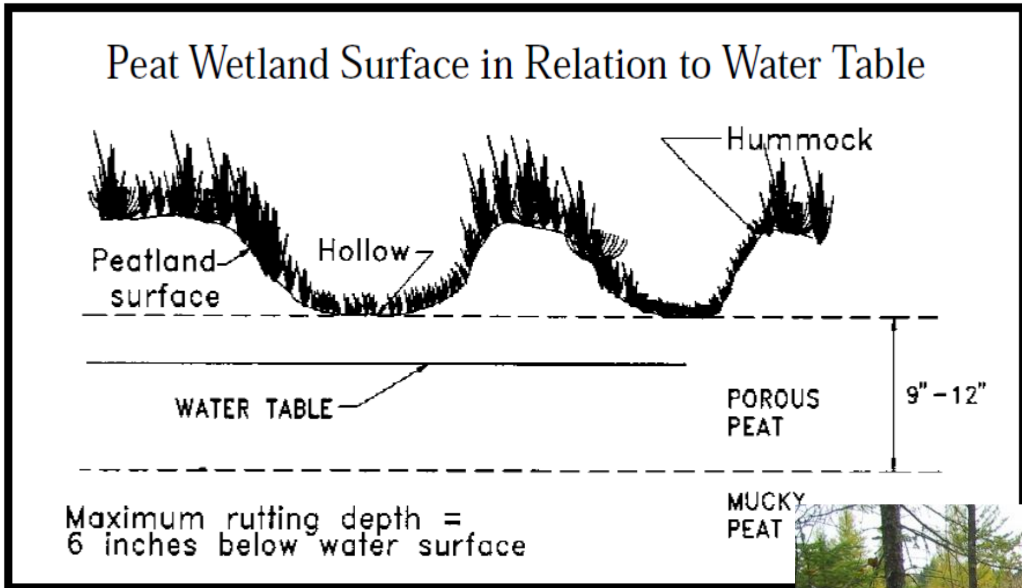
Fig. 3. Wind-caused mortality in relation to distance into the uncut strips remaining after the 1959-1961 cuttings on the Big Falls Experimental Forest.

Elling, A. E., & Verry, E. S. (1978). Predicting wind-caused mortality in strip-cut stands of peatland black spruce. The Forestry Chronicle, 54(5), 249-252.

Same Experiment, New Questions

1. To study the effects of traditional versus alternative silvicultural methods on individual tree diameter growth
2. To study the effects of traditional versus alternative silvicultural methods on stand level dynamics

Black Spruce & Rutting



Morris, D. M., Mackereth, R. W., Duckert, D. R., & Hoepting, M. K. (2009). The influence of soil rutting severity on regeneration potential and seedling performance for black spruce-dominated peatlands. Canadian Journal of Soil Science, 89(1), 57-66.

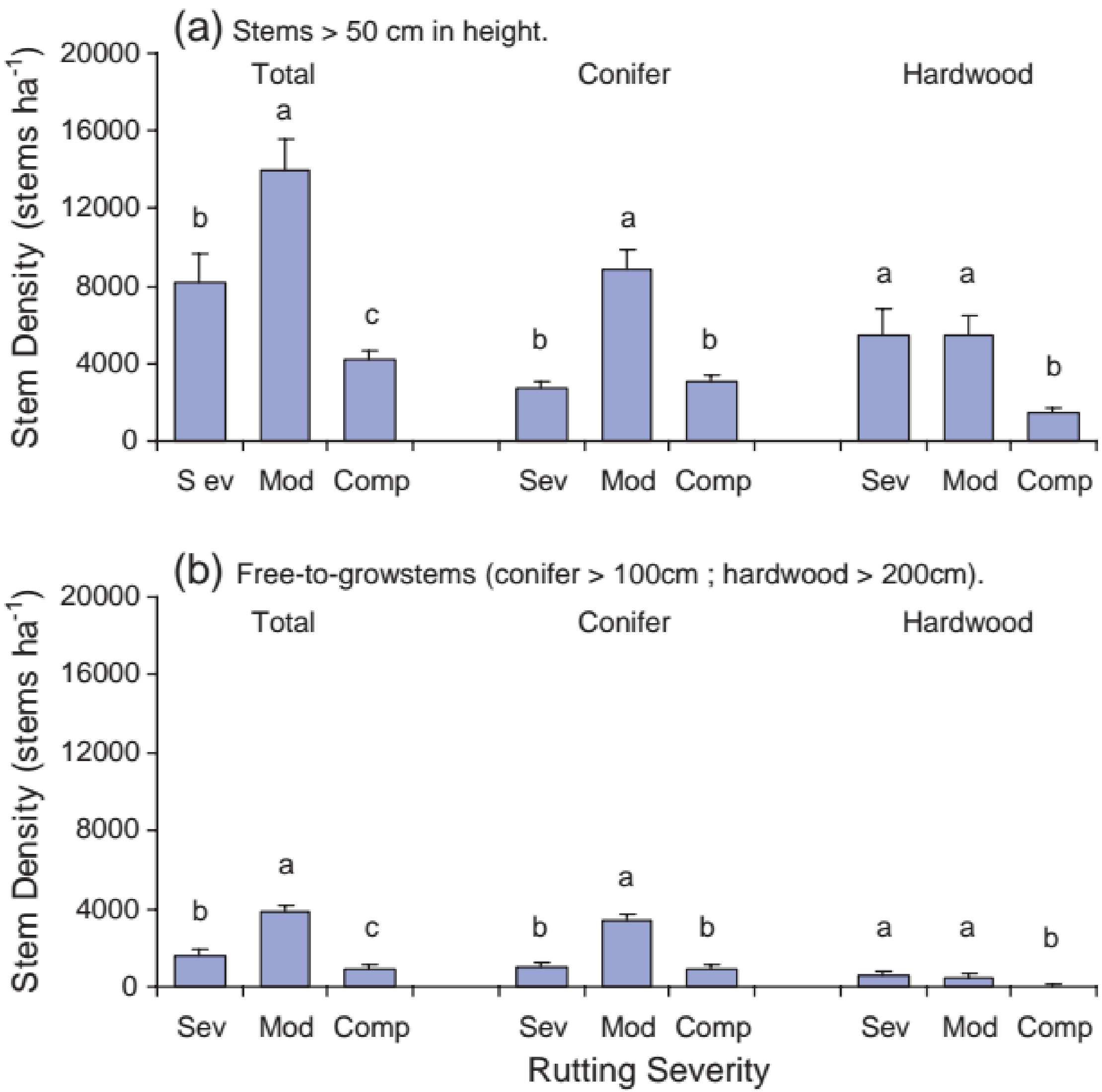


Fig. 1. Comparison of stem densities of naturally regenerated black spruce seedlings (a) greater than 50 cm in height and (b) stems that have reached free-to-grow (conifer > 100 cm; hardwood > 200 cm) for severely-rutted, moderately-rutted, and non-rutted (compliant) harvest blocks.

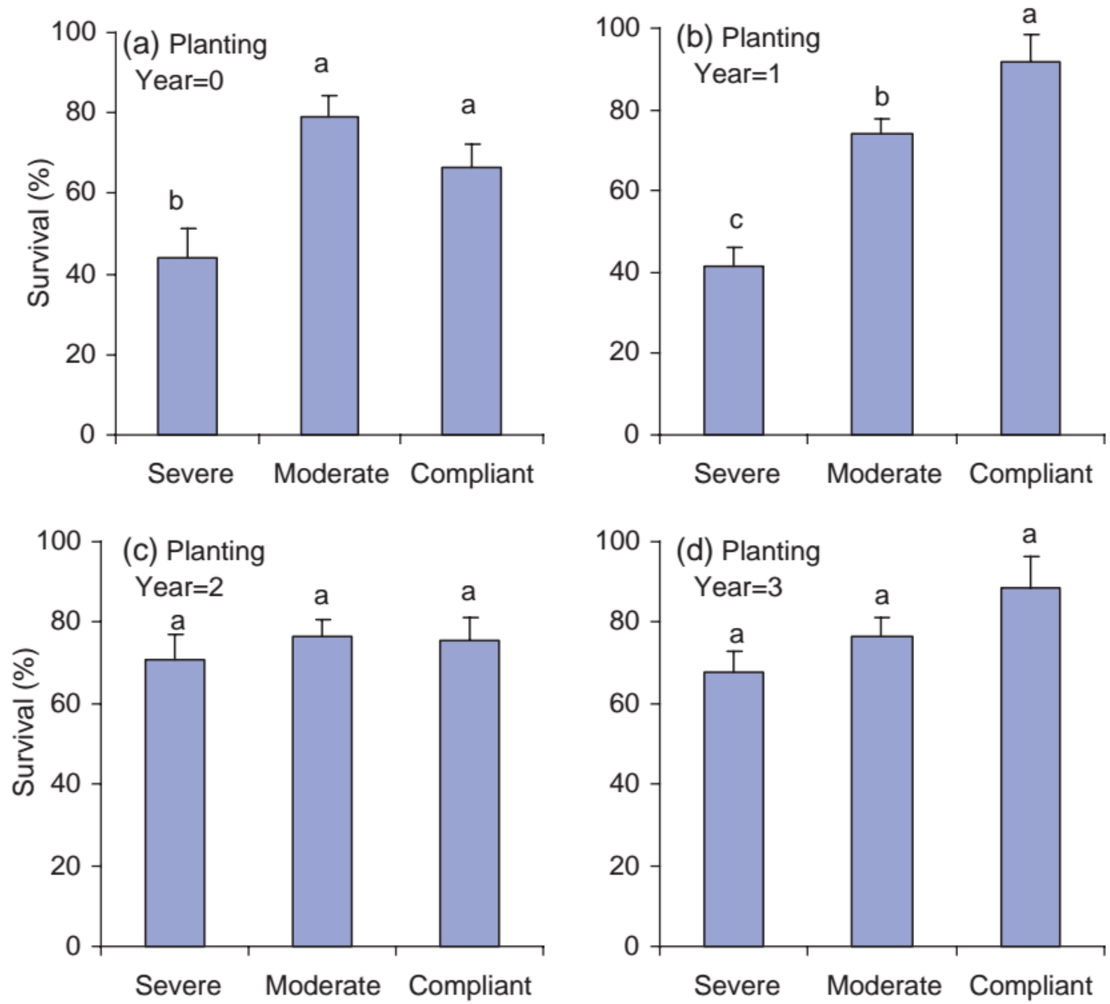
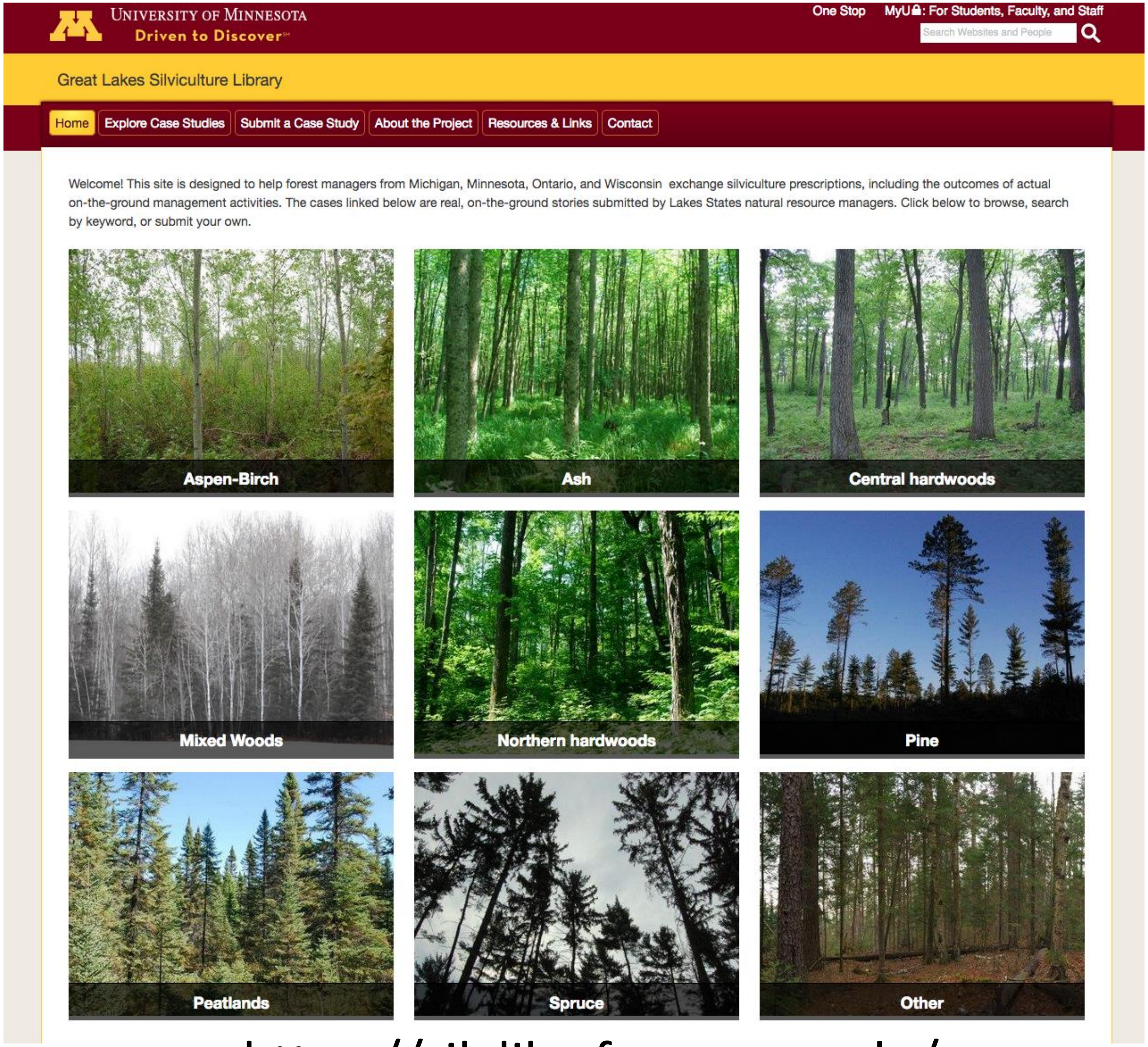


Fig. 2. Comparison of black spruce seedling survival, measured in 2006, resulting from a delayed planting option of harvested black spruce peatlands.

Case Studies



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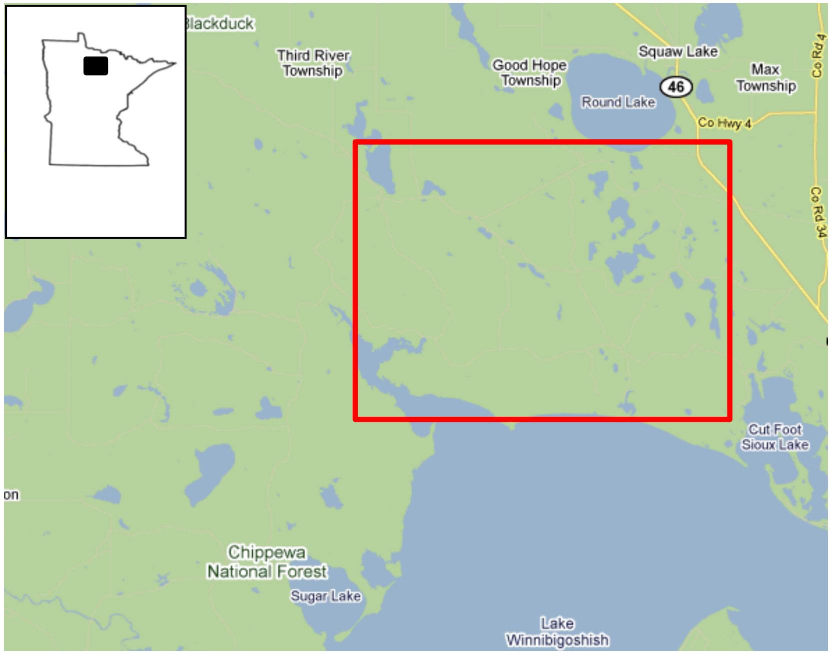
Evaluating the ecological impacts of EAB and climate change on black ash forests (Chippewa NF)

Rob Slesak, Tony D'Amato, Brian Palik, Chris Looney, Daniel McLaughlin, Jake Diamond

Photo by Rob Slesak

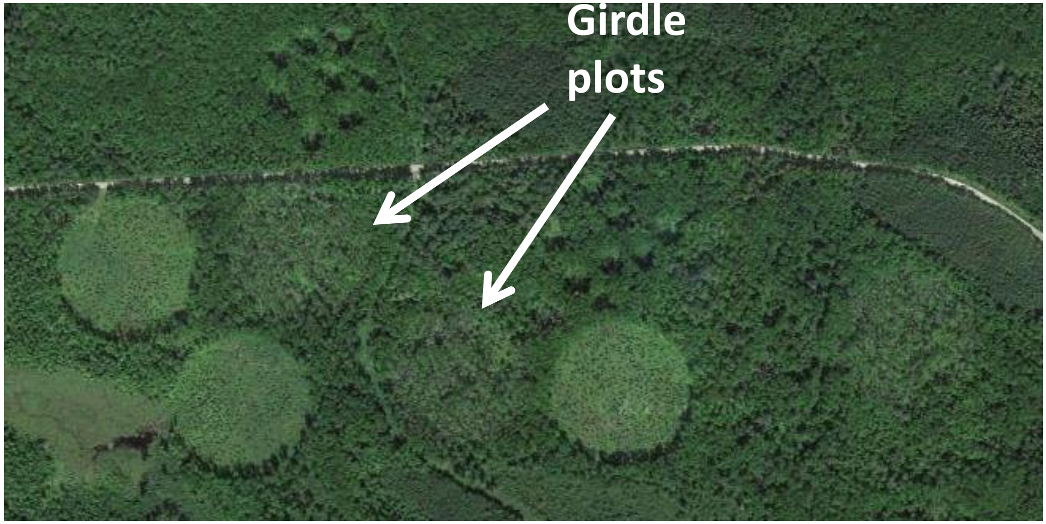
Experimental design

Chippewa NF
WFn 55 and WFn64
80-95% black ash dominance



Treatments

1) Girdle ash >6 cm
2) Clearcut
3) 20% removal group selection
4) Control



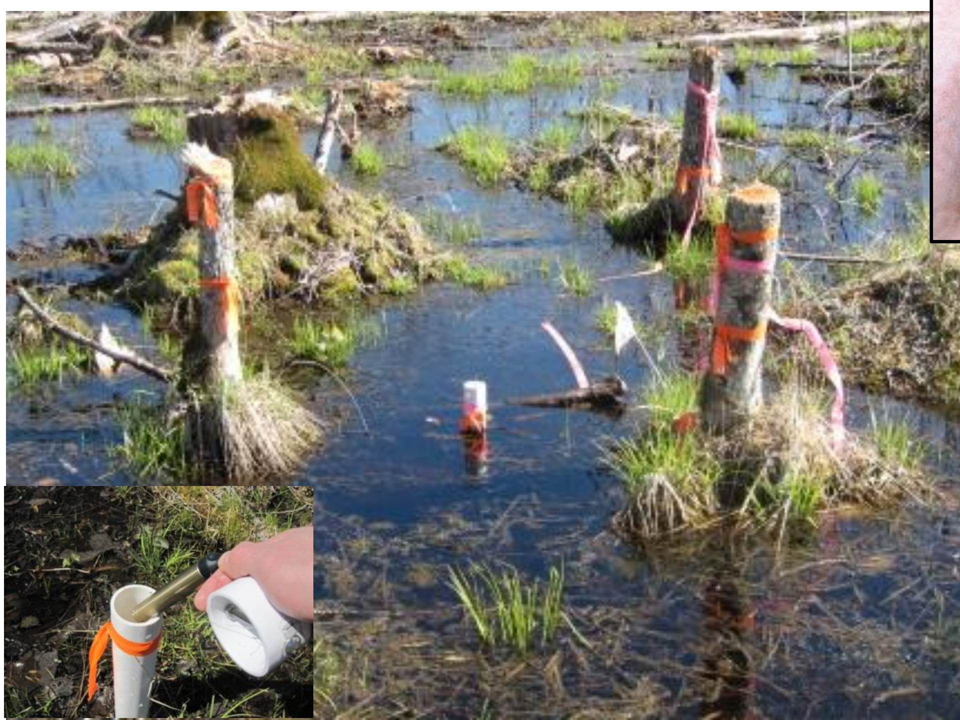
4 acre plots, 8 replications
Established winter 2011

Slide from R. Slesak

Site Limitations & Hydrology

Mineral soils with confining layer at 0.5-3 m depth

Precipitation is dominant water source (~700 mm annual)



Shallow subsurface interflow

Typically flooded through spring and sometimes into summer

Slide from R. Slesak

Experimental design at a glance

Group selection

Clearcutting

Survival of Planted Stock

Species	Clearcut	Control	Girdle	Group
red maple	14.7	33.3	29.6	33.5
yellow birch	0.3	3.9	4.9	6.5
hackberry	17.3	76.7	66.1	51.6
Manchurian ash	56.5	74.4	84.4	78.3
tamarack	8.1	8.1	7.3	14.8
black spruce	11.4	17.4	24.9	22.7
balsam poplar	39.3	28.5	31.2	45
cottonwood	11.6	5.3	10.9	16
trembling aspen	7.6	0.3	3.2	8.4
swamp white oak	68.2	83.2	74.4	76.5
white cedar	4.2	16.1	15.5	13.8
American elm	31.8	93	91.3	87
Overall	22.1	32.9	33.3	34.5

Additional Resources

- Looney, C. E., D’Amato, A. W., Palik, B. J., & Slesak, R. A. (2015). Overstory treatment and planting season affect survival of replacement tree species in emerald ash borer threatened Fraxinus nigra forests in Minnesota, USA. *Canadian Journal of Forest Research*, *45*(12), 1728-1738.
- Looney, C. E., D’Amato, A. W., Palik, B. J., & Slesak, R. A. (2016). Canopy treatment influences growth of replacement tree species in Fraxinus nigra forests threatened by the emerald ash borer in Minnesota, USA. *Canadian Journal of Forest Research*, *47*(999), 183-192.
- Looney, C. E., D'Amato, A. W., Palik, B. J., Slesak, R. A., & Slater, M. A. (2017). The response of Fraxinus nigra forest ground-layer vegetation to emulated emerald ash borer mortality and management strategies in northern Minnesota, USA. *Forest Ecology and Management*, *389*, 352-363.
- Looney, C. E., D’Amato, A. W., Fraver, S., Palik, B. J., & Reinikainen, M. R. (2016). Examining the influences of tree-to-tree competition and climate on size-growth relationships in hydric, multi-aged Fraxinus nigra stands. *Forest Ecology and Management*, *375*, 238-248.
- Slesak, R. A., Lenhart, C. F., Brooks, K. N., D’Amato, A. W., & Palik, B. J. (2014). Water table response to harvesting and simulated emerald ash borer mortality in black ash wetlands in Minnesota, USA. *Canadian Journal of Forest Research*, *44*(8), 961-968.
- Telander, A. C., Slesak, R. A., D’Amato, A. W., Palik, B. J., Brooks, K. N., & Lenhart, C. F. (2015). Sap flow of black ash in wetland forests of northern Minnesota, USA: hydrologic implications of tree mortality due to emerald ash borer. *Agricultural and Forest Meteorology*, *206*, 4-11.

Alternatives in black spruce stands UPM Blandin

Photo by Adam Sutherland

The PONSSE 10w solution is based on a simple and reliable idea: a third pair of wheels and tracks suitable for the conditions are mounted behind the rear bogie.

Dwarf Mistletoe Control Trial Site Submitted by Angela Yuksa MN DNR

Photo by Angela Yuska

Minnesota Department of Natural Resources

ASV with mulching head grinding up dwarf mistletoe infected black spruce saplings
Photo by Angela Yuska

Your Experience

- What has worked for you or your organization?
- What information do you wish you had to better inform your management decisions?

Email: mwind@umn.edu

Gerald J. Lenhard, Louisiana State University

YouTube

Rethinking on how we operate in these system?

- Research on impacts of operating on non-frozen ground
  - How much of a mineral content?
  - How dry is dry enough?
  - What is an appropriate level of site impact?
- Need examples from you (https://silvlib.cfans.umn.edu/content/submit-case-study)

Submit a Case Study

To contribute, you have to have a Silviculture Library account. To start that process, fill out the form below. If you don't hear back from us within a business day, contact Eli Sagor at esagor@umn.edu or (218) 409-6115.

Summary

- Lowland systems are challenging to work in
- Threats on the horizon to these systems
- Case Studies
  - Harvesting in black ash
  - Cut-to-length in black spruce
  - ASV in black ash
- Harvesting in the Southeast
- Sharing experiences and research for the future knowledge

Acknowledgements

Thank you for the opportunity to present

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- UPM Blandin
- Great Lakes Silviculture Library (https://silvlib.cfans.umn.edu/)
- UMN Silviculture Lab

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