

# *Timber Harvest and Invasive Plant Establishment in Northeastern Minnesota*

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# Outline

- Invasive plants-timber harvest
- Study area and methods
- Large patch project-collaborative forest management
- Results
- Management implications



# Invasive Plants and Timber Harvest

- Summer logging: soil disturbance
- New roads, skid trails
- Logging equipment: moves within and between sites
- Harvest: increase light, nutrient, mineral soil
- **Facilitates invasive plant establishment!**



# Invasive Plants and Timber Harvest

- Invasive plant distribution at time of harvest?
- Post-harvest establishment: timing, location? Skid trail, road, landing
- Distance from sources
- Role of logging equipment
- Species: frequency and abundance
- Management recommendations

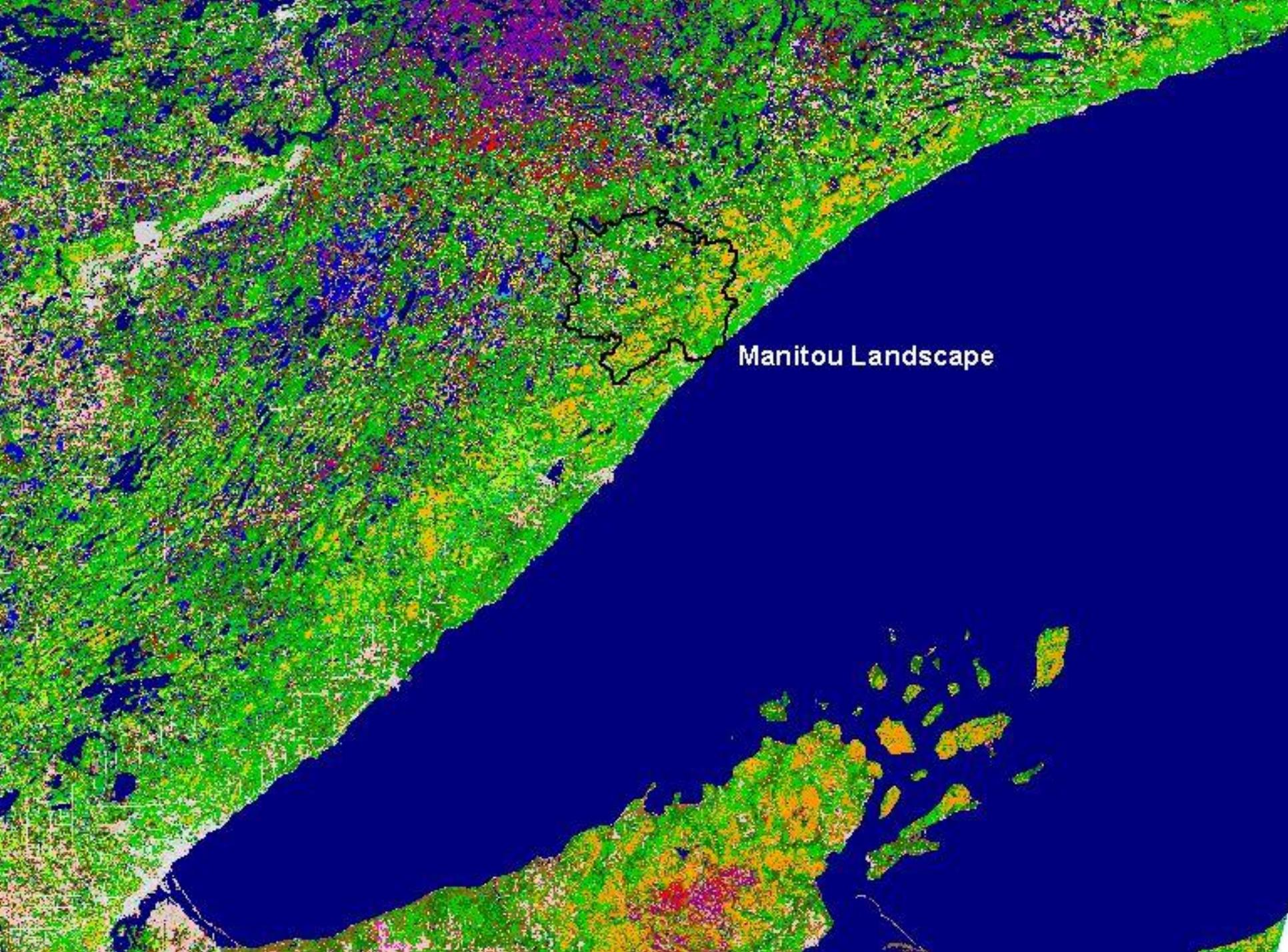


# Manitou Landscape

- 42,000 ha
- Working landscape-high biodiversity significance
- Multiple owners-public and private
- Collaborative forest management: MN DNR, Superior National Forest, Lake County

## Large Patch Project

- 400 ha, ecological forestry, restore long-lived conifers, spatial pattern, summer harvest
- Variable density-higher retention harvest
- Plant white pine and white cedar
- Browse protection

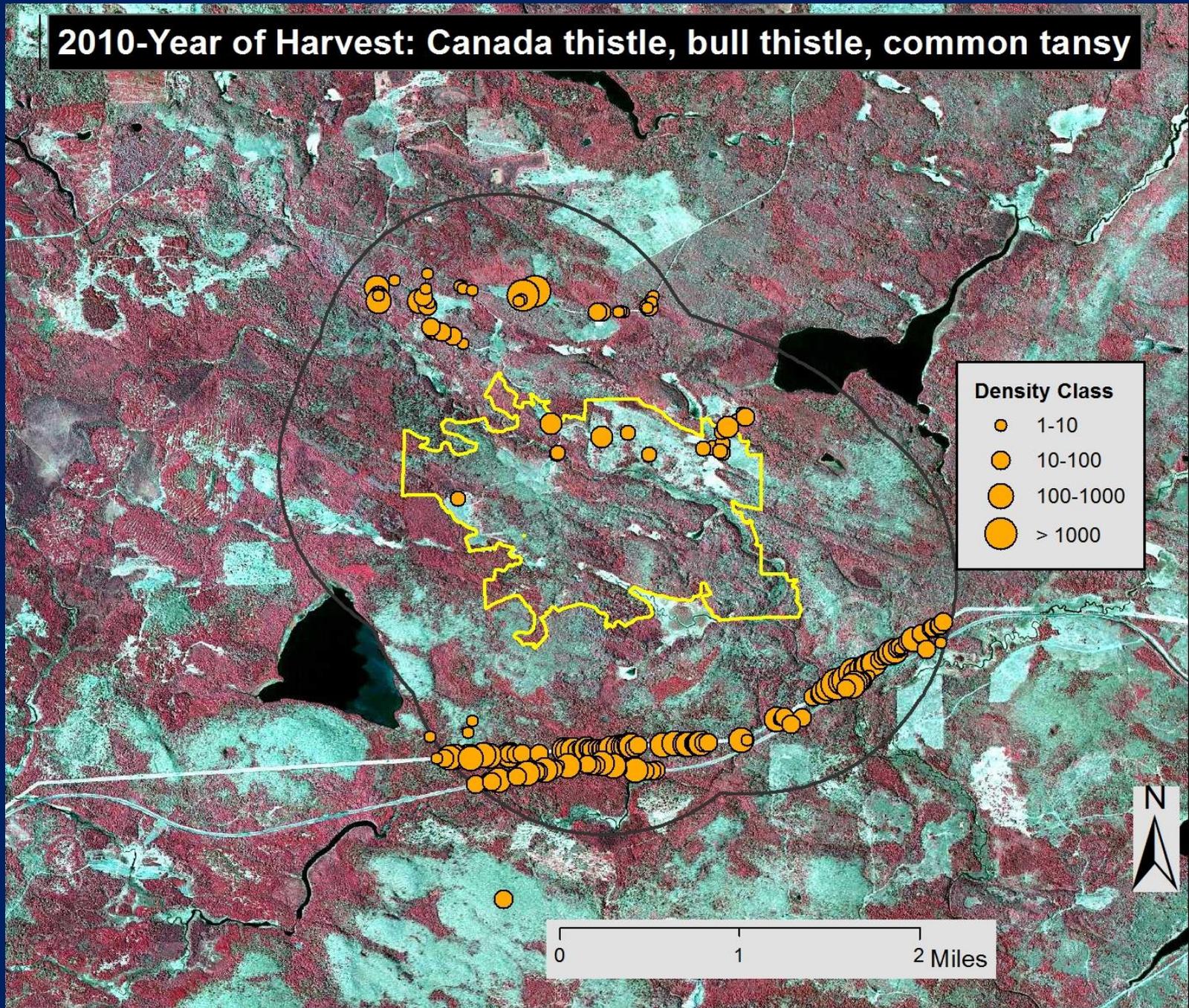


Manitou Landscape

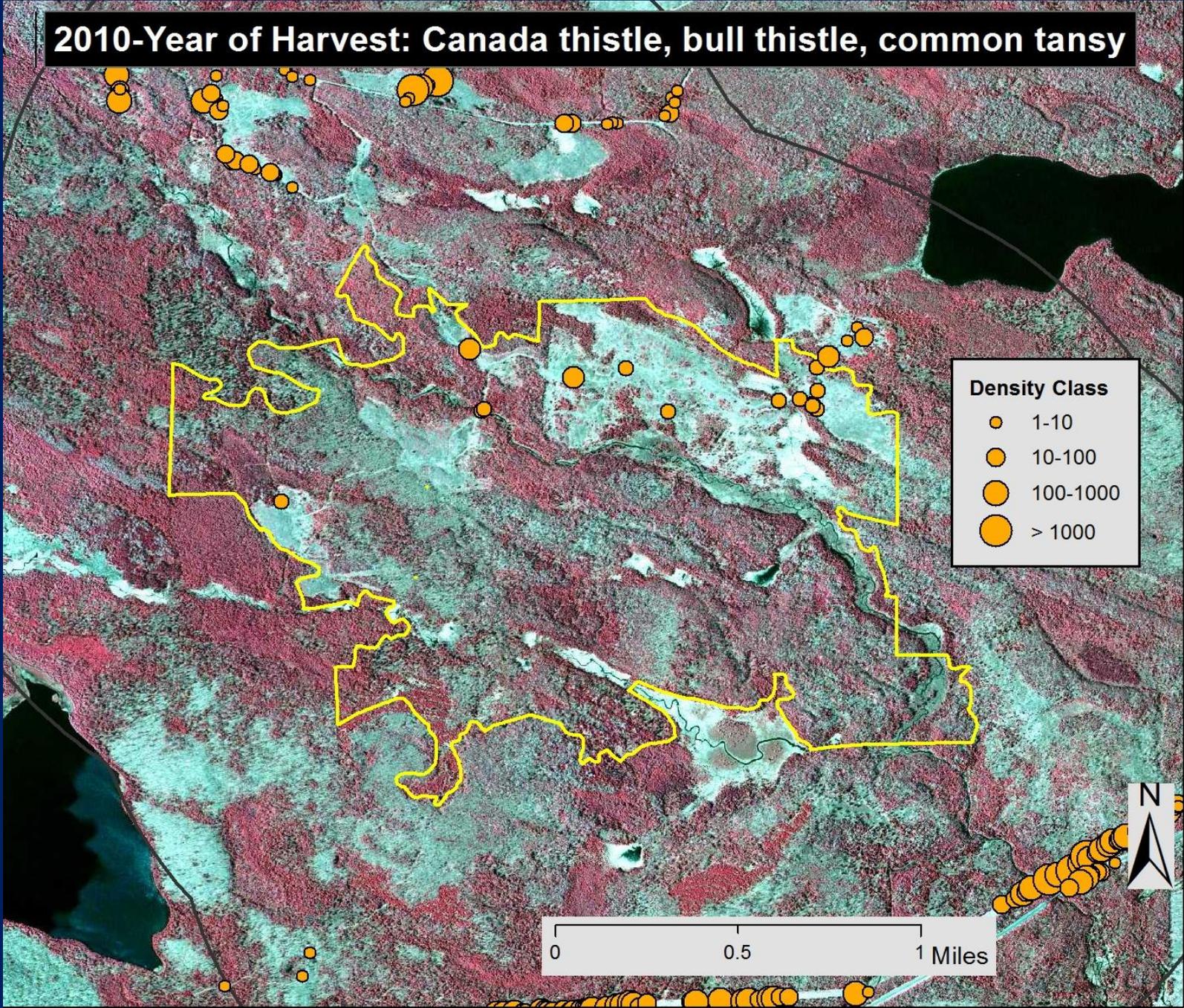
# Methods

- 2008-2009: 131 transects in un-harvested forest
- 2010: survey roads/trails on site, within 1 mi buffer.
- Record species, location, density, distribution, area
- 2011-2012: landing transects, survey roads + skid trail. Resample 60 vegetation plots
- Logger survey: equipment cleaning-limit spread of invasive plants to new sites
- Invasive earthworms

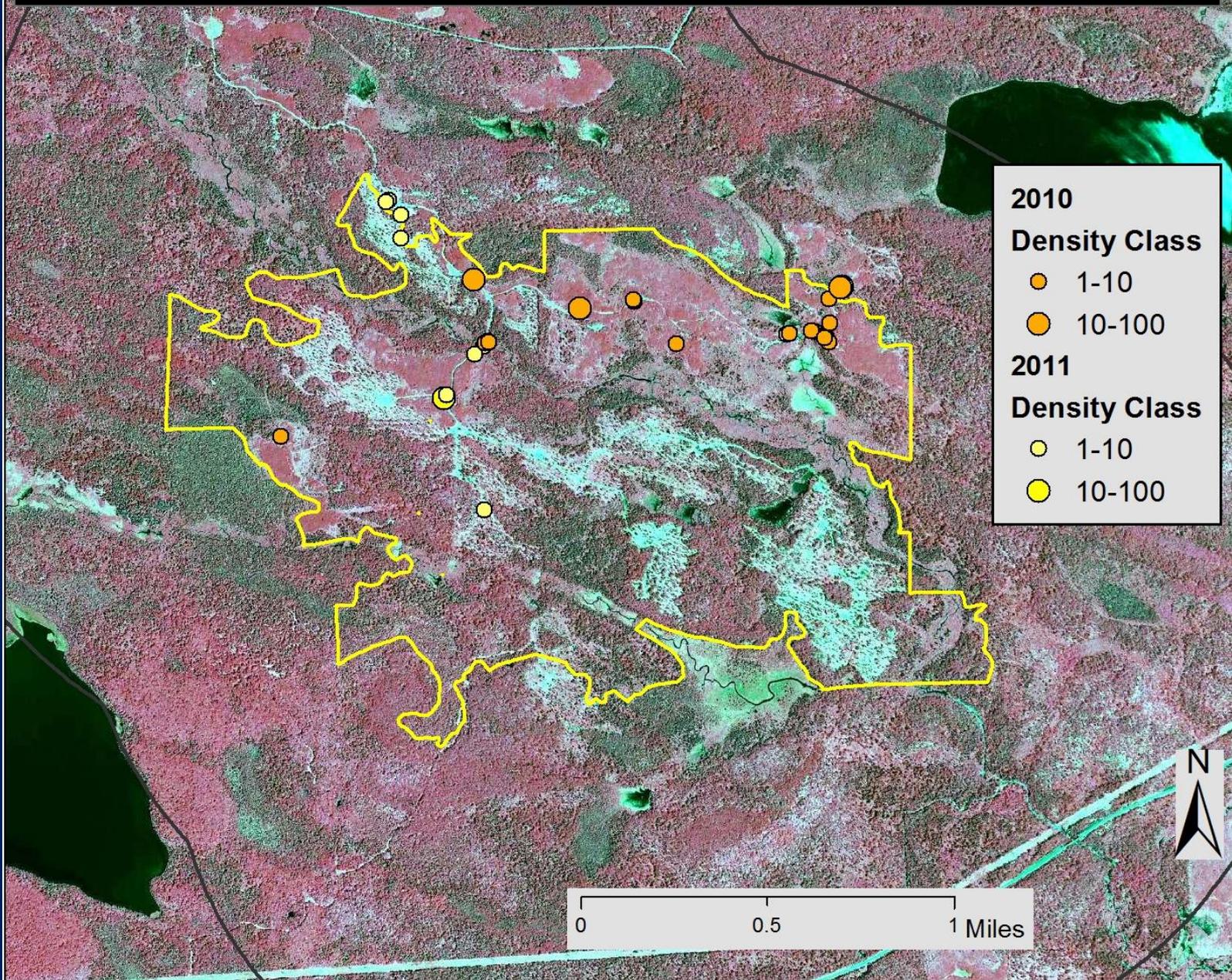
# 2010-Year of Harvest: Canada thistle, bull thistle, common tansy



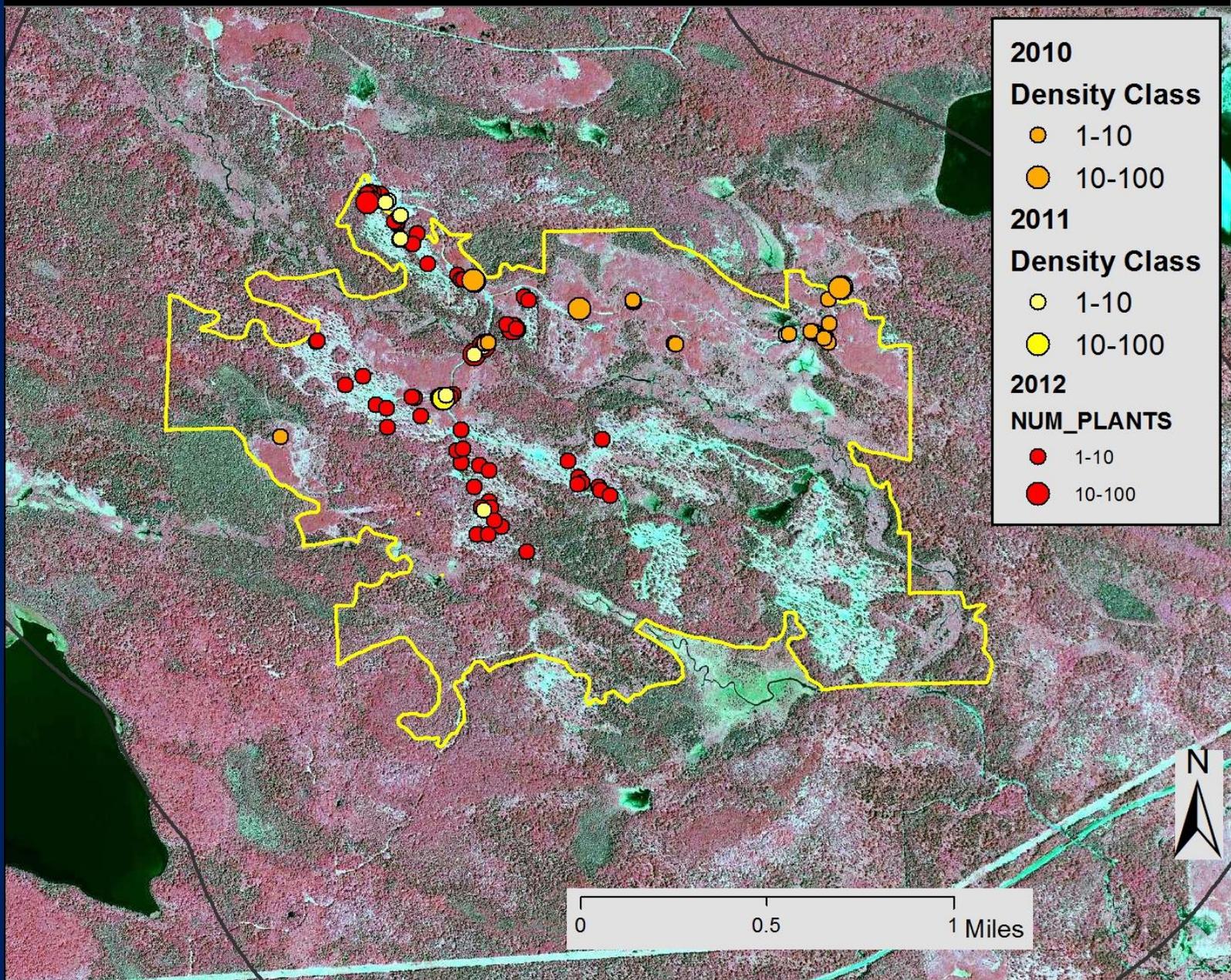
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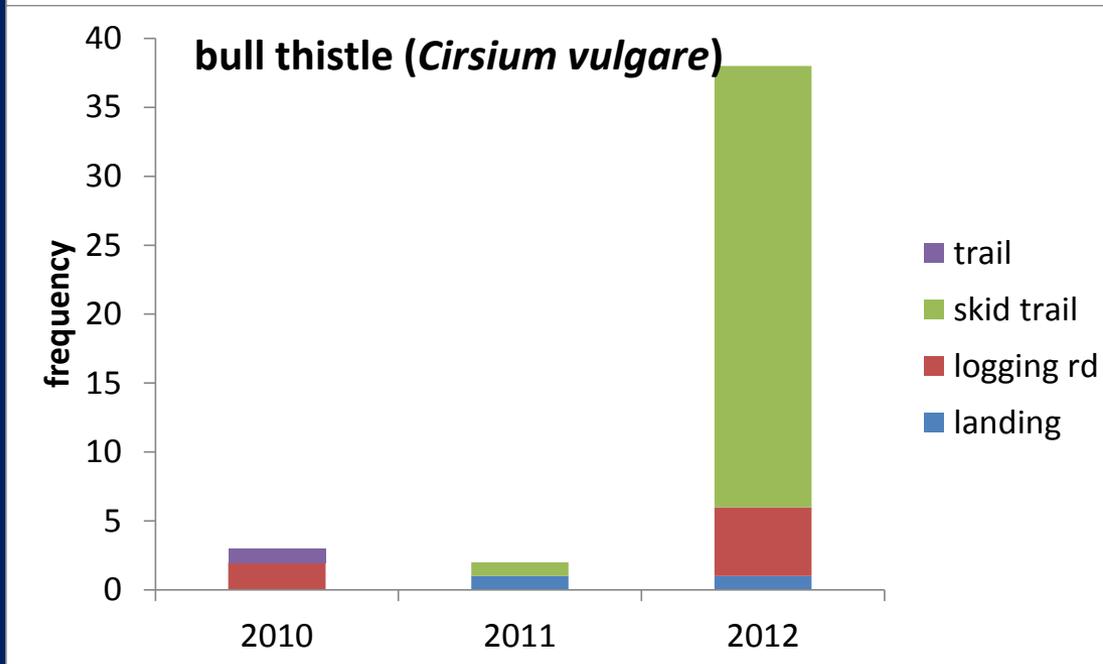
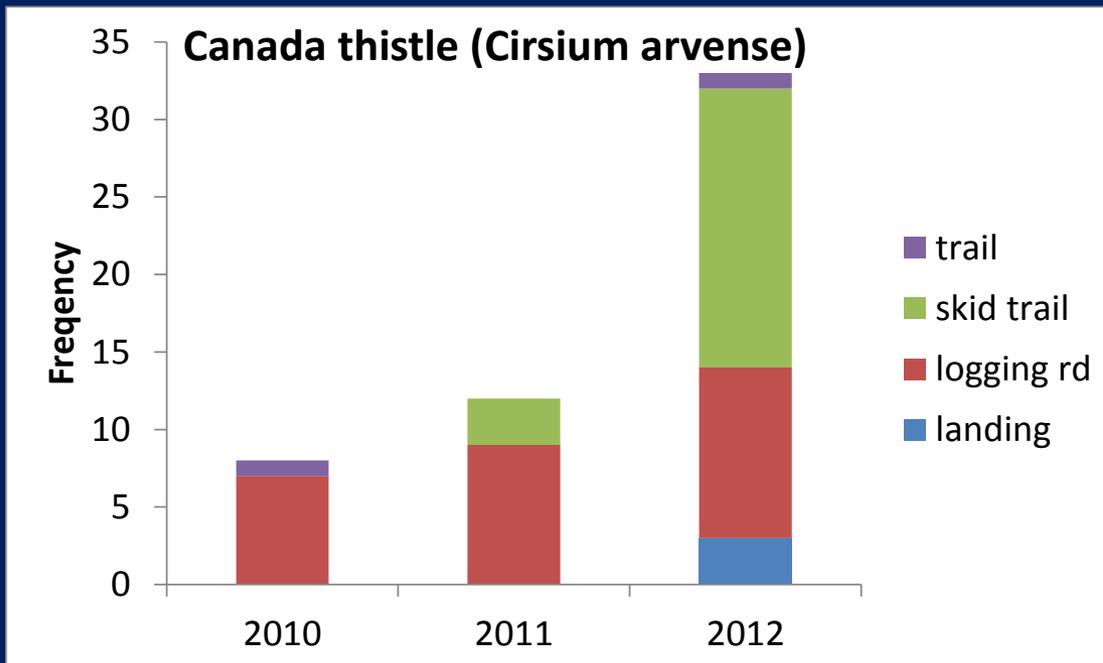


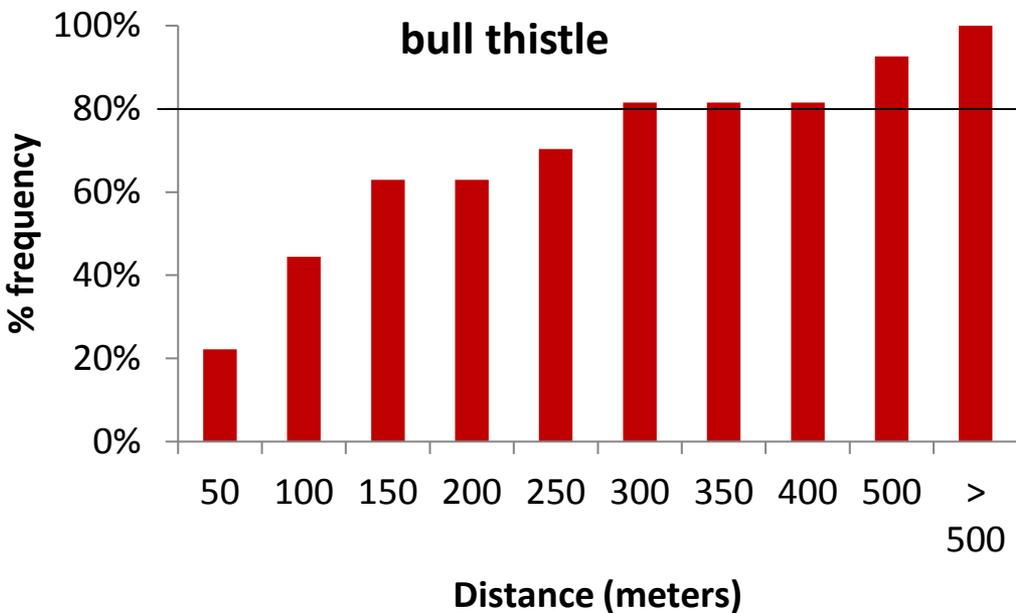
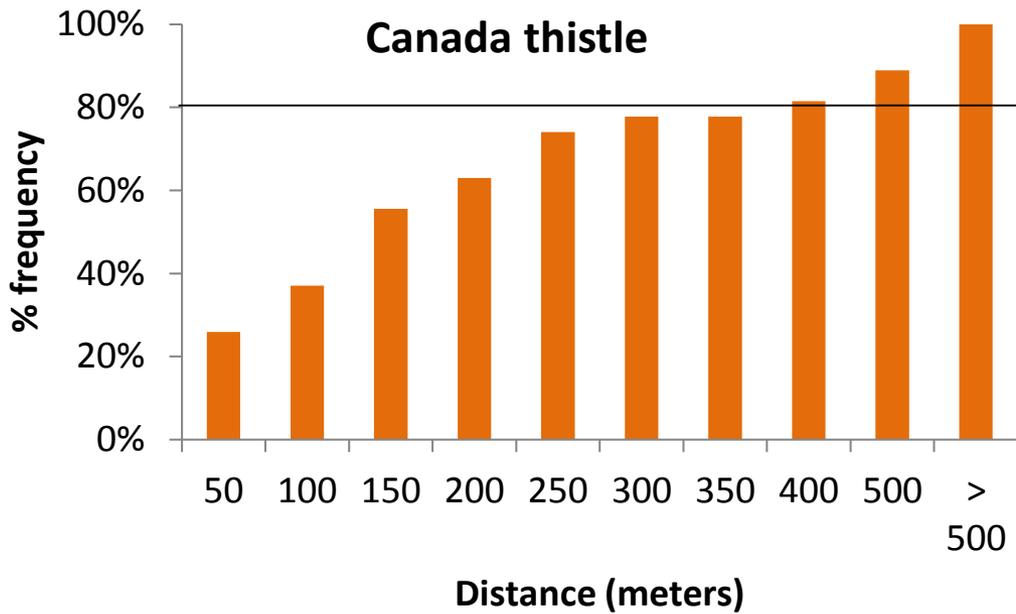
# 2011-1 Year Post Harvest: Canada thistle, bull thistle, common tansy



# 2012-2 Years Post Harvest: Canada thistle, bull thistle, common tansy







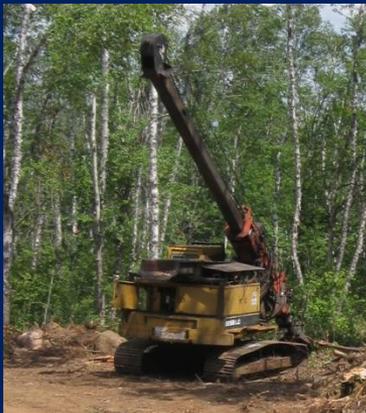
Cumulative frequency  
of nearest neighbor  
distance-new  
occurrence to existing

Species	Nearest neighbor ratio	Z score	p-value
Cirsium arvense	0.520	-5.727	0.000
Cirsium vulgare	0.376	-7.355	0.000

ANN: Average nearest  
neighbor distance

# Logger Survey: Equipment Cleaning

- Pressure washing: Required on Federal sales when equipment is moved from site with known invasive occurrences
- Consensus: pressure washing regulations could be an unnecessary burden-increased costs-but will do if needed
- Regulations should be based on sound science and clearly explained to loggers
- Show evidence of invasive plants affecting forest productivity

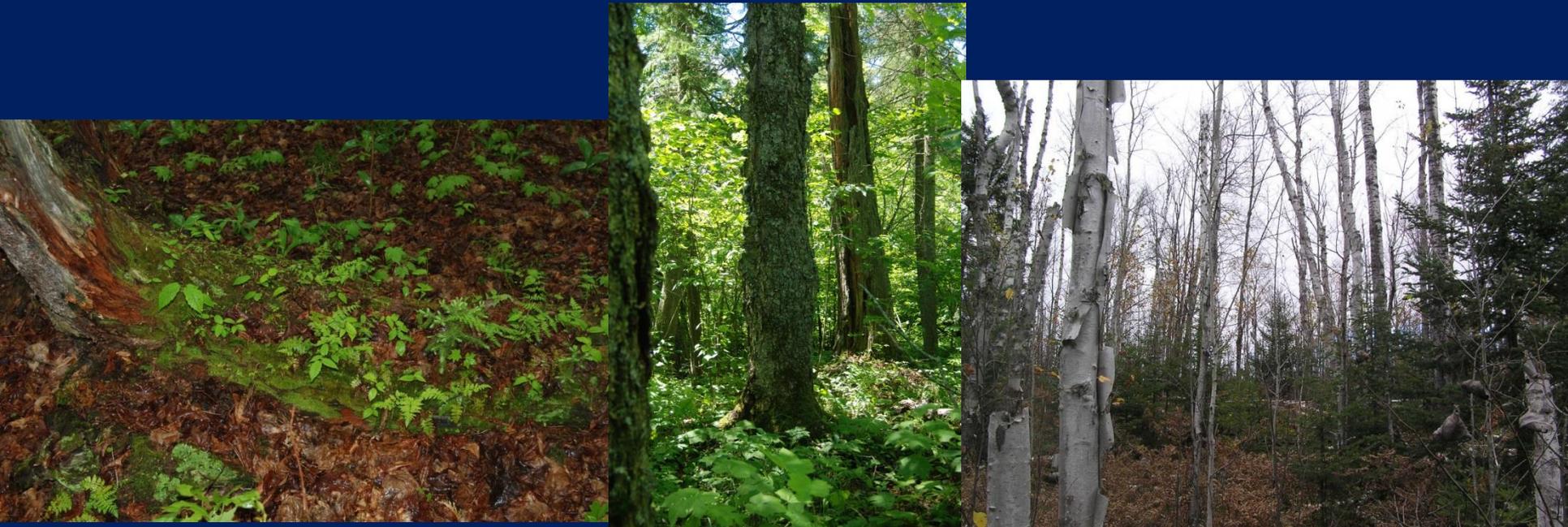


## Summary

- Highest establishment on skid trails
- Skid trails: mineral soil, large area, less compaction than roads and landings, less slash than landings
- Establishment dependent on seed sources < 300 m
- Invasives shade intolerant-small patches-low impact on tree regeneration, larger patches limit regeneration
- IPS-well distributed NE MN-roads, trails, landings
- Shade tolerant invasives-buckthorn, garlic mustard

# Management Recommendations

- Survey timber sale sites, treat prior to equipment entry
- Include ATV trails, old logging roads and skid trails
- Extend survey at least 400 m from sale boundary
- Power wash equipment before entry to new sale





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