



Lowland Conifer Harvesting: There's no clear-cut way

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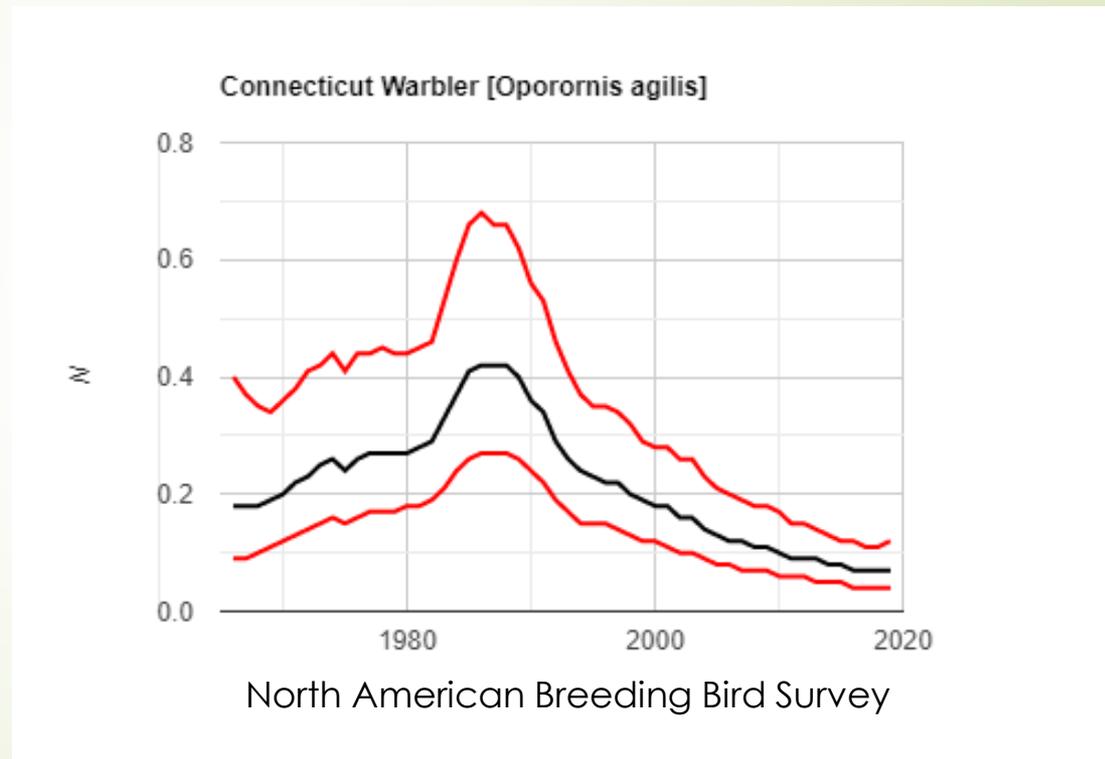
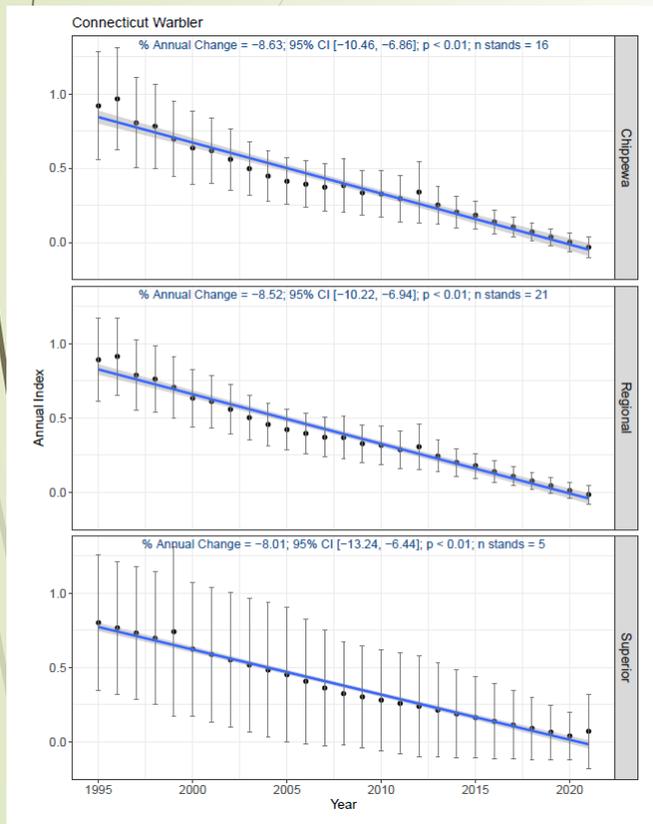


Background



- ▶ How we got here?
 - ▶ Previous studies
- ▶ Why?
 - ▶ Species of conservation concern
 - ▶ In Minnesota's National Forests, ~40% of the species declining use lowland conifers
 - ▶ Forest health
 - ▶ Tamarack
 - ▶ ELB impacted
 - ▶ Climate change
 - ▶ Another tool in the toolbox

Connecticut Warbler – a species in decline



Boreal Chickadee



Connecticut Warbler





Alternative management in lowland conifers

- ▶ Lowland conifer harvesting
 - ▶ Clearcuts
 - ▶ Strip-cutting
 - ▶ Aerial seeding
- ▶ Goal: Retain 10-50% of original basal area
 - ▶ Every prescription will be different
 - ▶ Black spruce vs tamarack
 - ▶ Natural regeneration
 - ▶ Narrow cuts would facilitate natural seeding
 - ▶ Saleable
 - ▶ Tradeoffs with retention and return visits



Benefits of alternative management

- ▶ Who would benefit?
 - ▶ Majority of the species who use mature forest structure
 - ▶ Birds, mammals, etc
 - ▶ Benefits
 - ▶ Minimize the impacts of a clearcut
 - ▶ Forest connectivity
 - ▶ Allow stands to possibly regenerate better
 - ▶ Hydrology
 - ▶ Cavities
 - ▶ A single tree gives us so much more hope than no trees!
 - ▶ Reduce predation?
 - ▶ Cache is king
 - ▶ Canada Jay
- ▶ Tamarack?
 - ▶ Within stand structural diversity may mitigate threats from future disturbances



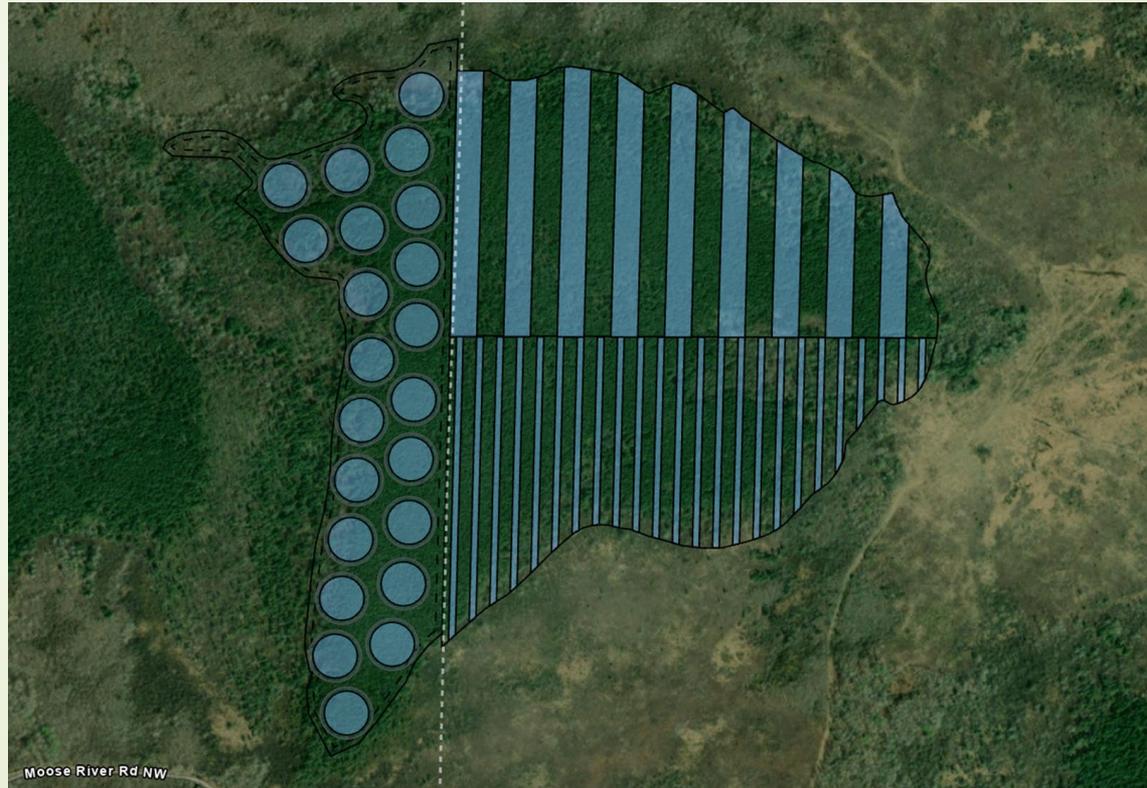
Alternative Management of Black Spruce

- ▶ Types of alternative harvesting (proposed)
 - ▶ Group selection (string of pearls, ½ acre cuts)
 - ▶ Most favored approach by researchers
 - ▶ Beneficial for all mature forest species
 - ▶ Potential for release/return harvest
 - ▶ Strip-cutting (100 ft strips)
 - ▶ Most operable approach
 - ▶ Beneficial for all mature forest species
 - ▶ Potential for release/return harvest
 - ▶ Shelterwood (thinning) 25/50ft strips
 - ▶ Great for Connecticut Warblers?
 - ▶ Beneficial for all mature forest species
 - ▶ Most likely to “look” like an intact stand

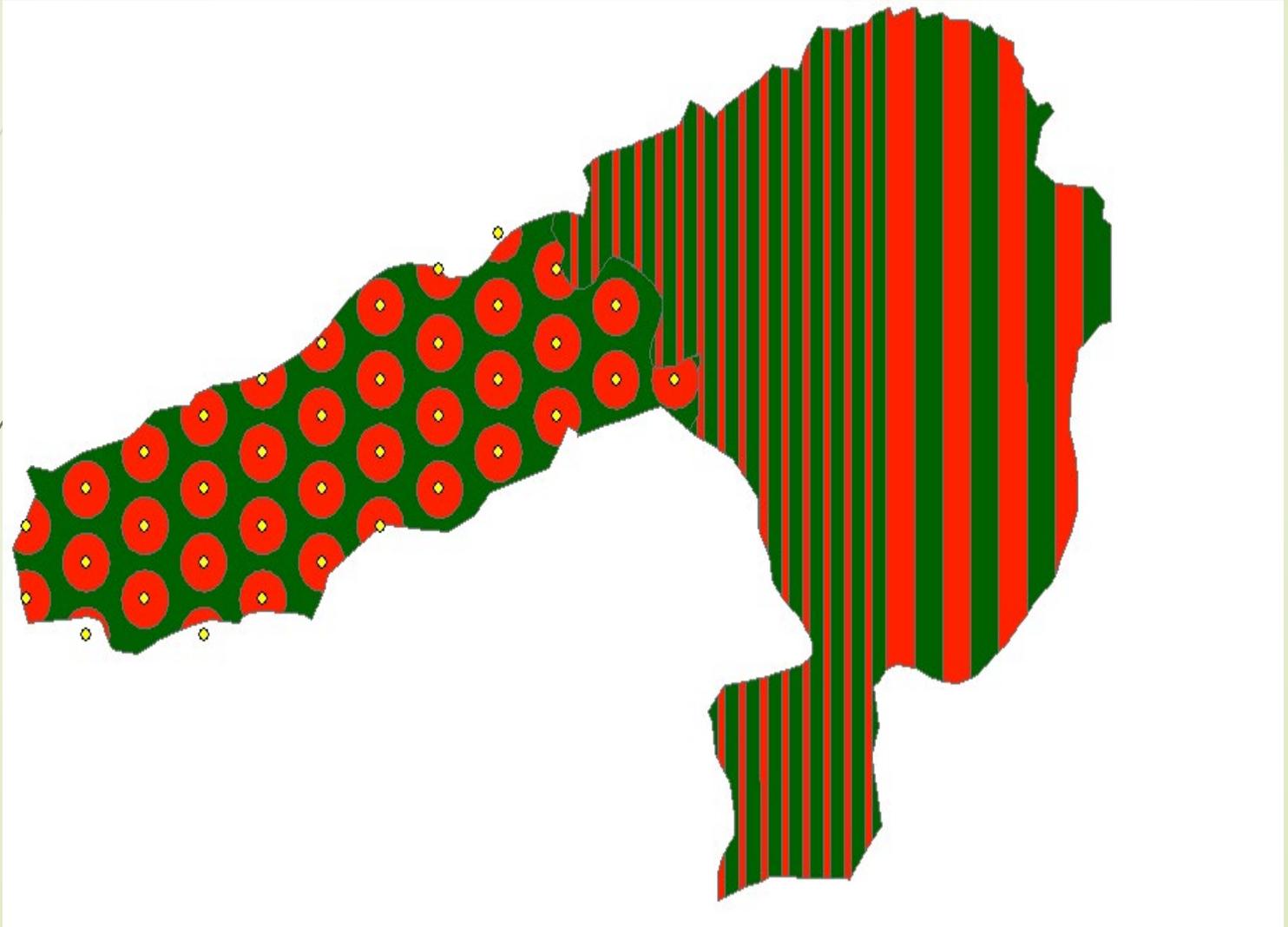
Moose River Road (Gladen's Camp)



Moose River Road (Gladen's Camp)



Hogsback



Summary

- ▶ These alternative cuts can be implemented anywhere
- ▶ Most mature forest species will benefit
- ▶ Within stand structure may be the best way for mitigating future disturbances
- ▶ Consider site index when implementing harvests
- ▶ Unlike aspen, these trees take a while to develop into cavity “potential” trees

Questions?

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The importance of mid and late-successional habitat structure

Josh Bednar

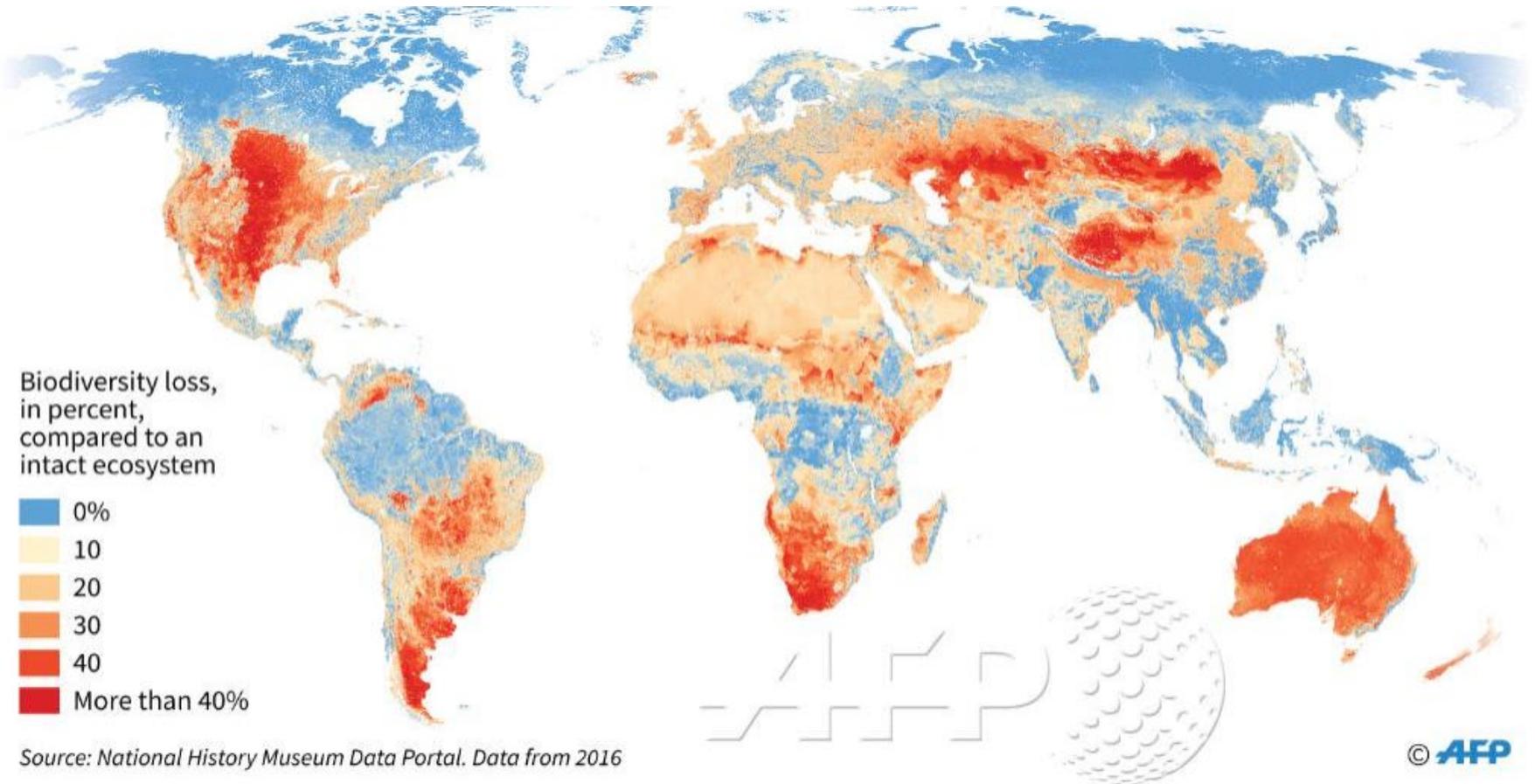


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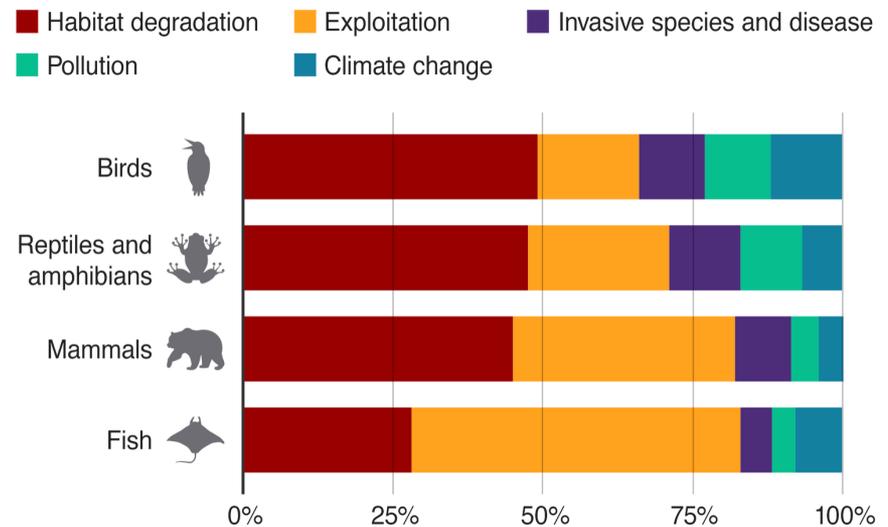
Loss of biodiversity



Goals of conservation and management:

1. Keep forested lands forested
2. Keep common species common
3. Conserve biodiversity
4. Be diverse!

Habitat loss is a major threat to biodiversity



Ecological importance of Minnesota's birds

Ecosystem Services

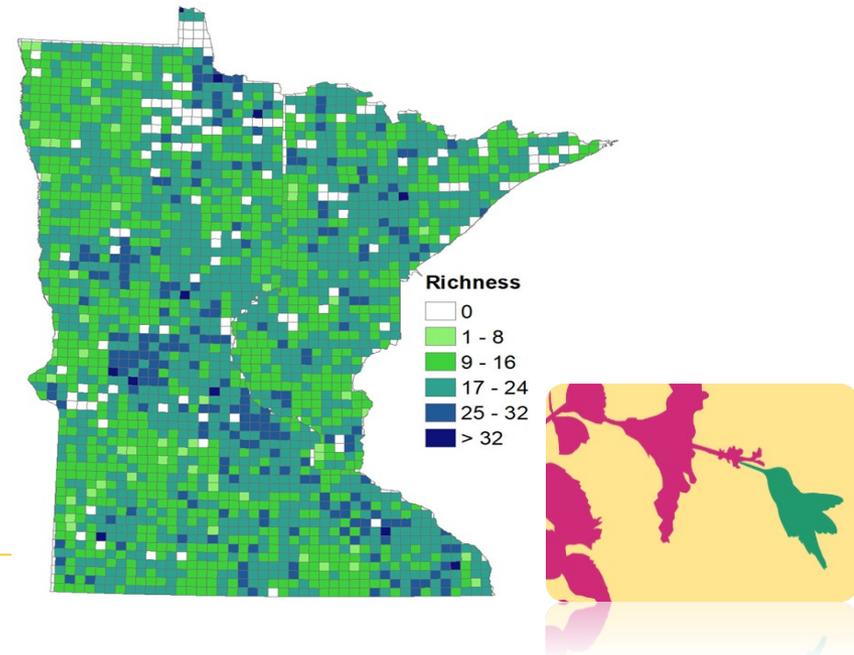
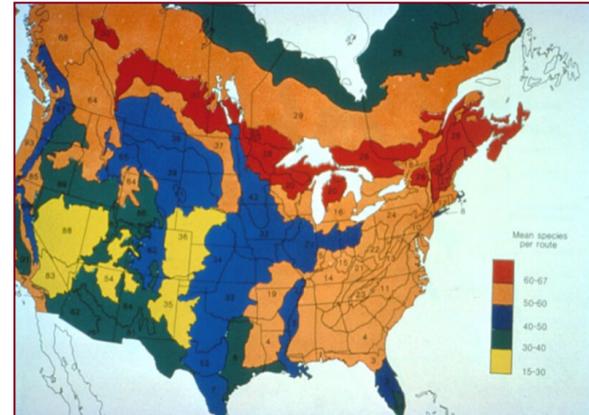
- Flower pollination
- Pest control
- Nutrient redistribution

Environmental indicators

- Habitat quality and degradation
- Environmental pollution
- Restoration

Quality of life

- Birds songs
- Recreation
- Stress relief
- Education

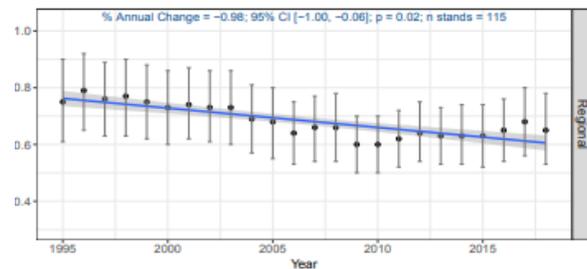
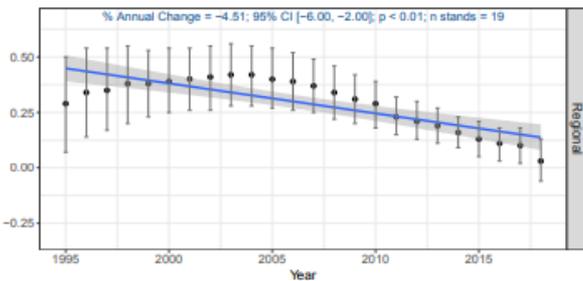
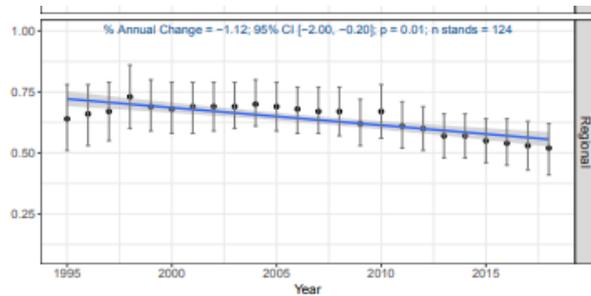


Why mid to late?

- Microhabitat
 - Diversity
 - Gaps
- It takes a long time to get there
 - Challenges ahead
 - Climate
- “More” ecosystem services
 - Function
 - 25 vs 60 year old aspen

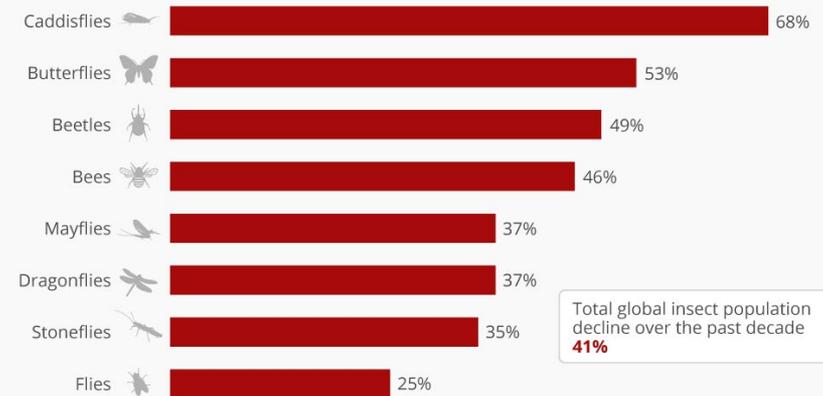
BCR 12: Boreal Hardwood Transition

Aerial Insectivores are declining.



Massive Insect Decline Threatens Collapse Of Nature

Percentage decline in selected global insect populations over the past decade



Total global insect population decline over the past decade **41%**

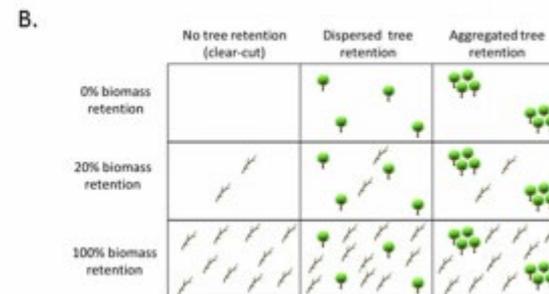
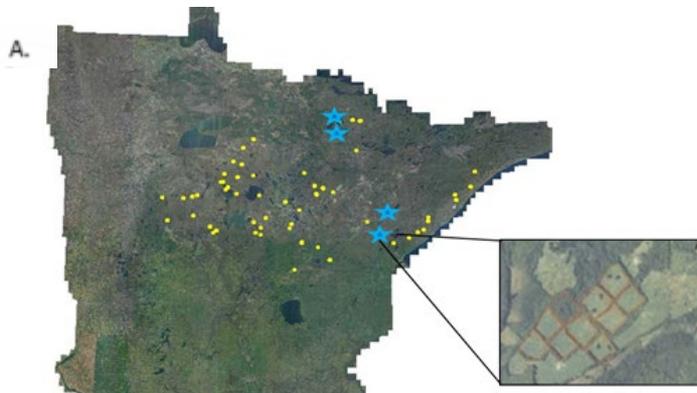


Source: Sánchez-Bayo & Wyckhuys, Biological Conservation, 2019



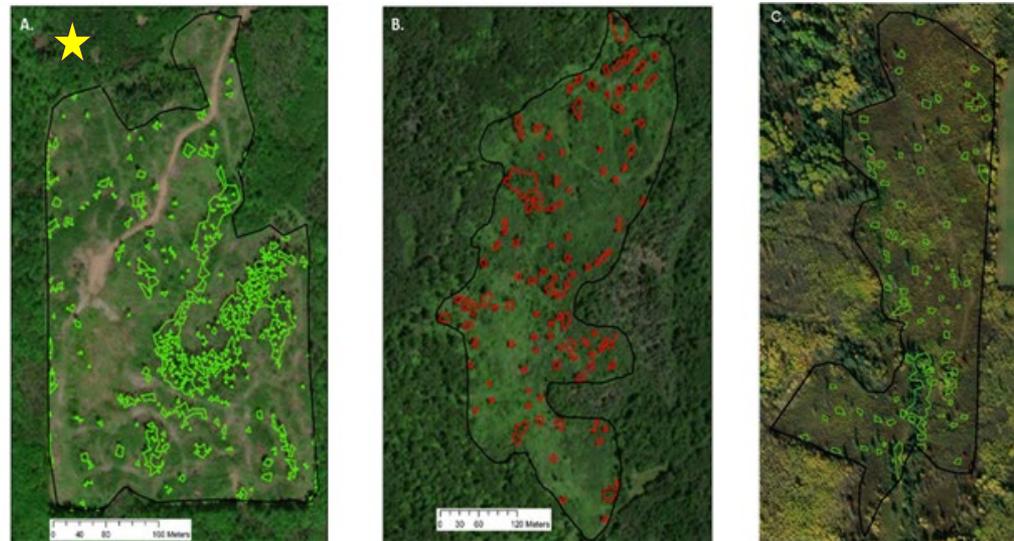
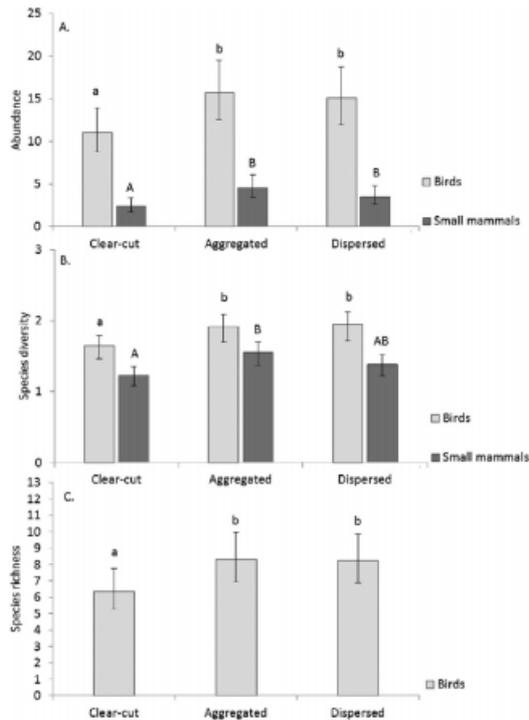
Aspen stands

Context: Minnesota's voluntary forest management guidelines are a set of best practices designed to mitigate impacts to...wildlife habitat... during activities such as timber harvesting. Clumps (preferred option)- 5% of site area in clumps >0.25 acre in size; Scattered trees- 6-12 per acre for most clearcut harvests; Combination of scattered trees and clumps in a configuration that achieves wildlife and silvicultural objectives



Aspen stands

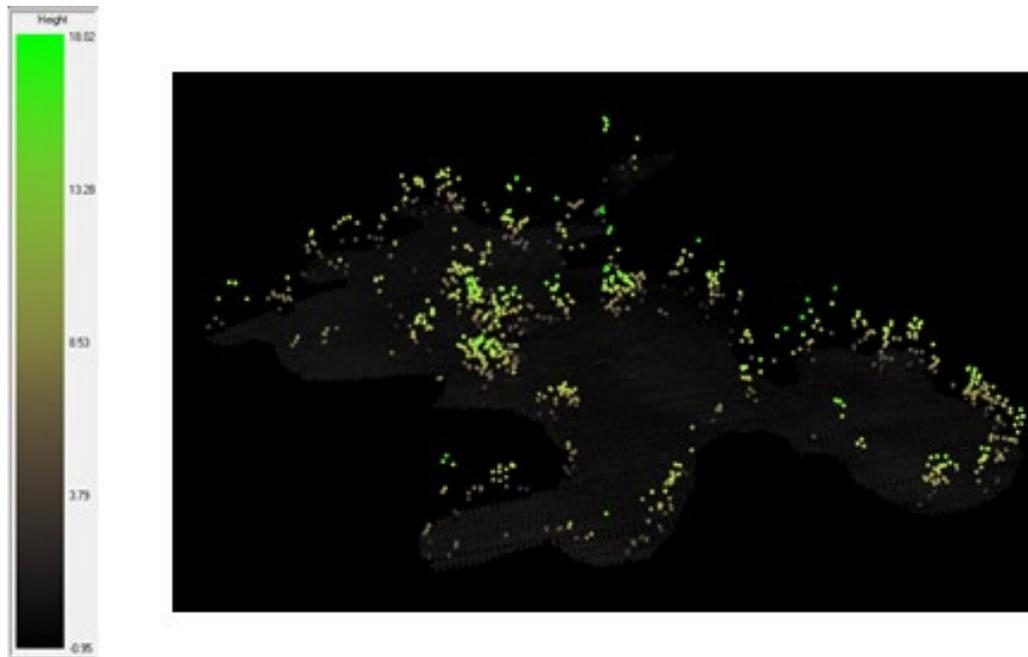
Results: Clearcuts had lower bird abundance, diversity and richness compare to stands with retained trees. Aggregated tree retention increased small mammal abundance and diversity.



← Gradient of leaf tree density
Gradient of “clumpiness” →

Aspen stands

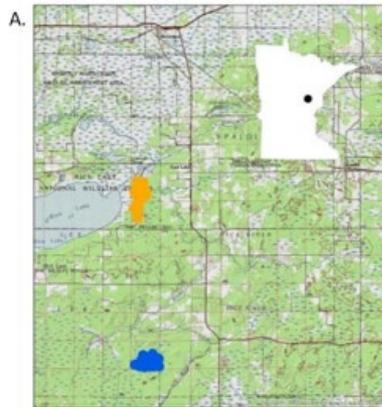
Take home: For land owners focused on economic return, at a minimum, keep implementing the MFRC BMPs. Feathering edges and using a combination of dispersed and aggregated retention if possible is beneficial for biodiversity. (Paradigm 3)



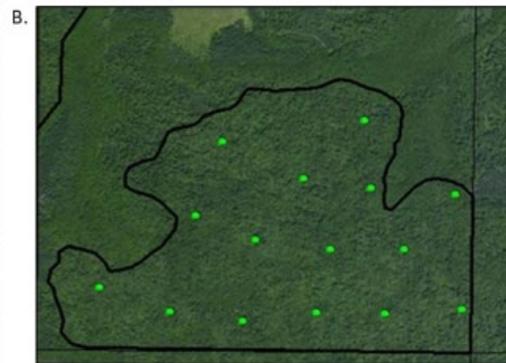
Northern hardwood stands

Context: Almost 4 million acres of northern hardwood stands in Minnesota have been converted to other forest types (primarily shade intolerant species like aspen) and only 1.5 million acres of this forest type currently exists in the state. There has been a recent interest in limiting future loss of this forest type in northern Minnesota by managing this type on an uneven-aged basis.

Question: Does managing NH forests with group selection gaps (~0.5 acres each) impact breeding birds?

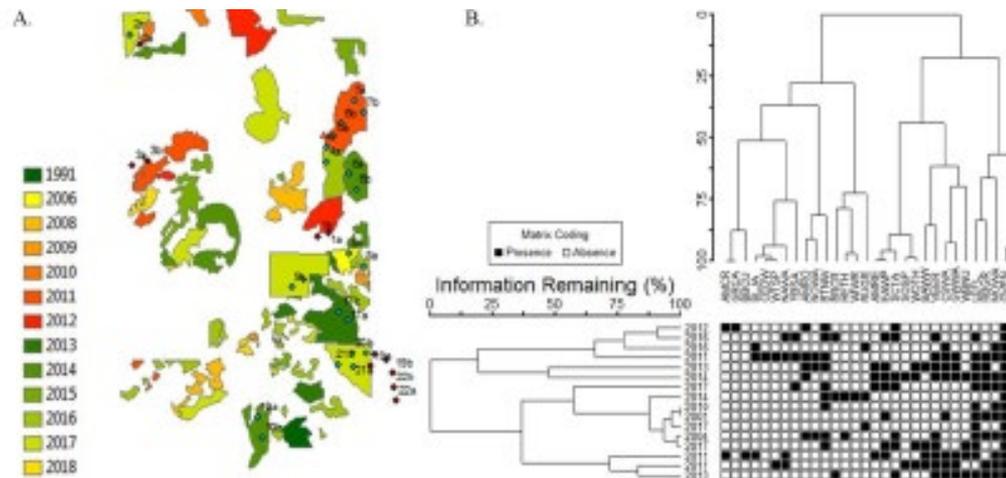


● Treatment area
● Control area



Northern hardwood stands

Results: Uneven-aged management techniques used in CHMA have maintained mature forest bird communities



Take home: Try new things but monitor response of the system. Goal was to open the canopy to favor shade intolerant tree species (oak, basswood, birch) regen (not sugar maple) while maintaining mature forest bird community. A great example of the value of monitoring wildlife response to inform adaptive forest management.

Red pine stands

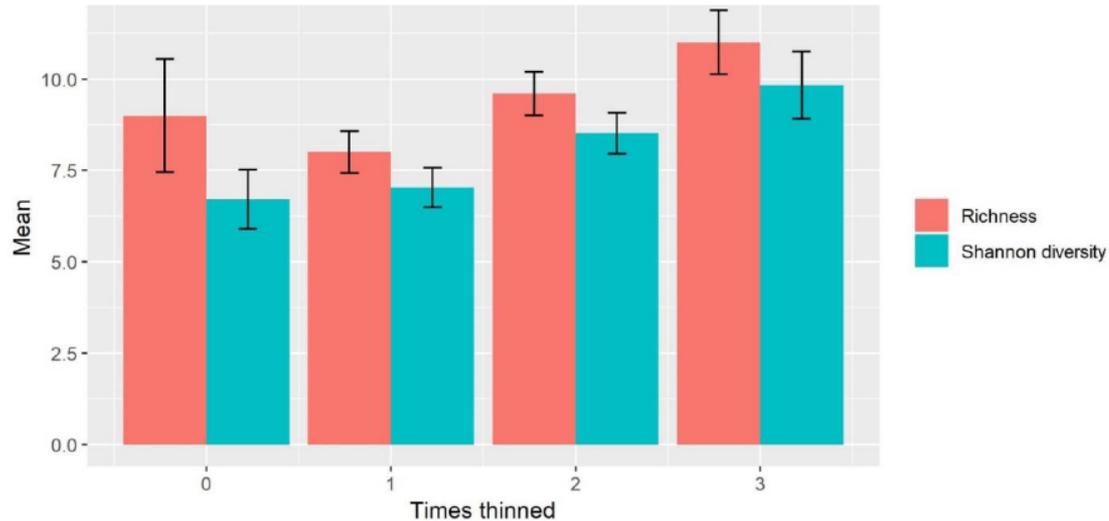


Figure 4. Mean species richness and Shannon diversity in red pine stands by number of thinnings in Bayfield County Forest. Error bars are +/- one standard error. An ANOVA of richness by times thinned showed no significant difference among treatments ($P = 0.13$). An ANOVA of diversity by times thinned was marginally significant ($P = 0.048$), but a post hoc pair-wise analysis using Tukey's correction for multiple comparisons found no significant difference between any two treatments.

Take home: Red pine plantations vary in diversity depending on management history. Thinning increases species diversity and richness due to increase in structural diversity. Managing red pine as part of multi-aged, mixed species stand may promote wildlife diversity.

Group selection- assess adaptive management options



Clearcutting- pre-salvage / long-term outcome



Questions?

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