

Avian Habitat Considerations in Northern Hardwoods Silviculture



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Forestry for the Birds Workshop

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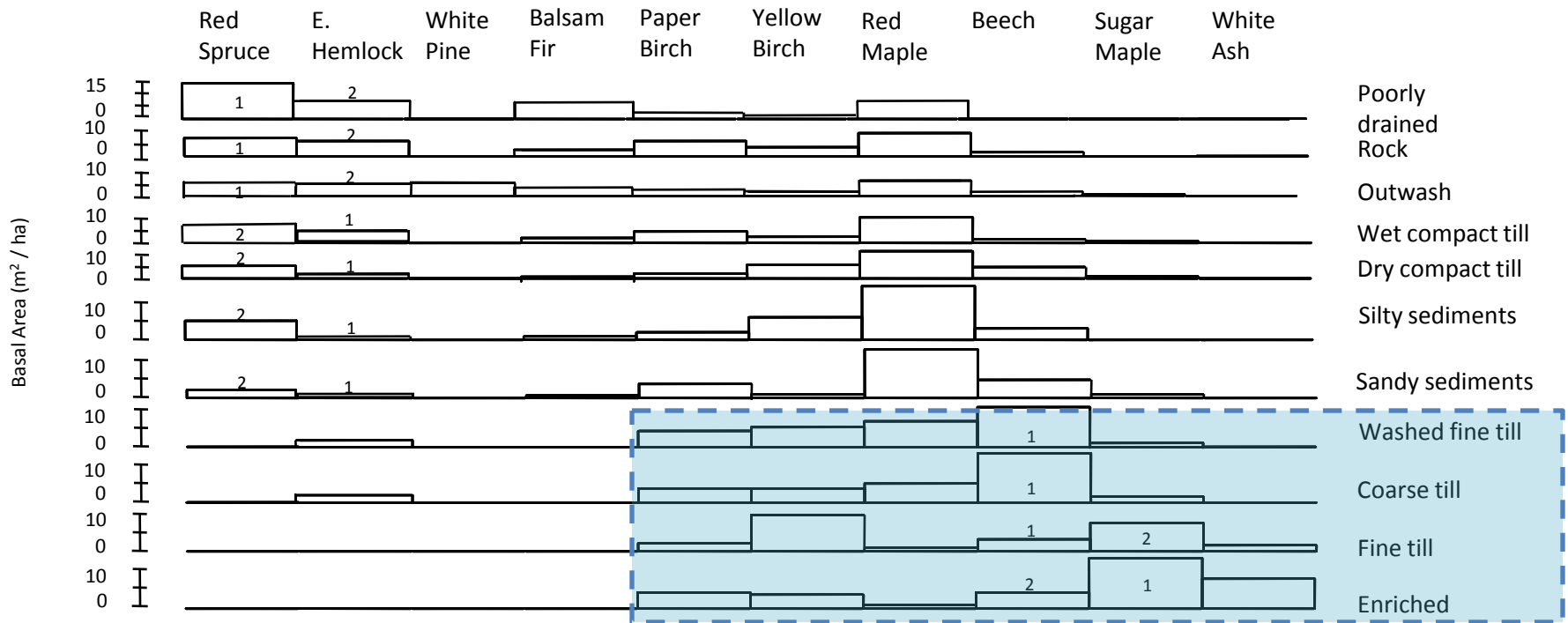
Predator-Prey Relationships



Managers create habitat conditions across landscapes over time that influence predator-prey relationships -- including insects

Soil-Site Relationships

Hardwoods



Modified from: Leak (1982)

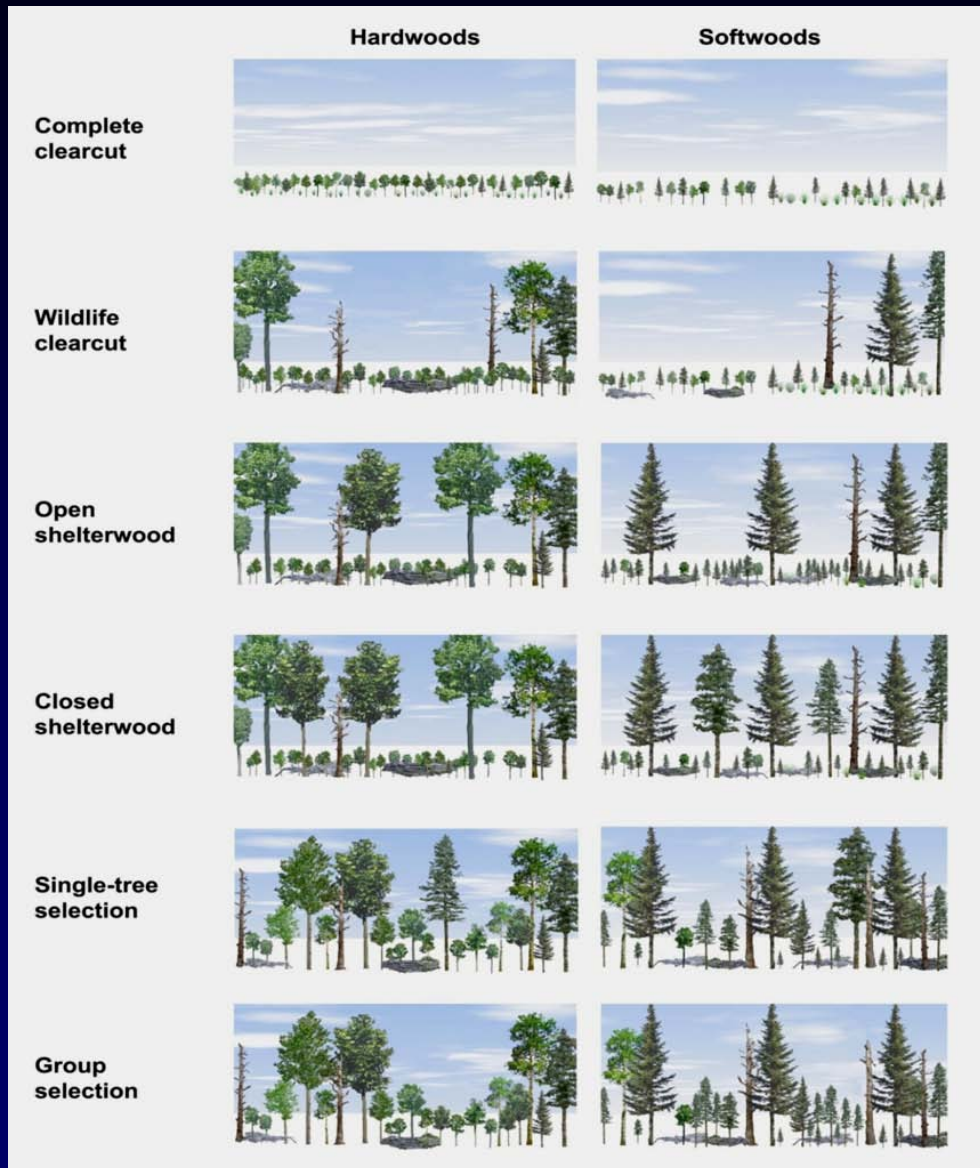
1 = most abundant in climax stands; 2 = second most abundant in climax stands

Opening Sizes Are Variable Across NE Landscape



- Influences woody, herbaceous, and avian species composition
- Available forage and foraging substrates
- Presence of soft mast

Silvicultural Approaches



- Size of opening influences composition
- Cuts create important ephemeral habitats
- Spatial and temporal patterns influence the reoccupation of these ephemeral habitats

Species composition of stocked milacres, 10 to 15 years after cutting in beech-birch-maple by tolerance groups

| Tolerance Group | Clearcutting | Group Selection | Single-tree Selection |
|-----------------|--------------|-----------------|-----------------------|
| | ----- | Percent | ----- |
| Tolerants | 43 | 62 | 92 |
| Intermediates | 19 | 34 | 7 |
| Intolerants | 38 | 4 | 1 |

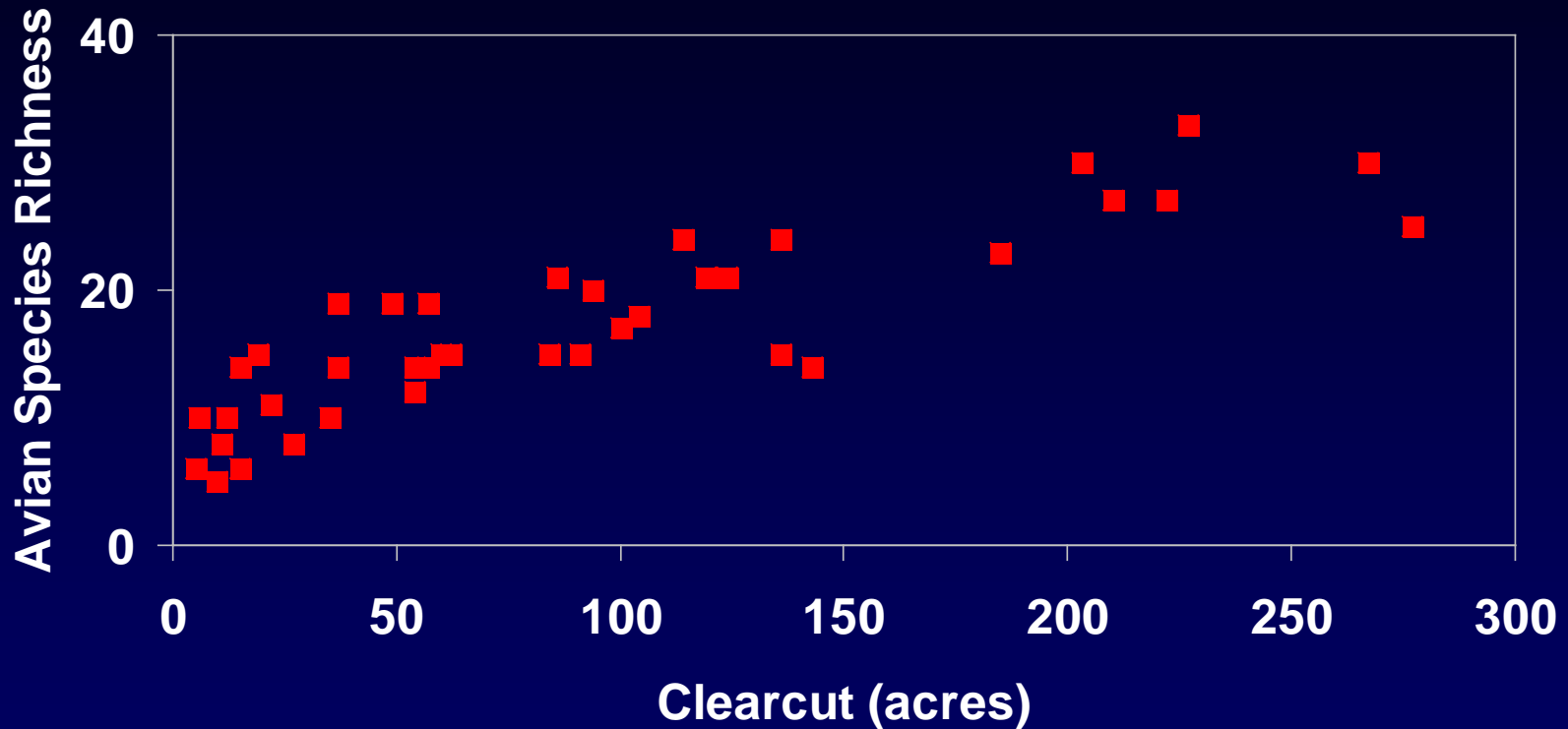
Tolerants: beech, sugar maple, hemlock, red spruce

Intermediates: yellow birch, white ash, red maple (white pine)

Intolerants: paper birch and aspen

From: Leak et al. (1987)

Opening Size Matters – Species-Area Relationships



Modified from: Rudnicky and Hunter (1993)

Birds using larger forest gaps will be habitat-limited in locales solely practicing single-tree and group selection management

Birds Found in Larger vs Smaller Cuts and Where Cavity Trees Are Present (Costello et al. 2000)



- Tree swallow
- Indigo bunting
- Alder flycatcher
- Cedar waxwing
- Eastern towhee
- Eastern bluebird
- Olive-sided flycatcher
- Northern flicker
- Purple finch
- American goldfinch
- Song sparrow

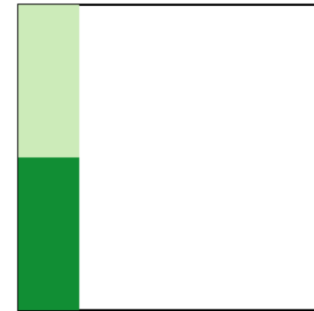
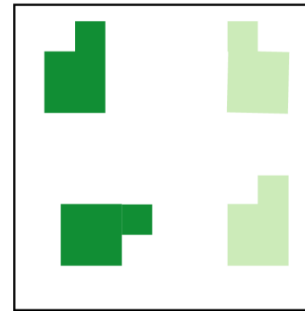
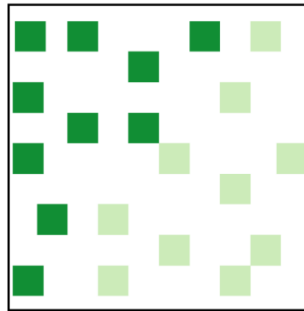
Frequency of Cutting Cycle Matters - Ephemeral Habitats

| Species | First appear | Common | Decline |
|------------------------------|--------------|--------|---------|
| E. bluebird | 1 | 1 | 2 |
| N. flicker | 1 | 1 | 7-10 |
| Willow flycatcher | 1 | 4 | 7-10 |
| Winter wren | 1 | | 2 |
| Swainson's thrush | 2 | 4 | 15* |
| Chestnut-sided warbler | 2 | 4 | 10 |
| Mourning warbler | 2 | 5 | 7-10 |
| Common yellowthroat | 2 | 6 | 10 |
| American goldfinch | 2 | 6 | 7-10 |
| Cedar waxwing | 2 | 4 | 7-10 |
| Veery | 3 | 6 | * |
| Black-and-white warbler | 3 | 4 | 15* |
| Rose-breasted grosbeak | 3 | 15 | * |
| Canada warbler | 5 | 15 | * |
| Ruffed grouse | 10 | 15 | * |
| Wood thrush | 10 | 15 | * |
| Ovenbird | 10 | 15 | * |
| Black-throated blue warbler | 15 | * | * |
| Black-throated green warbler | 15 | * | * |

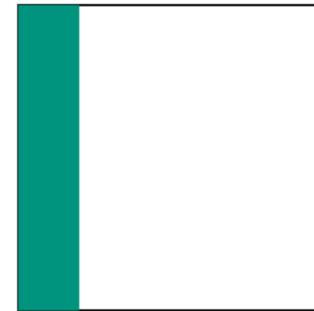
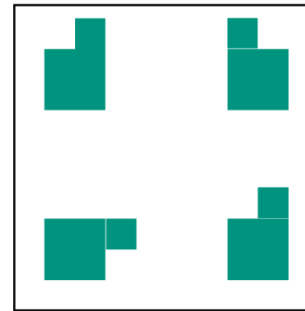
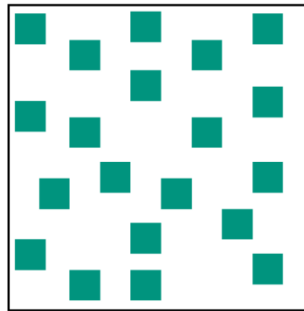
From: DeGraaf et al. (1992)

Early Successional Habitat Strategies

10-year entry period
wildlife approach



20-year entry period
traditional timber approach



20 1-ac cuts

4 5-ac cuts

1 20-ac cut

Increasing cut size and early successional habitat quality →

■ Cut in year 1 on a 10-yr entry
■ Cut in year 11 on a 10-yr entry

■ Cut in year 1 on a 20-yr entry

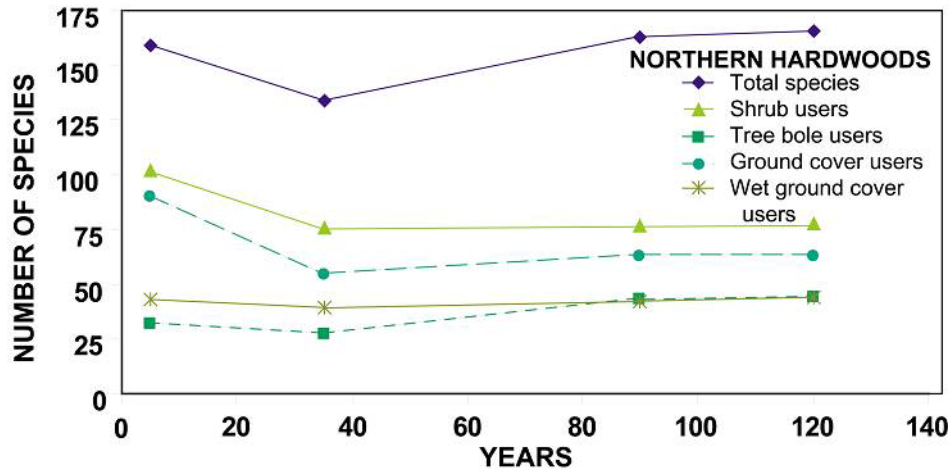
Assumes 100 acres; 100 year rotation

Edge Effects on Birds in Forested Landscapes

- No unique breeding bird assemblages at forest stand edges
- Forest stand edges are ephemeral – no grass stage and woody regeneration grows quickly
- Forest stand edges different from field-forest edges
- Avian assemblages were most different across seedling- and sapling-sawtimber (abrupt) forest edges
- Nest predation was similarly low in managed and reserved forest blocks in forest landscapes and different from field-forest landscapes
- Nest parasitism by cowbirds is low in forest dominated landscapes

From: DeGraaf (1992, 1995), DeGraaf and Angelstam (1993), and Yamasaki et al. (2000)

BEF Vegetative Structure



| | | | | | | | |
|-------------------------------|-----------|----------|---------|---------|---------|---------|---------|
| Mean d.b.h. (in) | 2-4 | 4-6 | 6-8 | 8-10 | 10-12 | 11-13 | 12-14 |
| Basal area (ft ²) | 50-70 | 90-100 | 100-110 | 100-120 | 90-100 | 100-120 | 100-120 |
| No. stems per acre | 1000-2000 | 500-1000 | 300-500 | 200-300 | 125-165 | 125-150 | 110-125 |
| Maximum height (ft) | 30-40 | 40-60 | 50-70 | 60-80 | 70-80 | 70-80 | 70-80 |
| Maximum d.b.h. (in) | 8-10 | 10-12 | 12-14 | 16-18 | 16-18 | 16-18 | 16-18 |



- Cover-type -- a good habitat descriptor for some species, not for others -- better with stand structure info
- For species with size-class affinities, interpreting relationships needs stand structure assessment
- Forest bird habitat management needs the finer details of stand structure that neither cover-type nor size-class can provide alone

From: DeGraaf et al. 1998; Leak et al. 1987; DeGraaf et al. 2001, 2005, 2006

Within-stand Features Enhanced with Integrated Prescriptions

| | Clearcut | Shelterwood | Group/patch | Single-tree | Thinning |
|---------------------------|---------------|---------------|---------------|-------------|------------------|
| Canopy closure | Open | Partial | Partial | Closed | Closed - partial |
| Exposed perches | X | X | X | | |
| Inclusions | X | X | X | X | X |
| Large cavity trees | X | X | X | X | X |
| Hard mast | Possible | X | | X | X |
| Midstory | Not immediate | Not immediate | Not immediate | X | X |
| Shrub layer | X | X | X | | |
| Herb layer | X | X | X | | |
| CWD | X | X | X | X | X |

Tree Related Within-Stand Features



Exposed perches



Cavity trees



Hard mast inclusions



Soft snags



Den trees

Structure Related Within-Stand Features



Soft mast and herbaceous layer

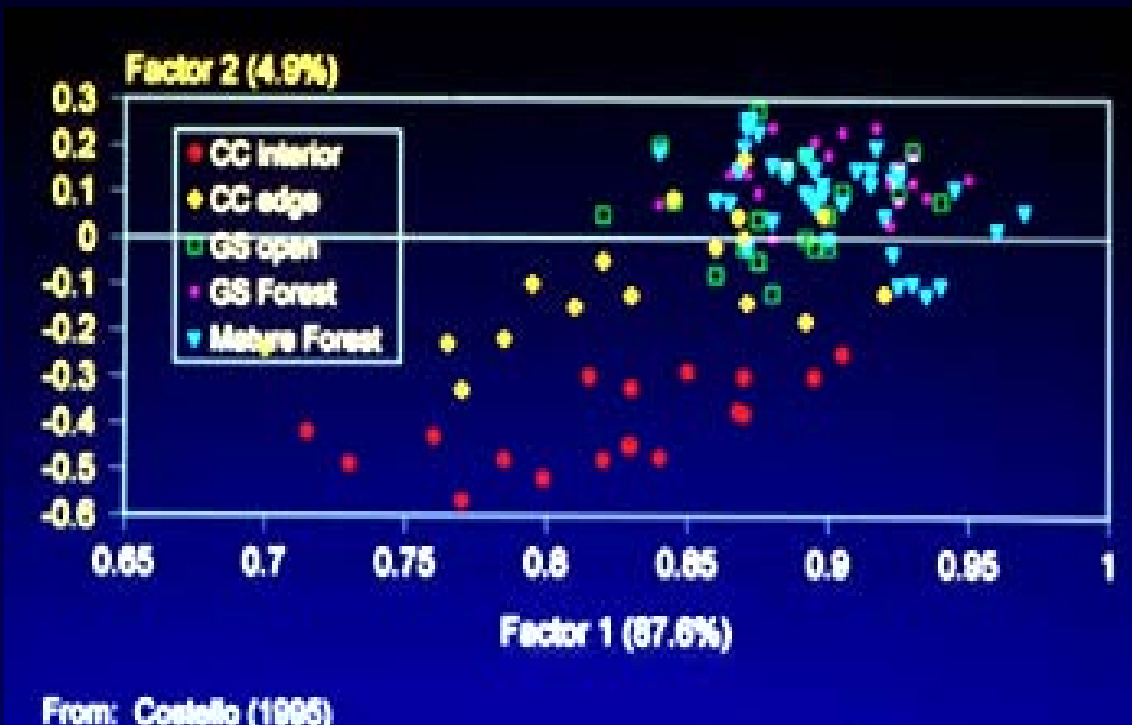


Regenerating shrub layer



Midstory layer

Ordination of avian similarity for 114 survey points, WMNF



- Early successional bird community in new hardwood clearcuts is very different from the mature hardwood bird community
- Bird community in group selection cuts are mixtures of mature hardwoods and some but not all early successional communities

Forest Raptors Using Managed Forests



- Nesting sites
- Foraging areas

Forest Nesting Context



- Often near upland openings, wetlands, or lakes, rivers or impoundments
- Often adjacent to old woods roads and trails
- Often at lower slope positions
- Very often a component of managed stands

Uneven-aged Management Approaches



- **Individual tree selection:** Closed canopy, midstory layer, late successional species mixes
- **Group selection:** Partial canopy, midstory and shrub understory, mid- to late successional species mixes

Uneven-aged Management Concerns



Extensive landscapes managed using single-tree selection only tends to limit horizontal diversity, distribution of browse and early and mid-successional foraging substrates used by herbivores and insectivores alike

No Vegetation Management Approaches



- No vertebrate old growth-obligates documented in NE to date
- Surveys indicate some bryophyte, mite, and ground-dwelling beetle species may find such stands of interest