Effects of Experimental Forestry on Songbird Abundance

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Acknowledgments

• We gratefully thank all of the over 250 hard-working, hard-playing MOFEP interns that we’ve worked with over the years.

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  – Missouri Department of Conservation
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Missouri Ozark Forest Ecosystem Project

• Large-scale (9 400 ha sites)
• Long-term (>100 years)
• Manipulative experiment
• Compare alternate methods of forestry
• Many components
  – mammals, birds, fungus, herpetofauna, herbaceous and woody vegetation, microclimate, herbaceous insects, leaf litter invertebrates, soils, mast production and others
• In most heavily forested landscape in Missouri.
Ovenbird  Worm-eating Warbler

Acadian Flycatcher

Kentucky Warbler  Wood Thrush

Photos from Thayer Birding Software
Yellow-breasted Chat
White-eyed Vireo
Prairie Warbler
Hooded Warbler
Indigo Bunting
Blue-winged Warbler
Even-aged Management

• 10% designated old-growth
• 10% in clearcut stands
• 7 – 9 clearcuts
• 3 – 13 ha in size
• 15 year rotation
Uneven-aged Management

- Removes the same amount of timber
- In “Group Selection Cuts”
  - 21 – 43 m diameter cuts
  - 57% of site
  - 15 year rotation
No Harvest Management

- No timber will be harvested on the three No Harvest sites for the duration of the study.
Methods

• Study period
  – Timber harvest treatments in 1996.

• Spot-mapping
  – Used topographic maps to cover ~ 40 ha. subplots.
  – 8 to 10 visits from mid-May to July.

• Nest Searching
  – Found and monitored nests every 3 to 4 days.

• Constant effort mist-netting
Ovenbirds

Pre-cut territory locations
1991 - 1995

Post-cut territory locations
1997 - 2000
Data Analysis

• First detailed analysis of post-treatment effects published in Gram et al. 2003.
  – Multivariate repeated-measures analysis of covariance, with treatment and block as the main effects and pretreatment density as the covariate.
  – Used contrasts to test whether the change on the treatment sites was significantly different from the change on the no harvest sites.

General Results

• Results were dynamic and species specific.
• Density was relatively stable in the 5 pre-treatment years.
  – N.S. year effects for all but Wood Thrush (p=0.087)
• All species showed 24-69% density reduction on the no harvest sites post-treatment.
  – Continues for up to 7 years for some species.
• Early succession species showed expected increase in density.
Worm eating Warbler (4 of 7 Subplots)
Prairie Warbler (4 of 7 Subplots)


Graph showing average density (#/100 ha) for different years and management treatments:
- No Harvest
- Unevenage
- Evenage

Legend:
- Green: No Harvest
- Yellow: Unevenage
- Grey: Evenage
Blue-winged Warbler (4 of 7 Subplots)
The future…

- Point Count Data Only
- Pre-treatment Round 2
- Second Harvest 2011
- Post-treatment 2

Avg. Dens. (#/100 ha)


Legend:
- No Harvest
- Unevenage
- Evenage

Year
• Even-aged management will create a mosaic of larger blocks, with less edge.

• Uneven-aged management will create smaller patches with three times as much edge habitat.

• No harvest sites will also change due to wind, fire and disease.
Landscapes will change...


http://www.fs.fed.us/projects/fote/maps/
Summary and Conclusions

• Dynamic, species specific responses
• No best strategy for all species
  – Depends on the relative conservation priority for each species.
  – Sustainable forestry using a mix of strategies may be needed to maintain viable populations of species requiring early succession and mature forest.
• Short-term studies, especially those lacking a pre-treatment study period may yield misleading conclusions.
• If the management goal is to maintain “undisturbed” populations of mature forest birds, then blocks of uncut forest much larger than our 400 ha study sites may be necessary.
• Over time, forest conversion may have a greater effect on nest success than forest management.
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