Small Forest Openings Impact Nest Predation At the Forest Edges

Ethan C. Valentine, Chap A. Apol, Dr. Darren S. Proppe

Introduction

Typical oil pad site used in this study

- Habitat edges alter the diversity of songbird communities and often increase predation.
- Previous studies have focused on linear corridors or at the transition between large fields and forest.
- Less is known about the effects of small forest openings.
- Northern Michigan hardwood forests are proliferated by abandoned oil pad sites which create small openings.

Hypotheses

1. Edge effects are present in small openings
2. Predation rates differ by nest and egg type
3. Edge effects differ by distance
4. Avian communities differ at oil pad edges

Placing artificial eggs into a synthetic ovenbird nest

Methods

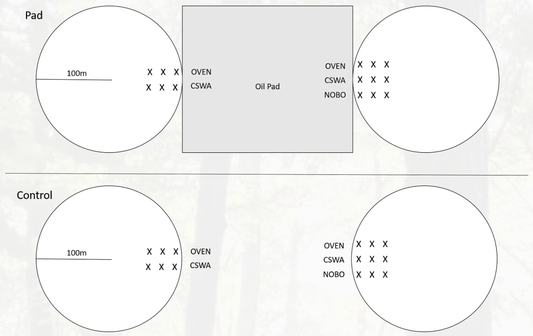

Figure 1. Nest placement at abandoned oil pads and control sites.

OVEN = ovenbird
CSWA = chestnut-sided warbler
NOBO = northern bobwhite

12 experimental sites
12 control sites

Figure 2. Nests and eggs were designed to mimic three avian species.

Species Used as Model	Species Appearance	Nest Type	Egg Type
Ovenbird (*Seiurus aurocapilla*)		 Ground	 Artificial
Chestnut-sided Warbler (*Setophaga pensylvanica*)		 Shrub	 Artificial
Northern Bobwhite (*Colinus virginianus*)		 Ground	 Real

Results

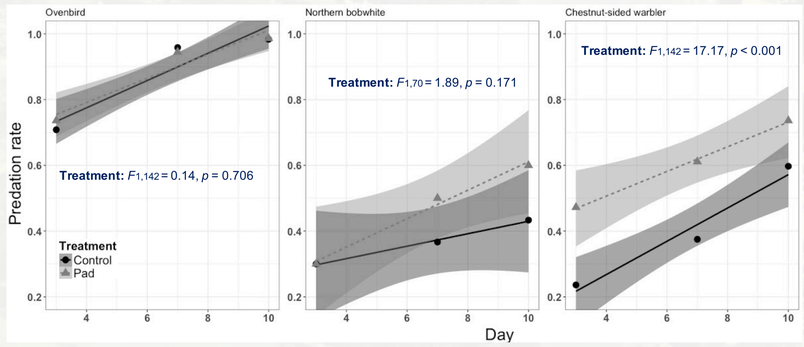

Figure 3. Nest predation by day and treatment. Predation at pads was higher for chestnut-sided warblers, but not ovenbirds or northern bobwhite. Distance was not significant for any species.

Full linear model results

Treatment: $F_{1,214} = 14.33$, $p < 0.001$
Number of Days Present: $F_{2,213} = 26.16$, $p < 0.001$
Species Type: $F_{2,213} = 94.85$, $p < 0.001$

Results

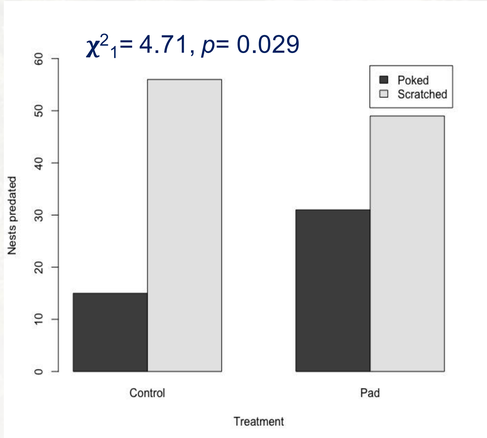

Figure 4. Predation by treatment, based on the type of indentation made in clay eggs.

1. Predation was significantly higher near oil pad edges
2. Twice as much poked predation occurred at oil pad edges
3. No observed diminish in effects as distance from edges increased
4. No difference in avian communities between treatments

Discussion

- Small forest perforations can increase predation at forest edges
- Oil pads may allow easier access for predatory bird activity (↑ poked predation)
- Edge effects likely exceed the 35m radius used in our experiment
- Birds are not avoiding pads, and are potentially nesting in subpar habitats

Acknowledgements

Calvin College Biology Dept.
Au Sable Institute
William H. and Celia I. Dornbush De Vries Family