



# Retention patch size influences beetle community persistence

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## Introduction

- Sustainable Forest Management (SFM) encourages live tree retention for biodiversity conservation
- Retention patches may provide reserves for intact forest species ensuring their conservation (1,2,3)
- Small retention patches (ie:<1.1 hectares) do not enable persistence of intact forest species (3,4,5)
- Forest managers and policy makers require knowledge of the benefits of larger retention patches (6)



Figure 1: Examples of small (left) and large (right) retention patches which are designed to preserve biodiversity

## Hypothesis

Retention patches can maintain beetle communities representative of intact forests if area thresholds are achieved

## Methods

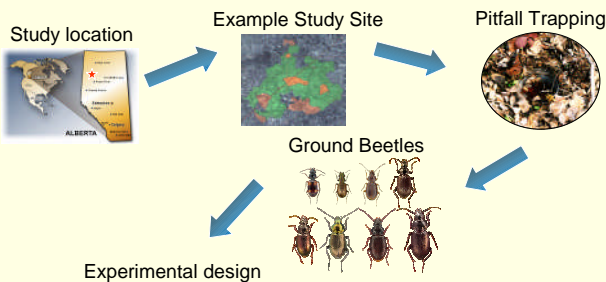


Figure 2: Flow diagram outlining critical steps in development of study

	Patch Size			Controls	
	Small (S)	Medium (M)	Large (L)	Intact (I)	Clear-cut (CC)
Aspen Dominated	▼ x3	▼ x3	▼ x3	■ x3	● x3

## Results

### Larger Patches Resemble Intact Forest

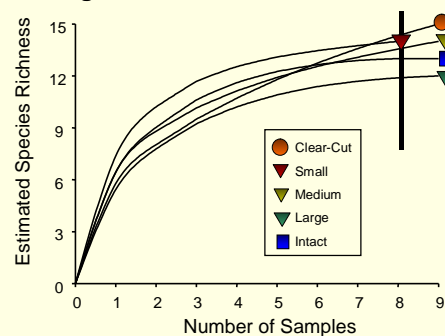
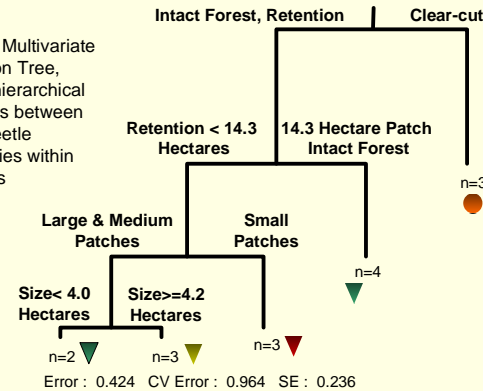


Figure 3: Sample based rarefaction curve comparing standardized species richness across treatments

### Beetle Communities Persist in Retention Patches

Figure 4: Multivariate Regression Tree, showing hierarchical differences between ground beetle communities within treatments



### Critical Retention Patch Size Varies by Species

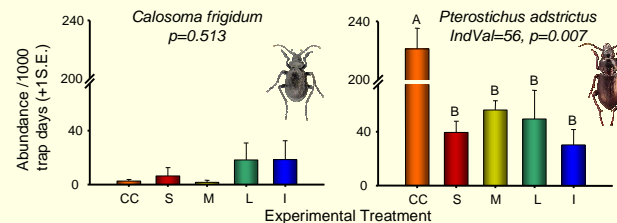


Figure 5: Ground beetle species level responses to retention patch treatments

## Results

- As retention patch size increases treatments become more similar to intact forest
- Retention patches greater than 14.3 hectares are indistinguishable from intact forest
- Community structure of small retention patches differ from medium and large patches
- Large retention patches maintain highest abundance of intact forest species

## Management Implications

- Retention patches can maintain ground beetle communities which resemble intact forest
- Large and medium sized retention patches influence beetle community persistence the most
- Variability in retention patch size is important for maintaining a broad spectrum of species
- Forest managers should utilize retention patches greater than 3 hectares in order to influence persistence of ground beetle communities

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