Duck settling and breeding success in landscapes fragmented by linear features

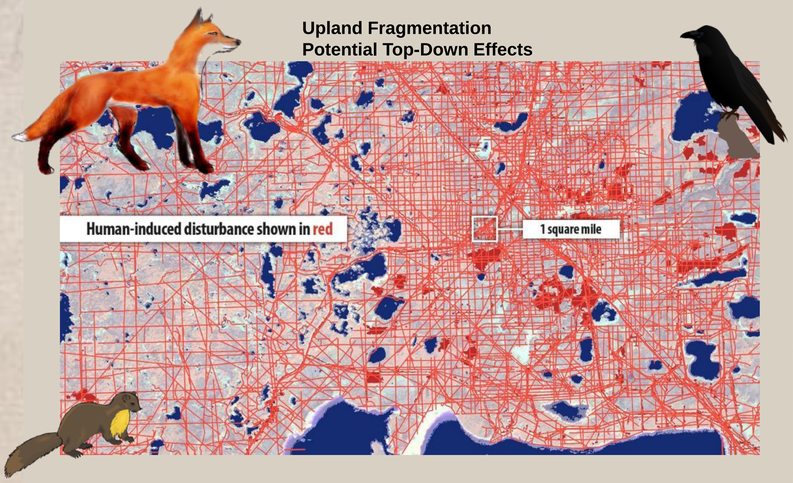
Stuart Slattery[1], Howie Singer, Susan Witherly, Llwellyn Armstrong, Glenn Mack, Jared Knockaert, Dave Howerter, Ducks Unlimited Canada

Introduction

The western boreal forest is the second most important area for breeding waterfowl in North America. However, intensive landscape change has occurred resulting in an extensive network of linear features throughout the boreal forest. Sustainable levels of linear feature densities for breeding waterfowl are unknown.

Project Purpose

Assess implications of linear feature development for waterfowl populations and develop recommendations for conservation. We hypothesized that negative effects could occur through top-down (increased predation) or bottom-up (altered hydrology) processes.



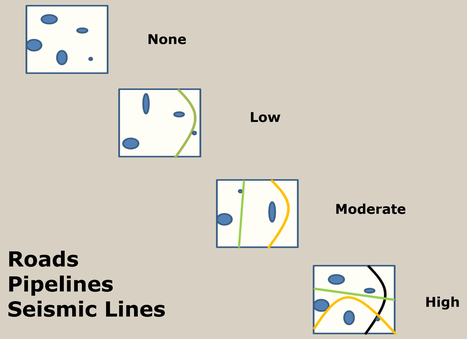
Core Questions

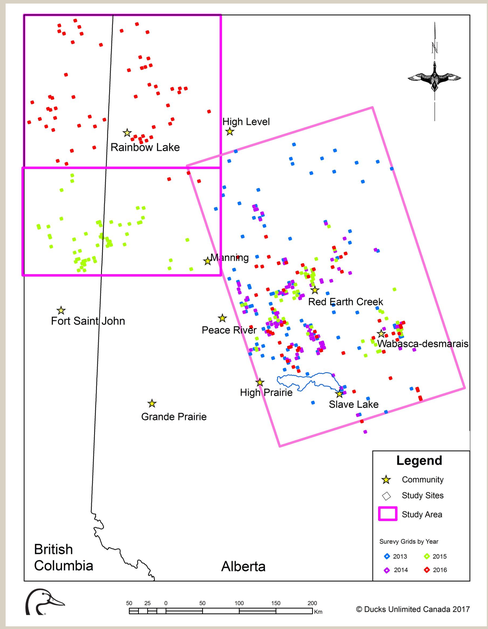
- How does duck pair abundance and breeding success change with increasing density and distance to roads, pipelines, and seismic lines?
- What is the relative importance of our hypotheses?
- What densities of linear features are sustainable for waterfowl (and waterbirds)?

Study Design

- We sampled ~420 grids (6.25 km^2 each, n = ~100 per year) during 2013-2016

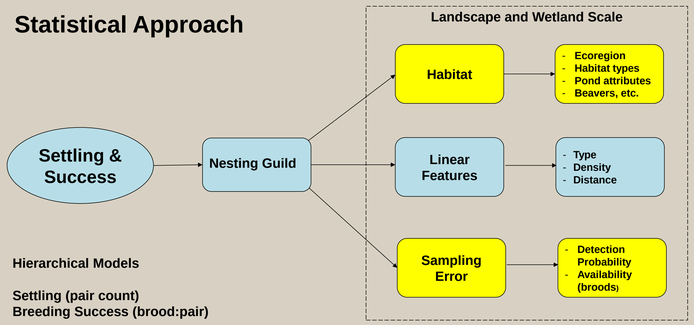
Survey grids chosen with a range of individual and cumulative linear feature densities





Distribution of 2013-2016 sample sites (grids)

Statistical Approach



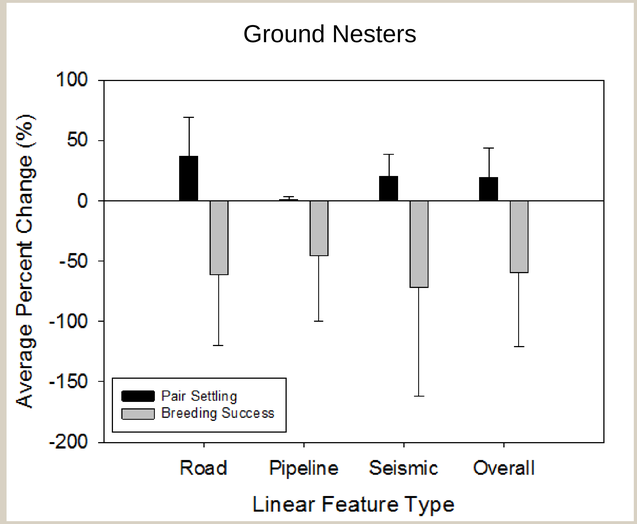
Hierarchical Models

Settling (pair count)
Breeding Success (brood:pair)

Preliminary Results

	Cavity		Overwater		Ground	
Feature	Settling	Success	Settling	Success	Settling	Success
Pipeline	0	0	0	0	0	-
Road	+	0	+	0	+	-
Seismic	+	0	0	0	0	-

+ indicates positive, - indicates negative, and 0 indicates no relationship



Implications

1. Important to monitor both settling and breeding periods for the whole story
2. Early results consistent with a predation/habitat fragmentation hypotheses
3. Mechanism unknown, though ground based research underway to elucidate.

We are grateful for support from:

Alberta Conservation Association
Alberta Environment and Parks
Alberta North American Waterfowl Management Plan
Environment Canada/ECCC
Prairie Habitat Joint Venture/NAWCA
Numerous Individuals
AEMERA/JOSM/OSM

[1] *Contact Information*

Ducks Unlimited Canada
Institute for Wetland and Waterfowl Research
Stonewall, MB R0C 2Z0
Business: (204)467-3323
E-mail: s_slattery@ducks.ca