Canada Warbler response to vegetation structure on recovering seismic lines

Jocelyn Gregoire, MSc Student
Dr. Erin Bayne

University of Alberta
Canada Warbler (Cardellina Canadensis)

- Neotropical migrant songbird
- Upland deciduous/mixed wood forests
- Dense shrubby understory
- SAR
  - Canada: Threatened
  - Alberta: Sensitive
Threats
How do CAWA respond to linear features?
Rapid point counts
• Where are the CAWA?
• Presence/absence of CAWA
• General seismic line characteristics
  • Regeneration
  • Human disturbance
  • Vegetation structure

Localization
• Given CAWA are present, how do they respond?
• Use/Selection of the disturbance
• Does vegetation affect their response? If so, how?
Regeneration

Class 1
- Clearly defined linear feature and/or
- Man-made pathway defined
- Little to no ingrowth
- Forb-Low Shrub dominated

Class 2
- Linear feature is visible and/or
- Man-made pathway defined
- Tall shrub and/or sapling ingrowth

Class 3
- Linear feature is visible and/or
- Man-made pathway narrow or undefined
- Tall shrub and/or sapling ingrowth

Class 4
- Linear feature is visible by canopy or not at all and/or
- Man-made pathways variable or non-existent
- Tall shrub and/or sapling regrowth is even across the feature
Human Disturbance Pathway

Class 1
• Prominent disturbance or minimal regrowth

Class 2
• Still visible but has evident regrowth

Class 3
• Still visible but has evident regrowth
  • Intermittent pathway

Class 4
• Barely visible or Non-existent; game trail; either through regrowth or it cannot be distinguished from the linear feature
Take Aways

- Moderate regeneration + Tall Shrub encroachment = CAWA
- Provided above, no strong effects from HDP
- Indication that effects decrease once regeneration reaches a certain level
- Exploring with binomial glms…needs some work

<table>
<thead>
<tr>
<th>Mod Rank</th>
<th>Model Formula</th>
<th>AIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CAWA ~ Regen + Land_PC1*</td>
<td>86.2031</td>
</tr>
<tr>
<td>2</td>
<td>CAWA ~ Regen + Broadleaf + Conifer + BSWI_near</td>
<td>86.3663</td>
</tr>
<tr>
<td>3</td>
<td>CAWA ~ Regen + Broadleaf + BSWI_near</td>
<td>87.8960</td>
</tr>
<tr>
<td>4</td>
<td>CAWA ~ Regen + Land_PC1* + (1</td>
<td>JDate:Group)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landcover</th>
<th>PC1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grassland</td>
<td>-0.26705564</td>
</tr>
<tr>
<td>Conifer</td>
<td>-0.09318337</td>
</tr>
<tr>
<td>Broadleaf</td>
<td>-0.64998424</td>
</tr>
<tr>
<td>Mixedwood</td>
<td>-0.15682726</td>
</tr>
<tr>
<td>Shrubland</td>
<td>-0.18377802</td>
</tr>
<tr>
<td>BSWI_near</td>
<td>-0.66268355</td>
</tr>
</tbody>
</table>
Local scale response to linear feature regeneration

• **Objective 1:** Identify how the Canada Warbler uses space around regenerating linear features.

• **Objective 2:** Determine if there is an influence of vegetation regeneration on space use.
Figure 2. Triangulation grid design deployed during the summer of 2017. Orange circles represent a SMB oriented perpendicular to the linear feature.
Methods

- Run CAWA recognizer in SongScope
- Validate recognizer hits
- Grid visualization script in R
- Select 4 nearest stations
- Rank by quality across each recording and placement within grid
- MSRP script in Matlab
- Eliminate detections outside of the grid in ArcMap

Detect singing events

Identify nearest stations

MSRP localization

Seismic Line
USE

• 2017 sites
• Detection on sites with 2 rows
• Calculated the nearest distance of each detection to the seismic line

SELECTION

• 100% MCP around known detections
• 1:5 sampling ratio
• 2 and 3 zones
Med. Shrub ≥ 1.5m

Tall Shrub (max height can be >2m)
- River Alder
- Green Alder
- Saskatoon
- Beaked Hazelnut
- Chokecherry
- Willow
- Buffaloberry
- Highbush Cranberry
Med. Shrub ≥ 1.5m

Tall Shrub (max height can be >2m)
- River Alder
- Green Alder
- Saskatoon
- Beaked Hazelnut
- Chokecherry
- Willow
- Buffaloberry
- Highbush Cranberry
Management Implications

• CAWAs do not select for edge habitat near narrow linear features and their use is dependent on a threshold level of regeneration.

• Concerns about fragmentation for forest bird species are based on their ability to cross linear feature. Vegetation methods may be more representative if conducted with that mindset.

• Species specific habitat associations are an important consideration in future reclamation activities.
THANKS