# Identifying High Quality Habitat for Landbirds at Risk in Forested Wetlands of Nova Scotia

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# Conservation Status

| Species | COSEWIC | Species at Risk Act (SARA) | Nova Scotia |
|---|---|---|---|
| **Canada Warbler** (*Cardellina canadensis*) | Threatened | Threatened | Endangered |
| **Olive-sided Flycatcher** (*Contopus cooperii*) | Threatened to Special Concern | Threatened | Threatened |
| **Rusty Blackbird** (*Euphagus carolinus*) | Special Concern | Special Concern | Endangered |

**Endangered** - facing imminent extirpation or extinction.
**Threatened** - likely to become endangered if limiting factors not reversed.
**Special Concern** - may become threatened or endangered because of a combination of biological characteristics and identified threats.

http://www.cosewic.gc.ca/

# Vulnerable to forest harvesting

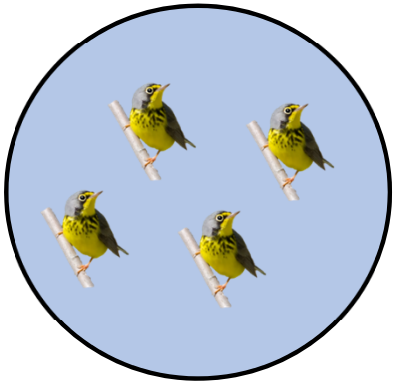
- No buffer requirements – can harvest to edge of a forested wetland
  - Changes hydrology
  - Increases sediment and nutrient inputs
  - Changes temperature and moisture regimes
  - Accelerates drying out, increases likelihood of fires
- No legal protection
  - New machinery can harvest the trees in the wetland
- Locations are poorly mapped
  - Challenge to identify on the landscape
  - Surrogate - combination of water table near surface, semi-open tree canopy, trees tolerant of wet conditions

# Project Goal and Strategy

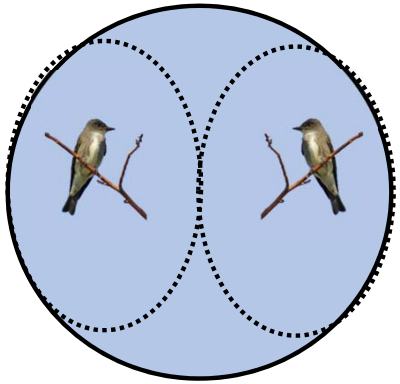
- Improve the prospects for conservation and recovery of these species in Nova Scotia.
- Conduct field work throughout Nova Scotia to locate areas being used by the birds and quantify site and landscape features.
- Use bird information to distinguish higher quality habitat
- Model high quality habitat on the landscape

# Identifying Higher Quality Habitat

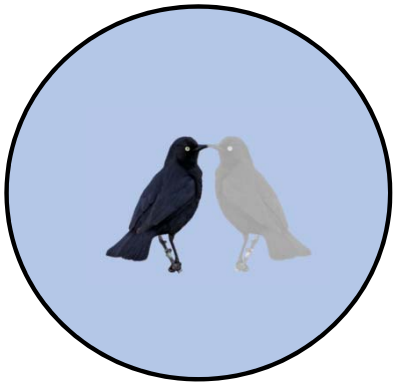
Higher abundance



Multiple territories

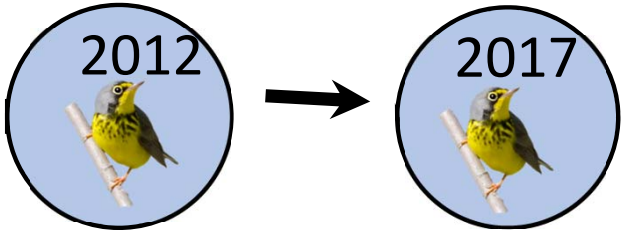


Breeding pairs



Multiple species

Returning to site in subsequent years




Successful breeding

# Project Elements

## 2017-2018

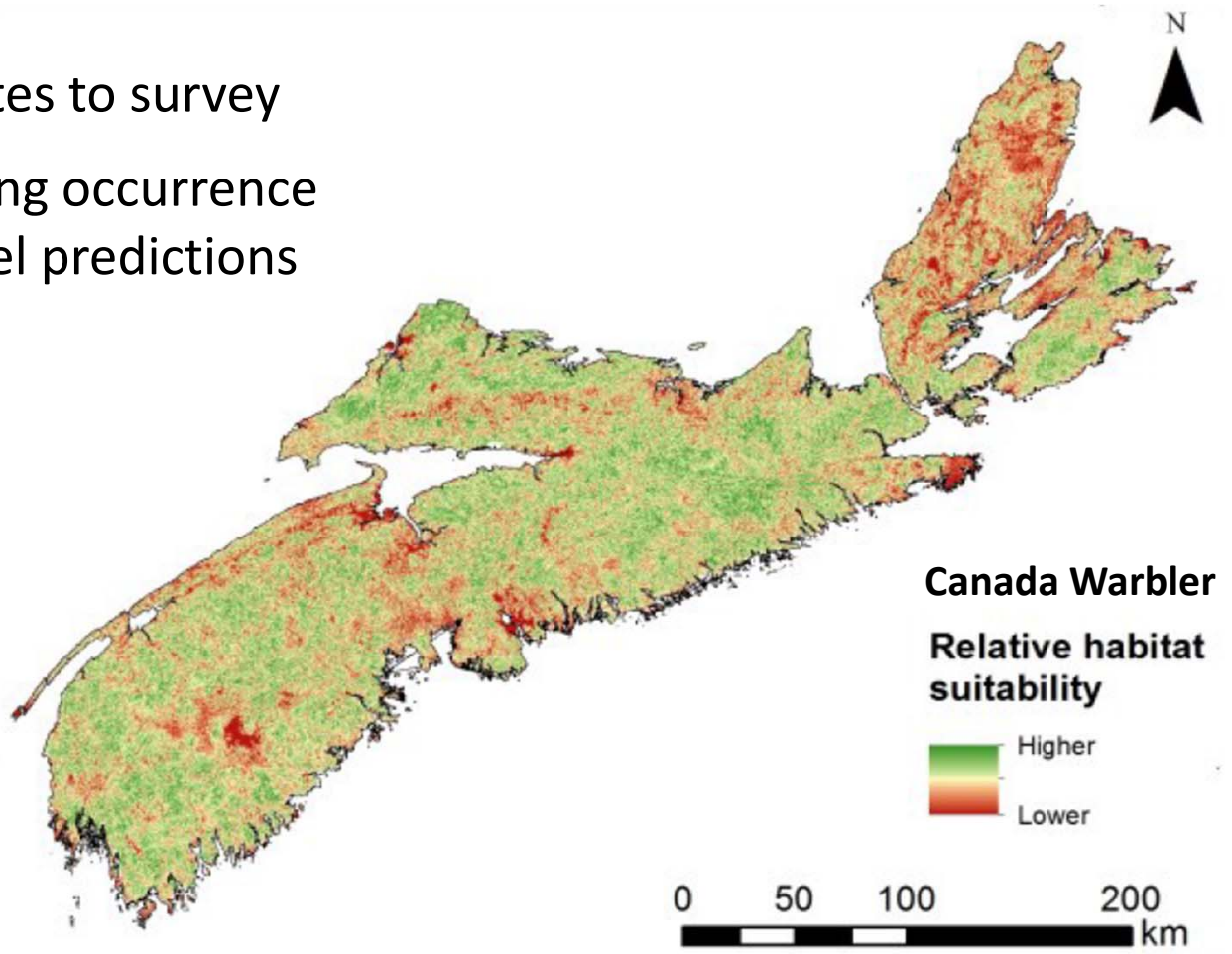
- *Research*
  - Field surveys & analysis
    - birds
    - habitat
    - forested wetland types
    - shrub layer structure
- *Outreach and stewardship*
  - Workshops, website
  - Recruit volunteers
  - Database for volunteer observations

## 2018-2019

- *Research*
  - Field surveys & analysis
    - birds
    - habitat
    - vascular plants, cyanolichens
  - Compile occurrences
    - team, volunteers
  - Use and refine habitat models
    - survey predicted sites field
    - test with recent occurrences
    - revise to improve prediction

# Used Shannon Bale's models for NS

- Identify new sites to survey
- Compare existing occurrence data with model predictions

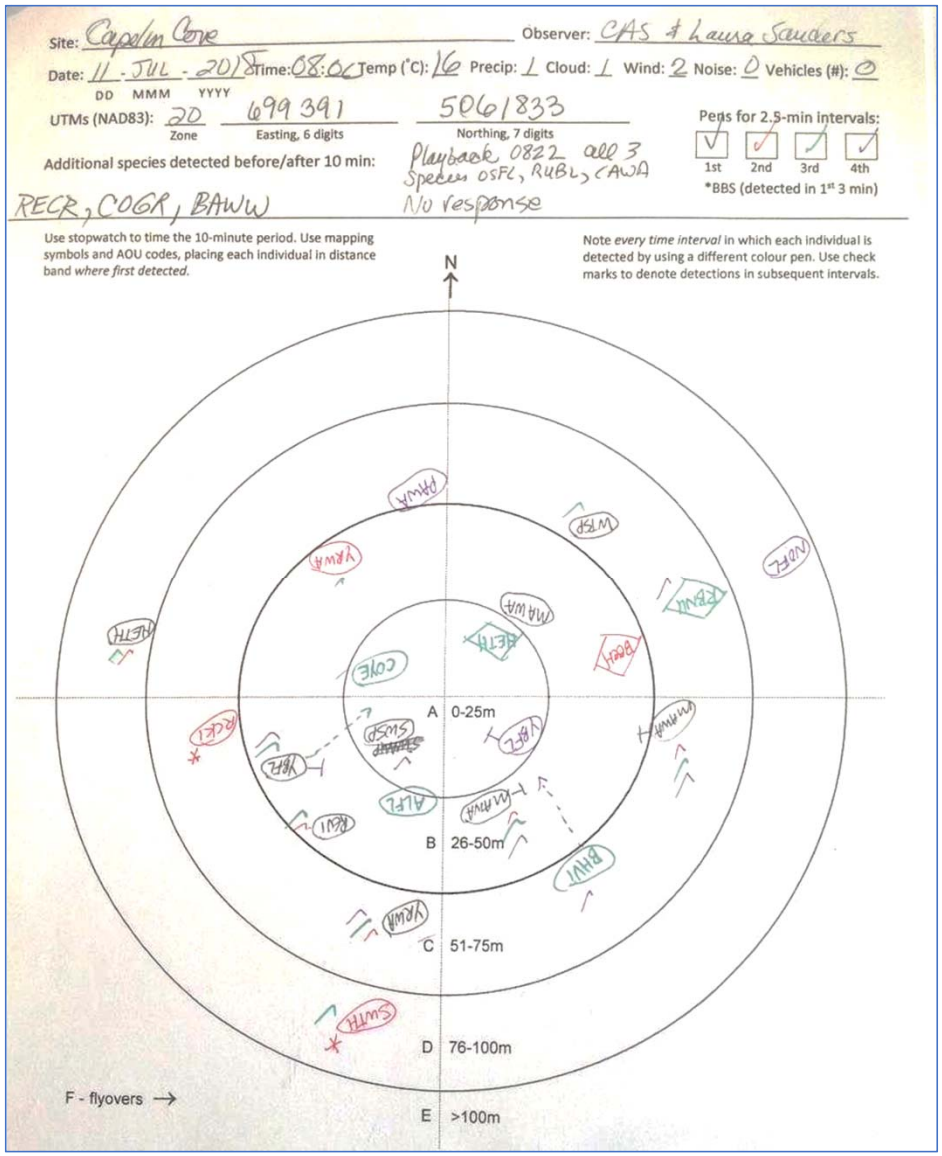



Bale, S. 2017.
MES thesis.
SRES, Dalhousie.

# Point Counts

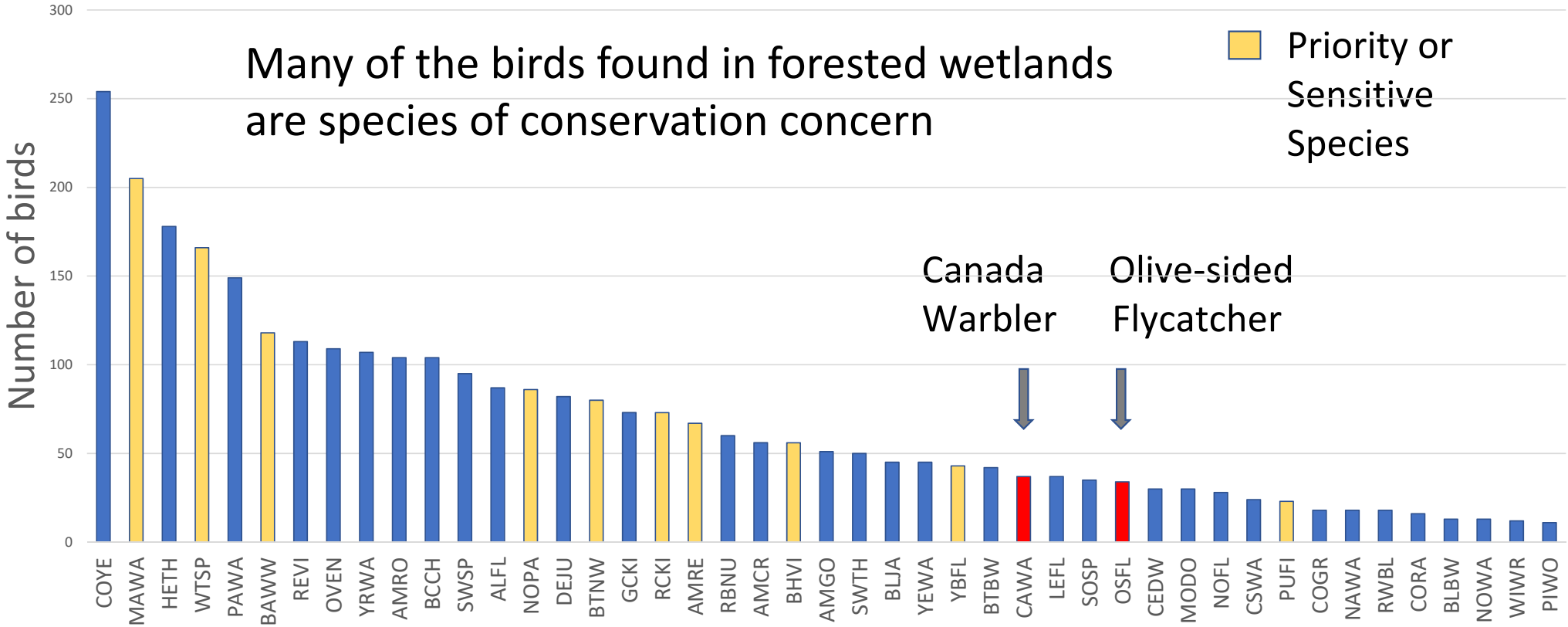
- 10 min duration, unlimited radius
- date, time, weather, observer
- for each individual bird:
  - species, sex, age
  - detection type
  - time interval
    - in each of four 2.5 min intervals
    - 1st 3 min (for comparison with BBS)
  - distance interval

    0-25, 26-50, 51-75, 76-100, 100 m
- use to calculate densities/ha



# Point counts - total individuals per species

(214 surveys)



# What species co-occurred with the these SAR significantly, either more or less often than chance?

## Olive-sided Flycatcher

- More often
  - Black-and-white warbler
  - Palm Warbler
  - Common Yellowthroat
- Less often
  - Red-breasted Nuthatch
  - American Robin
  - Yellow Warbler
  - Black-throated Blue Warbler

## Canada Warbler

- More often
  - Yellow-bellied Flycatcher
  - Ruby-crowned Kinglet
  - Black-throated Green Warbler
  - Northern Waterthrush
- Less often
  - Song Sparrow

## Rusty Blackbird

- More often:
  - White-throated Sparrow

# Playbacks increase detectability

Playback recording of all 3 SAR (May 22-July 12):

10-min point count +

**30 sec RUBL playback**+

2.5 min silence +

**30 sec OSFL playback**+

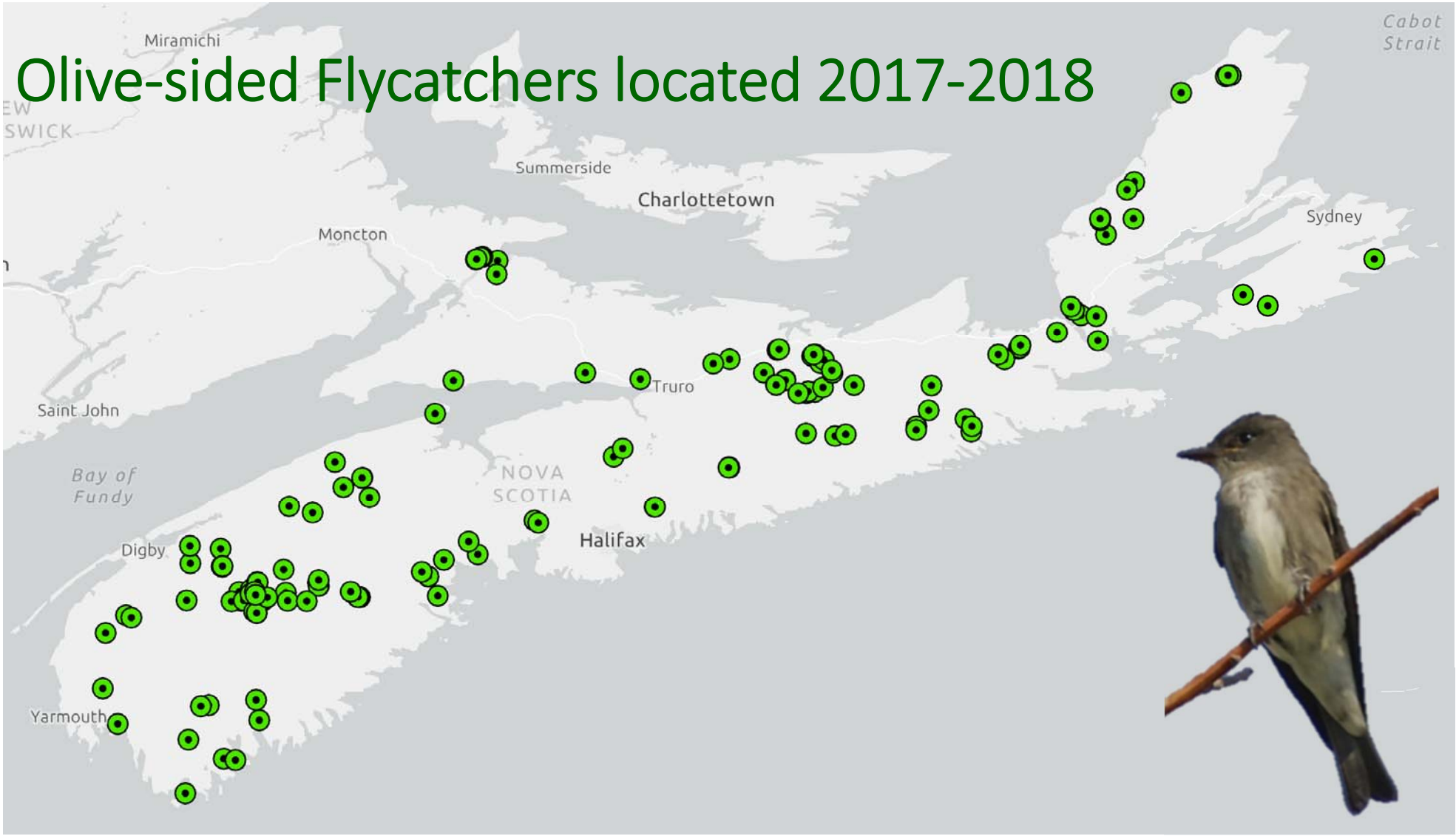
2.5 min silence +

**30 sec CAWA playback** +

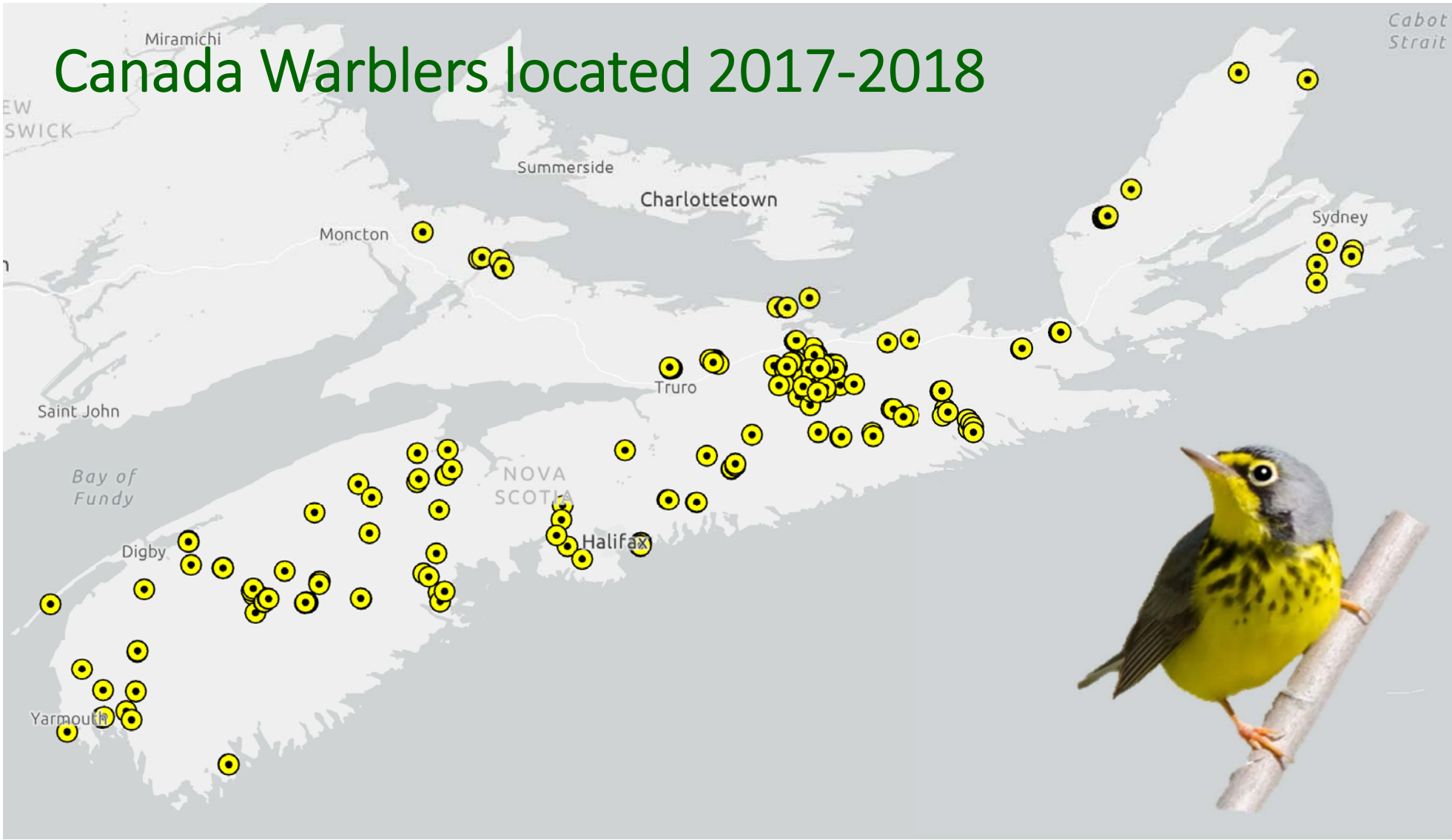
5 min silence


# Rusty Blackbirds located 2017-2018

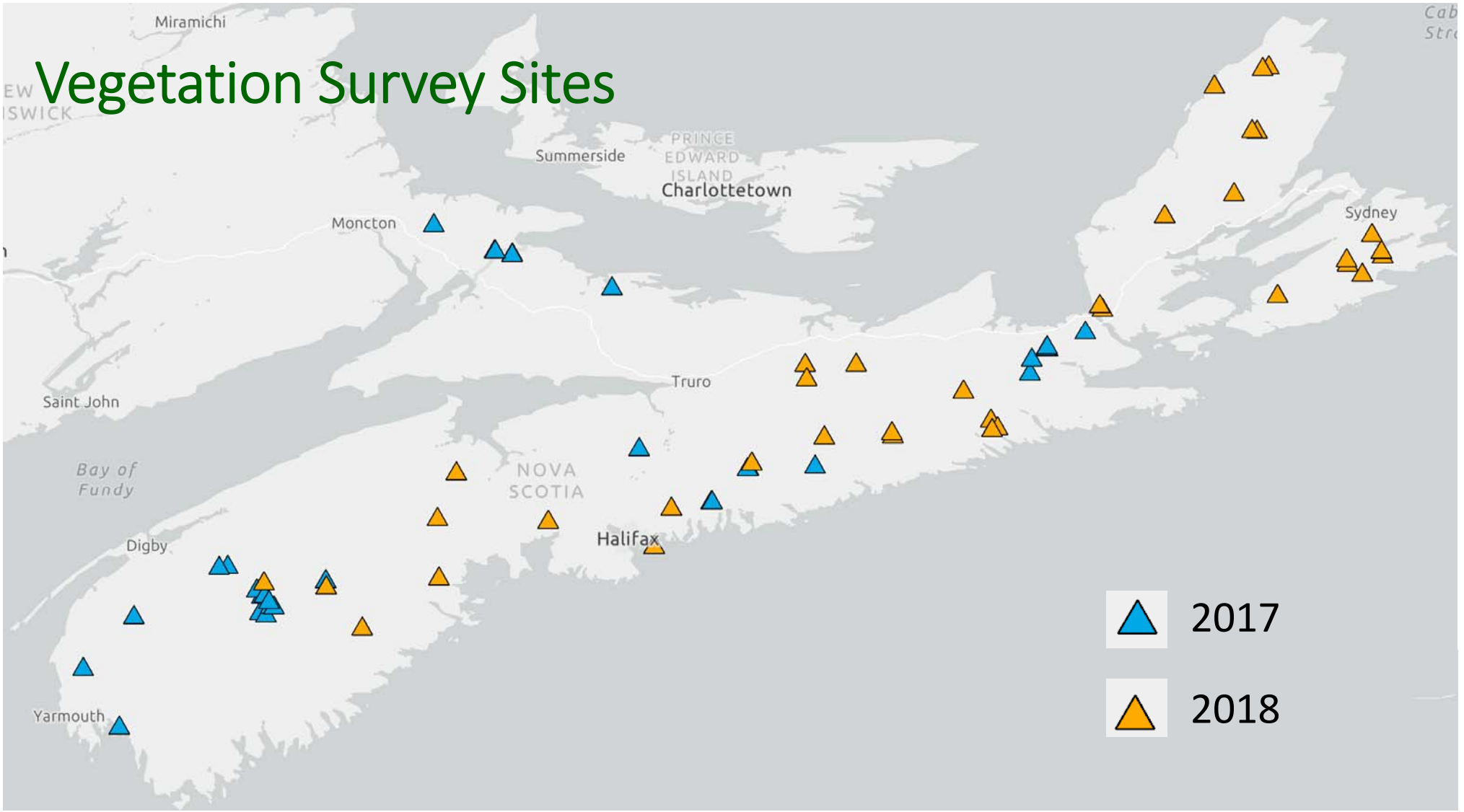
# Olive-sided Flycatchers located 2017-2018



# Canada Warblers located 2017-2018



# Vegetation Survey Sites



# Vegetation surveys

70 sites in 19 Ecodistricts within 6 Ecoregions

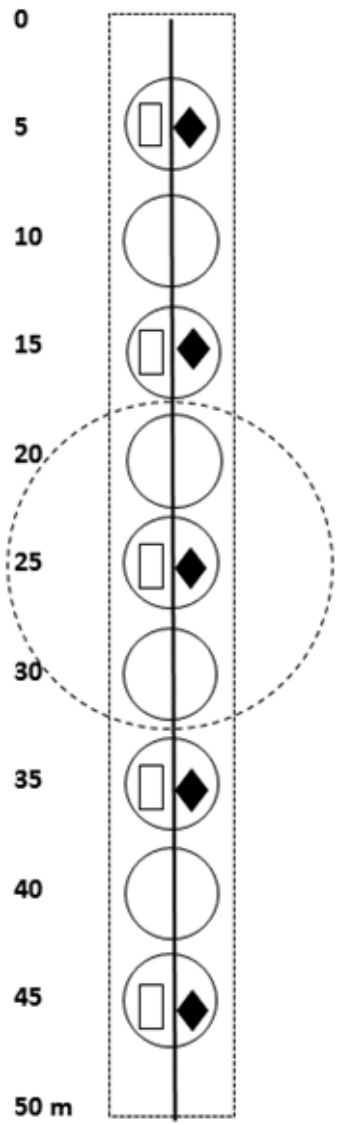
(plus 3 sites in southern NB)

| Nova Scotia Ecodistrict | | 2017 | 2018 |
|---|---|---|---|
| 210 | Cape Breton Highlands | | 5 |
| 310 | Cape Breton Hills | | 4 |
| 320 | Inverness Lowlands | | 1 |
| 330 | Pictou Antigonish Highlands | | 1 |
| 360 | Mulgrave Plateau | 8 | |
| 370 | St. Mary's River | | 1 |
| 380 | Central Uplands | | 2 |
| 430 | Eastern Granite Uplands | | 1 |
| 440 | Eastern Interior | 6 | 9 |
| 510 | Bras d'Or Lowlands | | 5 |
| 530 | Northumberland Lowlands | 3 | |
| 630 | Central Lowlands | 1 | |
| 720 | South Mountain | 3 | 1 |
| 730 | Clare | 1 | |
| 740 | LaHave Drumlins | 10 | 4 |
| 750 | Rossignol | 1 | |
| 780 | St. Margaret's Bay | | 1 |
| 810 | Cape Breton Coastal | | 1 |
| 840 | Tusket Islands | 1 | |
| **Total sites** | | **34** | **36** |

# Detailed vegetation surveys

**Also measured:**

- Number of shrub stems
- Number of song perch trees
- Cyanolichens




**Key to symbols**

Transect (50 m):
Low shrubs (0.25-2.0 m), every 1 m
CWD – diameter of logs intercepting
Water (length of intercepting features)

pH and canopy cover, every 10 m

Quadrat (1.0 x 0.5m), visual estimation of:
% cover of ground layer, including mosses
% cover of herbaceous layer (5-25 cm)

Tall shrubs (2-10 m) in 2-m radius, every 5 m

FEC plot: V type, S type, and Ecosite; list of tree species, dominance; % hardwood/softwood; Sphagnum presence; soil samples

Belt transect (3 m on either side of transect):
Trees (>10 m) – dbh, height, health class
Snags – dbh, height class, decay class

# A 10 m criterion for the tree layer missed many trees

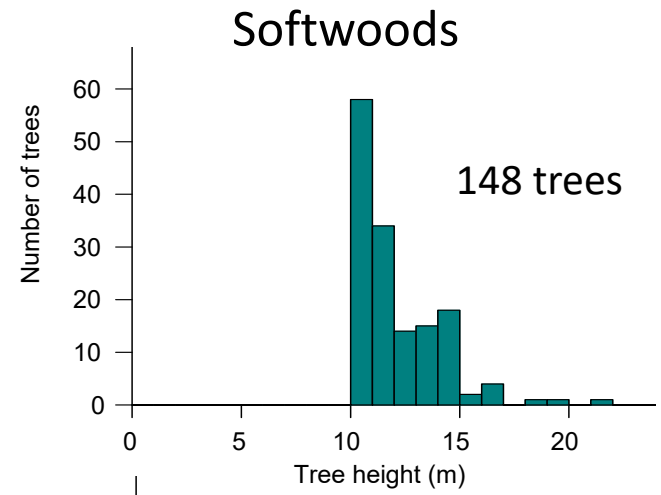
## 2017

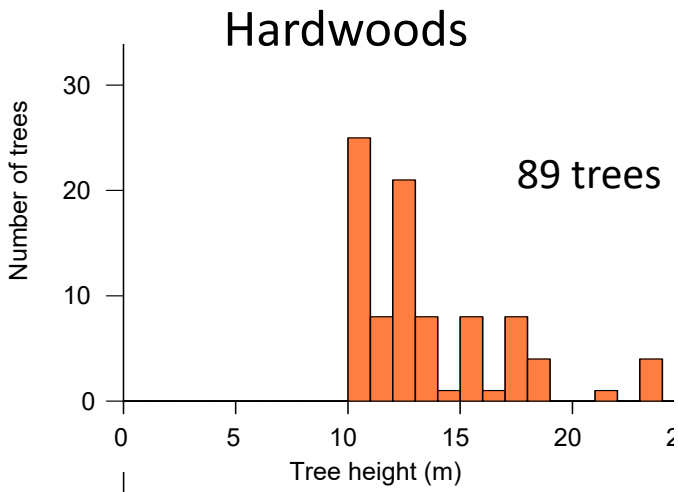
trees < 10 m
were classed as
shrubs

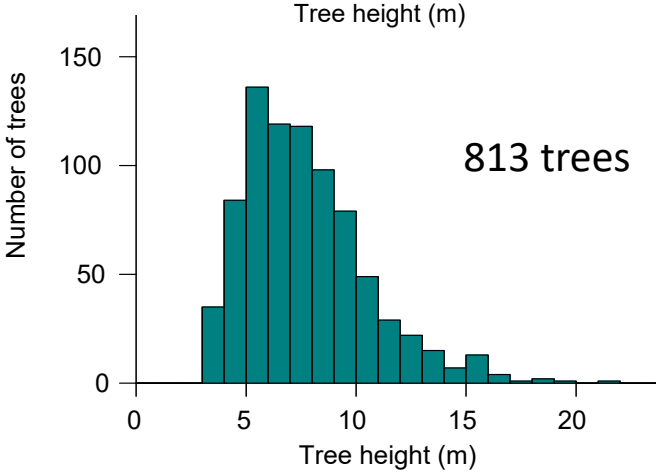
## 2018

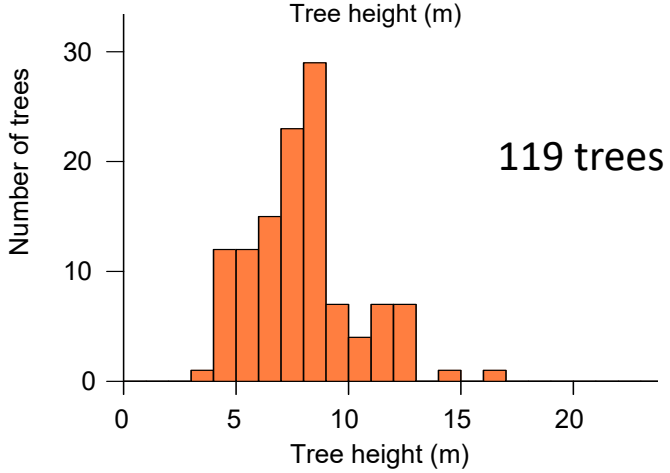
dbh > 7.5 cm
were trees

average tree
height was
< 10 m for all but
2 of 36 sites



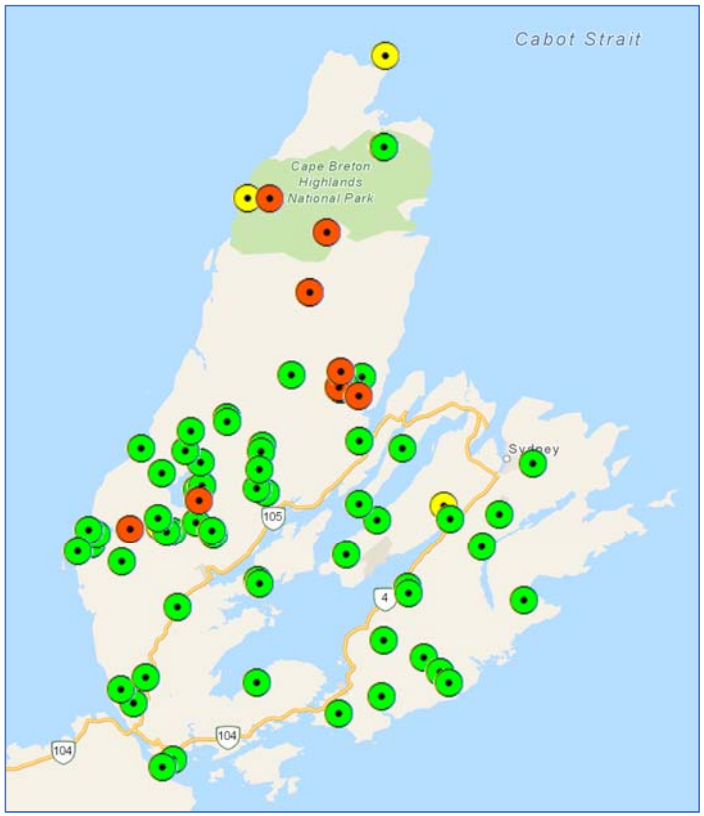



# Habitat results for 2018 – some differences

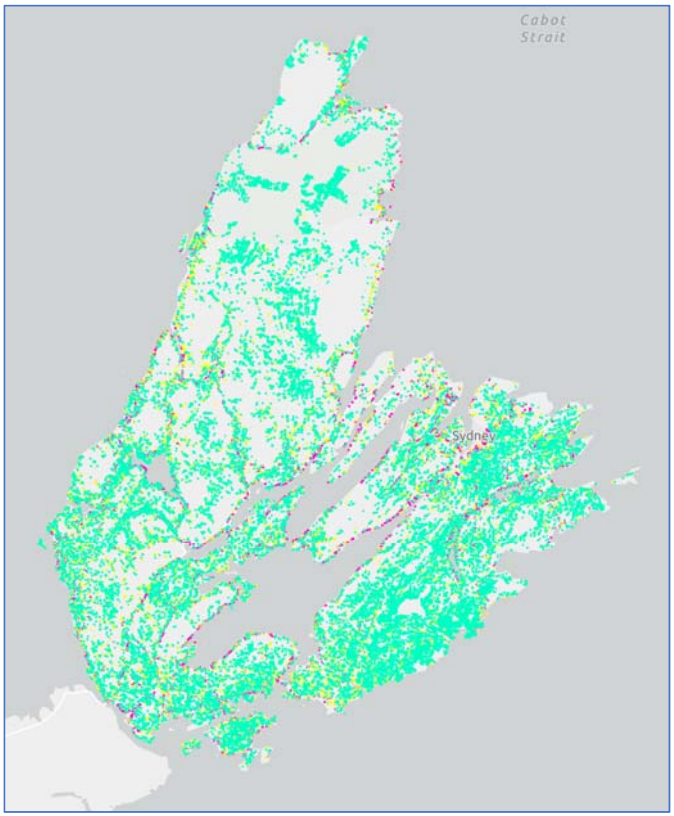
- Canada Warbler
  - Smaller sample size than in 2017
  - Cinnamon fern layer was less important statistically in 2018
  - In western and central NS, many cinnamon ferns killed by late frost
  - Cinnamon fern was less common in eastern NS and Cape Breton, where most surveys took place

# Results from Cape Breton – Olive-sided Flycatchers

MBBA occurrences (2006-2010)

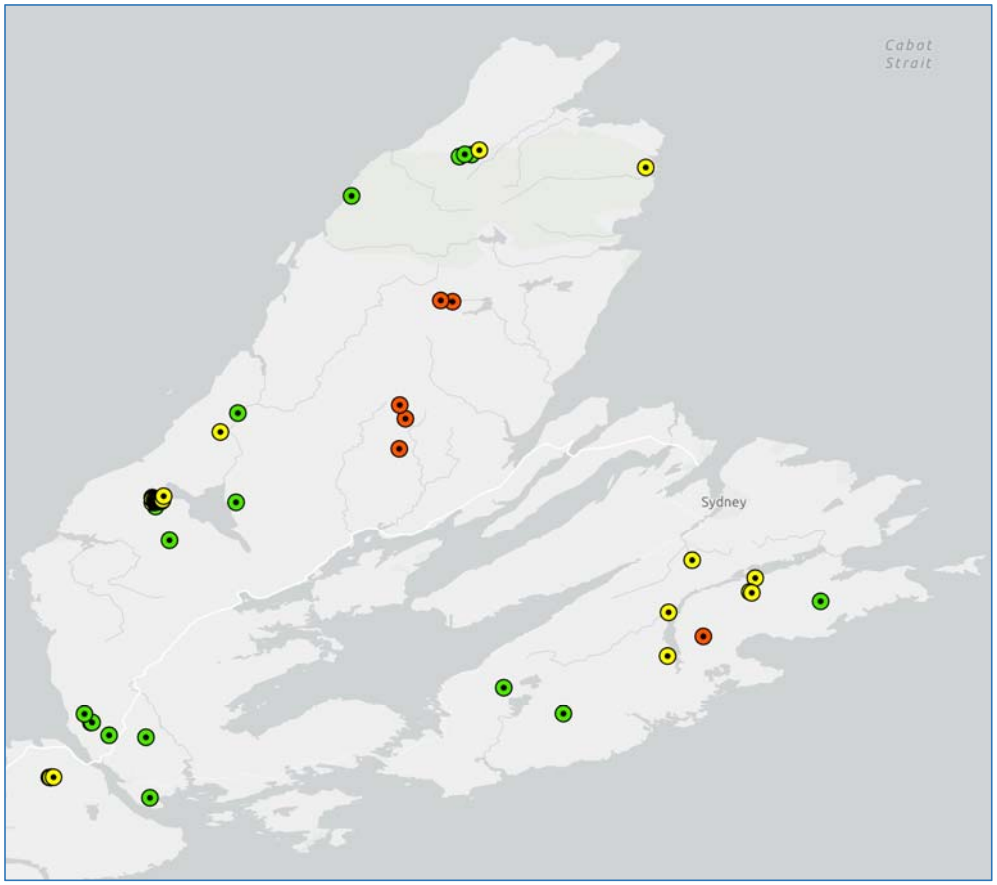



Predicted habitat (S. Bale model)

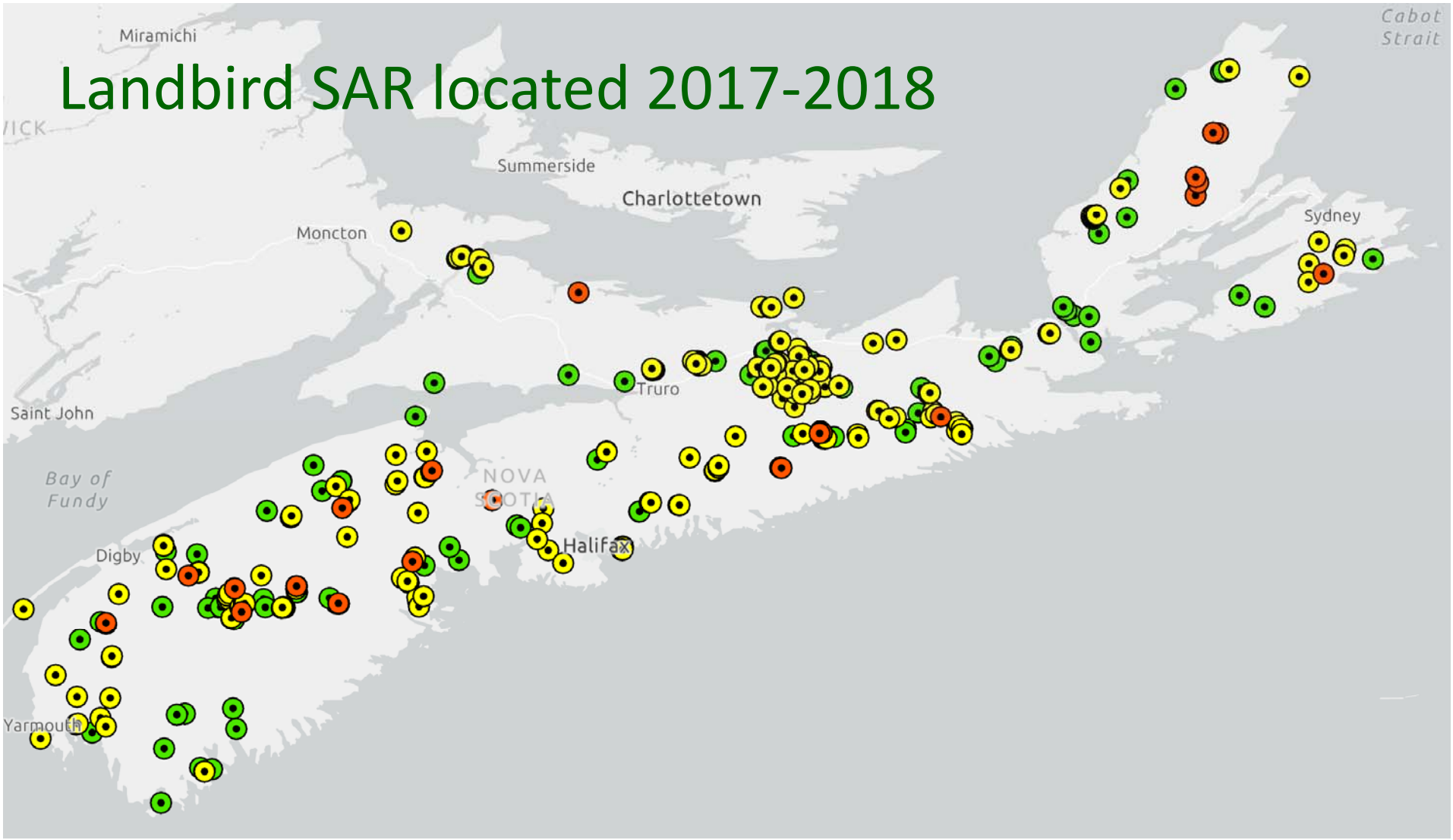


# Results from Cape Breton for 2017-2018

- Relatively few Canada Warblers and Olive-sided Flycatchers
  - Black River Bog (NCC land) was an exception (James Churchill, 2018)
- Several Rusty Blackbirds were found in the highlands south the CBHNP
- In 2018, the other two species were absent from wet forest and riparian forest in the Highlands

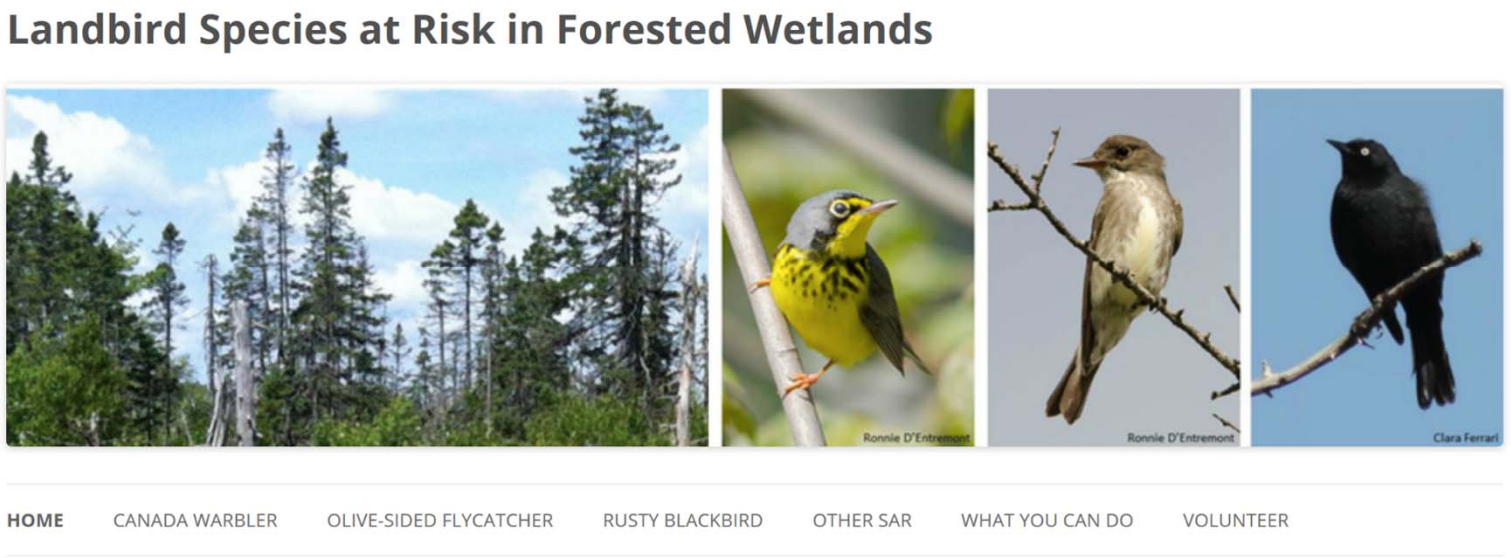


# Landbird SAR located 2017-2018



# Public website and project email

**http://landbirdsar.merseytobeatic.ca/**




Project e-mail contact:

**LandbirdSAR@merseytobeatic.ca**

# Acknowledgements


- Volunteers, Maritimes Breeding Bird Atlas, ACCDC, Sanctuary Trust, NSBS
- Environment Canada (Atlantic Ecosystem Initiative, Habitat Stewardship Program, Science Horizons Internship Program, Clean Tech Internship)
- Nova Scotia (DNR Habitat Conservation Fund, Endangered Species Recovery Fund, Strategic Cooperative Education Incentive)
- The Mersey Tobeatic Research Institute, Parks Canada, CARP, NSNT, NCC
- Students, interns and field assistants (Thomas Baker, Alex Setchell, Zach Simai, Iain Caldwell, Laura Achenbach, Sydney Bliss, Jen Randall, Clara Ferarri, Alicia Pray-Leslie, Amanda Lavallee, Brody Crosby, Clare Snow, Erika Nissen, Mandy Mitton, Nick Belliveau, Zachary Wallot-Beal, Jordan Haughn, Kyle D'entremont, Suchinta Arif, Marian Kemp, Dominic Cormier)

# Student posters

- Thomas Baker – Landbird SAR surveys, testing habitat models
- Zacharye Simai – Analysis of the 2018 habitat data with respect to SAR presence and absence
- Alex Setchell – Plant and cyanolichen diversity in the 6 x 50 m vegetation plots and anthropogenic disturbance
- Hailey MacDonald, Hannah Drake, Harriett Edwardsen, Lindsay Wood – Analysis of ARU data from Tegan's Newfoundland forested wetland sites (bird species abundance; detectability between different species, effects time of day, and season;  vocalization rates, Automated classifiers to identify species)