Prescribed burning to improve management for brushland dependent species

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ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

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Katherine Carrier

Goal: Keep dense shrubs at bay

and maintain a mosaic of shrub and open patches

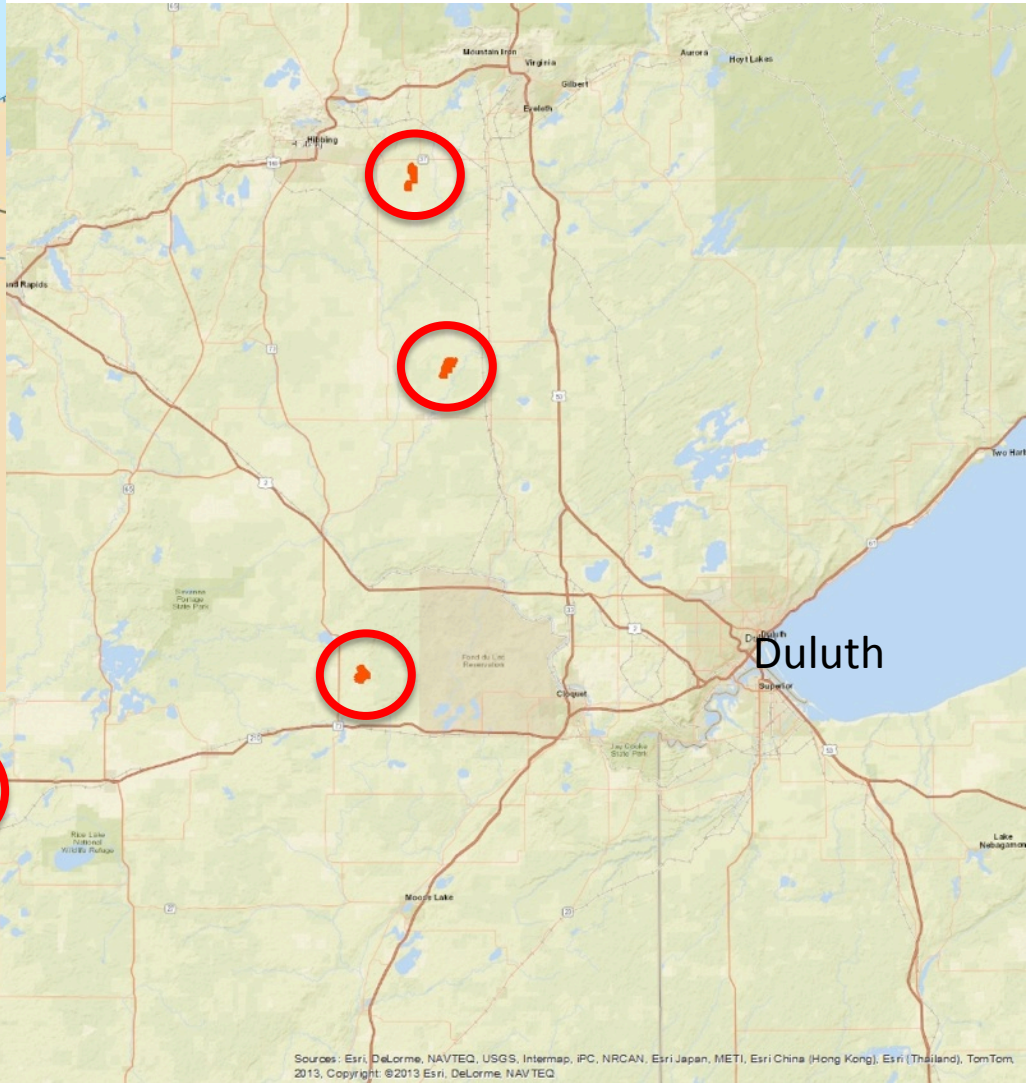

MARSH MASTER
DANGER

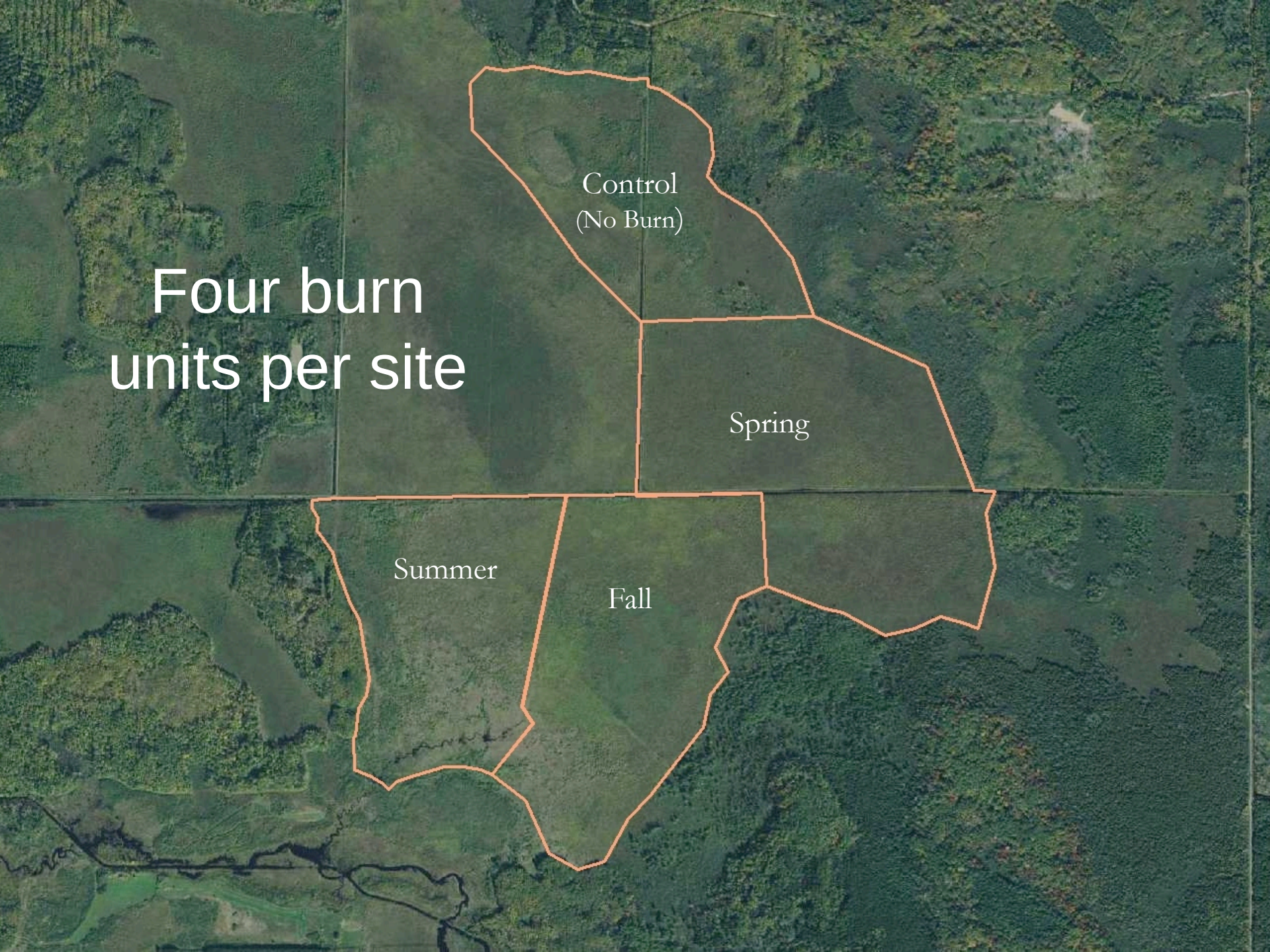

Prescribed burns in spring

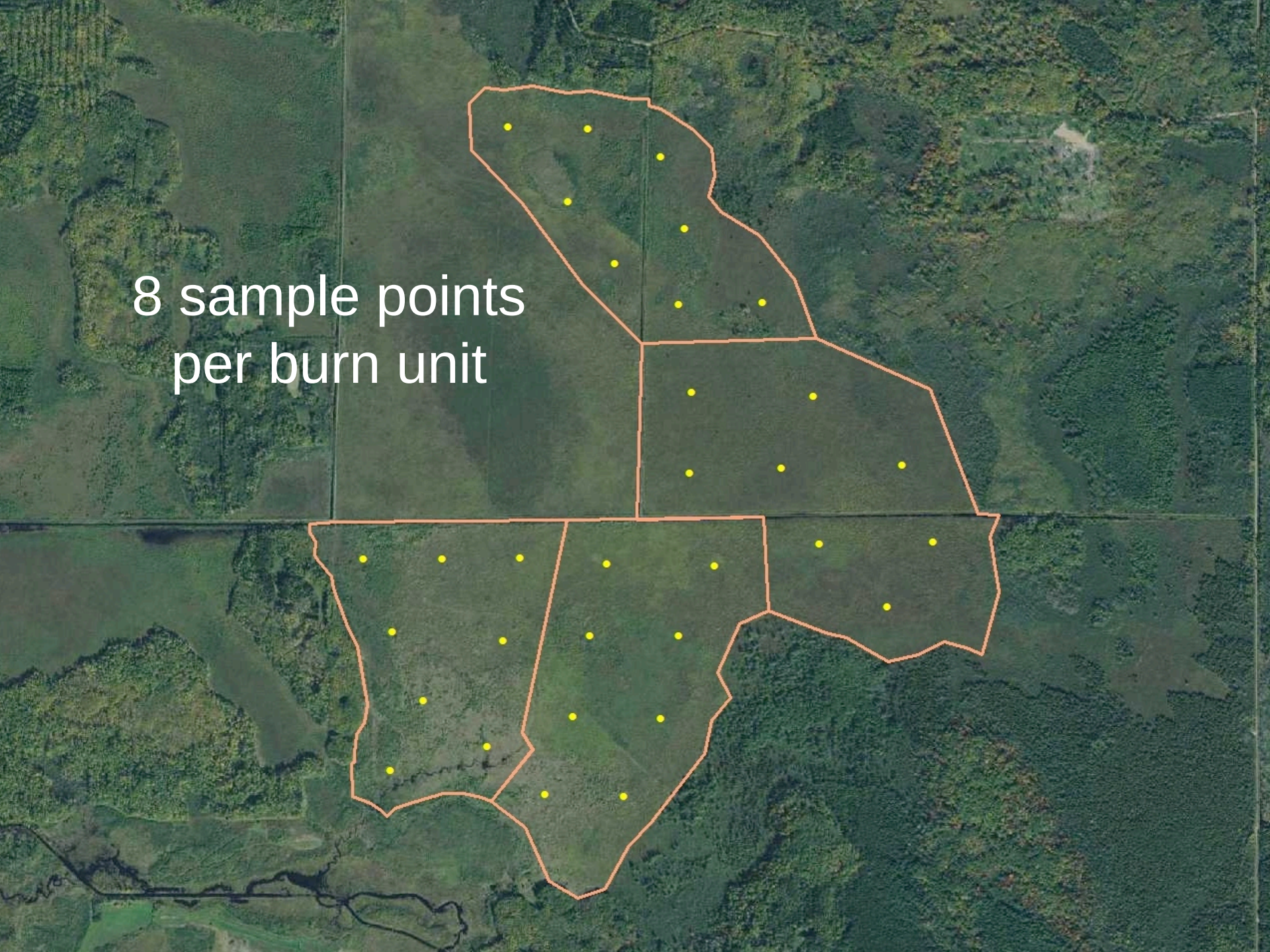
Historically fire in all seasons except winter

Might summer and fall burns be more effective at meeting goals?


Ontario
Minnesota
North Dakota
South Dakota
Wisconsin
Iowa


Duluth
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, Copyright ©2013 Esri, DeLorme, NAVTEQ


Four burn units per site
Control
(No Burn)
Spring
Summer
Fall


8 sample points
per burn unit

Avian Point Counts



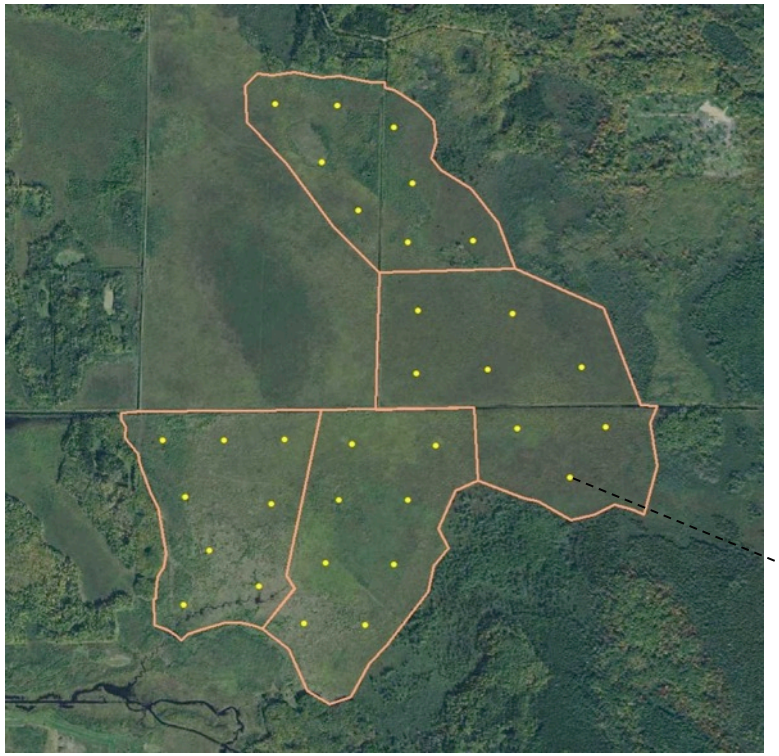


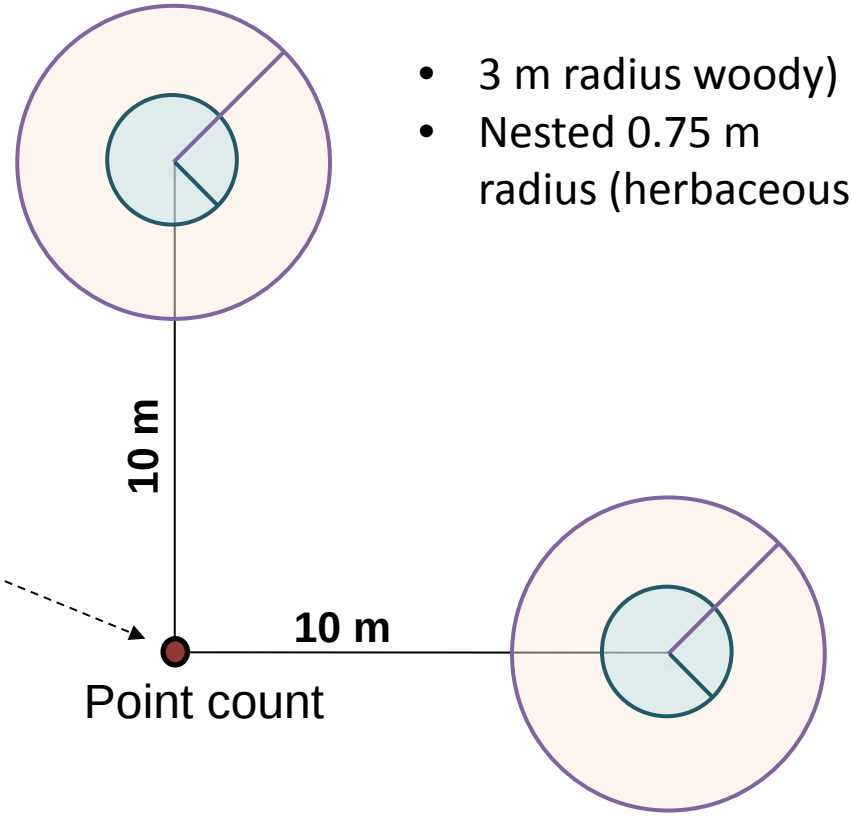



June 2016-2018

Vegetation and Burn Surveys

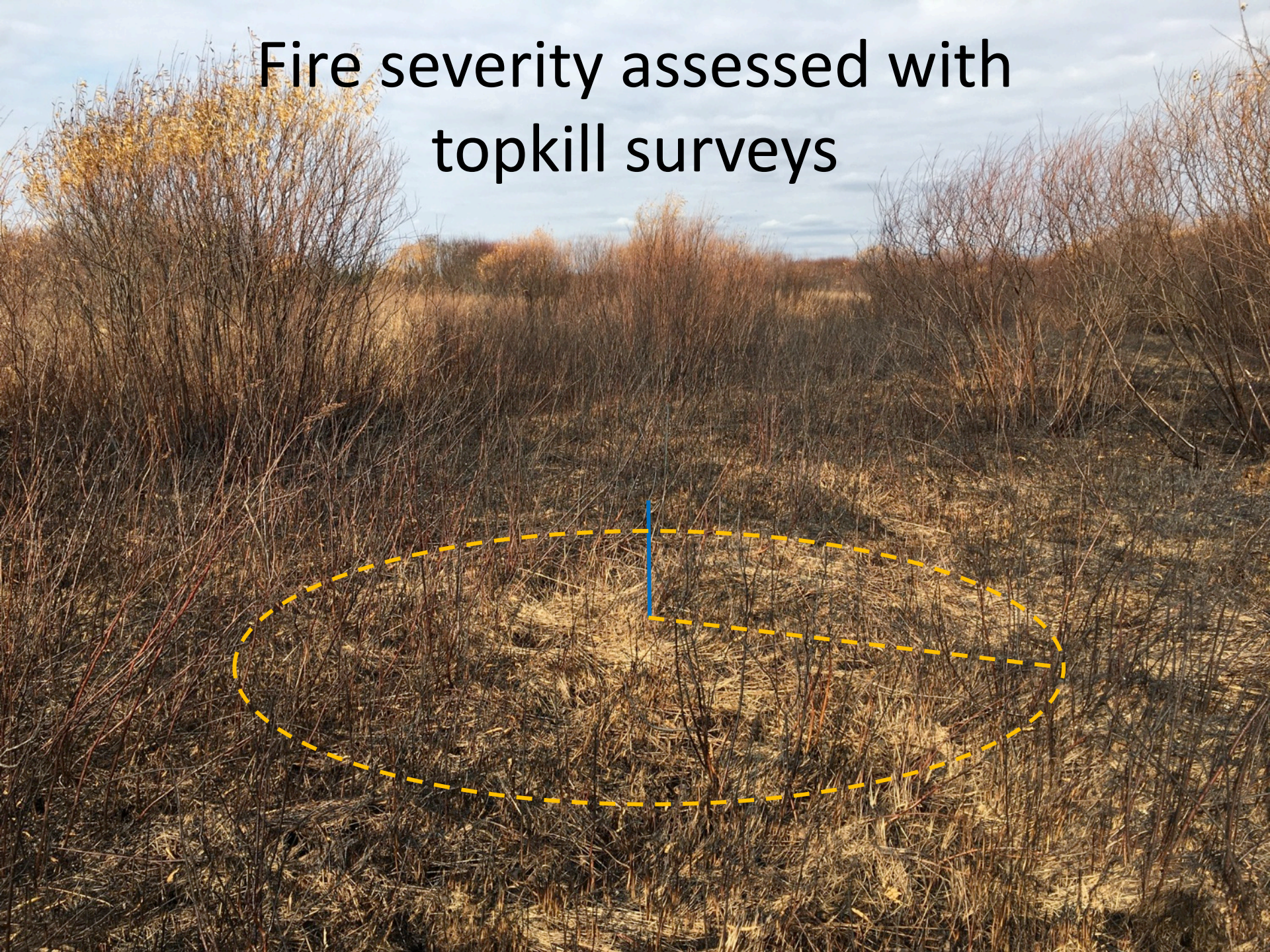
Vegetation surveys





- 3 m radius woody)
- Nested 0.75 m radius (herbaceous)

Fire severity assessed with topkill surveys



Burns to Date

Spring

- May 10, 2017
- May 12, 2017
- May 16, 2018+
- May 23, 2018+

Summer

- August 11, 2017
- September 12, 2017+
- August, 23, 2018*

Fall

- November 16, 2016
- October 19, 2017+
- October 18, 2018*

*No data yet so not included in analyses here
+topkill not yet analyzed

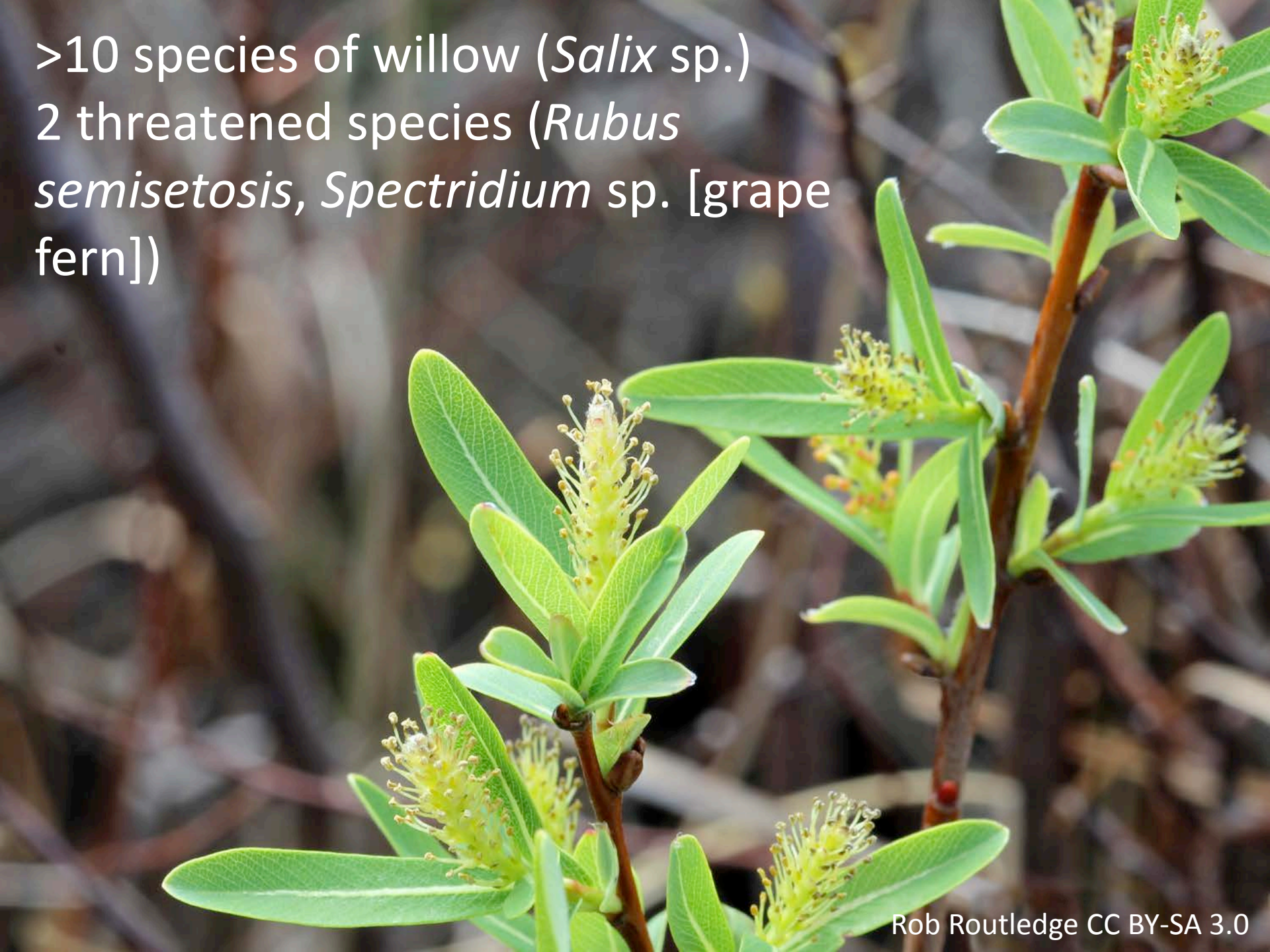
Results

105 bird species

26 SGCN  

21 LSFSC  

 fire-dependent


>10 species of willow (*Salix* sp.)
2 threatened species (*Rubus semisetosis*, *Spectridium* sp. [grape fern])
Rob Routledge CC BY-SA 3.0


Cody Hough - Own work, CC BY-SA 3.0


Montana Statewide Noxious Weed Awareness and Education Program , Montana State University, Bugwood.org, CC BY-SA 3.0
UGA2154003

Common yellowthroat

Dan Pancamo, CC 2.0

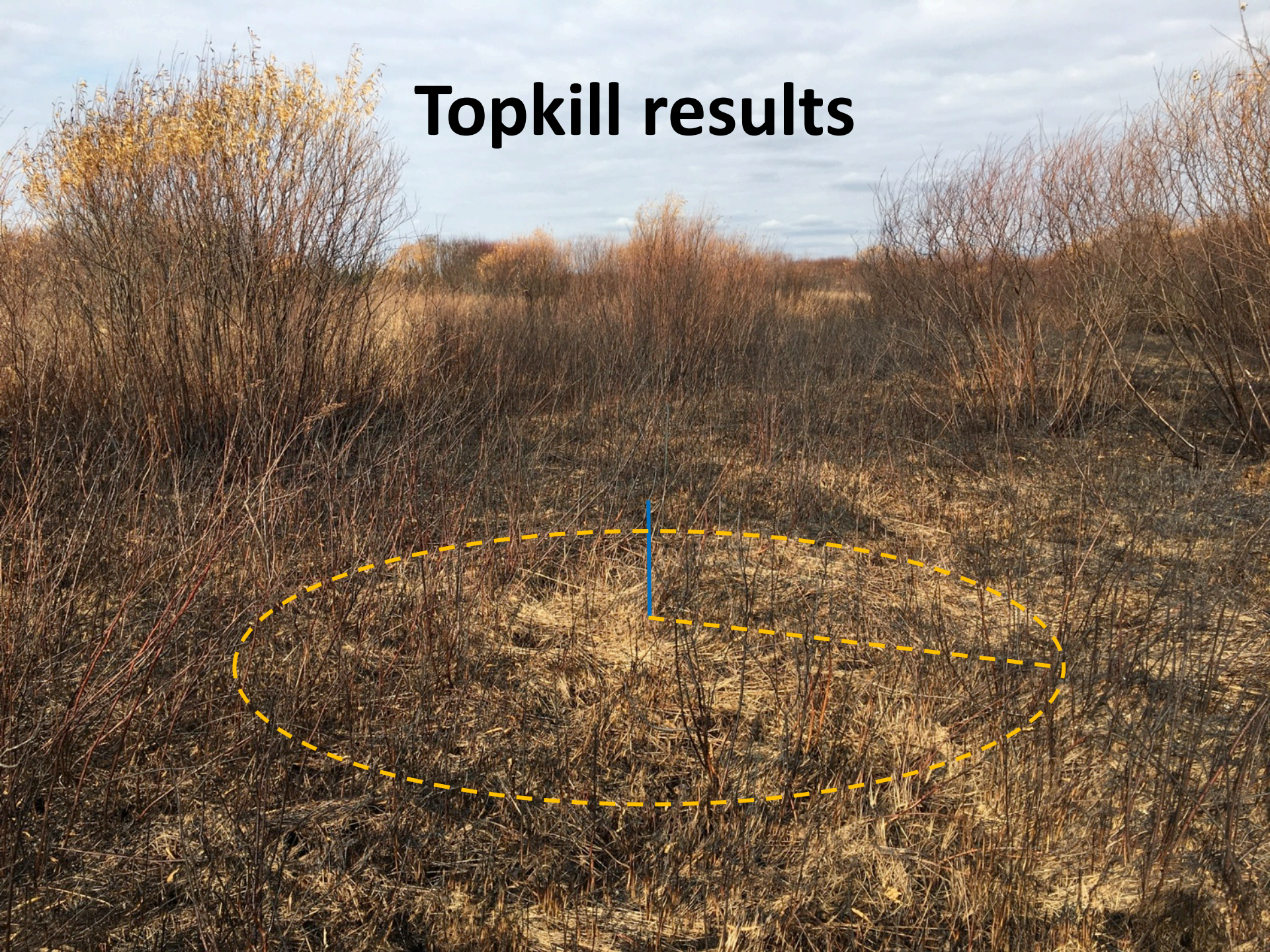
Sedge Wren

Andrew Cannizaro, CC 2.0

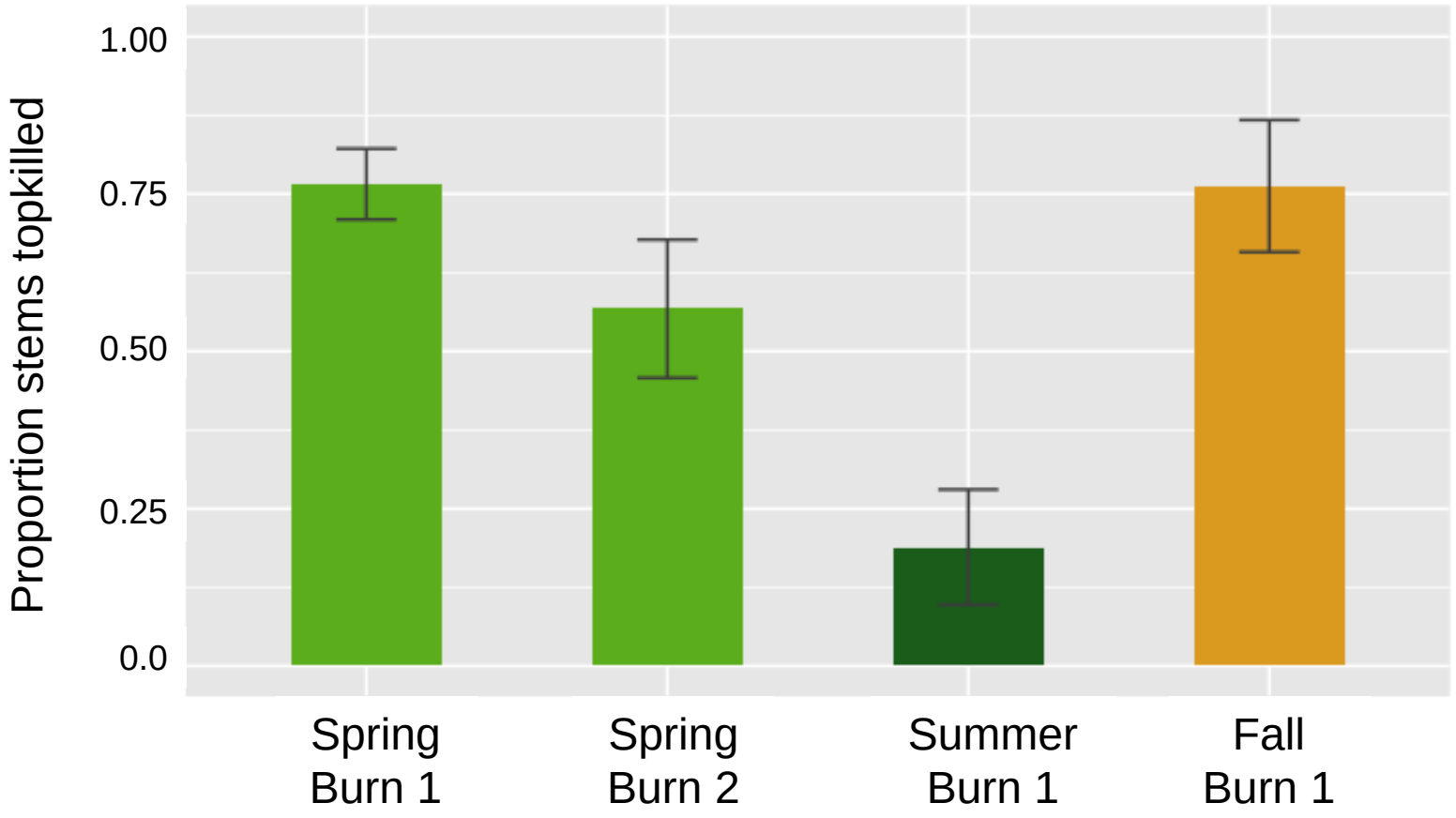
- Stem density
- Stem height
- Stem height diversity

Pre-burn (2016)

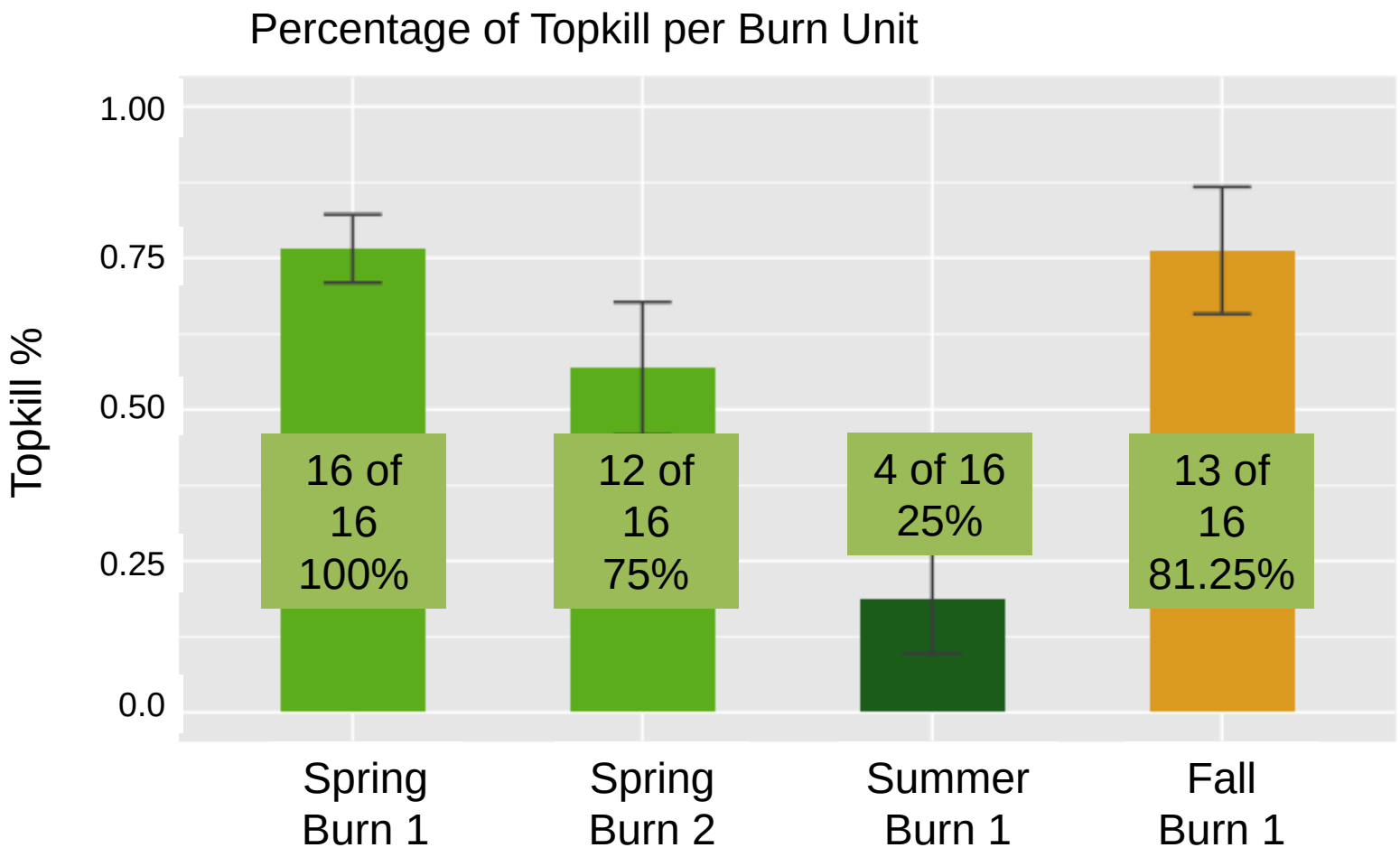
Topkill results



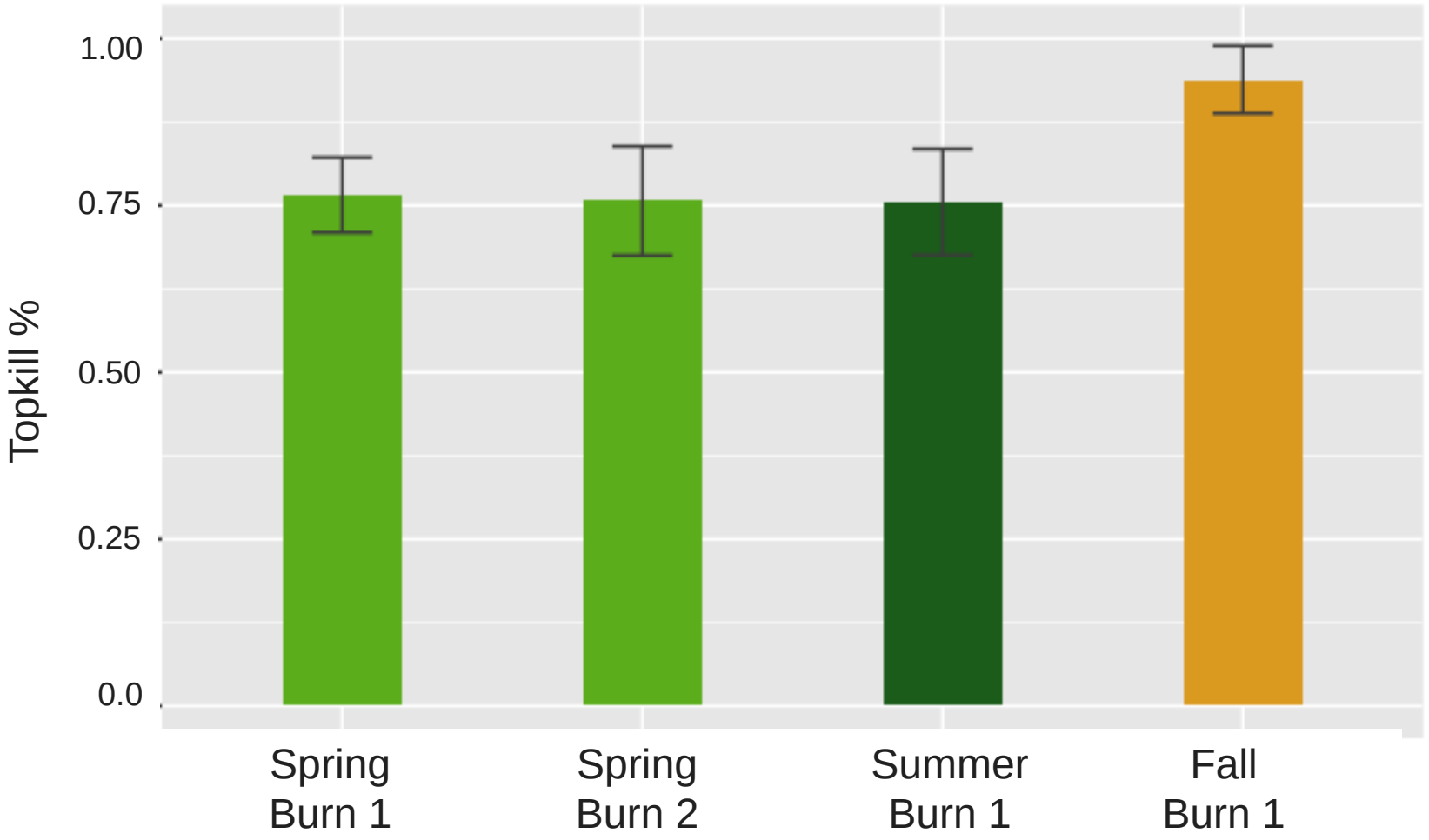
Topkill per Burn Unit



Plots Burned per Site

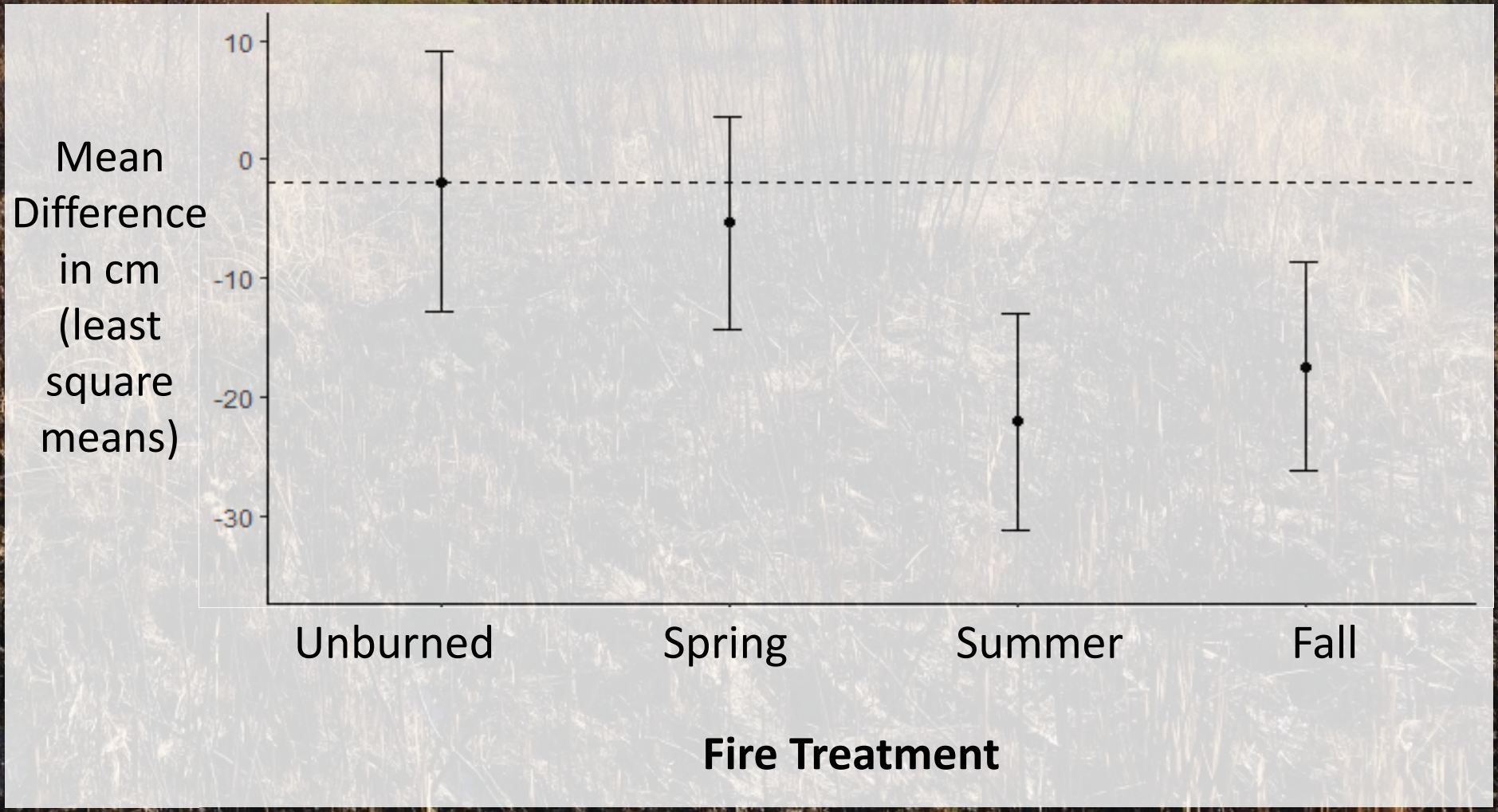


Topkill per burn unit (burned only)

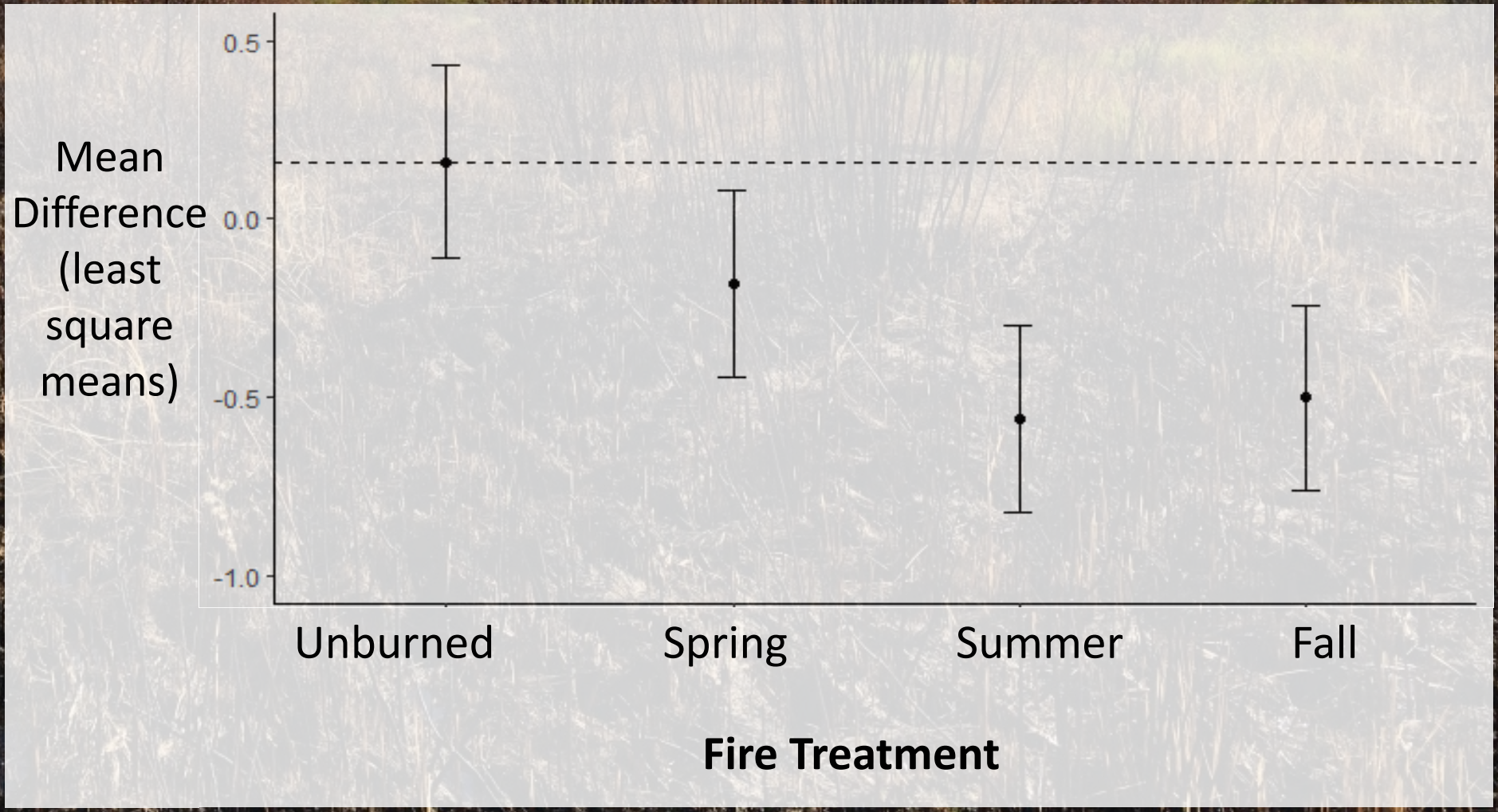


Vegetation response

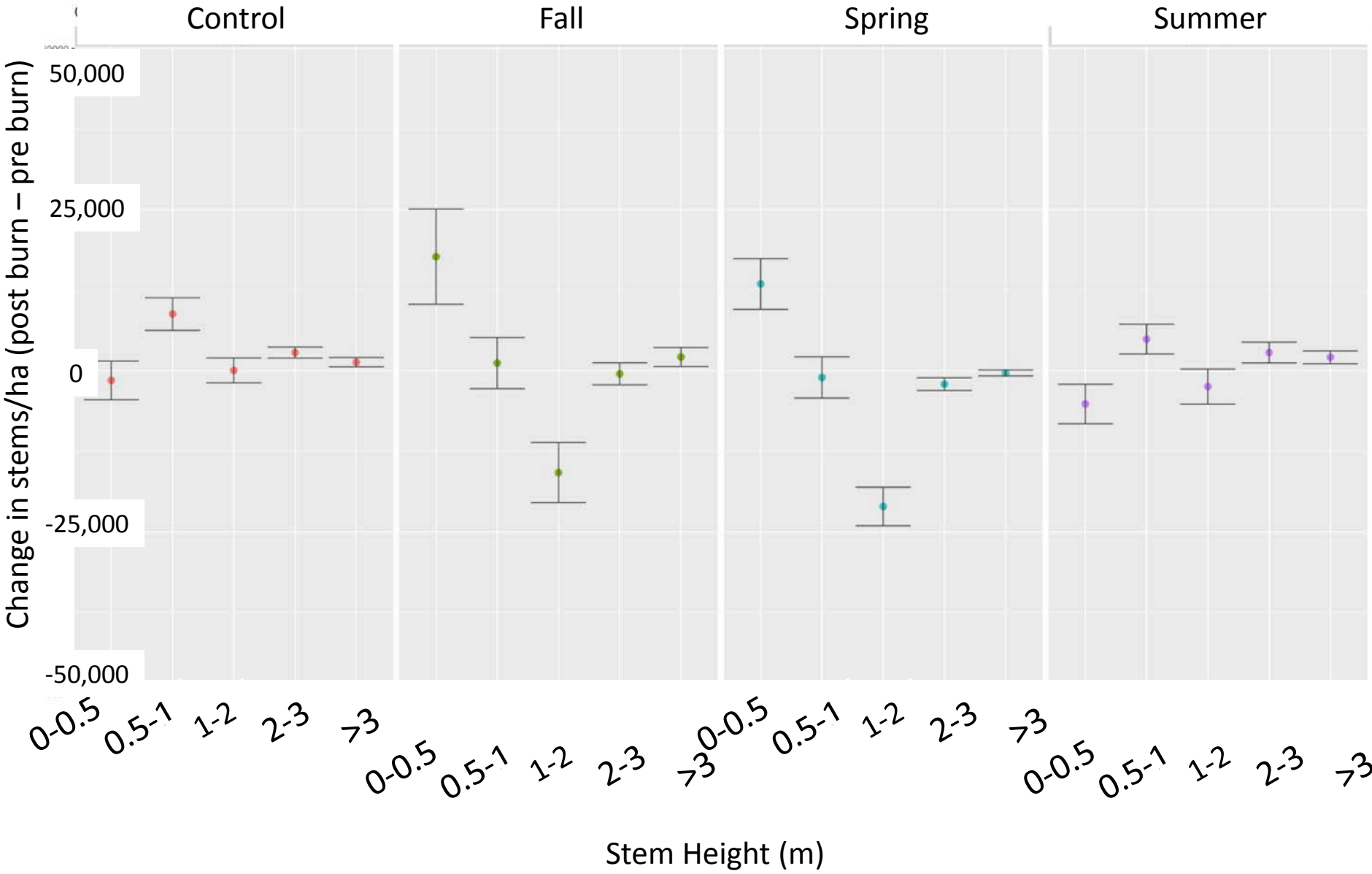
Stem height


Mean Difference in cm (least square means)
10
0
-10
-20
-30
Unburned
Spring
Summer
Fall
Fire Treatment

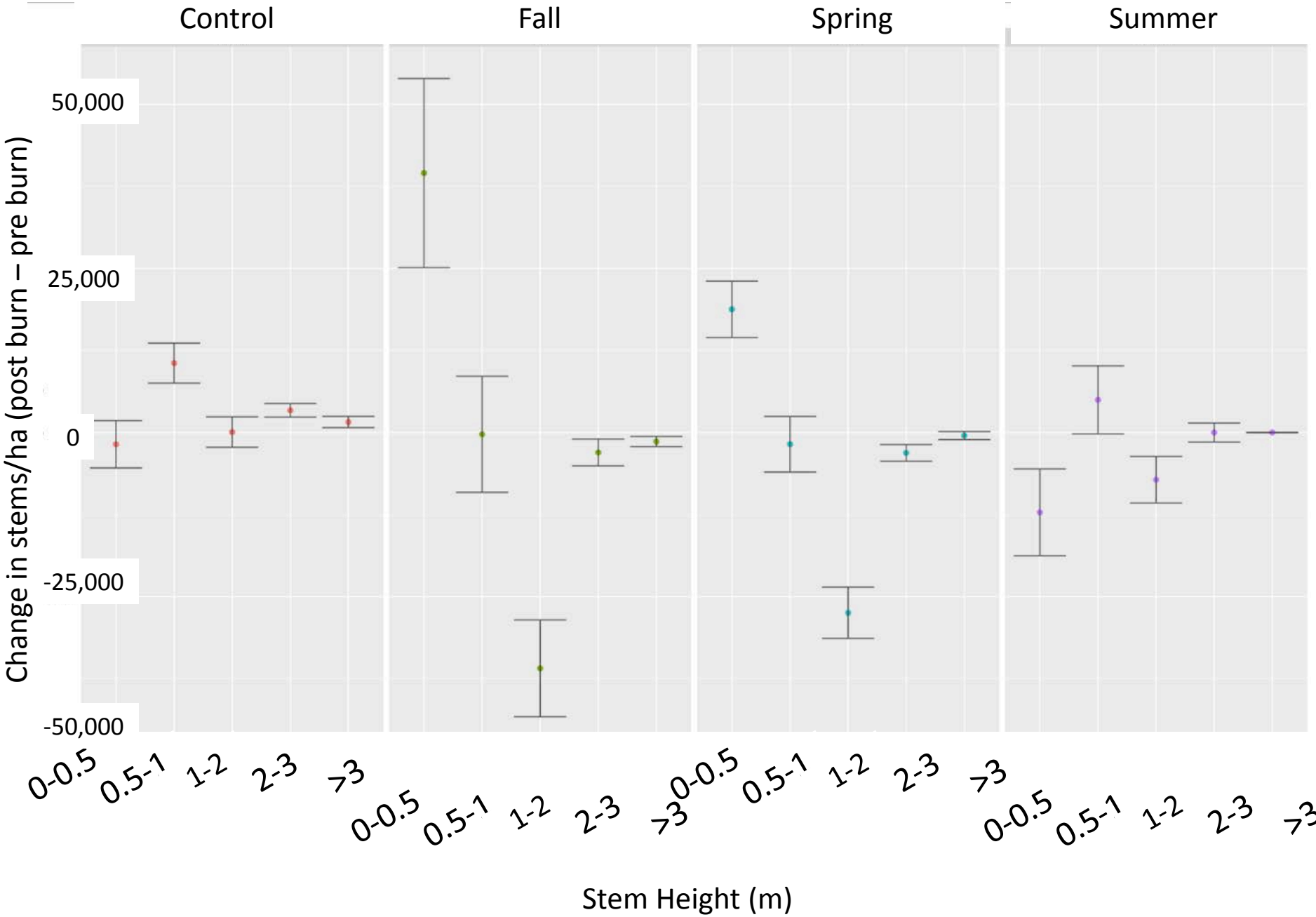
Stem height diversity



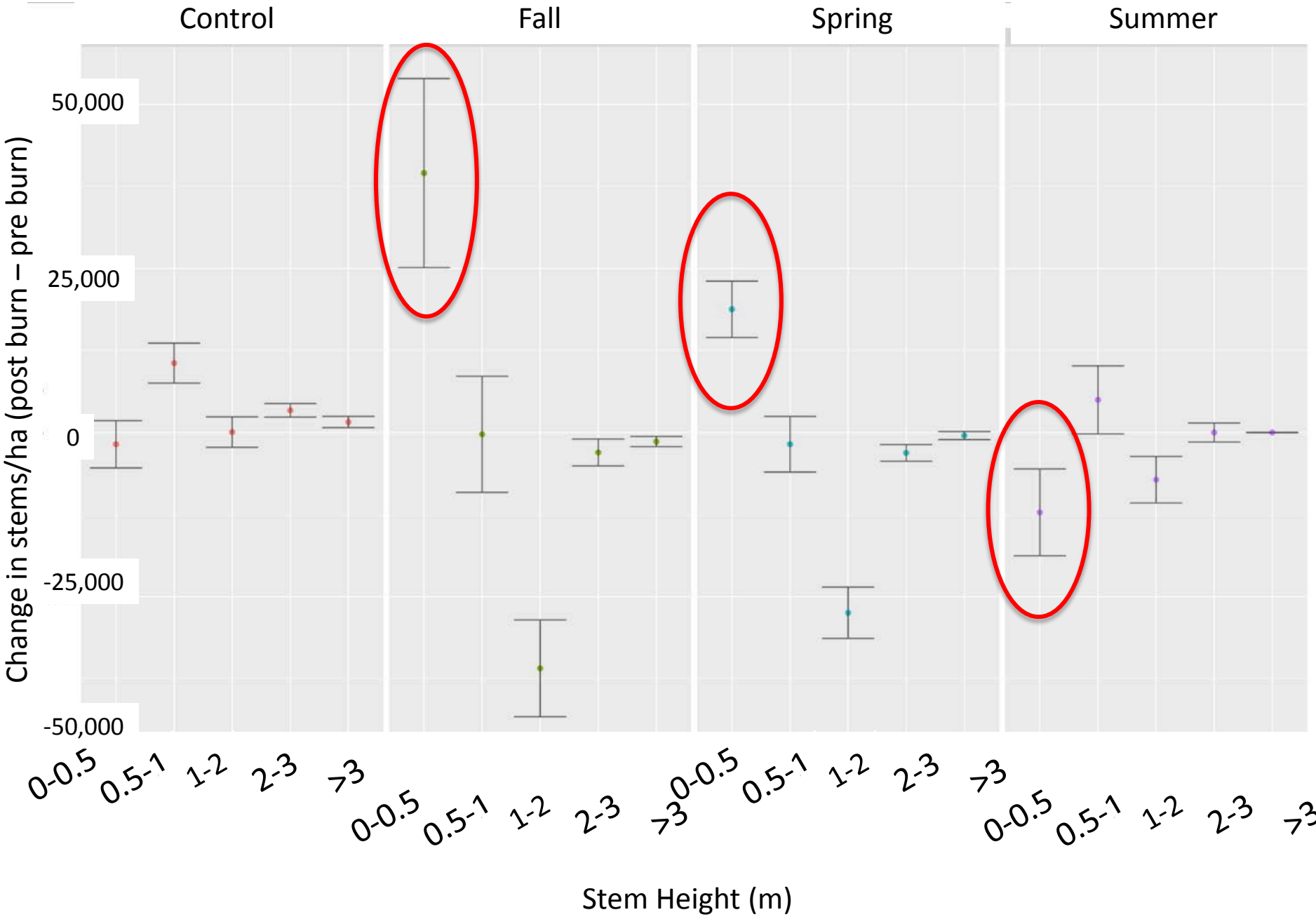
Stem density in height classes (all plots)



Stem density in height classes (burned only)



Stem density in height classes (burned only)



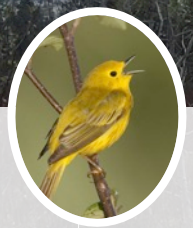
Bird response



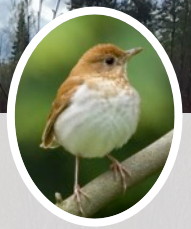




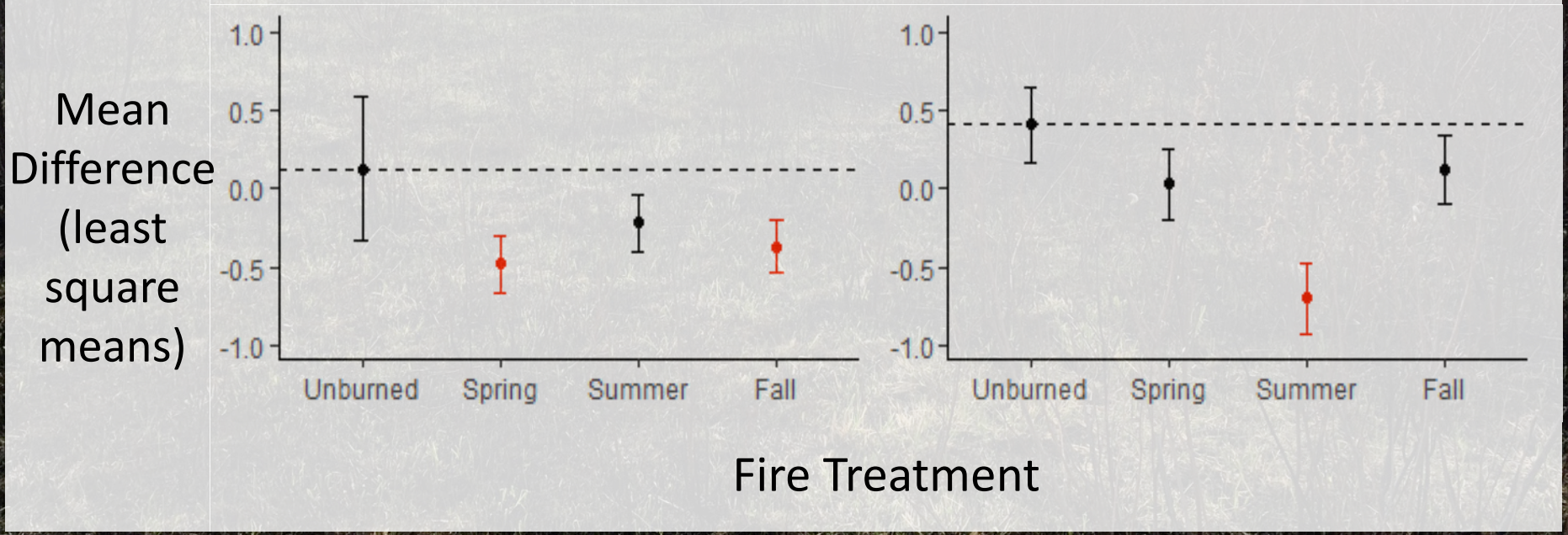

Bird total abundance and **4/10 bird species changed significantly** after fire treatments, compared to controls



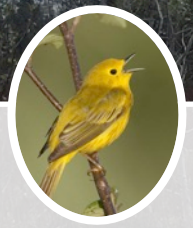
Yellow Warbler



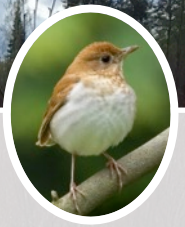
Veery



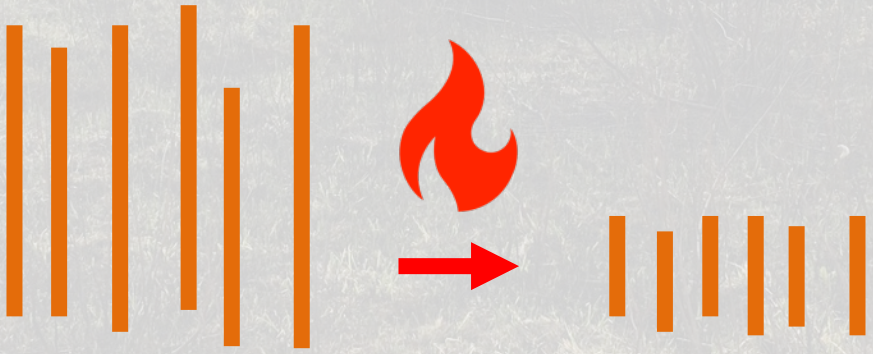
Strongly and positively related to stem height



Yellow Warbler

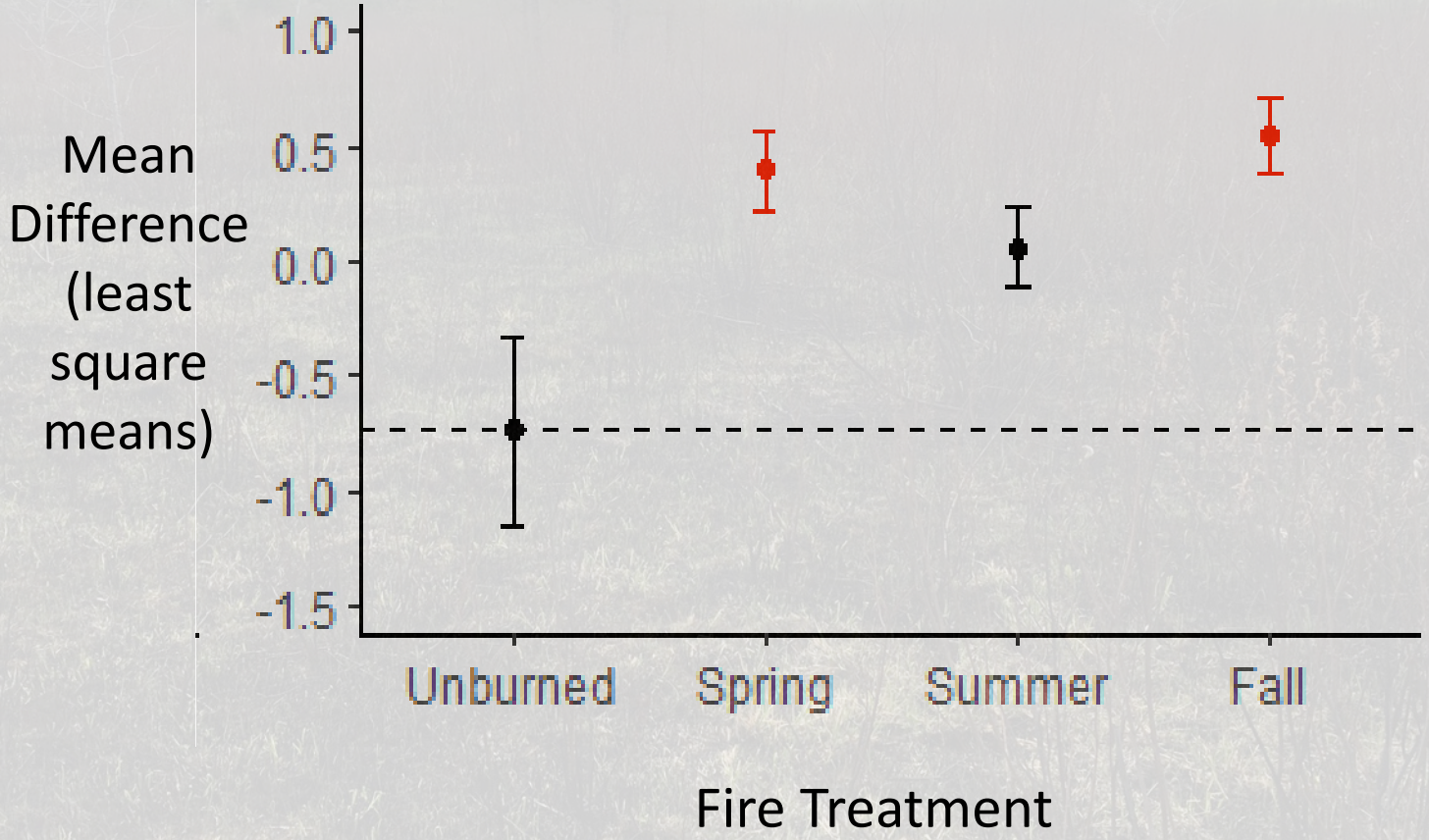


Veery



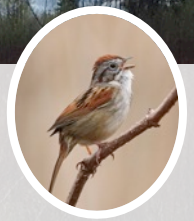
Strongly and positively related to stem height

Chestnut-sided warbler



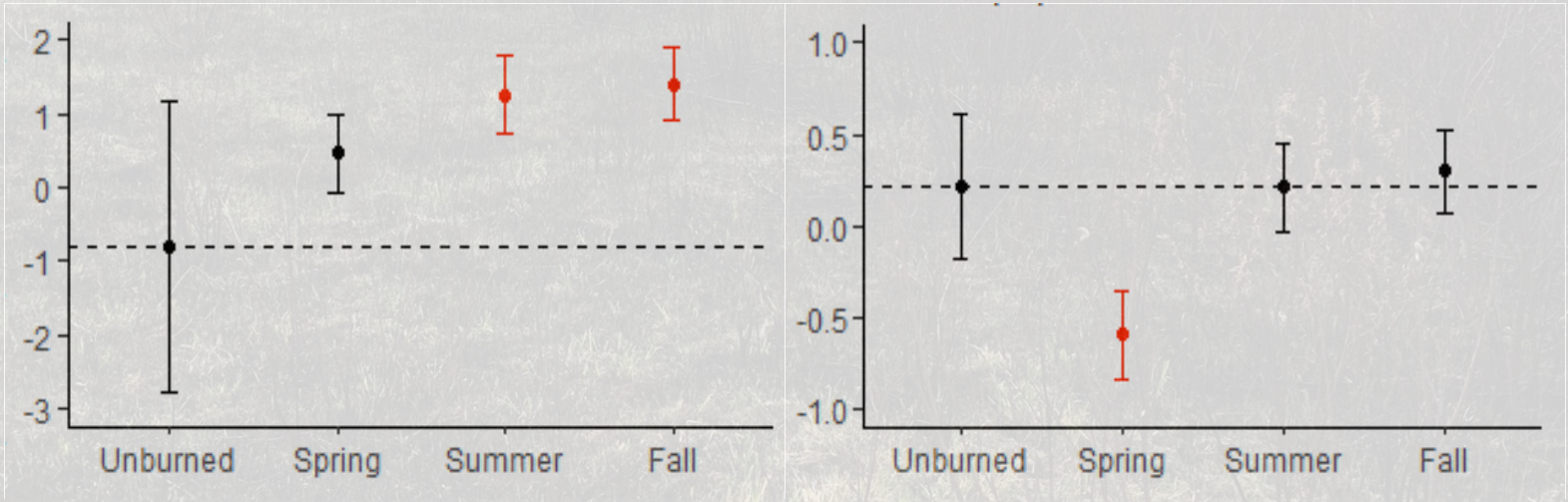
Strongly and positively related to stem height and woody plant species count

Bird Total Abundance



Swamp Sparrow

Mean Difference (least square means)



Fire Treatment

Null was top vegetation structure model

Summary

- Less area burned in summer but similar topkill where burned
- Spring and fall reduce tall shrubs but stimulate resprouting
- Bird response was diverse across seasons of burn

To support the most breeding bird species: promote woody vegetation structural diversity and a range of patches that vary in height

Management Implications

To benefit the most breeding birds: incorporate summer and fall fires into disturbance-regime

Acknowledgements

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[1]University of Minnesota
[2]MN Department of Natural Resources

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