Have You Heard About the Birds?

Mapping Bird Range Overlaps in GeoPandas

Brian Brakefield

Outline

1. Problem Statement
2. Background Information
3. Methods
4. Results
5. Future Considerations

Problem Statement

How will climate change affect bird species concentrations?

Climate Endangered

Common Loon

Find More Birds

Help this map take flight.

The darker the color, the more favorable the climate conditions are for survival. The outlined areas represent approximate current range for each season.
More on reading these maps.

- Winter
- Summer
- Winter Range
- Summer Range
- Both Seasons

2000 2020 2050 2080

Zoom In

Climate Endangered

Common Loon

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- Winter
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- Winter Range
- Summer Range
- Both Seasons

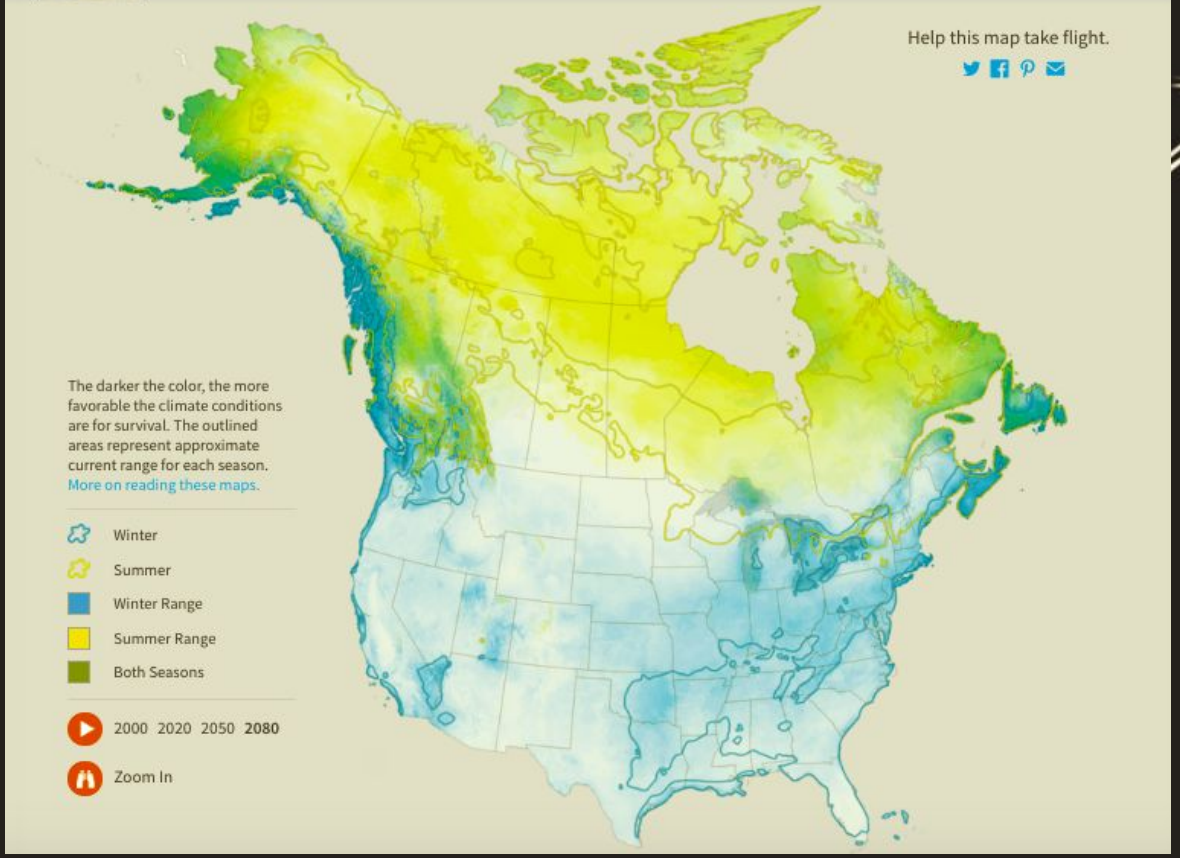
2000 2020 2050 2080

Zoom In

Climate Endangered

Common Loon

Find More Birds



Climate Endangered

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- Winter
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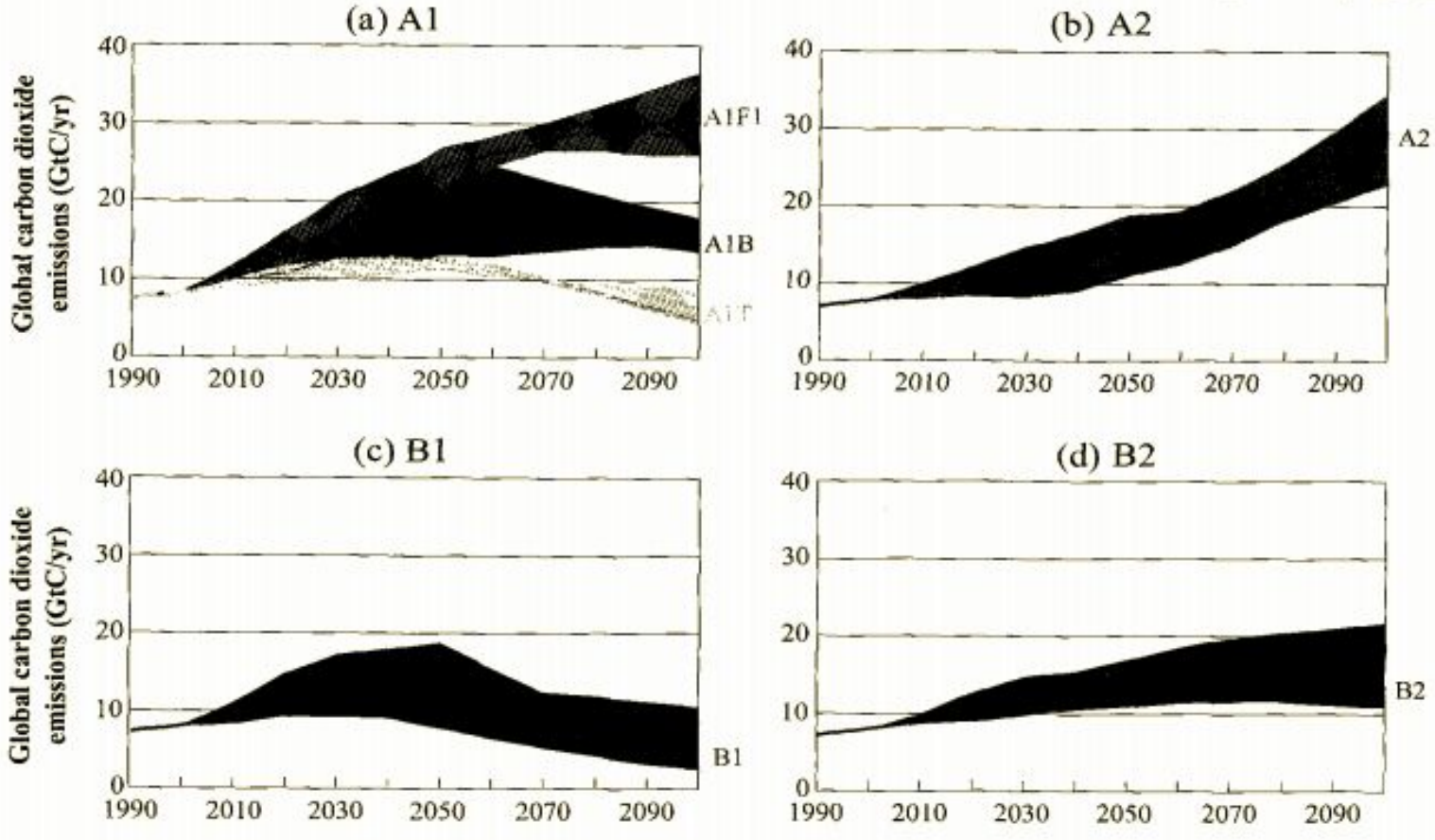
2000 2020 2050 **2080**

Zoom In


(a) A1
(b) A2
(c) B1
(d) B2
Global carbon dioxide emissions (GtC/yr)
Global carbon dioxide emissions (GtC/yr)
0
10
20
30
40
1990
2010
2030
2050
2070
2090
A1F1
A1B
A1T
A2
B1
B2

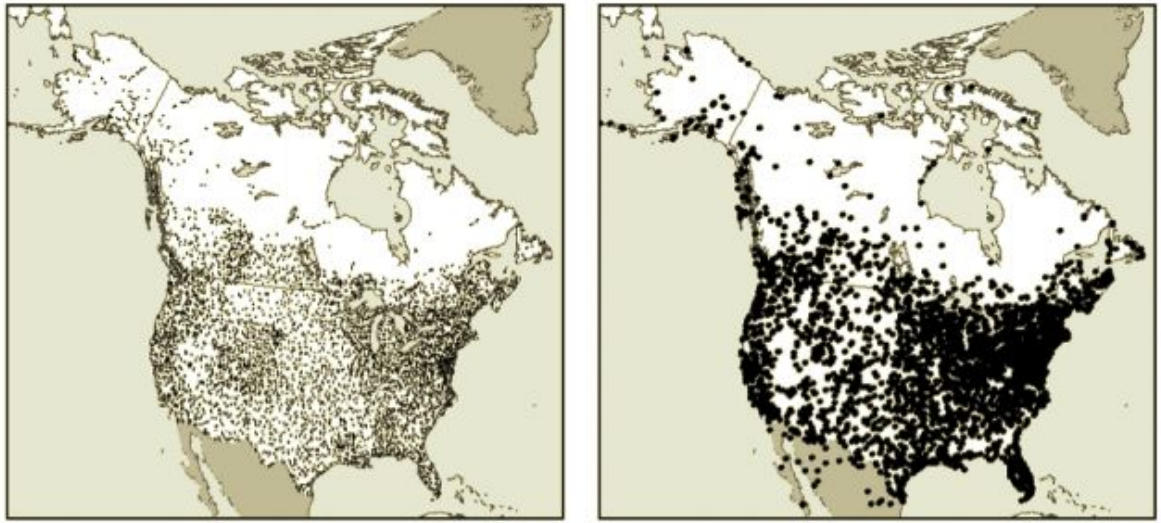


Figure 5.1. Distribution of Audubon Christmas Bird Count circles and North American Breeding Bird Survey routes (2000–2009).

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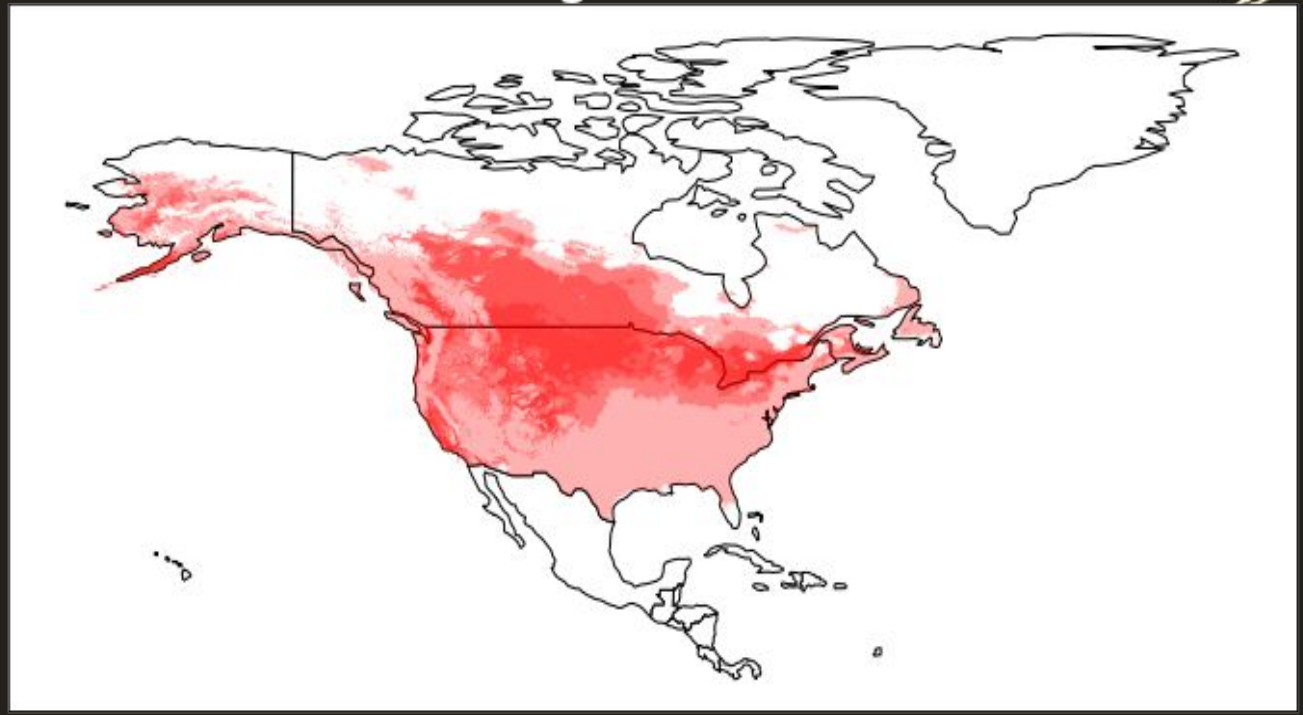
Prioritization Ag
*hedge your b

Figure 4.2. Two visualizations of Common Loon (*Gavia immer*) summer range using the same base data but varying color ramp scales: stretch by 2.5 standard deviations (left) and classified by geometric interval (right).

Methodology

Mallard Range and Predictions



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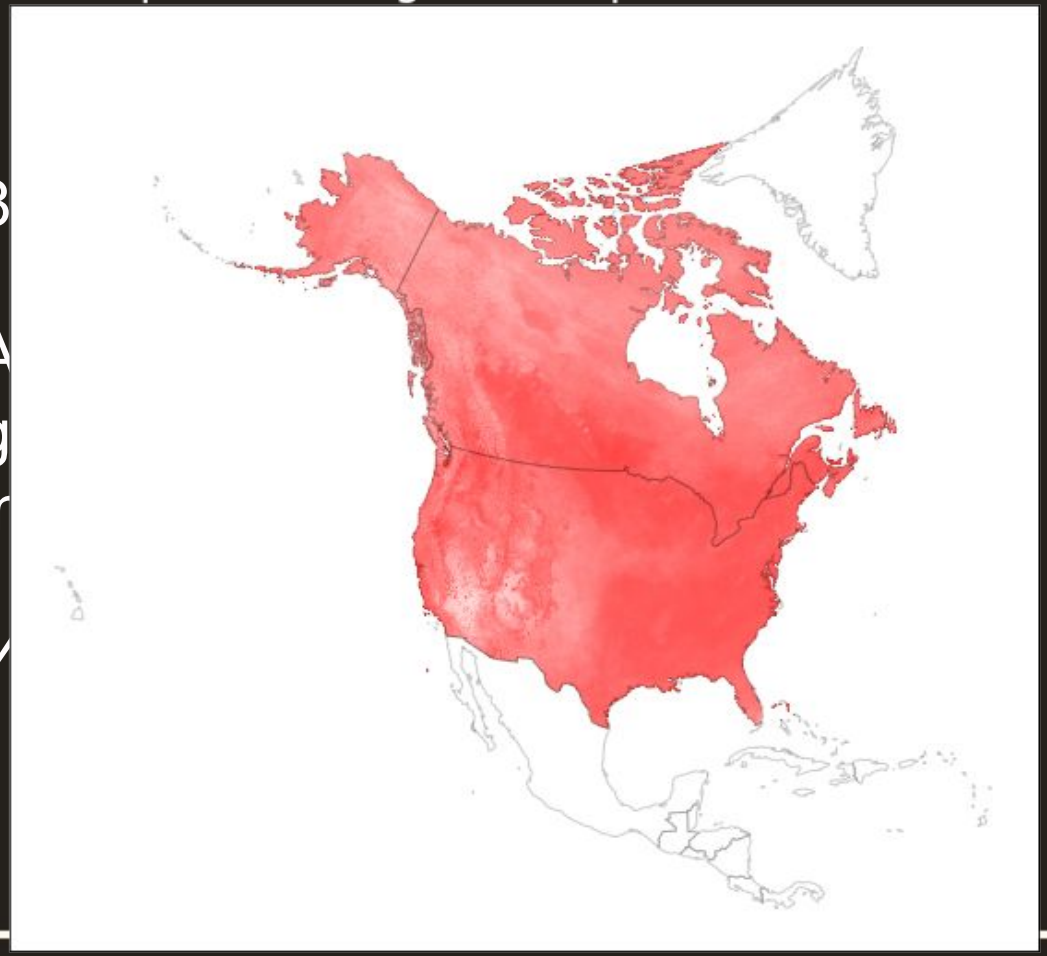
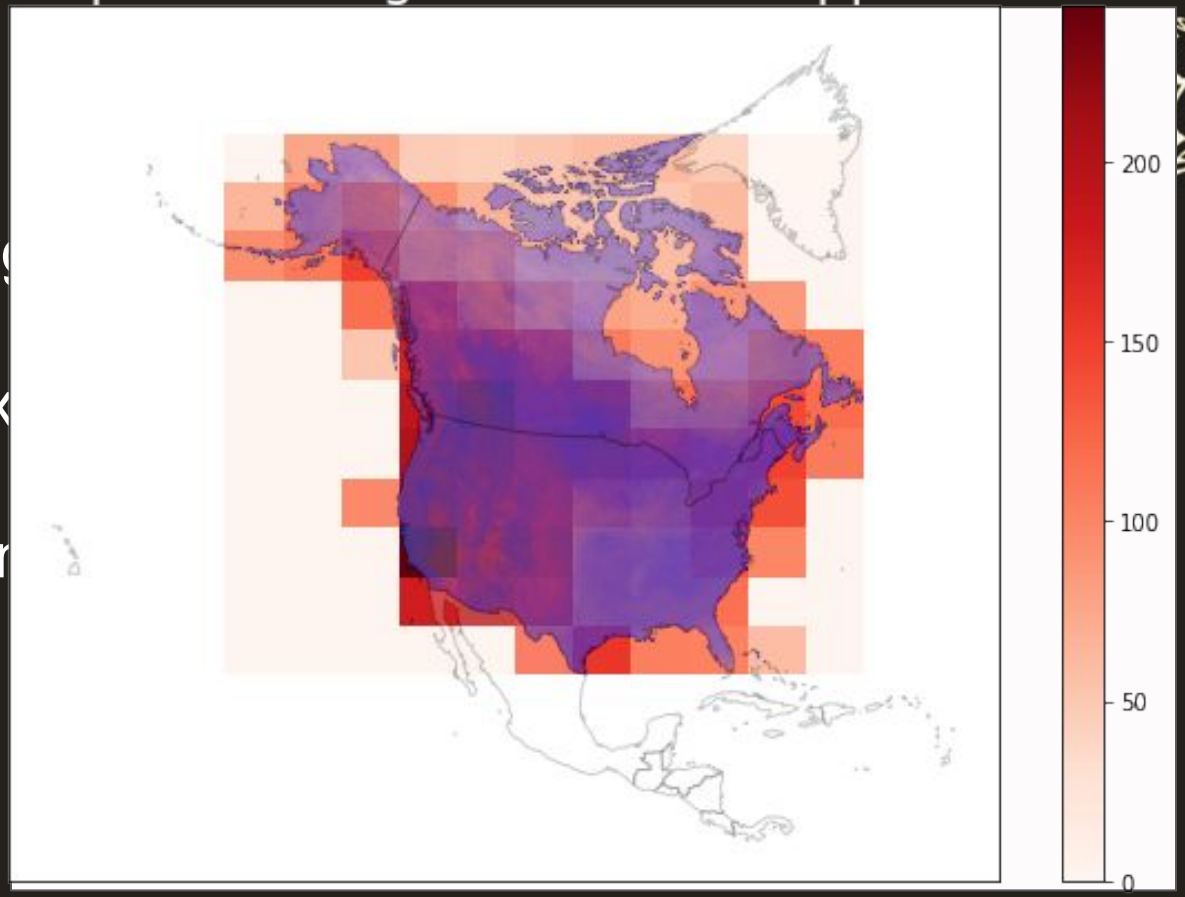
All Species' Range Overlaps, Summer 2000



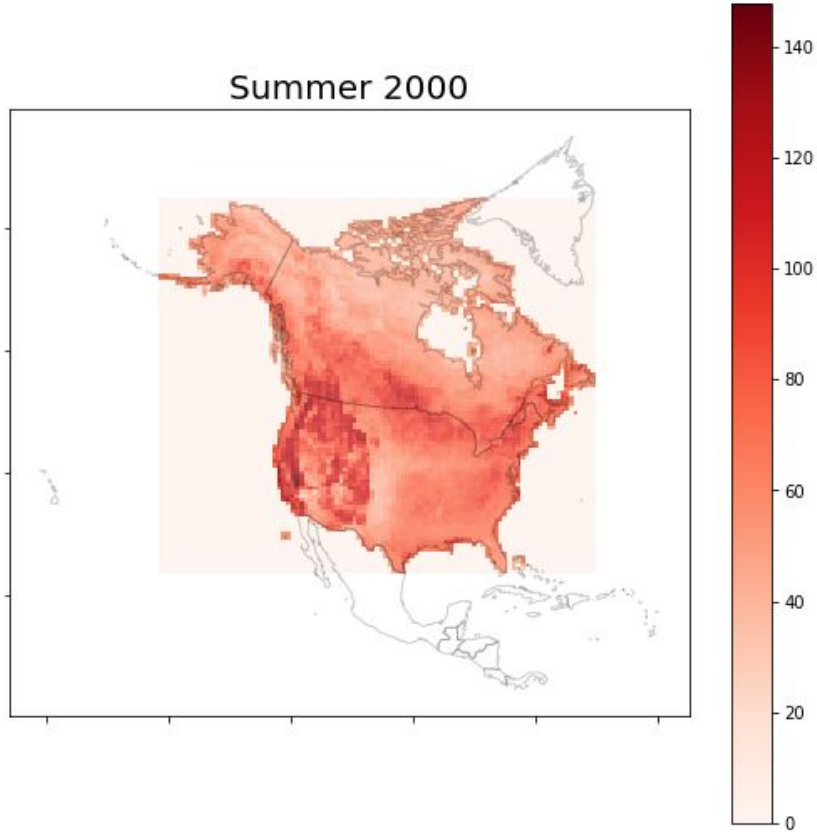
Poly

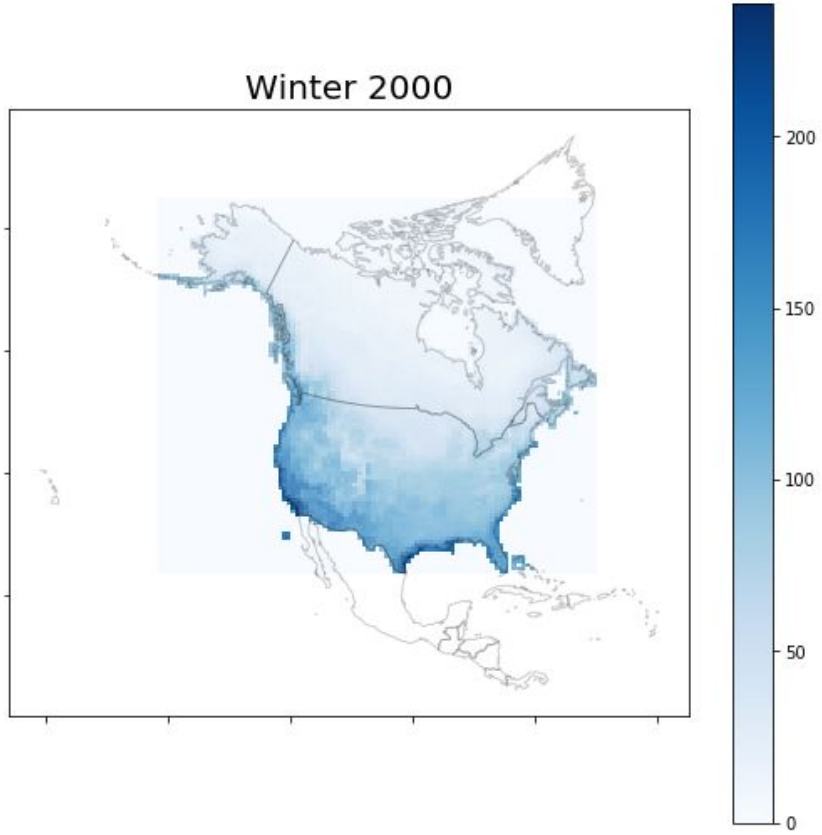
100x

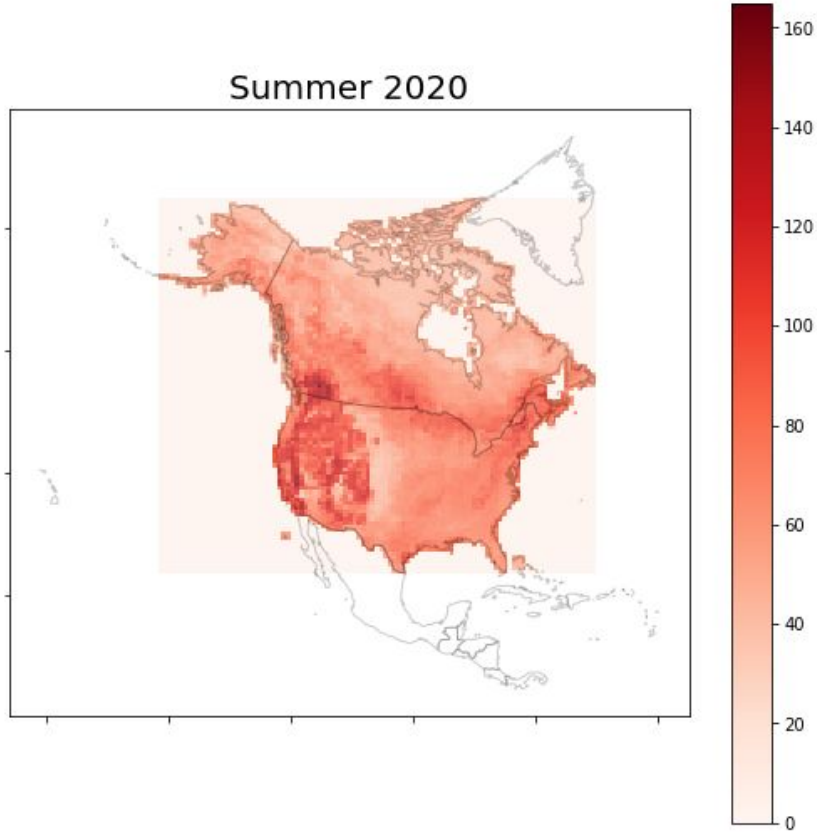
Cour

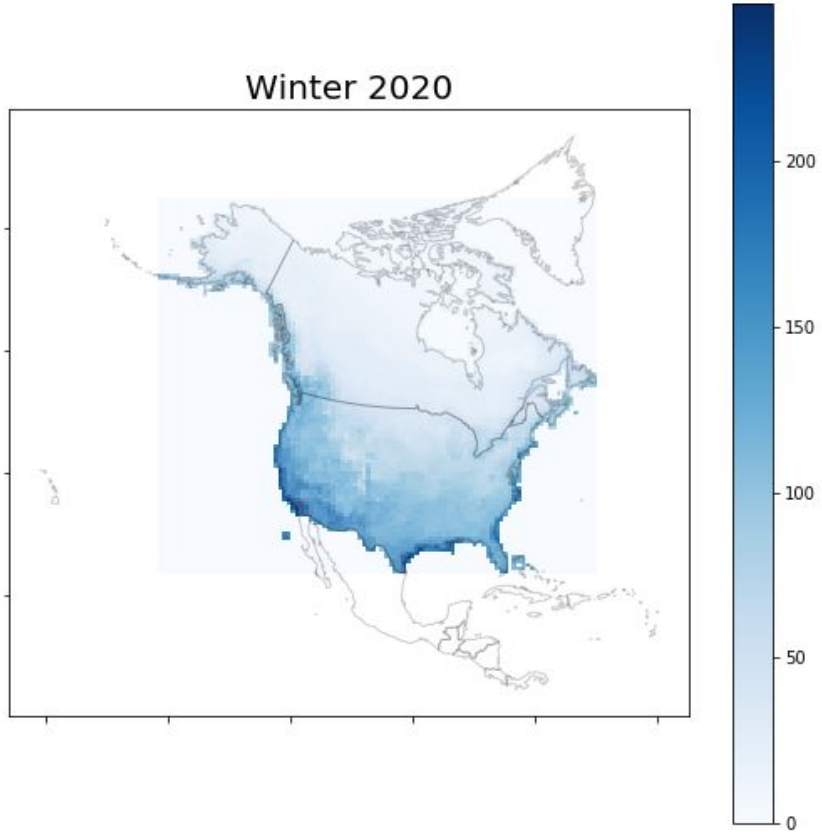


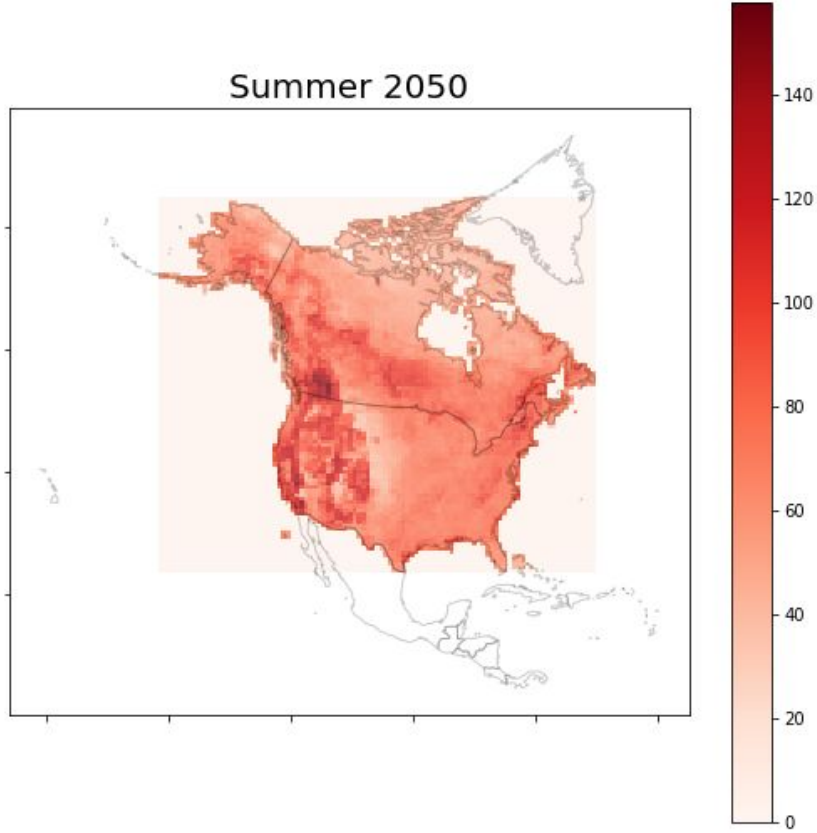
Results

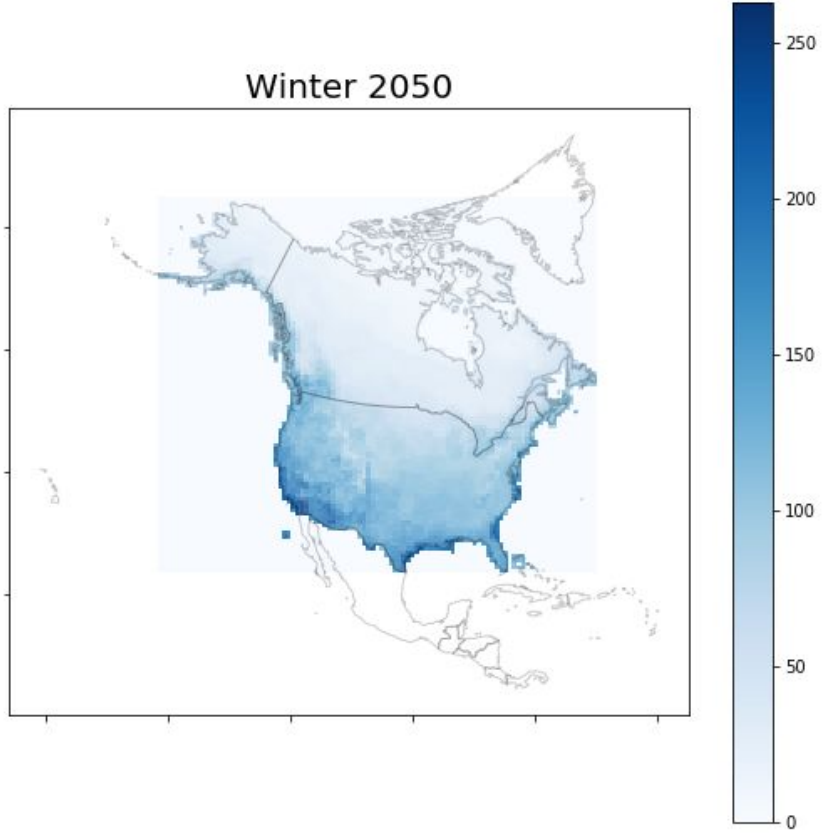

Summer 2000
140
120
100
80
60
40
20
0

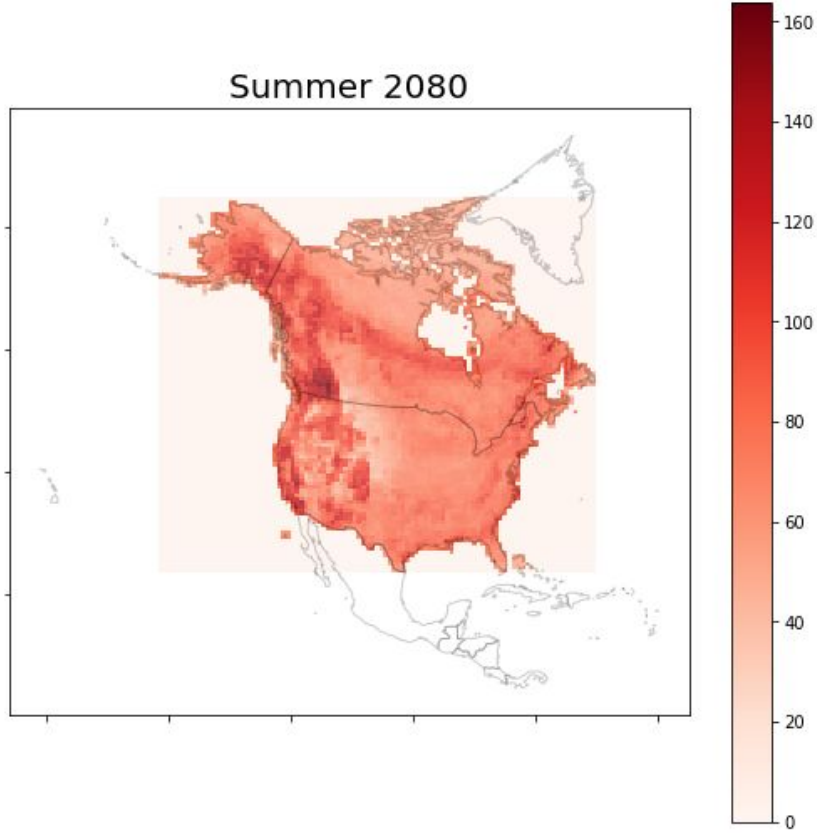

Winter 2000
200
150
100
50
0

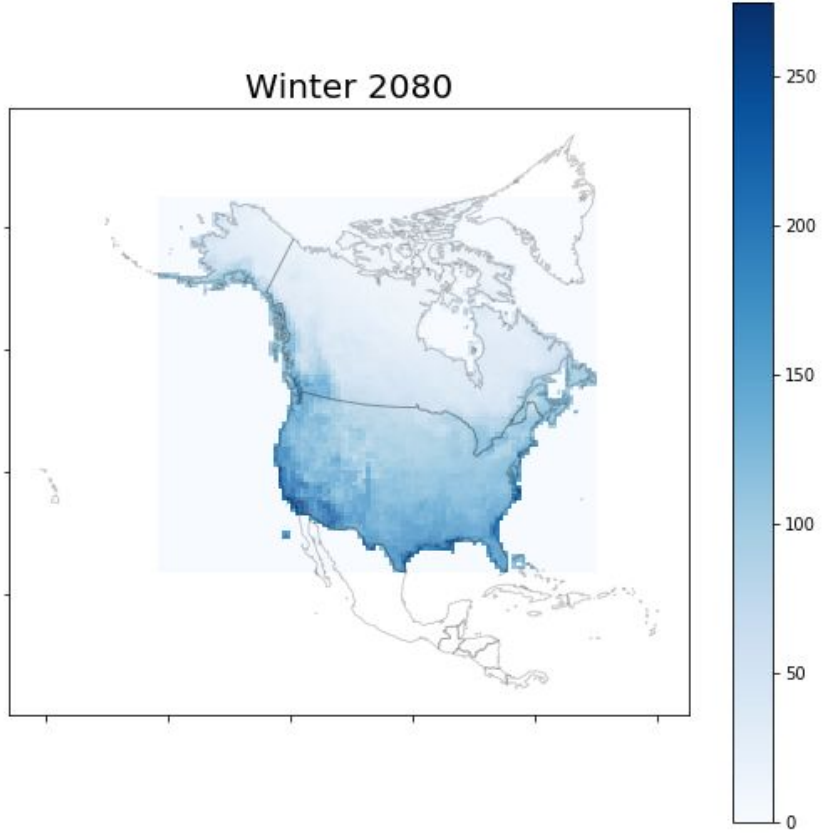

Summer 2020
160
140
120
100
80
60
40
20
0


Winter 2020
200
150
100
50
0


Summer 2050
140
120
100
80
60
40
20
0


Winter 2050
250
200
150
100
50
0


Summer 2080
160
140
120
100
80
60
40
20
0


Winter 2080
250
200
150
100
50
0

Future Considerations

- Different Software
  - Computing times
  - Customization
  - “Raster” resolution
- Both-Season Birds
- Other Emissions Scenarios
- Interactive/Animated

Questions?

Project Available:

Sources:

http://climate.audubon.org/sites/default/files/NAS_EXTBIRD_V1.3_9.2.15%20lb.pdf

https://www.ipcc.ch/report/emissions-scenarios/

http://geopandas.org/

https://geojson-maps.ash.ms/

Special thanks to Brooke Bateman, PhD, Senior Scientist, Climate at National Audubon Society for providing the species data