

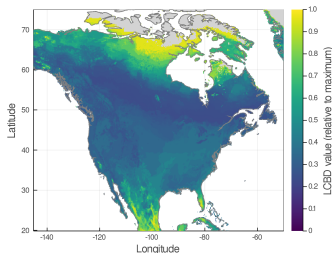
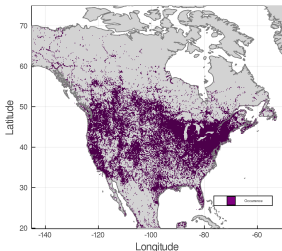
Spatially continuous identification of beta diversity hotspots using species distribution models

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Objective

"Spatially Continuous Identification of Beta Diversity Hotspots Using Species Distribution Models"



- ▶ Beta diversity hotspots (LCBD)
- ▶ Species distribution models (SDM)
- ▶ Spatially continuous identification

Ex 1. Discontinuous Identification of Beta Diversity Hotspots

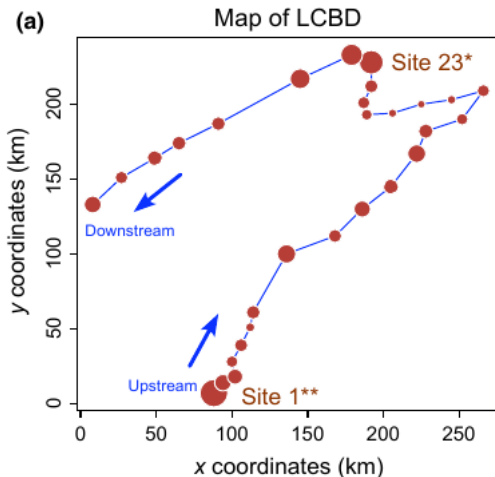


Figure 1: Example of LCBD calculation on a river stream (Legendre & De Caceres, 2013)

Ex 2. Discontinuous Identification of Beta Diversity Hotspots

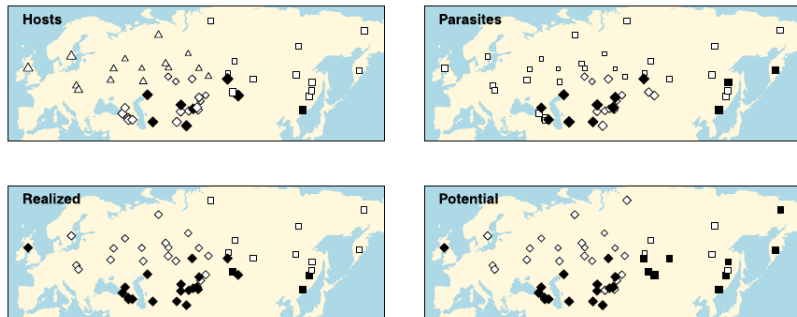
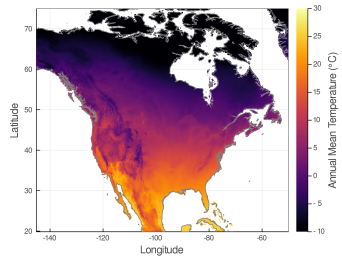
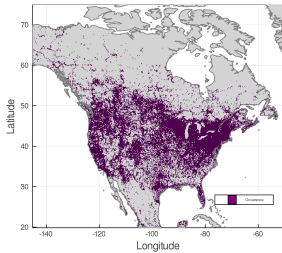
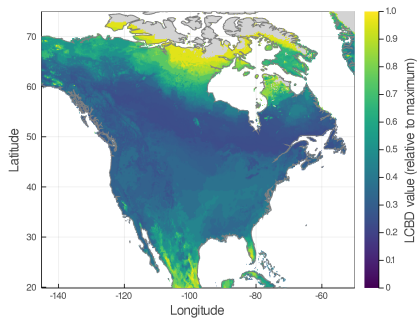
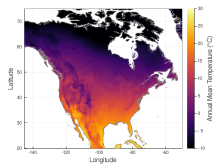
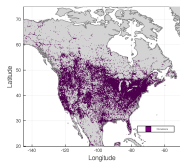


Figure 2: Example of LCBD calculation on an extended scale (Poisot et al., 2017)

Available Data



Objective



Data - Why eBird & Warblers

According to Johnston et al. (2019):

1. Complete checklists to infer absences
2. Sampling effort metadata to reduce biases

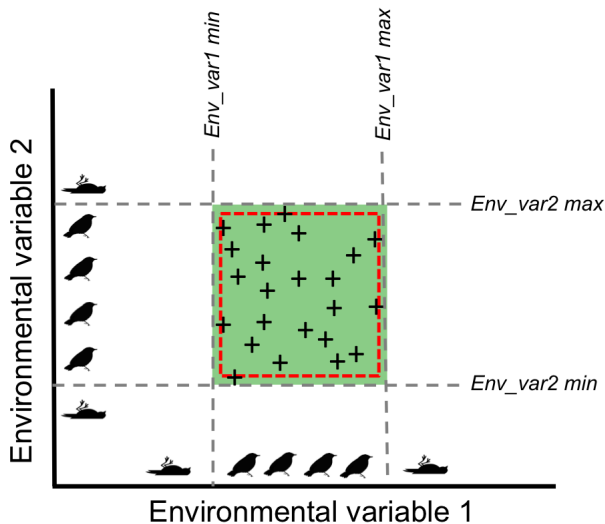
Figure 3: Structure of the Warblers (*Parulidae*) occurrence data for North America as checklists in the eBird Dataset

Country	Observations	Checklists	Species	Species per checklist (mean)	Species per checklist (median)	Species per checklist (maximum)
US	19 206 453	7 840 526	56	2.450	2.0	34
CA	3 360 650	1 115 625	45	3.012	2.0	31
MX	407 227	147 599	61	2.759	2.0	21
Total	22 974 330	9 103 750	63	2.523	2.0	34

Data - WorldClim 2 (Fik & Hijmans, 2017)

Variable	Description
1	Annual Mean Temperature
2	Mean Diurnal Range
3	Isothermality
4	Temperature Seasonality
5	Max Temperature of Warmest Month
6	Min Temperature of Coldest Month
7	Temperature Annual Range
8	Mean Temperature of Wettest Quarter
9	Mean Temperature of Driest Quarter
10	Mean Temperature of Warmest Quarter
11	Mean Temperature of Coldest Quarter
12	Annual Precipitation
13	Precipitation of Wettest Month
14	Precipitation of Driest Month
15	Precipitation Seasonality
16	Precipitation of Wettest Quarter
17	Precipitation of Driest Quarter
18	Precipitation of Warmest Quarter
19	Precipitation of Coldest Quarter

BIOCLIM - A Climate Envelope Model



Preliminary Results

Ex. Yellow Warbler - Raw Data

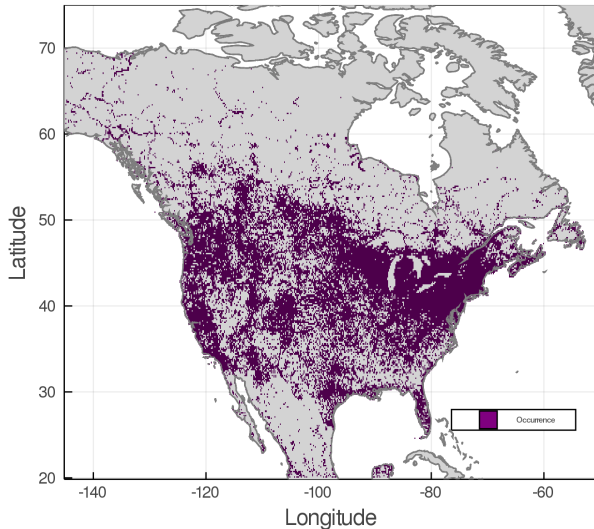


Figure 4: Yellow Warbler Distribution (presence-absence per site)

Ex: Yellow Warbler - SDM with threshold

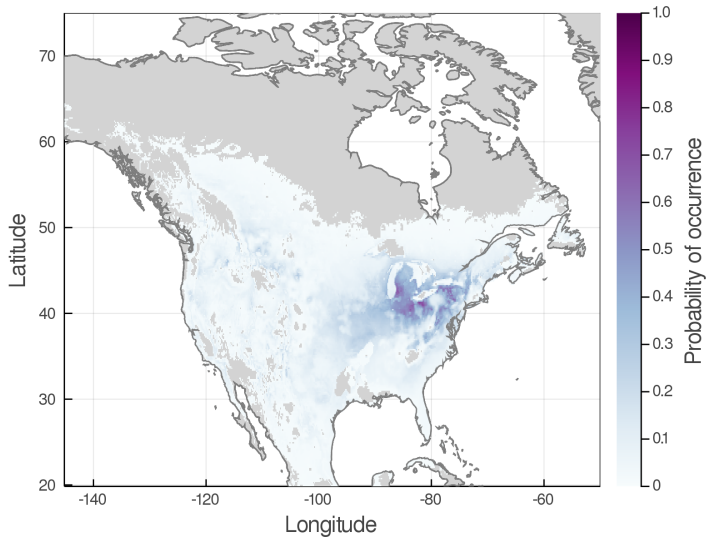


Figure 5: SDM predictions with threshold (5%) for the distribution of Yellow Warblers

Ex: Yellow Warbler - SDM without threshold

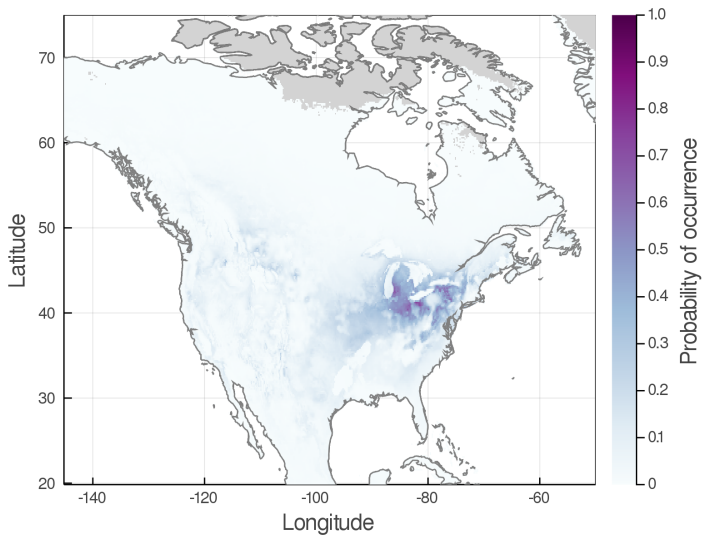
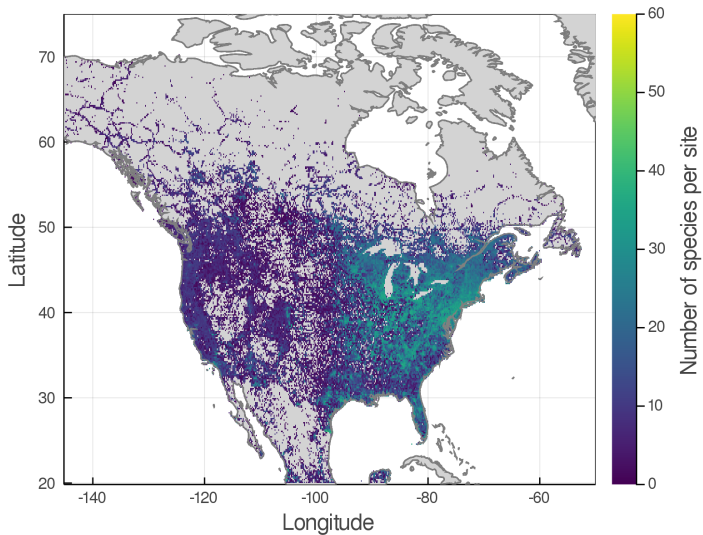
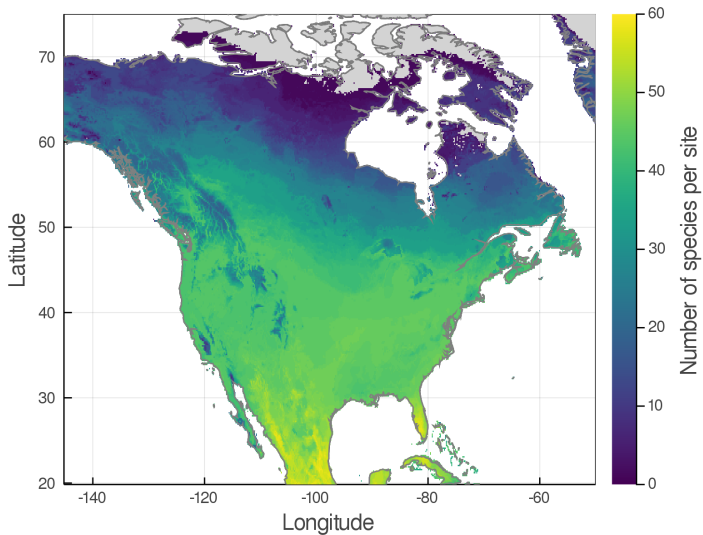


Figure 6: SDM predictions without threshold for the Yellow Warbler

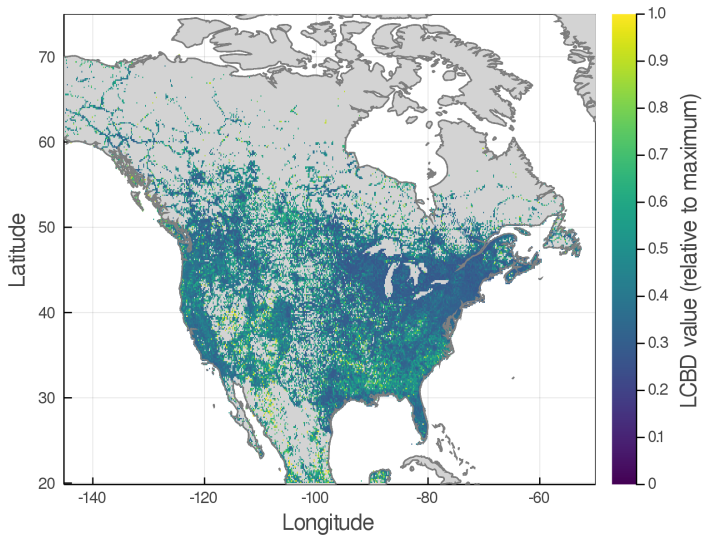
Species richness - Raw data



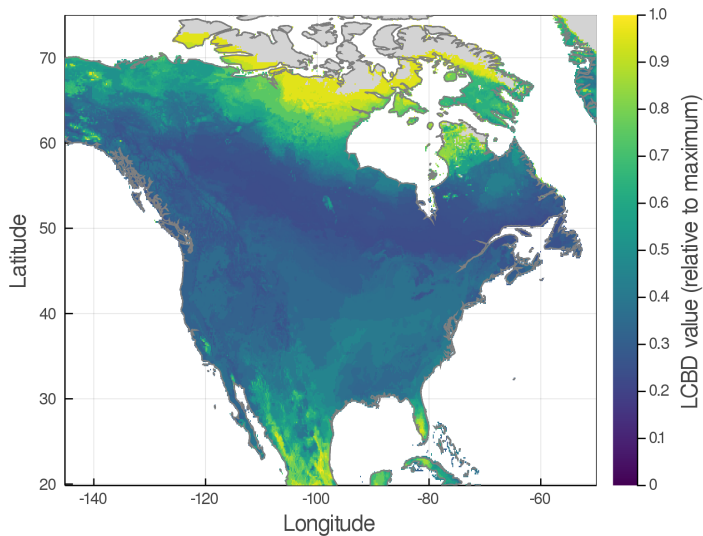
Species richness - SDM without threshold



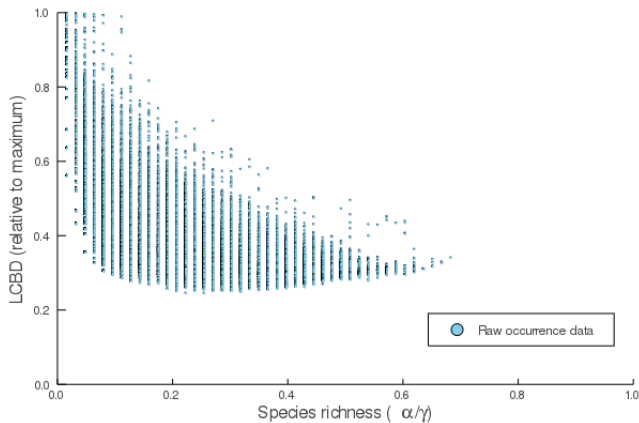
LCBD - Raw data (with Hellinger transformation)



LCBD - SDM without threshold (no transformation)



LCBD-richness relationship



LCBD-richness relationship

