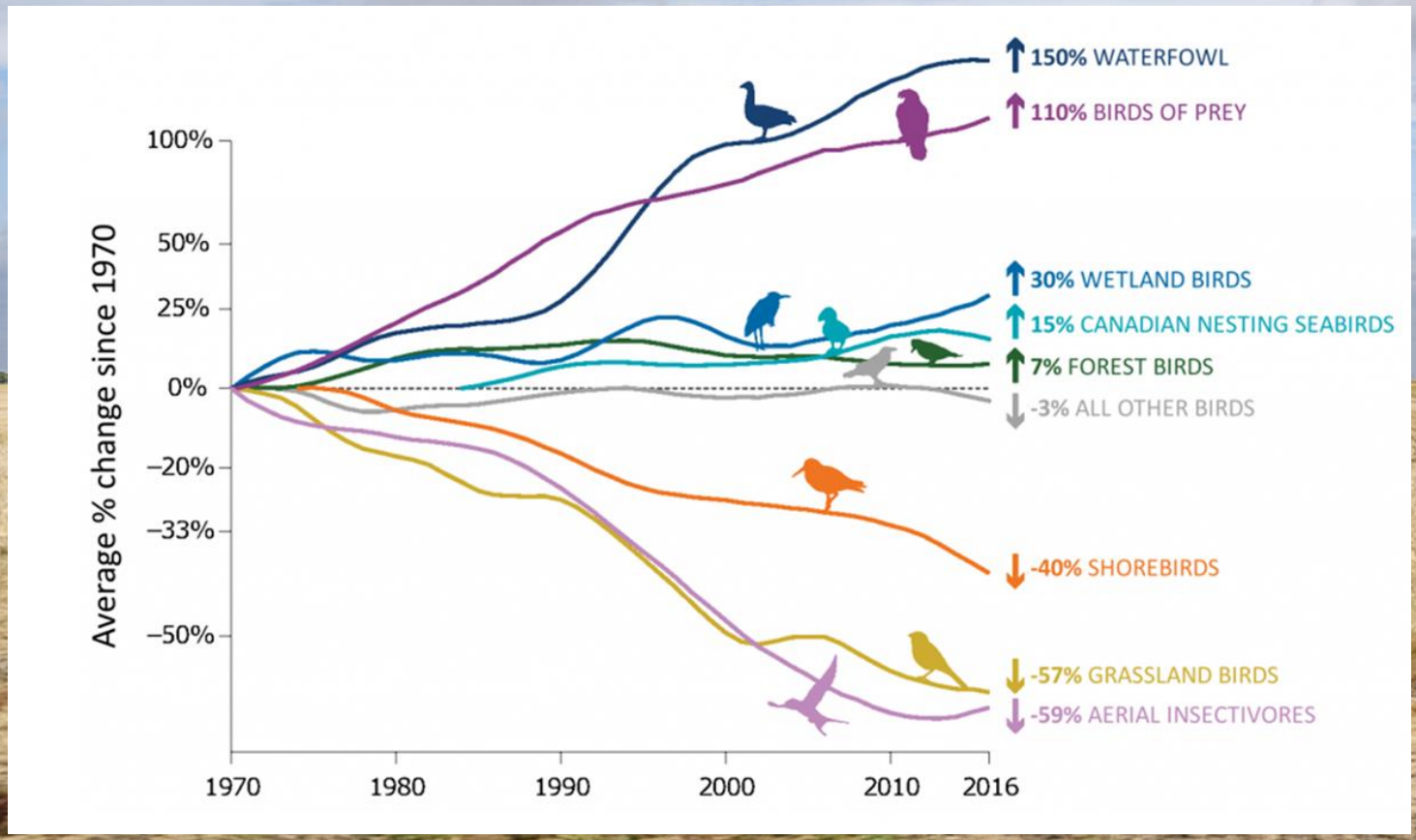
Chestnut-collared Longspur
Photo: Dan Arndt

Bird-friendliness Index: An outcome-based indicator for grassland bird conservation

BIRDS CANADA OISEAUX CANADA

Biodiversity in the Agroecosystem

"...traditional output from agricultural production is priced by the markets, externalities are not... [Externalities] will be overproduced unless their costs are "internalized". ***Canadian Agri-food Policy Institute, 2022.***



Outcome-based Approaches and Market Applications

"...outcome-based payment... can provide better outcomes for biodiversity. [They] are flexible in how landholders can achieve outcomes resulting in management innovation; increase landholder effort..." **McDonald et al., 2018.**
J. Appl Ecol, 55(3); 1476-1485

"Result-based...schemes are thought to have several advantages. Farmers...can choose the means by which to deliver the results, and thus adapt (cost effective) methods fitting the local requirements." **Elimger et al., 2023.** *Ag Systems, 204.*

"...we need indicators that are actionable at the ranch level, measure progress toward sustainability goals of interest to companies and consumers, and therefore, facilitate increased compensation for ranchers on the basis of these sustainable outcomes."
Aherling et al., 2021. Rangeland Ecology & Management, 79:217-230

"...a key challenge in designing biodiversity oriented result-based schemes is finding the appropriate biodiversity indicators... ***Elimger et al., 2023 .*** *Ag Systems, 204.*

Bird-friendliness Index

An outcome-based indicator that represents the impact of management and conservation measures on a bird community.

Goals

The Bird-friendliness Index is a dependable, actionable, and scalable biodiversity indicator that is implemented in applications where it will:

1. **Serve as a biodiversity indicator to evaluate impact management and stewardship are having on biodiversity to guide management.**
2. **Provide a dependable and scalable biodiversity indicator to enable a market environment that incentivizes biodiversity outcomes.**

Chestnut-collared Longspur
Photo: Yousif Attia

Michel et al., 2020; Div. & Dist.

Bird-friendliness Index - How it Works

Outcome-based Indicator

- Bird data inputs only to measure bird community outcomes

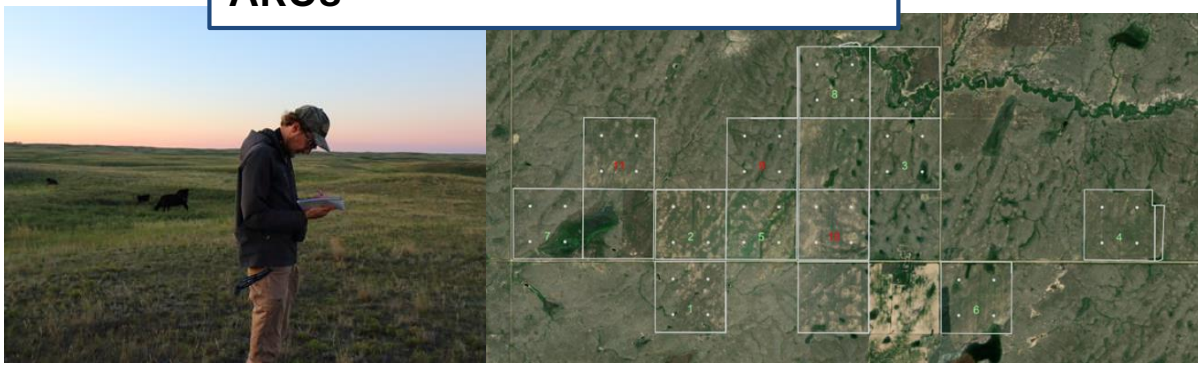
Measured at a Farm Scale, Standardized to the Surrounding Landscape

- Bird community represented on-farm and in the surrounding landscape
- Presented as a single number between 0 and 1.
- A score above 0.5 indicates the farm is above average for their region.

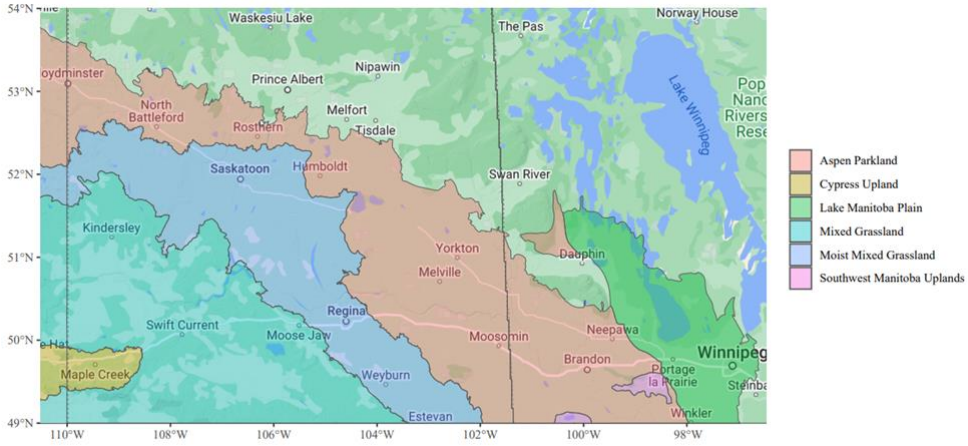
Data Collection

Species List – Grassland Birds

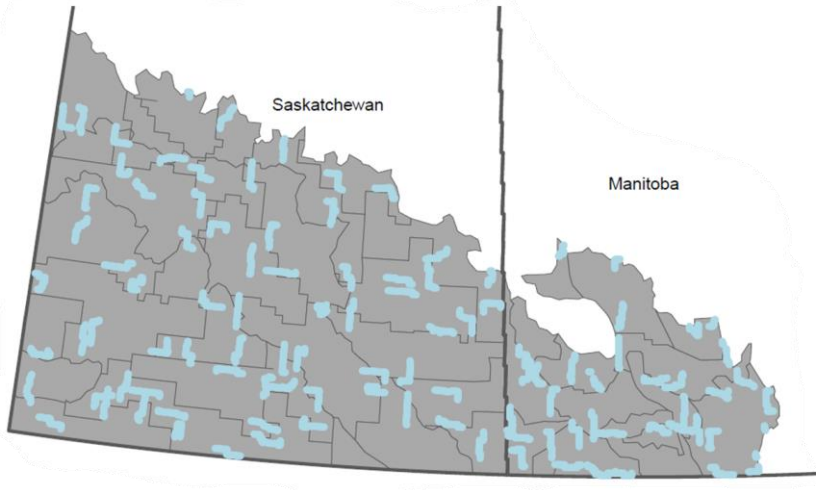
Sampling at Farms and Ranches – Point Counts and ARUs



Strata – Ecoregion and Province



Background data – BBS



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Calculation Methods

1. Multiply each species' density by its multipliers to calculate conservation weighted densities

Density (birds/ha)

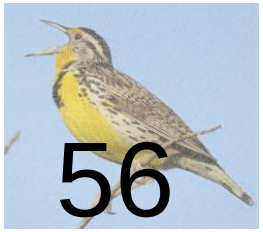
PIF BCR 11 Regional Combined Score

Not at risk= 1x Special Concern = 2x
Threatened = 3x Endangered= 4x

×

×

2. Add together Weighted Densities to get raw BFI score for each point



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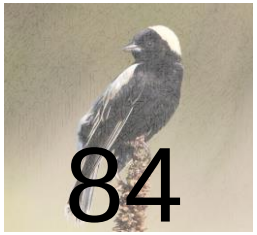

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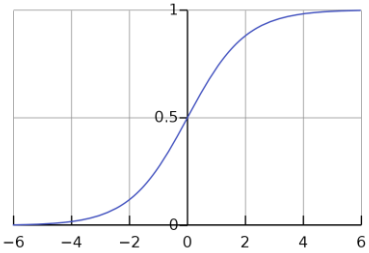
3. Compare each point's raw BFI score to the background and scale between 0 and 1



= .65

Michel et al., 2020; Div. & Dist.

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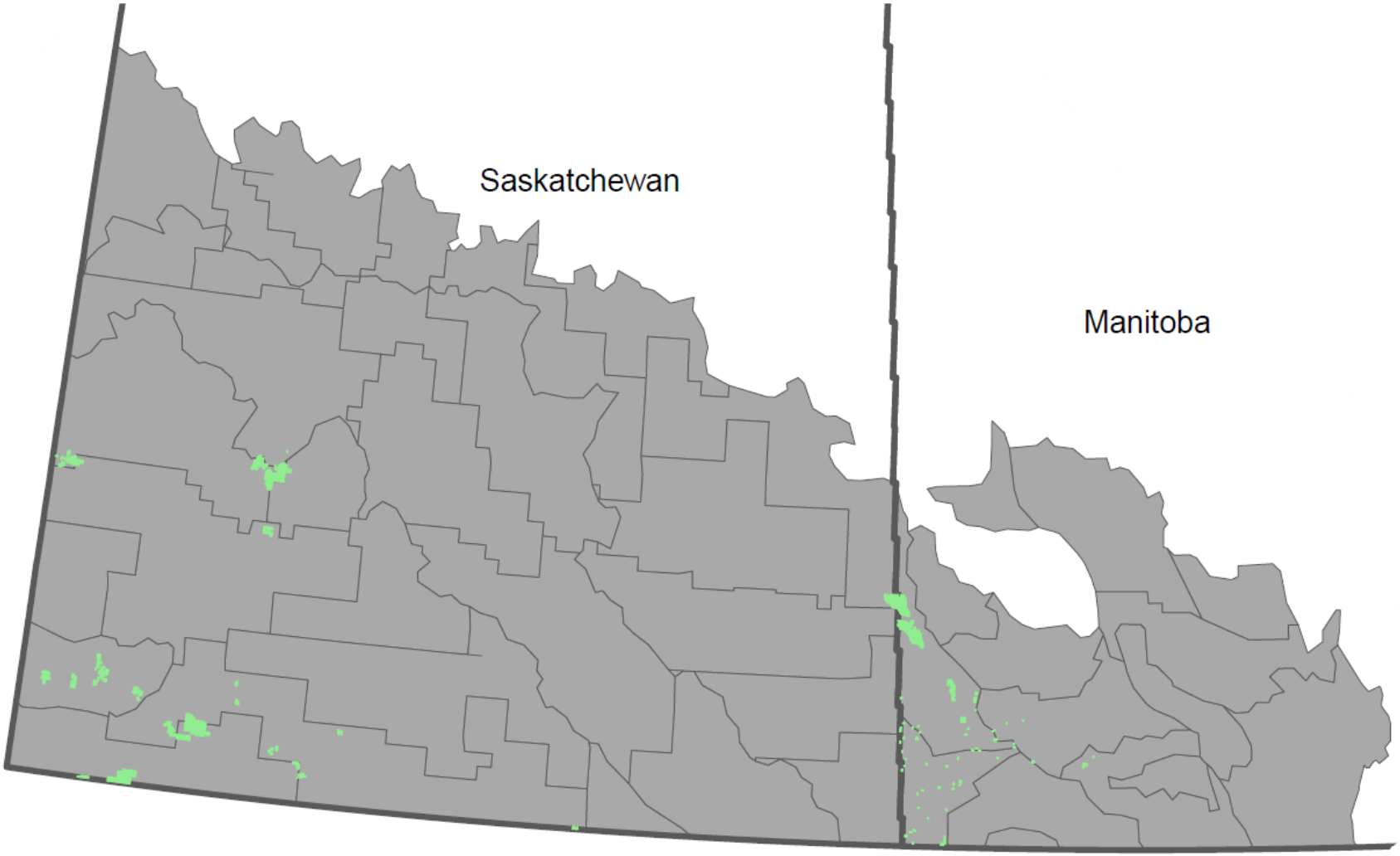
Results

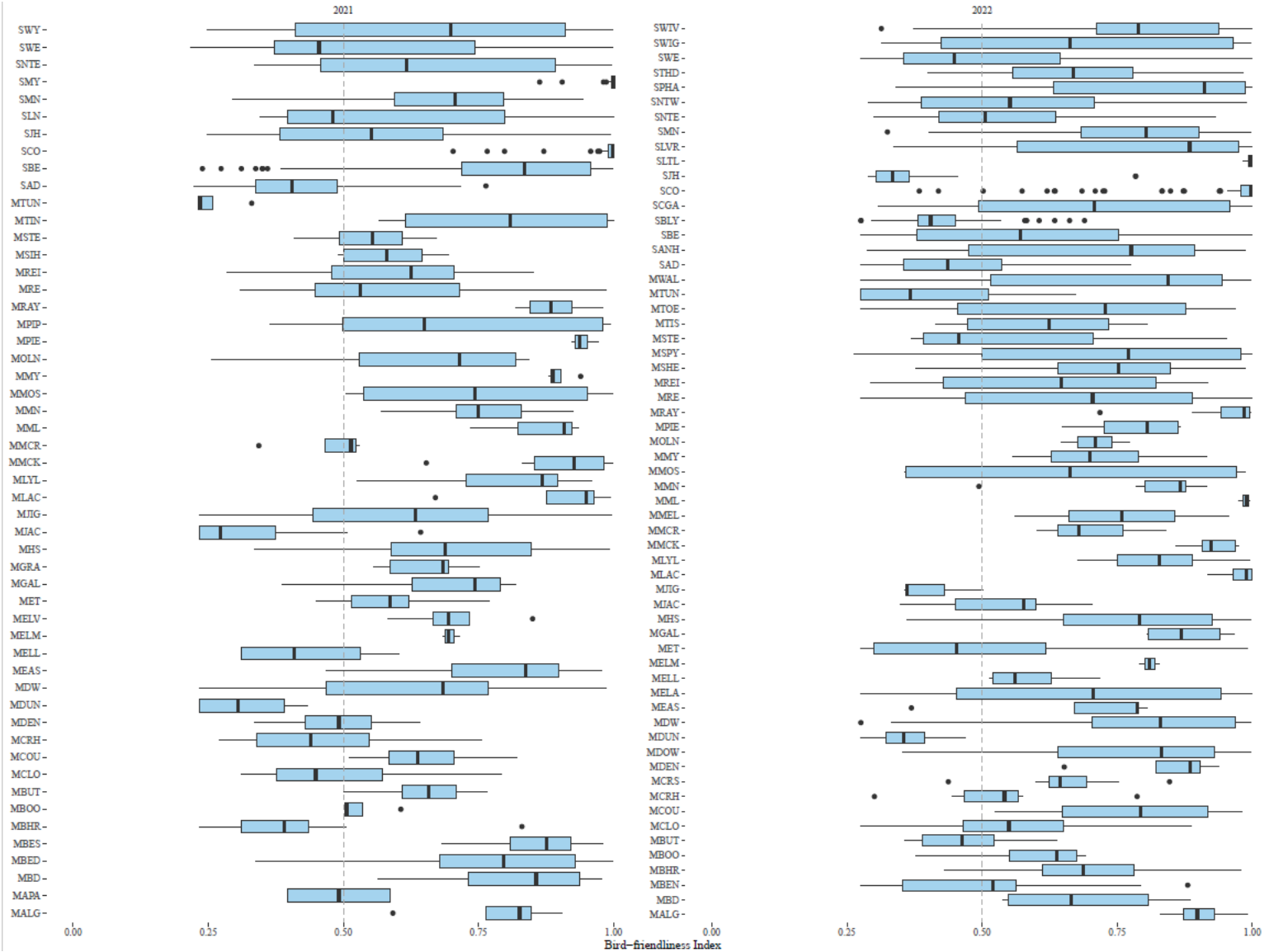
- 119 Site Years
- 3,300 total survey stations in MB & SK
- 342,000 unique acres represented

- 50,782 Total Detections
- 5,387 SAR detections



Results and Findings

- **Site BFI score range: .23-.99**
- **Mean BFI score: 0.68**
- **81% of sites scored >0.5**



Results

MLAC - 160 acres
2021 BFI score: .95
2022 BFI Score: .99

- **Aspen Parkland-MB**
- **Grazed pasture,**
- **high structural heterogeneity and plant diversity.**

MOLN - 160 acres
2021 BFI score: .72
2022 BFI Score: .71

- **Hay field**
- **on shore of Oak Lake,**
- **low structural heterogeneity and plant diversity.**

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Results

SCO- 27,000 acres
2021 BFI score: .99
2022 BFI Score: .99

- **Mixed Grassland-SK**
- **Community pasture**
- **Participates in stewardship and conservation programs.**

SMN- 40,000 acres
2021 BFI score: .71
2022 BFI Score: .80

- **Mixed Grassland-SK**
- **Community pasture**
- **Participates in stewardship and conservation programs.**
- **Oil and gas development may be impacting densities and SAR.**

Results

MHS - 1,920 acres
2021 BFI score: .69
2022 BFI Score: .79

- **Aspen Parkland-MB**
- **Regenerative farm**
- **Mostly perennial cover, with some annual intercropping, cover crops etc.**

SPHA- 2,720 acres
2022 BFI Score: .91

- **Mixed Grass-SK**
- **Private ranch**
- **Participates in stewardship and conservation programs.**

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Next Steps

- **Producer visits – bird reports, feedback survey**

2021 Bird Survey Summary Report
Example Ranch

Survey area: 25 sections (total area), 80 points,
20% of total area surveyed

Method: Automated Recording Units (25 points), In-person (55 points)

# of Species Identified: 51
# of Species at Risk: 7

Some of the birds we found:


6 Loggerhead Shrikes


27 Bobolink

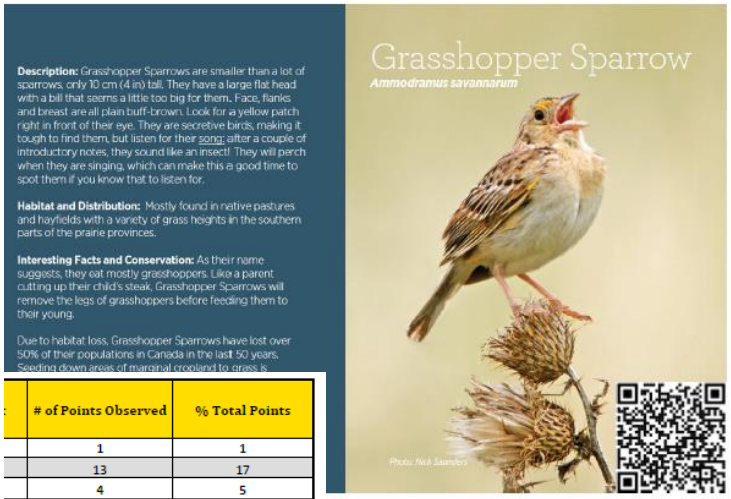

3 Chestnut-collared Longspurs


4 Lark Buntings


1 Sprague's Pipit


16 Bank Swallow

Photos provided by: May Haga, Nick Saunders, Yousif Attia

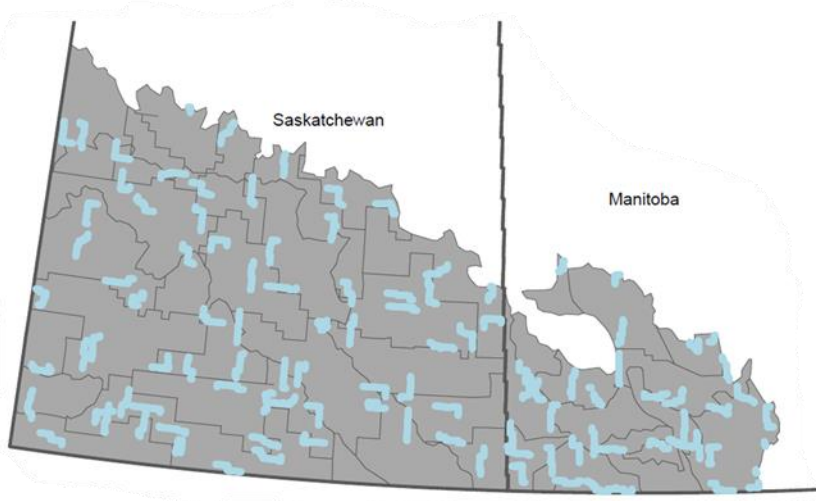


		# of Points Observed	% Total Points
		1	1
		13	17
		4	5
		1	1
		16	21
		18	23
		8	10
		2	3
		13	17
Brown-headed Cowbird	2	2	3
Bobolink	4	2	3
Brewer's Blackbird	4	3	4
Canada Goose	8	5	6
Chestnut-collared Longspur	4	2	3
Clay-colored Sparrow	54	32	42
Cedar Waxwing	1	1	1
Common Grackle	11	6	8
Common Raven	5	4	5
Common Yellowthroat	8	7	9
Eastern Kingbird	2	2	3
European Starling	2	2	3

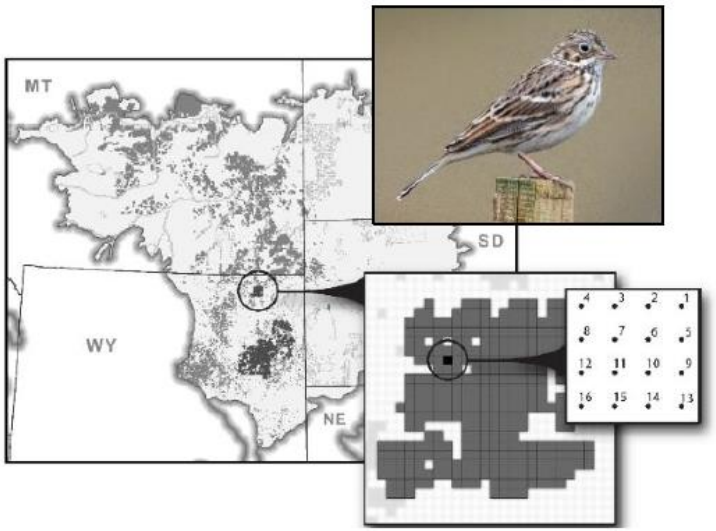
Next Steps

Background Data

- BBS has limitations as background data source
- Integrated Monitoring in Bird Conservation Regions (IMBCR) is the best data source to achieve accurate, timely and directly comparable background data
- IMBCR has many impactful applications and will facilitate hemispheric conservation collaboration



BBS



IMBCR in Bird Conservation Region 11

Next Steps

The Bird-friendliness Index shows significant promise as a dependable, actionable, and scalable biodiversity indicator to:

1. Serve as a biodiversity indicator to evaluate impact management and stewardship are having on biodiversity to guide management.
2. Provide a dependable and scalable biodiversity indicator to enable a market environment that incentivizes biodiversity outcomes.

- **Pursue impactful applications of the Bird-friendliness Index**

CRSB
Canadian Roundtable for Sustainable Beef

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