

Short-billed Dowitcher breeding habitat preferences in Churchill, Manitoba, Canada

A maximum entropy modelling approach and climate change implications

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Introduction

The Short-billed Dowitcher (*Limnodromus griseus hendersoni*) breeds in the North American sub-Arctic and nests in wet sedge meadows. This region is particularly vulnerable to the effects of climate change, threatening the viability of shorebird populations. To understand how species cope with changing habitat conditions, it is crucial to have comprehensive knowledge of what characterizes their habitat.

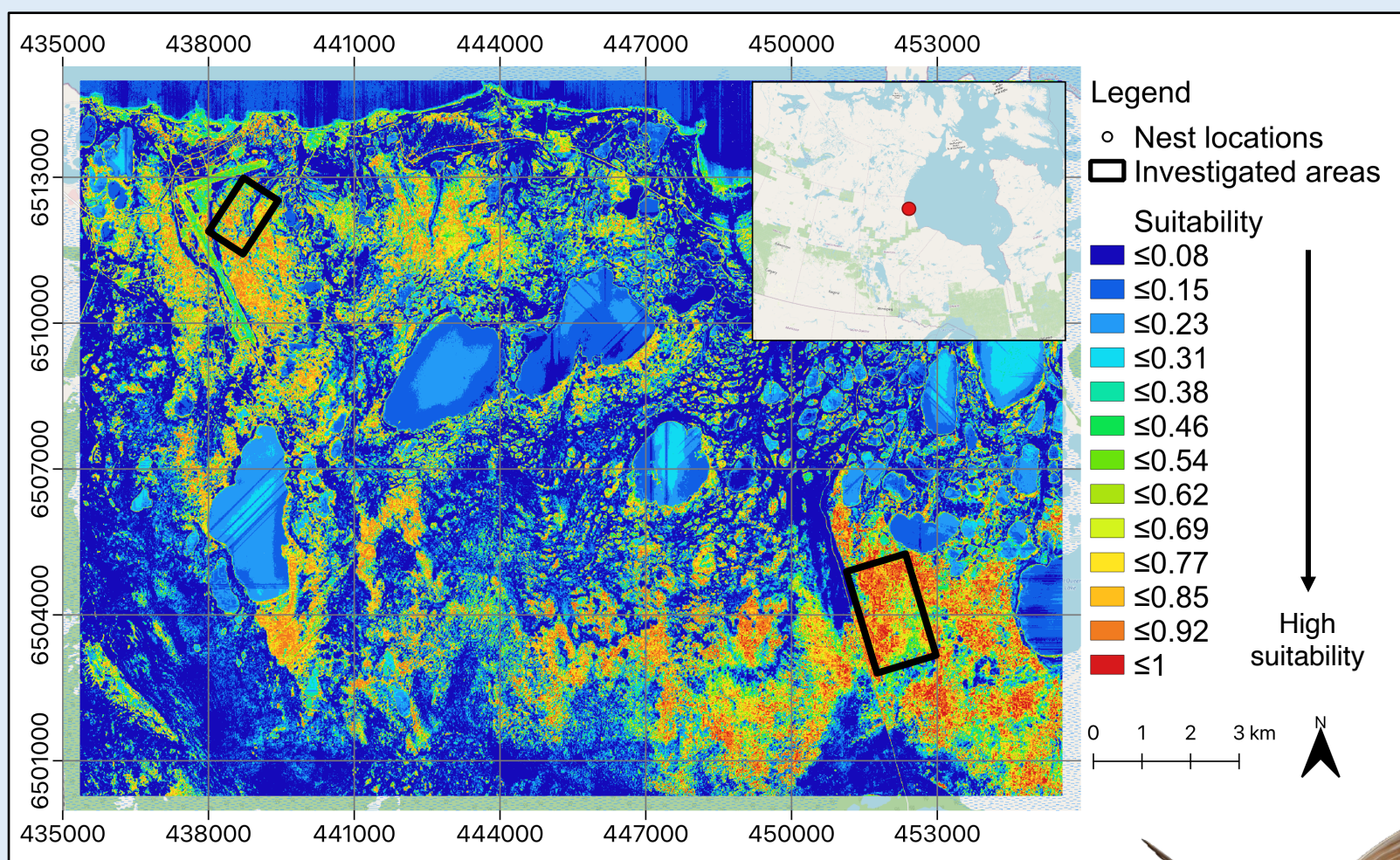
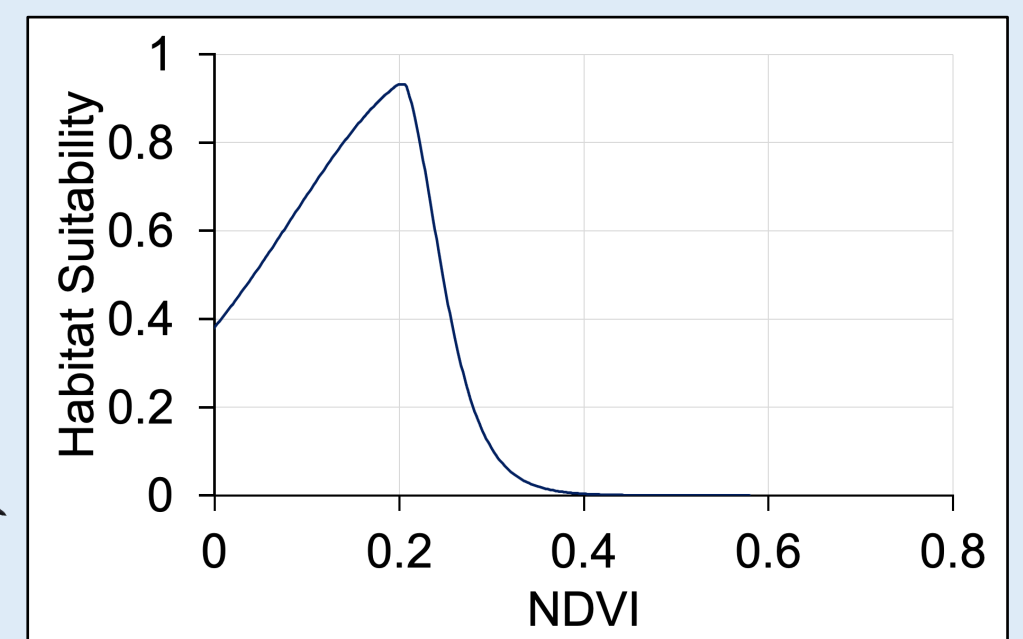


Material & Methods

- **Suitable areas** are hard to determine in the field as the terrain is difficult to access and to investigate.
- I used **presence data** and a set of **environmental variables** to predict **potential habitat suitability** within a defined landscape in a presence-only species distribution model : **MAXENT**.
- **Presence data** : nest locations from field survey and sightings from eBird (2021 and 2022).
- **4 environmental variables** reflecting the topography and the vegetation structure, derived from remote sensing.
- **5 climate variables** reflecting the current and future climate.

Aims

- Identifying the **breeding habitat preferences** of the Short-billed Dowitcher in the Churchill region.
- Estimating the **impact of climate change** on its breeding habitat range.

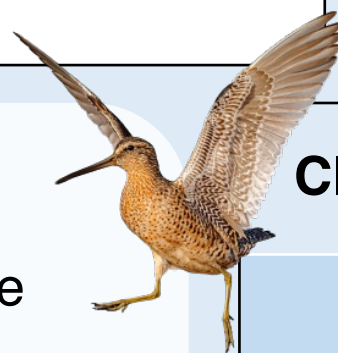


Results

- Plenty but patchy and scattered potential **suitable nesting habitats** throughout the local area were **identified**.
- The **highest** habitat suitability was reached for **NDVI** value between 0.12 and 0.21.
- Depending on the different scenarios, there is a **significant increase** in potential **breeding habitat** in response to climate change at a regional scale.

Conclusions

- **New potential nesting areas** around Churchill were **identified** and could be validated with field survey.
- Data on **vegetation structure**, i.e., NDVI, could be a good proxy to the **nest locations**.
- **Climate change** may **expand** the range of the breeding habitat. **Precipitation increase** may be the reason. However, other factors like vegetation changes and invasive species should also be considered.



Climate conditions	Period	Breeding area	
		km ²	Modification
Current	Present	290	
Middle of the Road scenario	2070s	263	- 9,4 %
Fossil-fueled Development scenario	2070s	3153	+ 1089 %