

CC-Bio

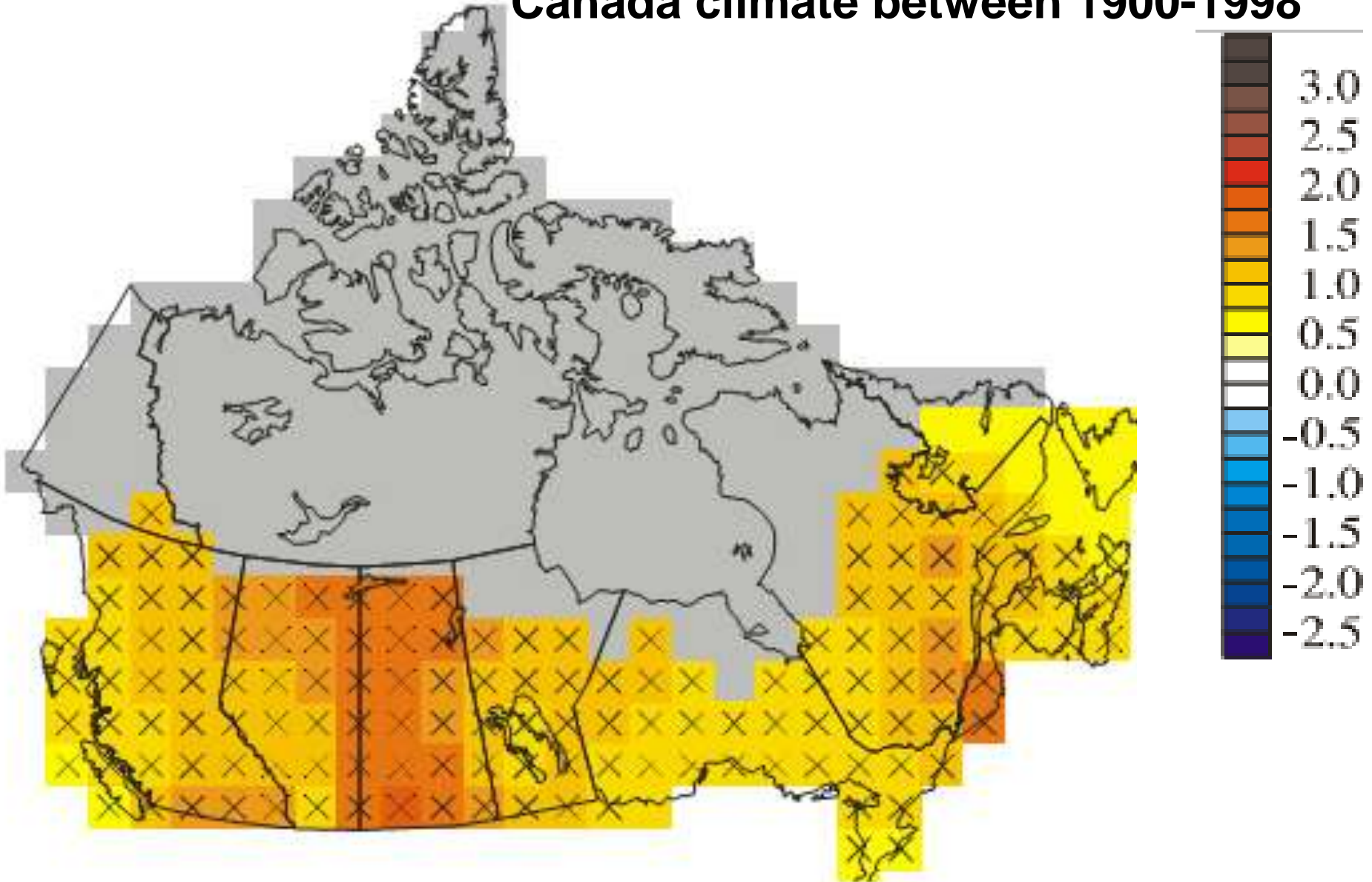
Effets des Changements Climatiques sur la Biodiversité du Québec
Effects of Climate Change on Quebec Biodiversity



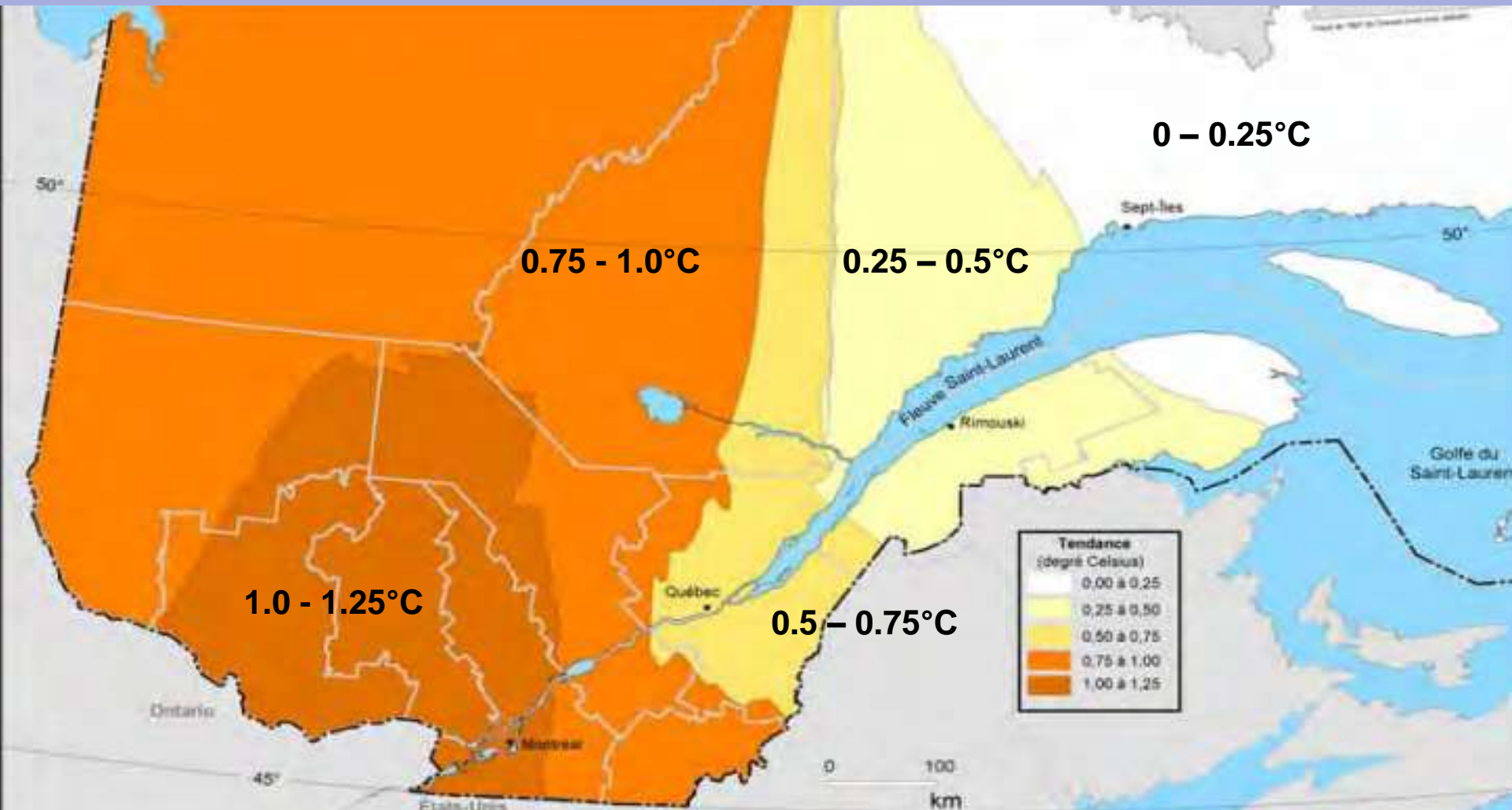
The NatureServe Climate Change Vulnerability Index applied to Quebec biodiversity

Yanick Gendreau, Dominique Berteaux and Patrick Nantel

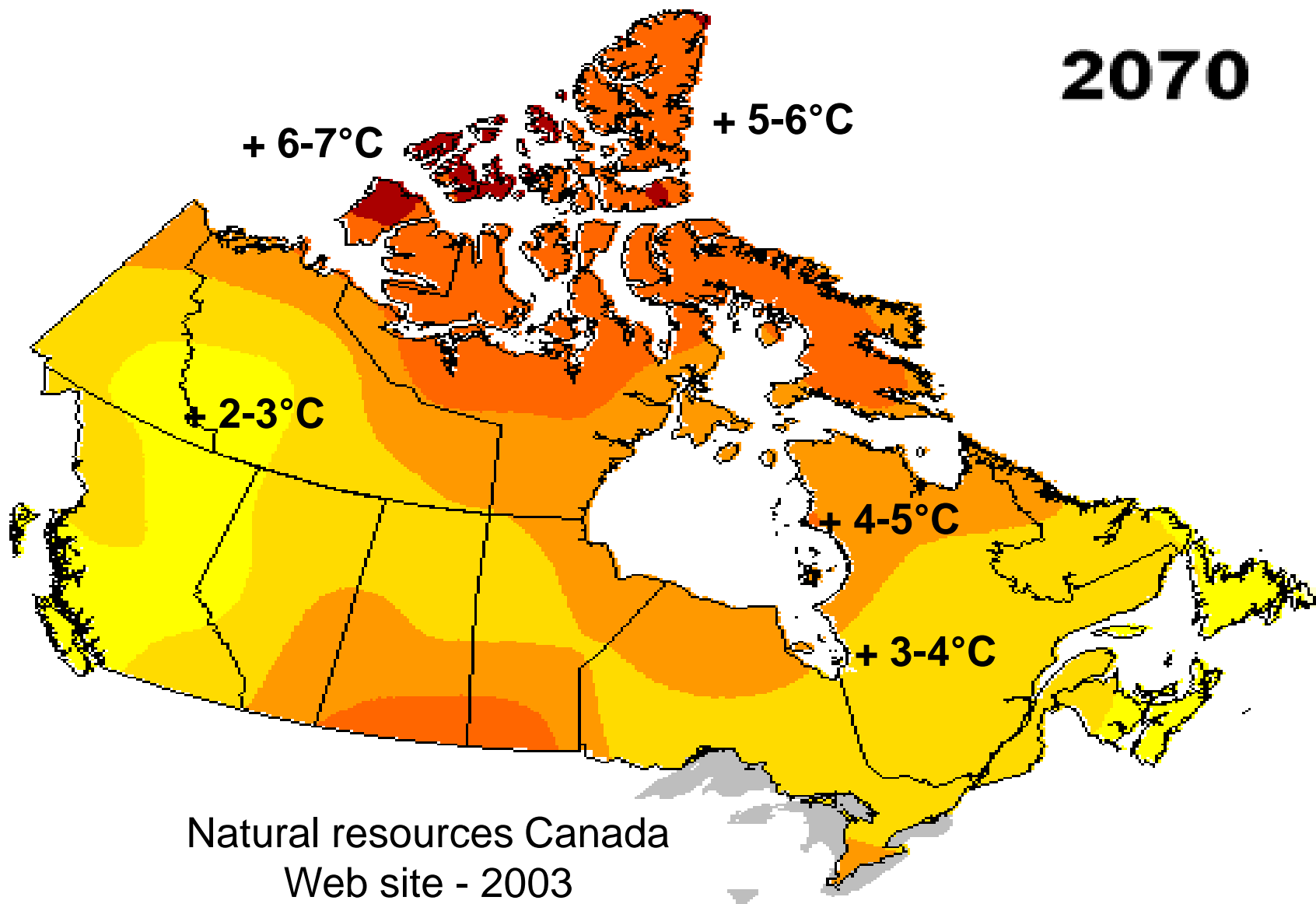
Canada climate between 1900-1998



Quebec's annual mean temperature change between 1960-2003

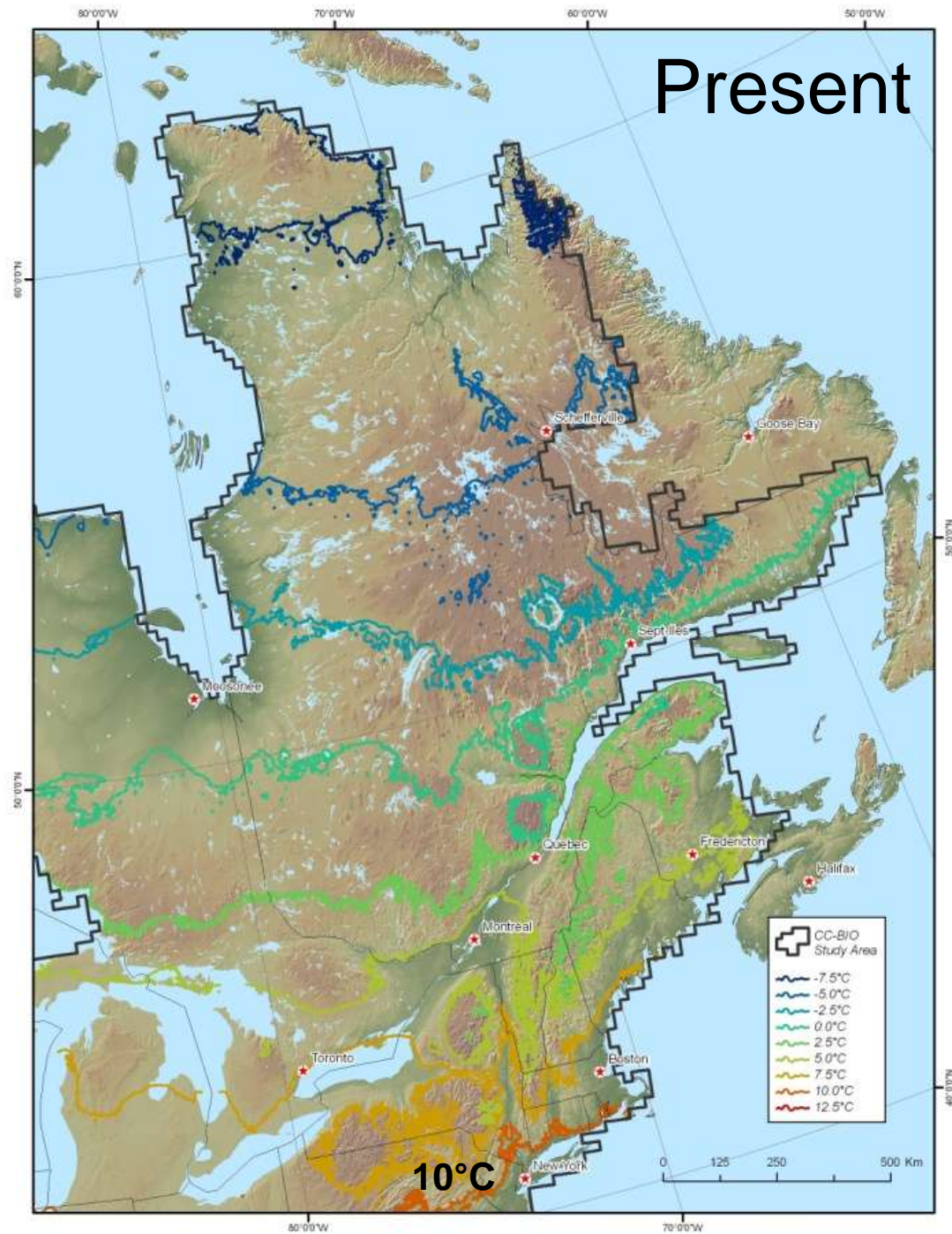


2070

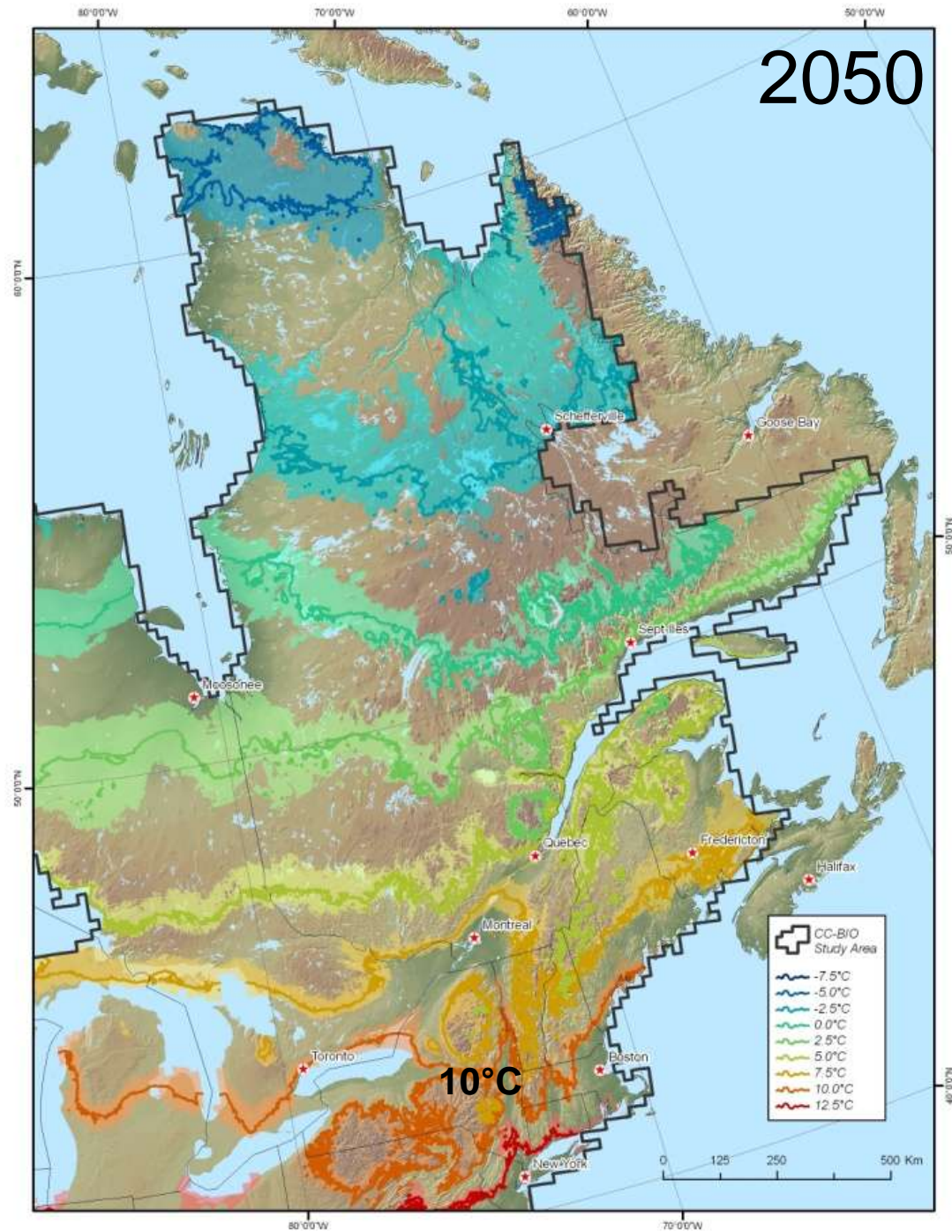


Natural resources Canada
Web site - 2003

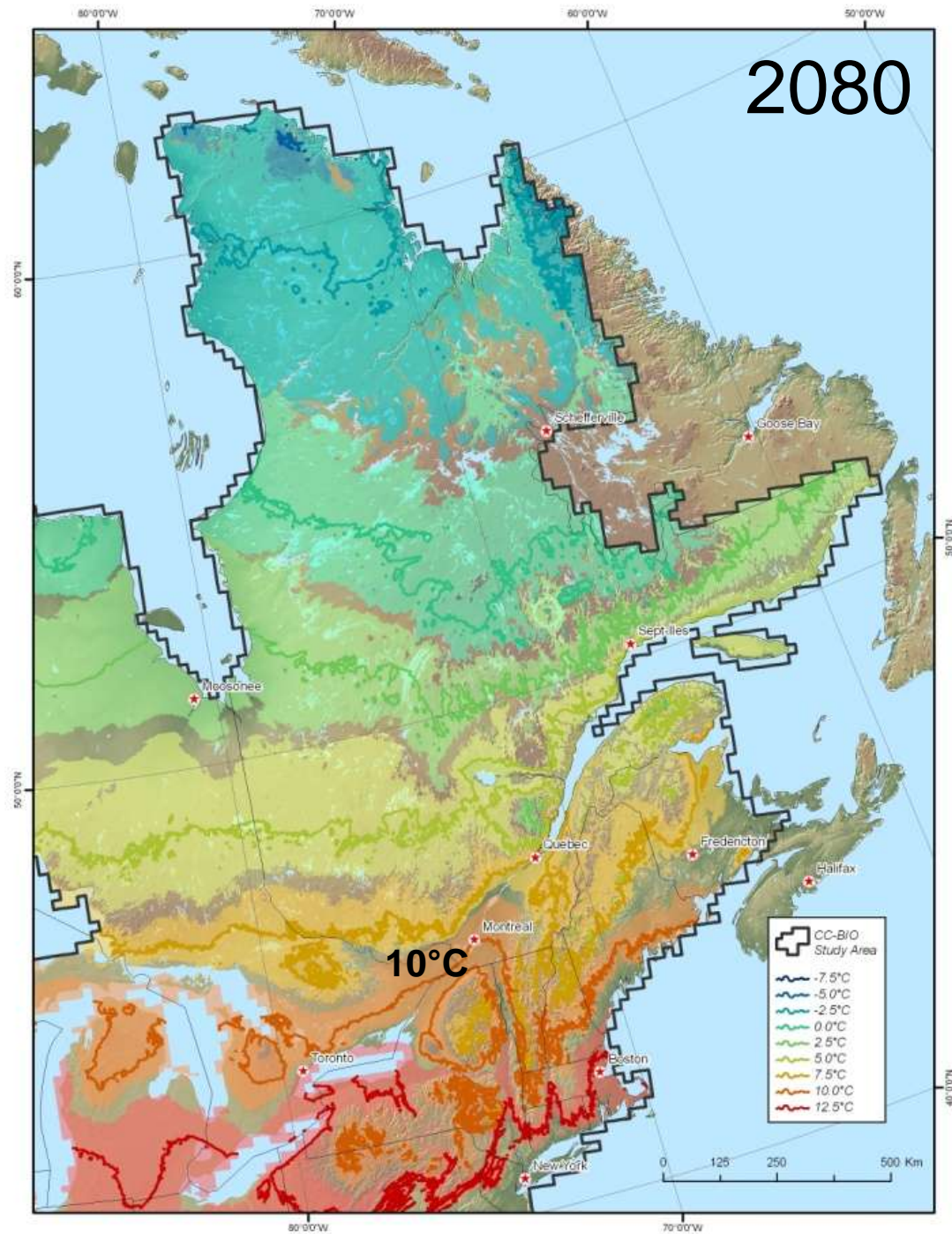
Isotherms



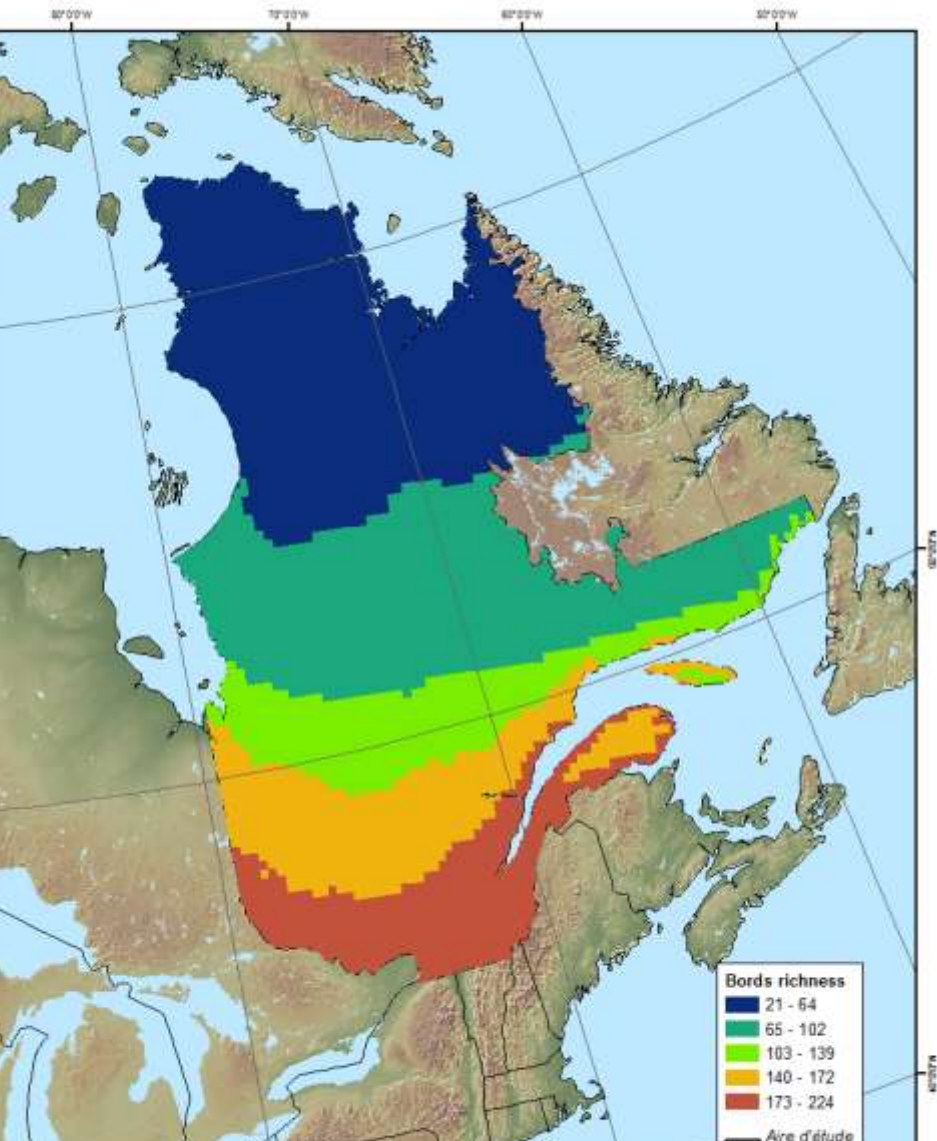
Isotherms



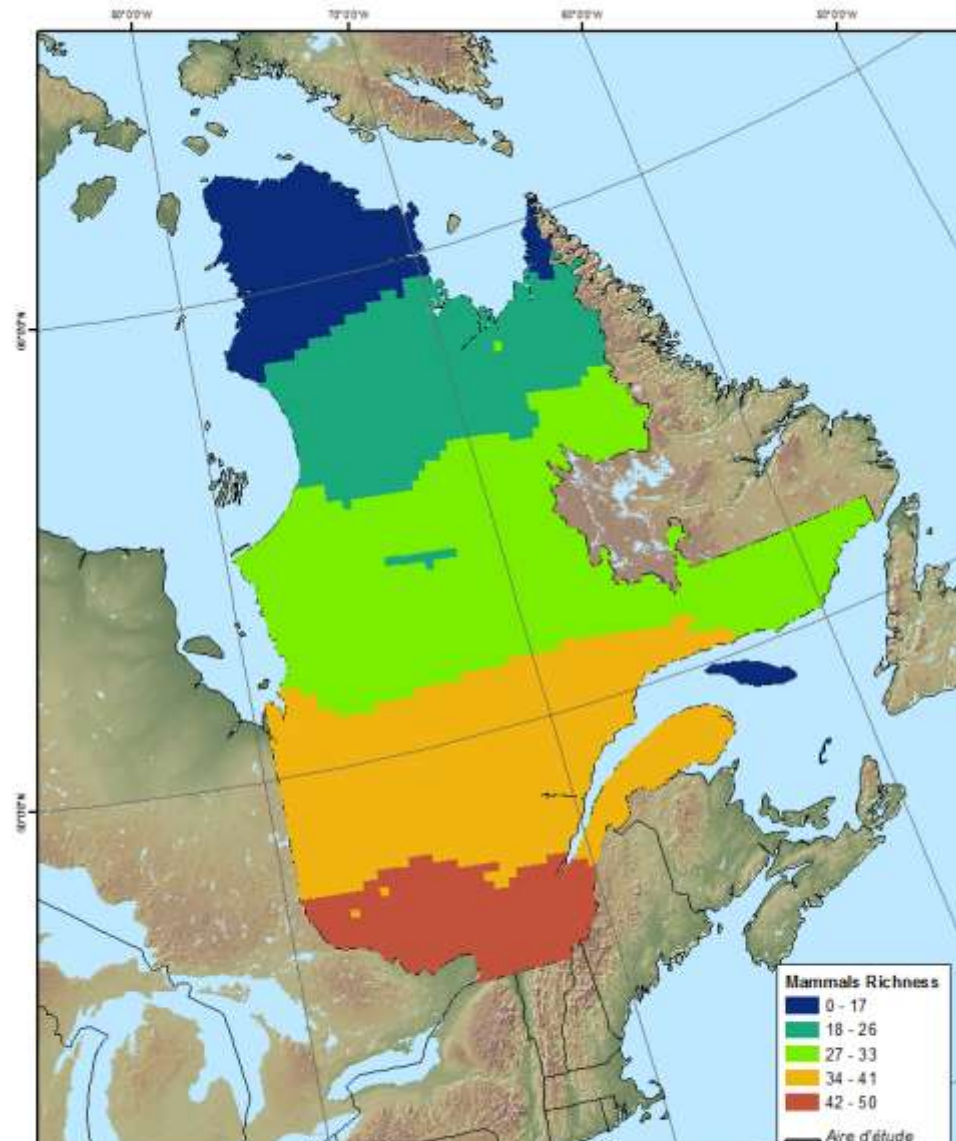
Isotherms



Birds richness



Mammals richness





31000 invertebrates

6000 non-vascular plants and fungies



650 vertebrates

Species at risk in Quebec ≈550

20 Terrestrial mammals

21 Amphibians and reptiles

33 Birds

392 Plants

Wo
Sta

Bicknell's Thrush (*Catharus bicknelli*)
Satus: Vulnerable

Alan Hogue www.oiseaux.ca

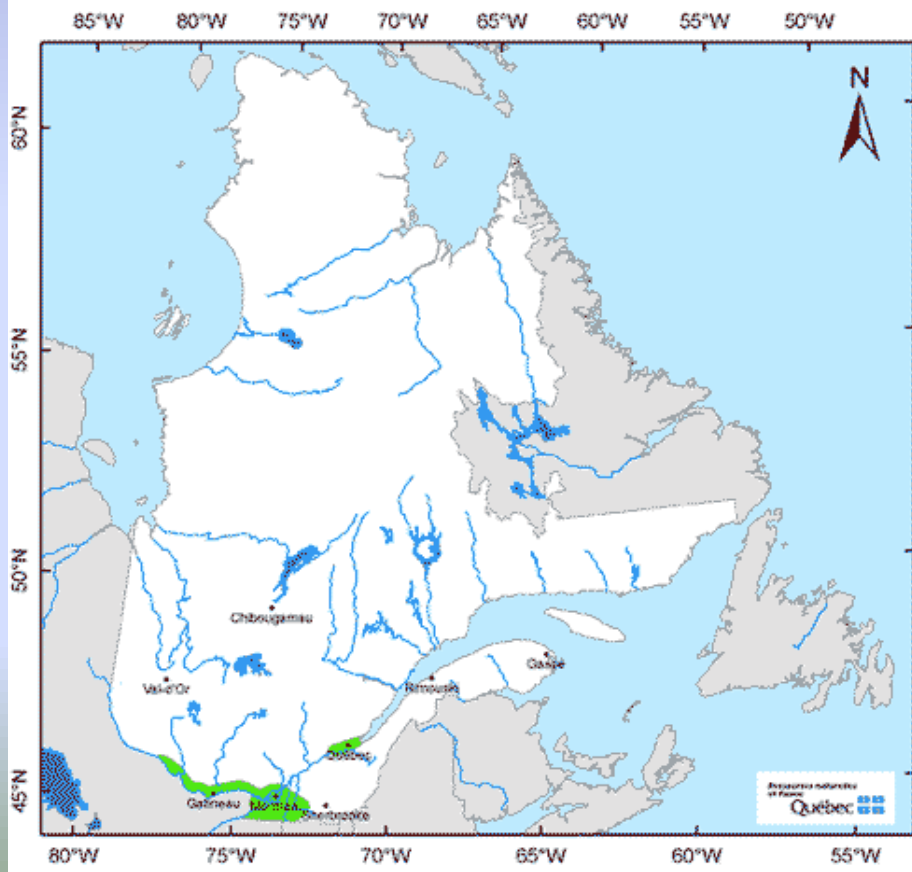
Sparrow's-egg lady's-slipper
Cypripedium passerinum
Statut : Threatened

**62% of species at risk
are considered to be at
their northern range limit**

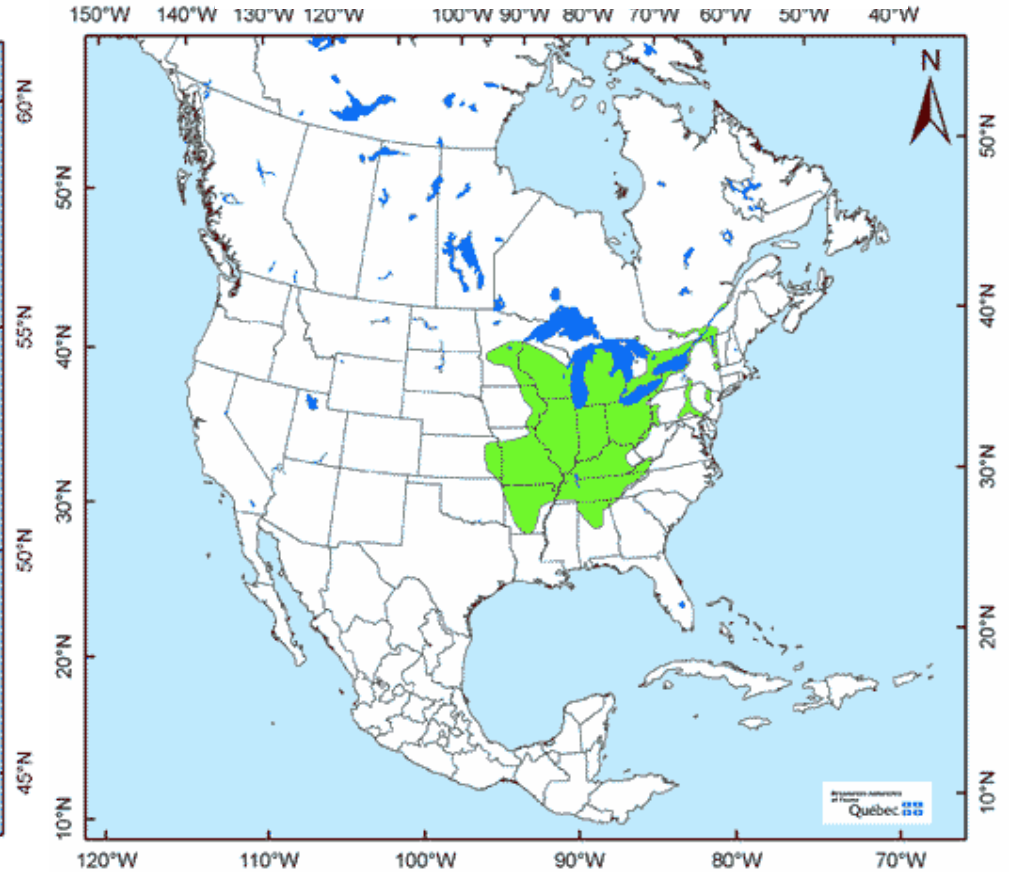


**Common map turtle
Status: Threatened**

Distribution in Quebec



Distribution in N. America



Climate change and biodiversity

- **CC act in synergy with other biodiversity threats (Brooks et al. 2008, TREE);**
- **Up to 41 % of the species on Earth have been affected by CC (Parmesan & Yohe, Science 2003);**
- **If temperature rise above 2-3°C in 2100 compare to pre-industrial temperature, we might witness the extinction of 20 to 30 % of species on Earth (IPCC 2007).**

The general objective of CC-Bio is to project potential effects of climate change on the distribution and abundance of a large range of plant and animal species from Quebec.

<http://cc-bio.uqar.ca>

CC-Bio

Effets des Changements Climatiques
sur la Biodiversité du Québec

Effects of Climate Change on
Quebec Biodiversity



English

Français

Español

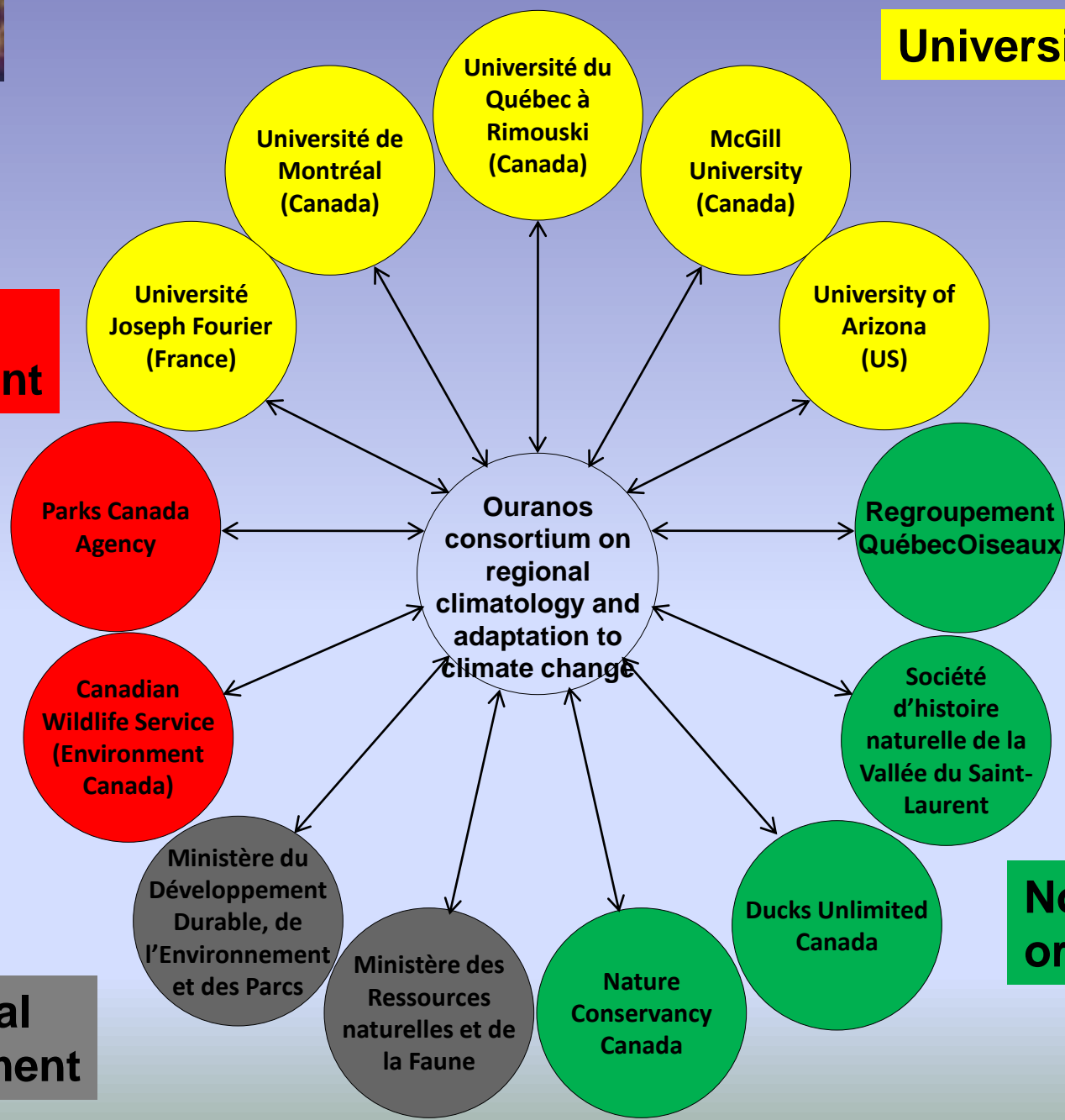
Part 1: Historical examination of the effects of climate change on Quebec biodiversity (plant phenology, phenology and distribution of birds and herptiles);

Part 2: Modeling future distribution of trees, other plants, birds, beaver, other mammals(?), and herptiles;

Part 3: Examining some consequences for biodiversity conservation.

Universities

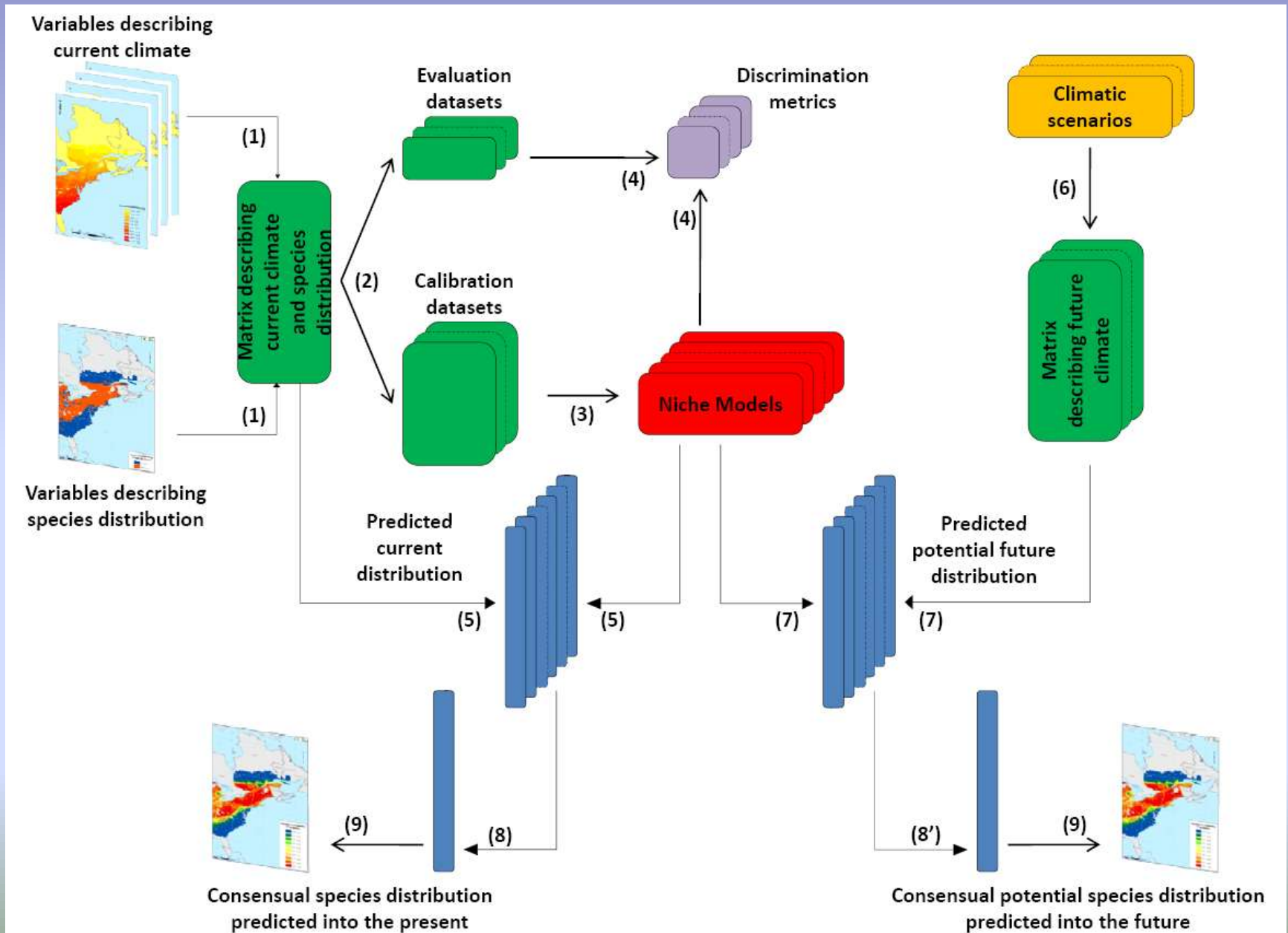
Federal Government



Provincial Government

Non-profit organizations

Species distribution modeling



Species distribution modeling

Current

	X	
X		X

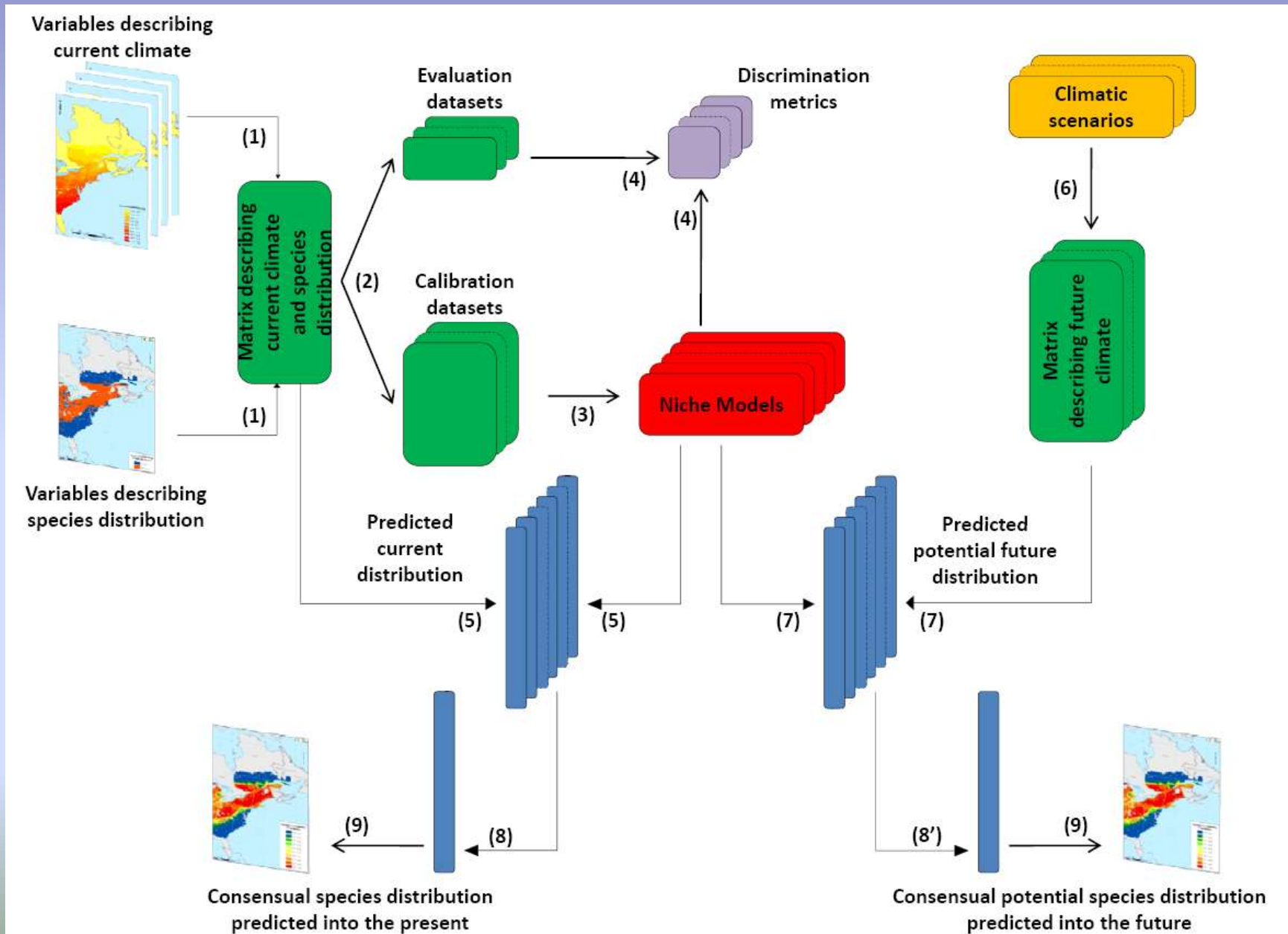
Climate data = 1960-1990

2050 or 2080

X		X
	X	

Climate projection

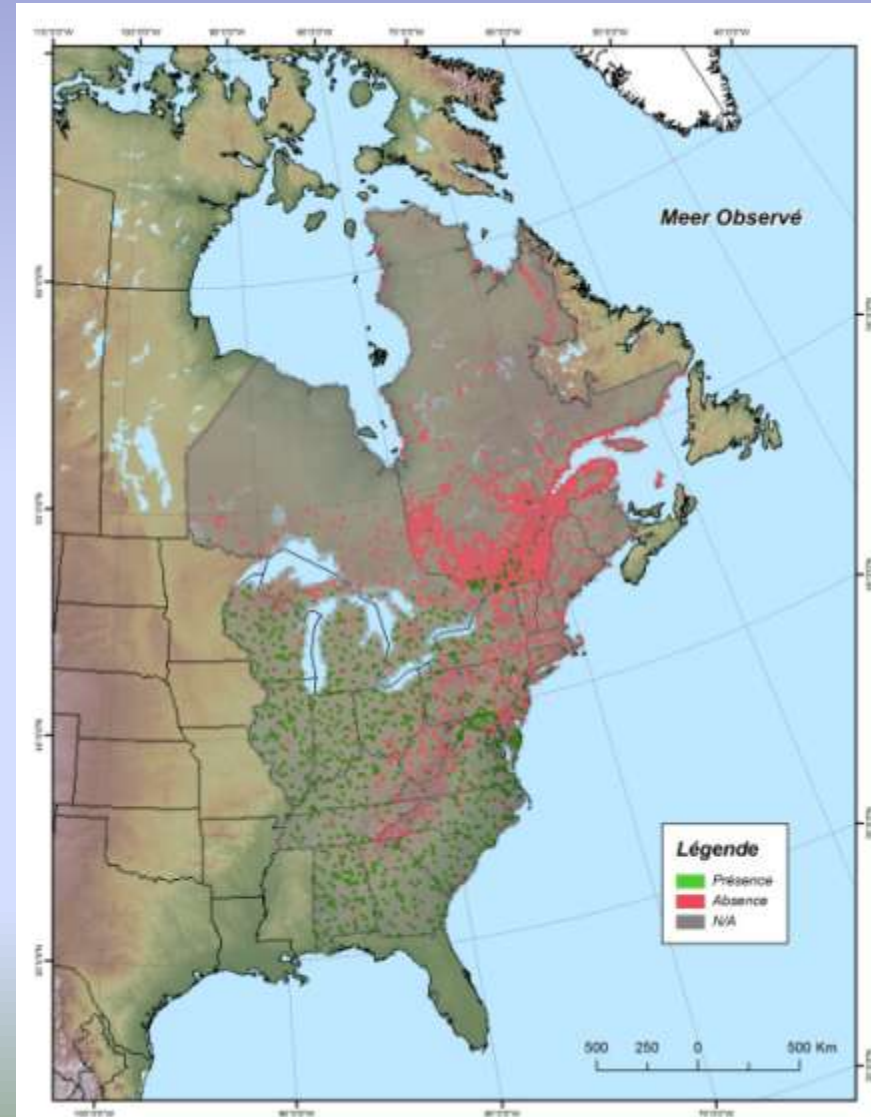
Species distribution modeling



Melanerpes erythrocephalus

Red-Headed Woodpecker

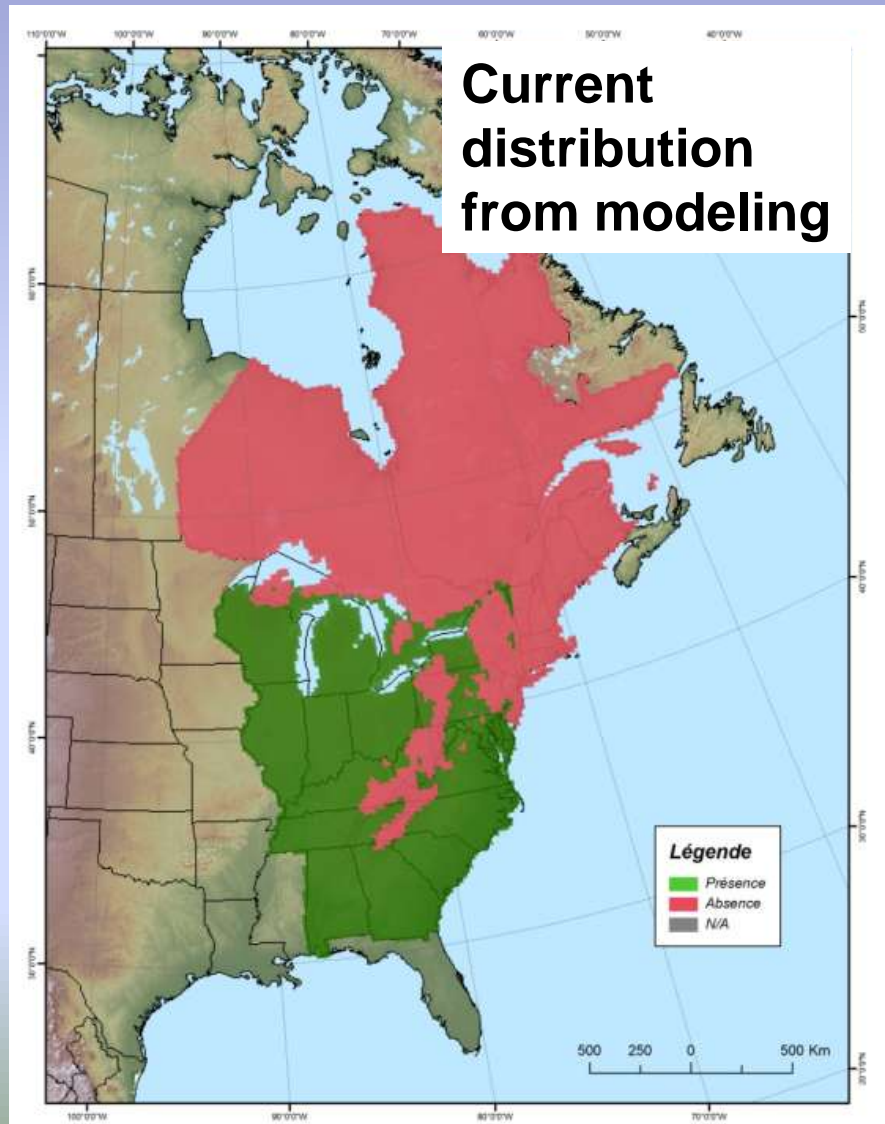
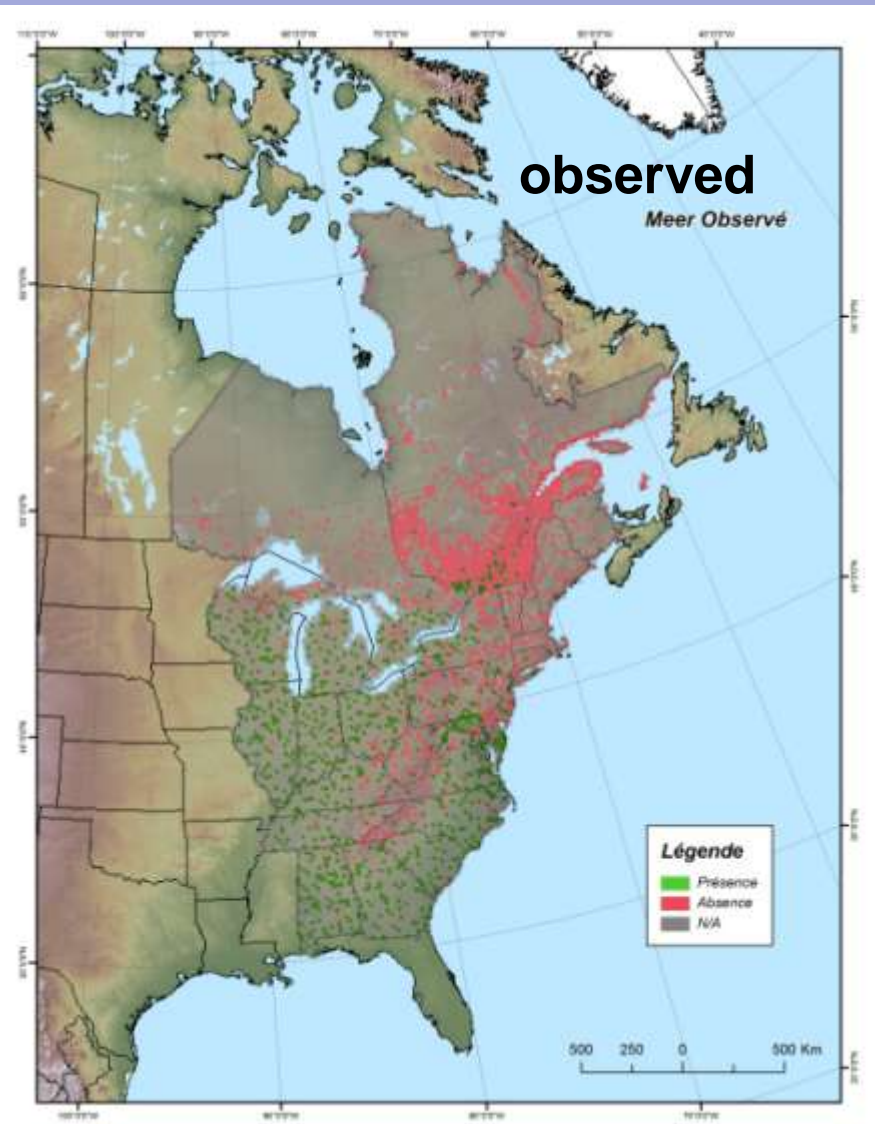
Status : Threatened

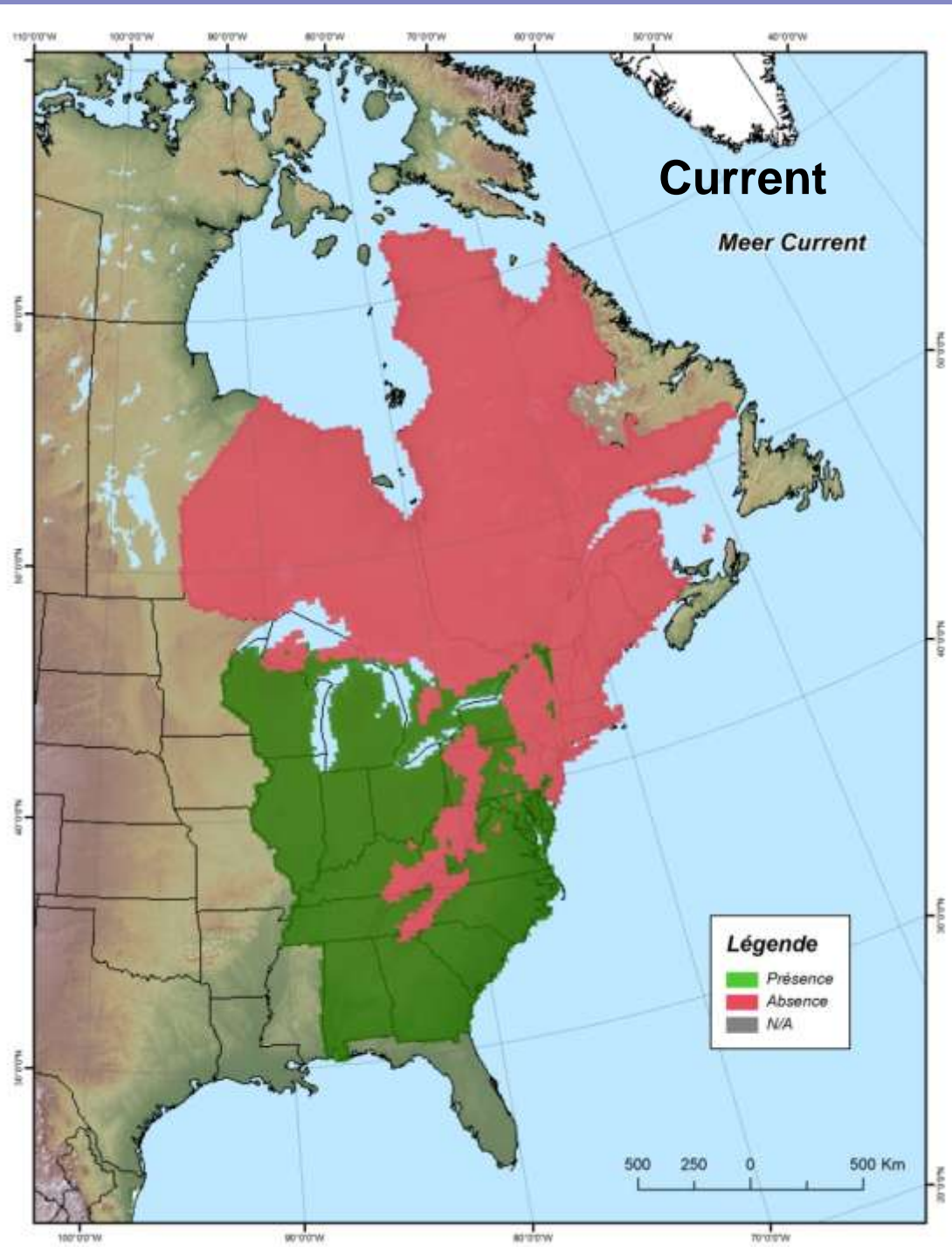


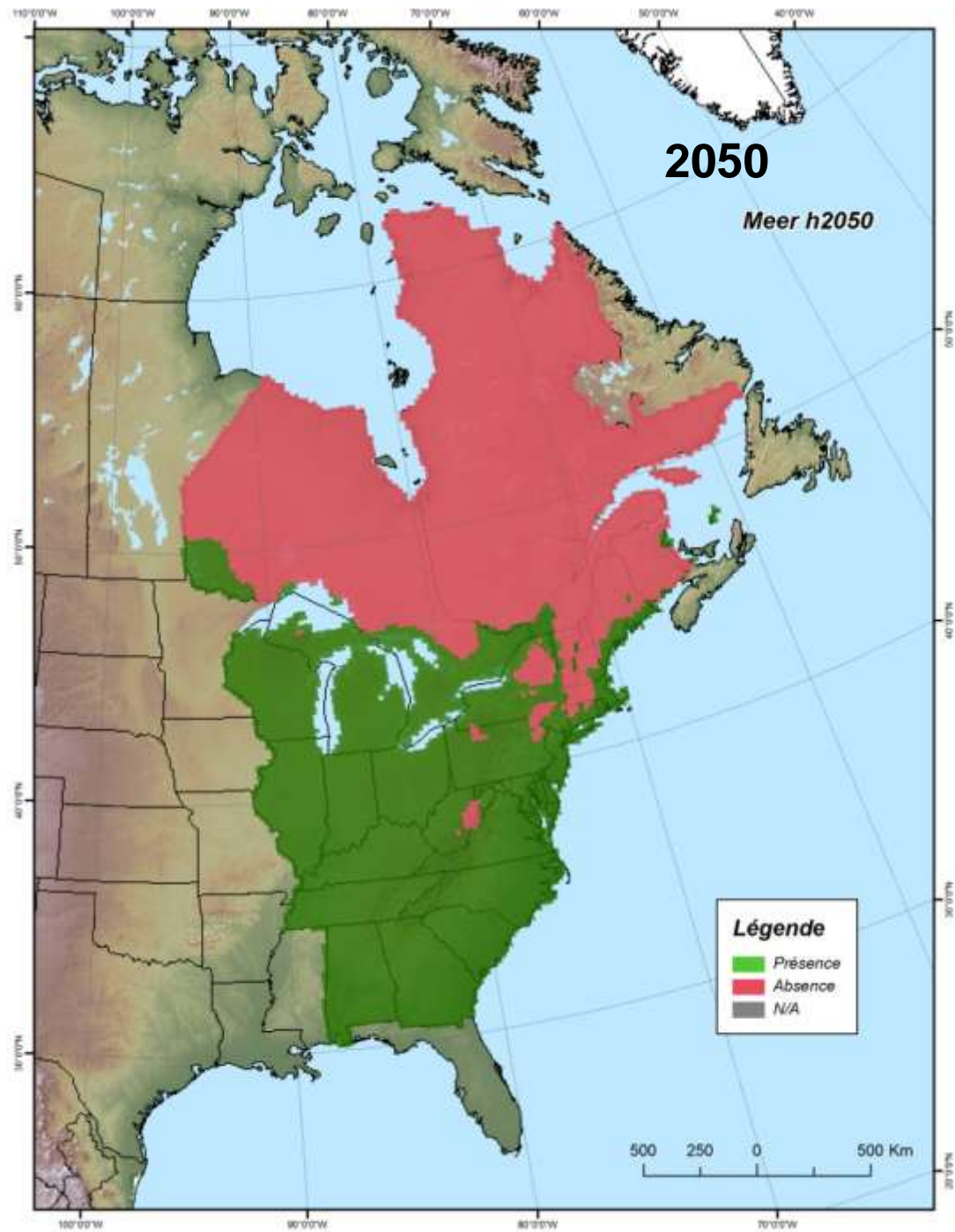
Red-Headed Woodpecker

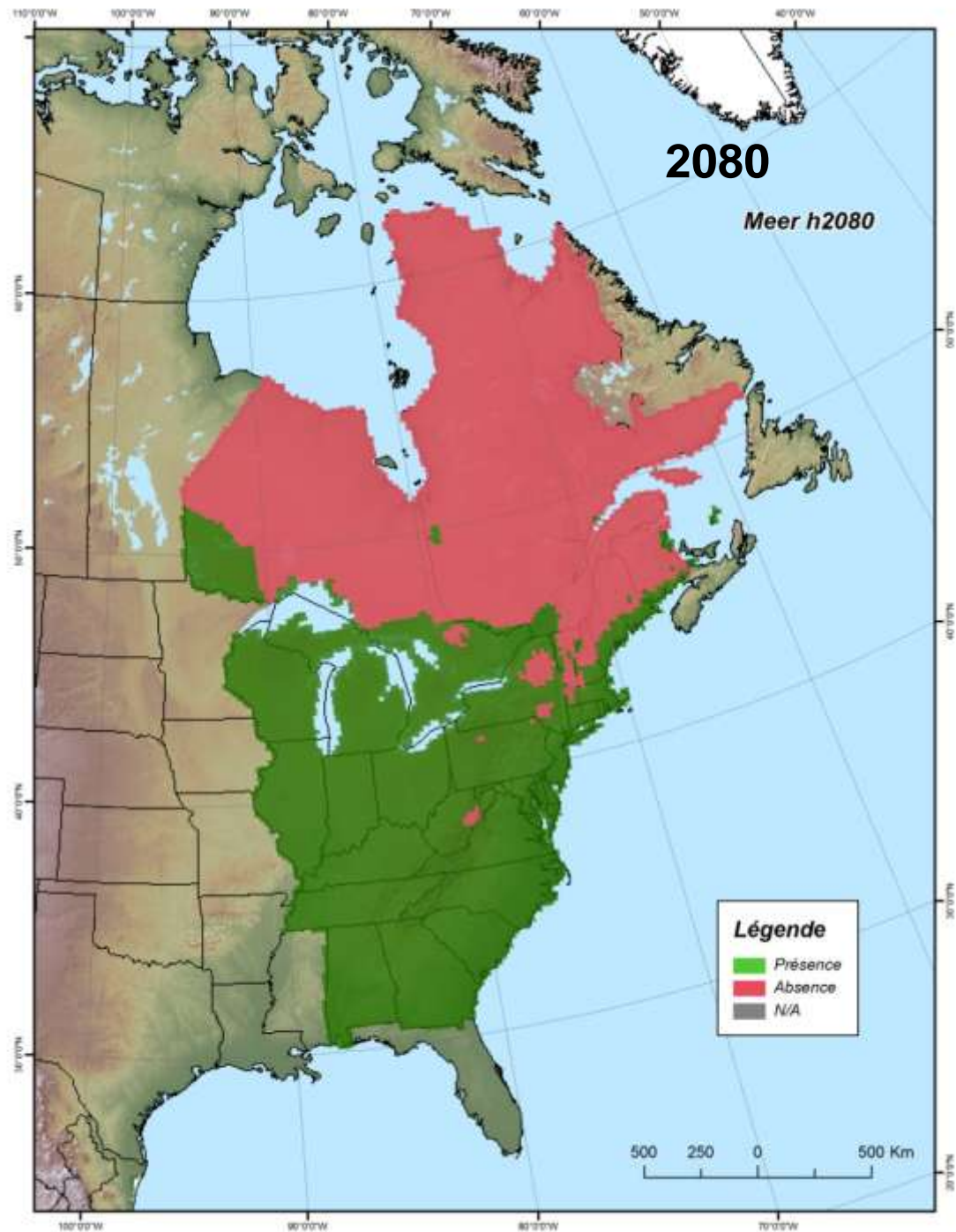
Current distribution

Model performance = 0.935 (0.014)





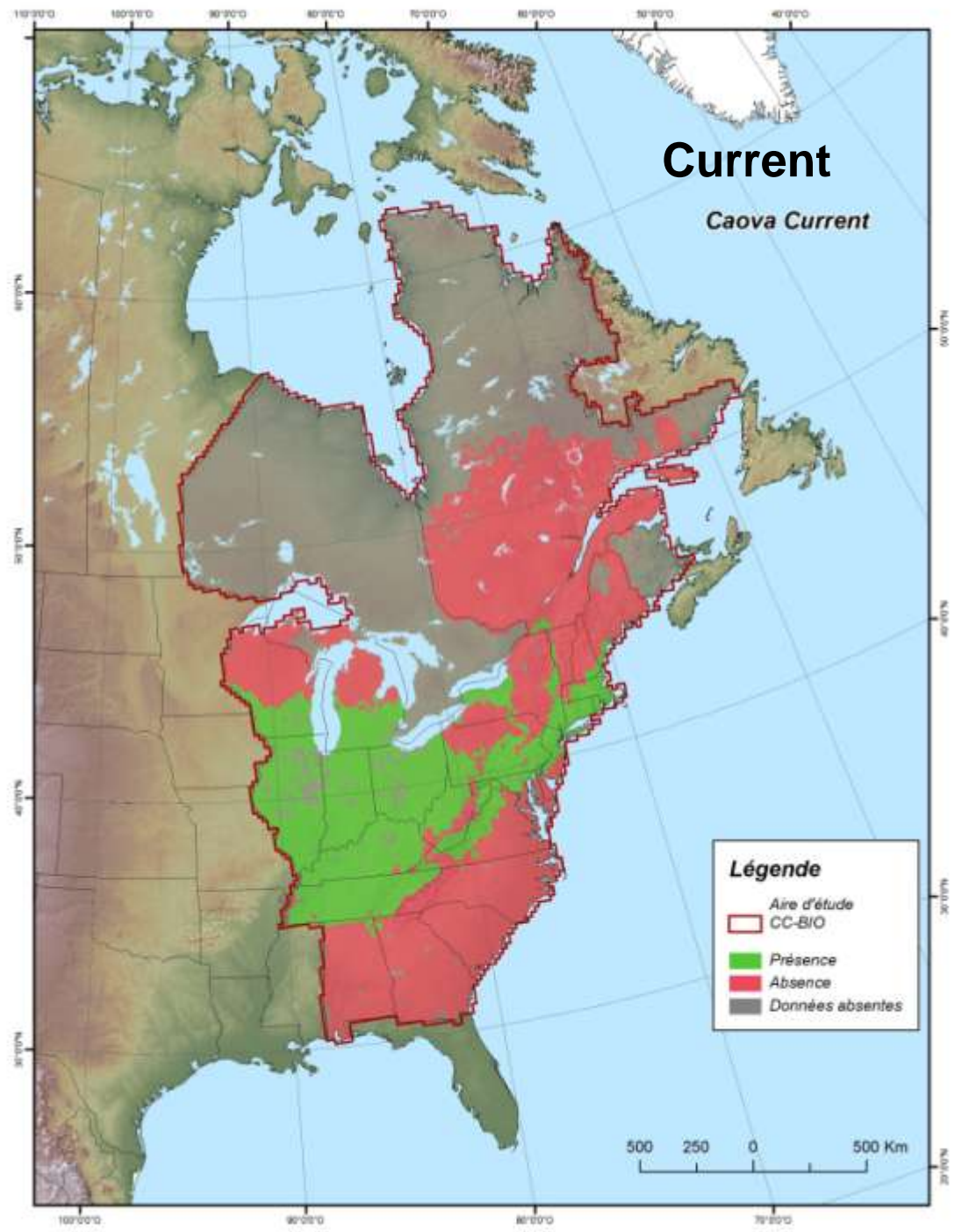




Carya ovata var. *ovata*
Shagbark hickory
Status :
« Proposed » Threatened



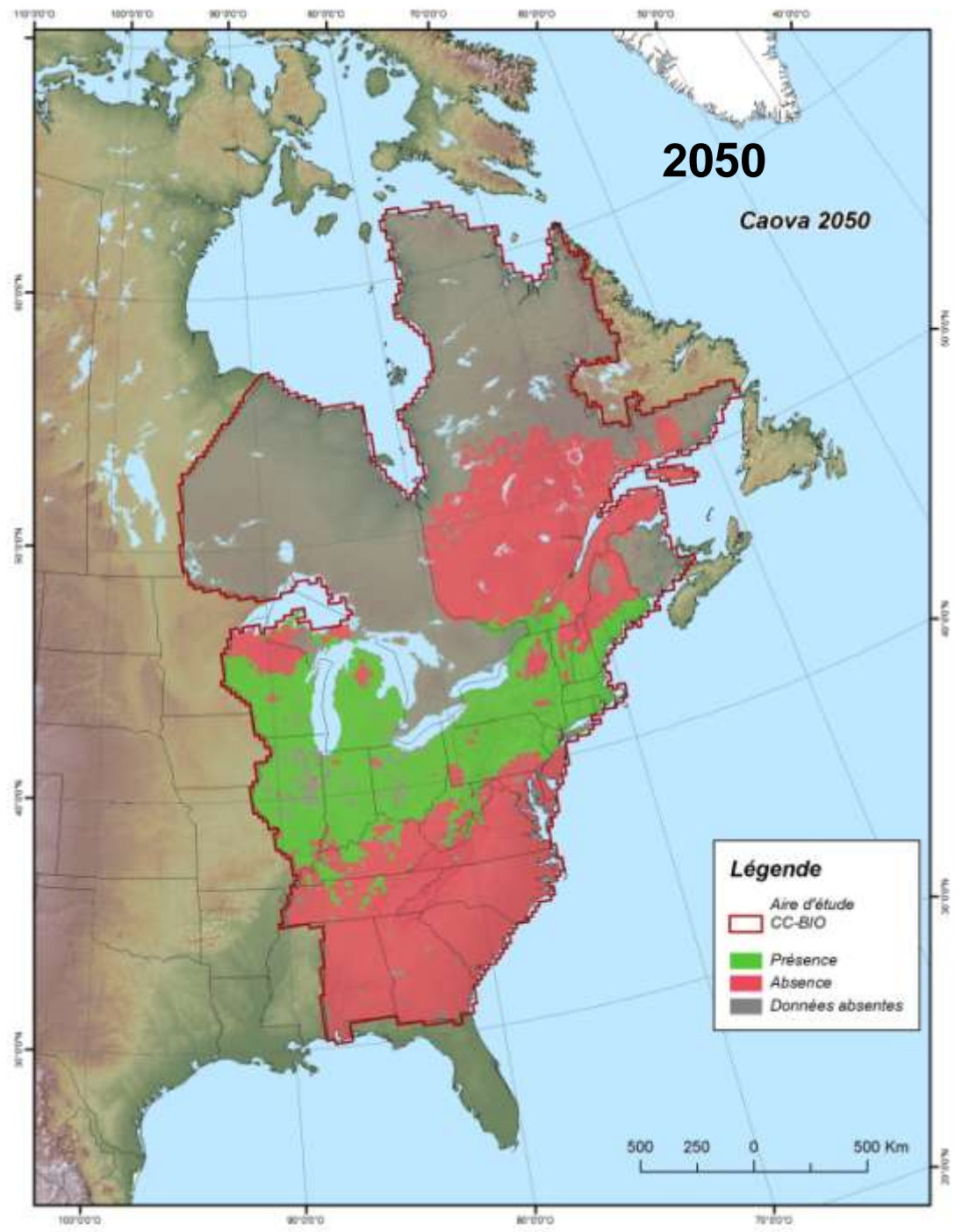
Credit: Catherine Périé
Natural resources Quebec



Carya ovata var. *ovata*
Shagbark hickory
Status : « Likely » Threatened



Credit: Catherine Périé
Natural resources Quebec

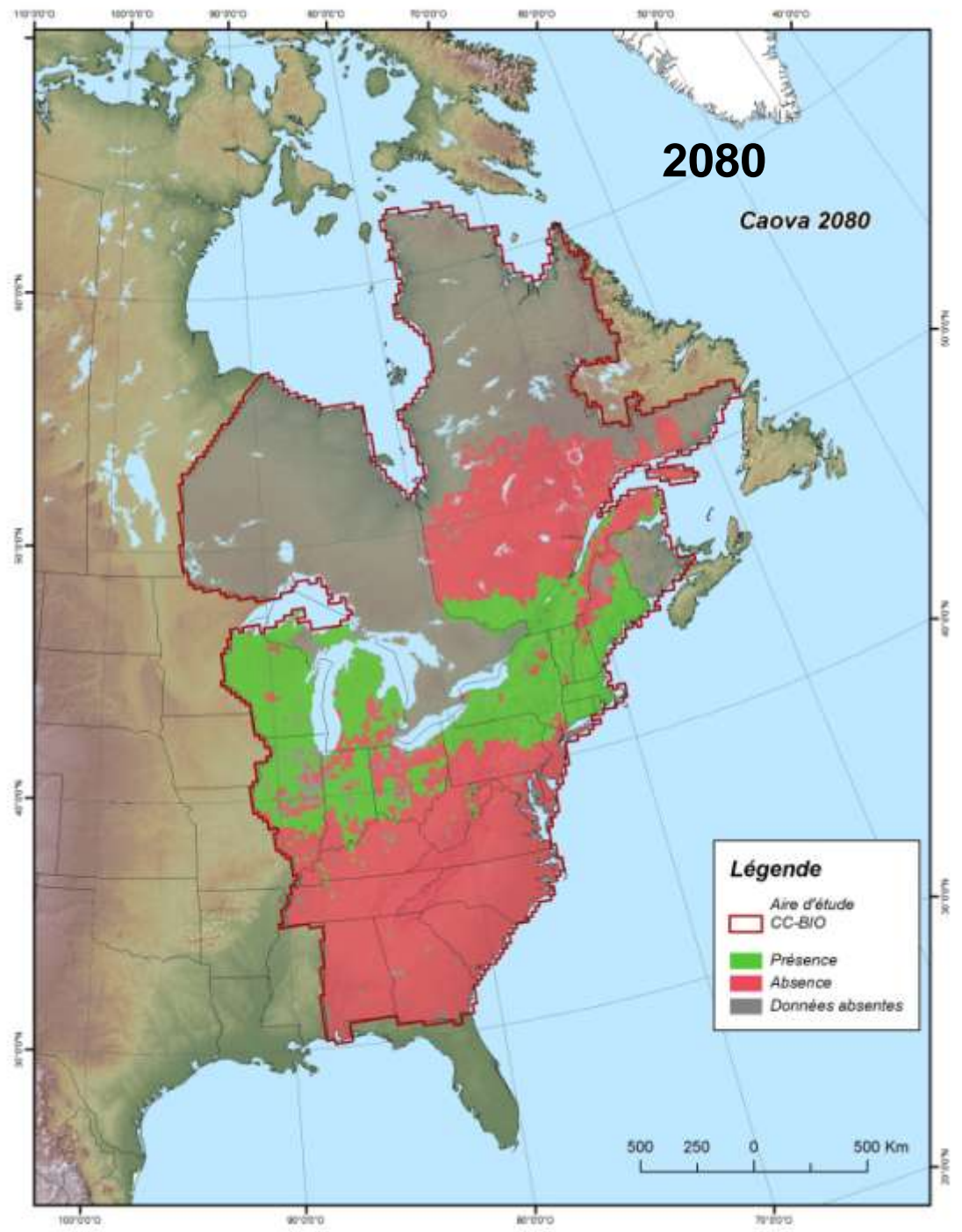


Carya ovata var. *ovata*
Shagbark hickory

Status : « Likely » Threatened



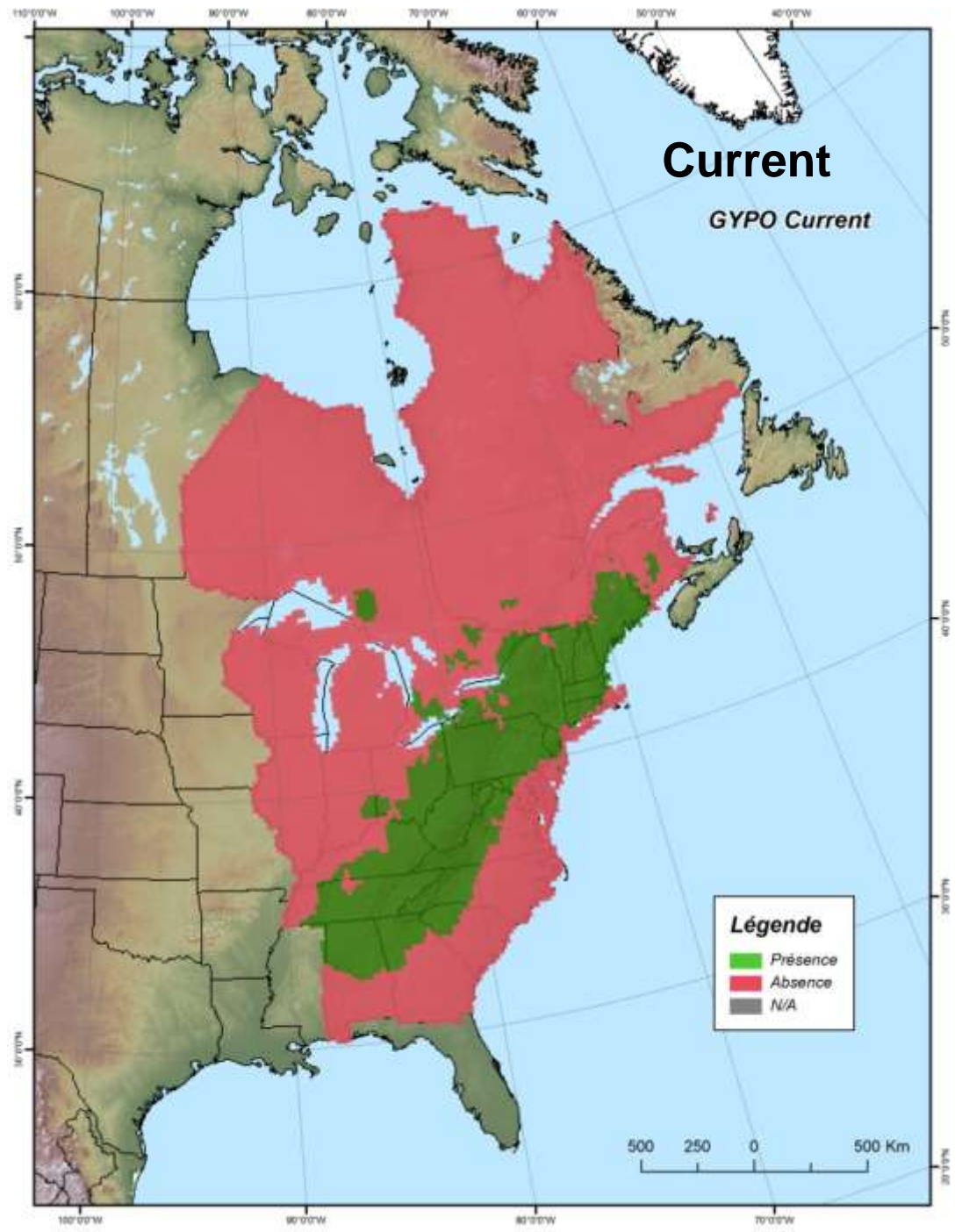
Credit: Catherine Périé
Natural resources Quebec



Gyrinophilus porphyriticus
Spring salamander
Status : Vulnerable



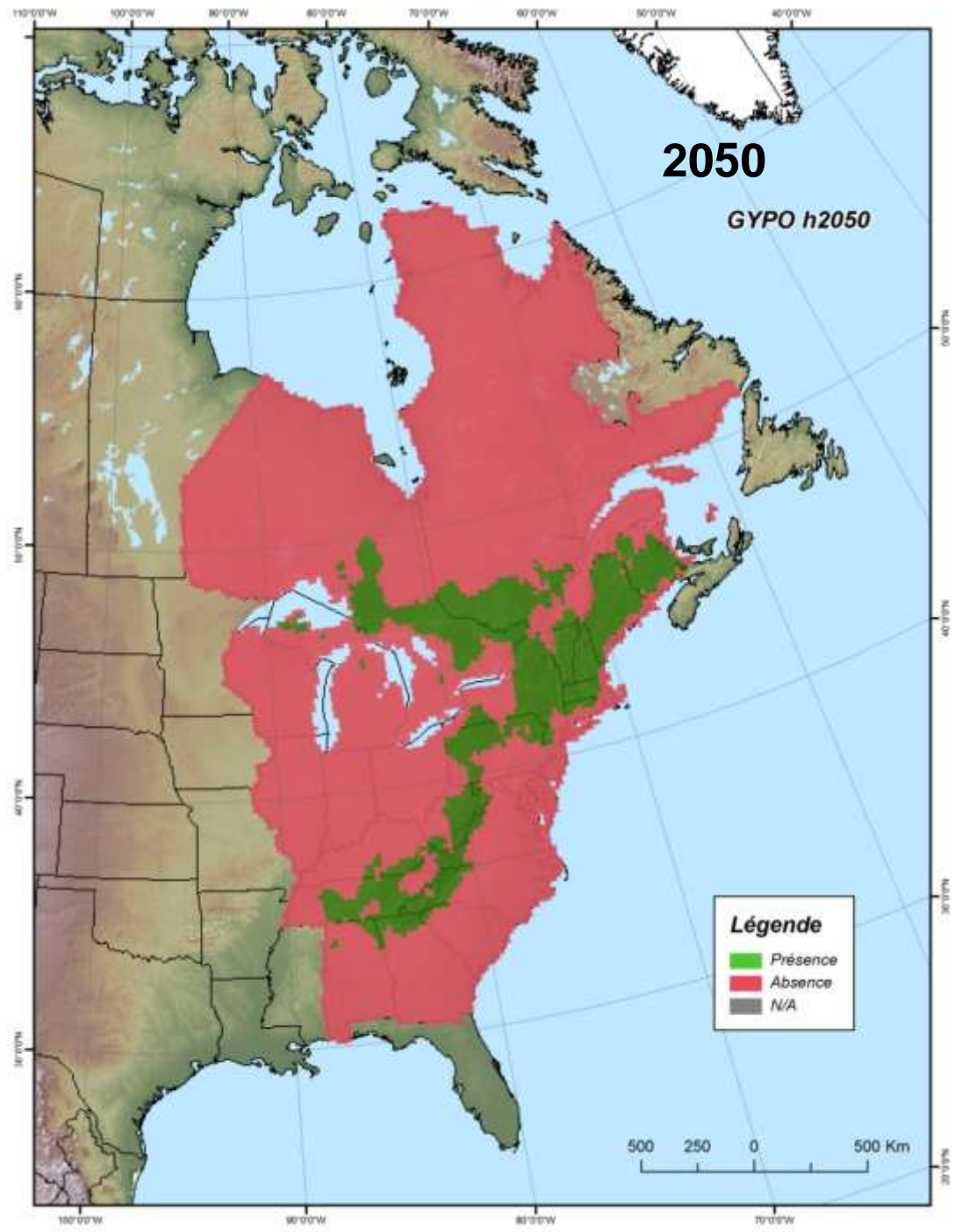
Photo : Jean-François Desroches



Gyrinophilus porphyriticus
Spring salamander
Status : Vulnerable



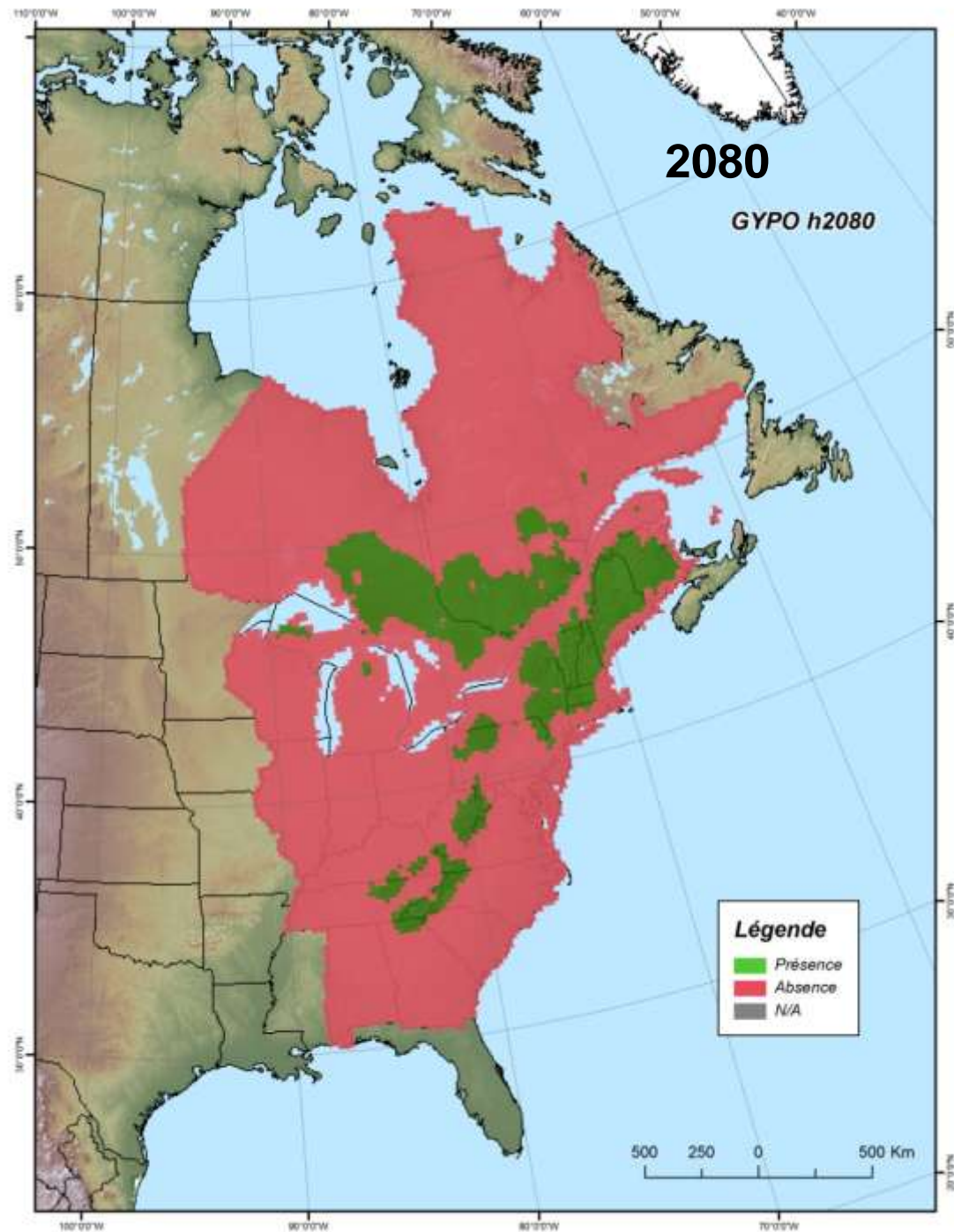
Photo : Jean-François Desroches



Gyrinophilus porphyriticus
Spring salamander
Status : Vulnerable



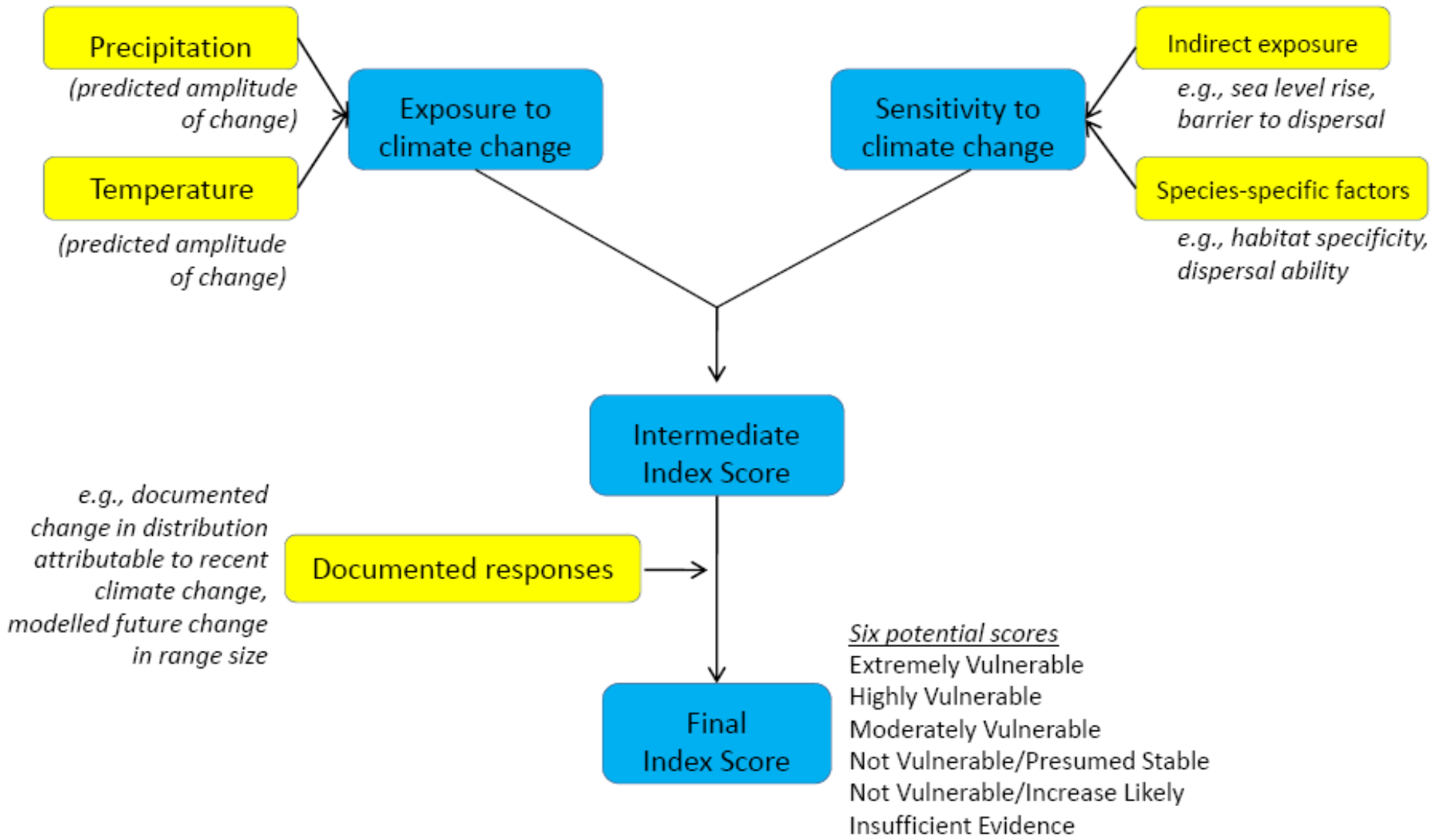
Photo : Jean-François Desroches



Guidelines for Using the NatureServe Climate Change Vulnerability Index



NatureServe CCVI



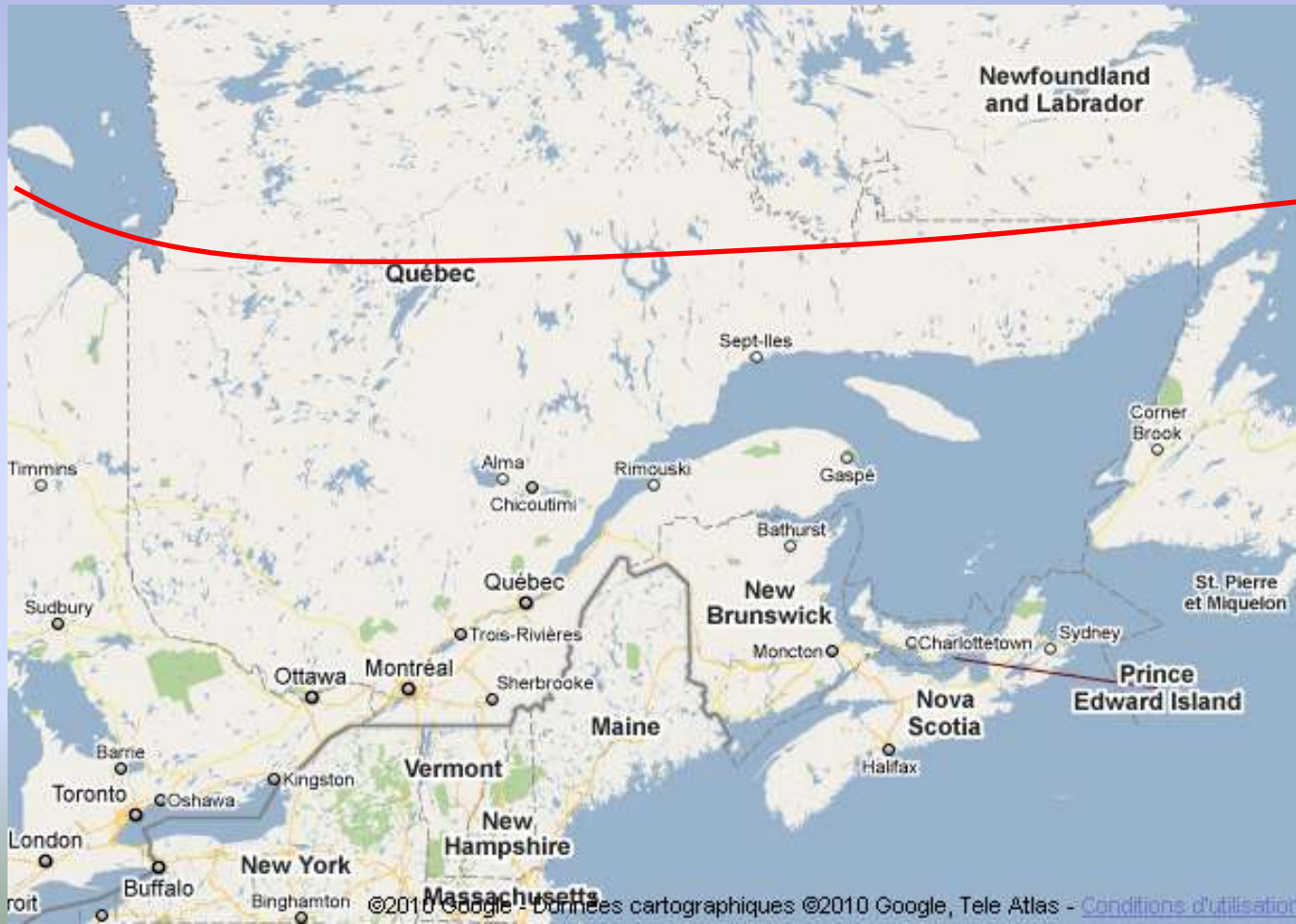
Why using CCVI ?

- 1- Need less data than modeling;**
- 2- Can be used at different scales (from a park to the whole province);**
- 3- Give information about how species will possibly react to CC through different life history traits and strategies;**
- 4- Will provide further information to wildlife and biodiversity managers to face the threat of CC.**

Does the index need to be adapt for Quebec ?

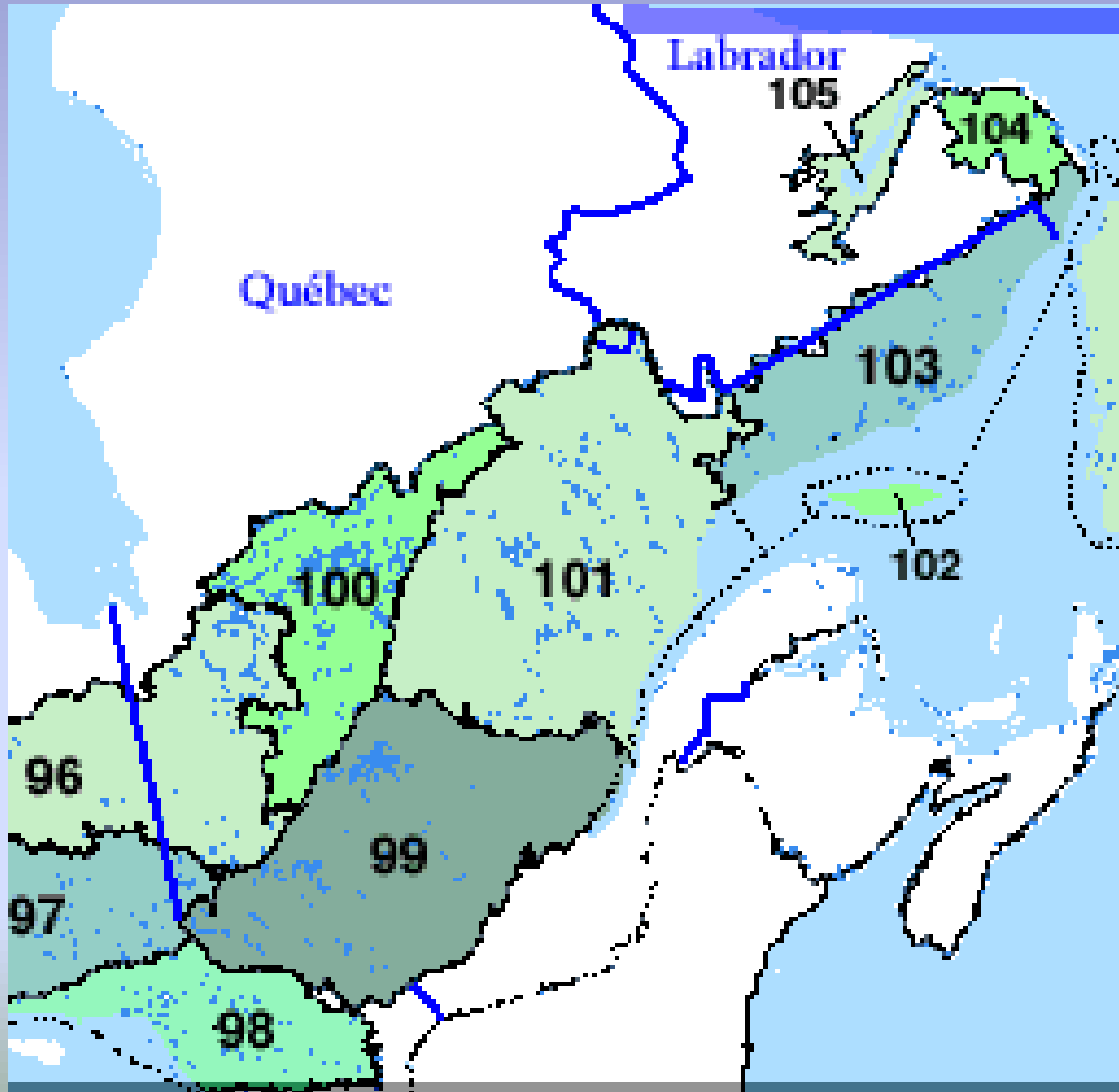
1- The CCVI at different geographic scales.

“The Index works best for assessment areas on the scale from the size of a national park or wildlife refuge to a state. It could be used for a regional analysis in the case of several eastern states, but use for more than one western state may cause complications.”



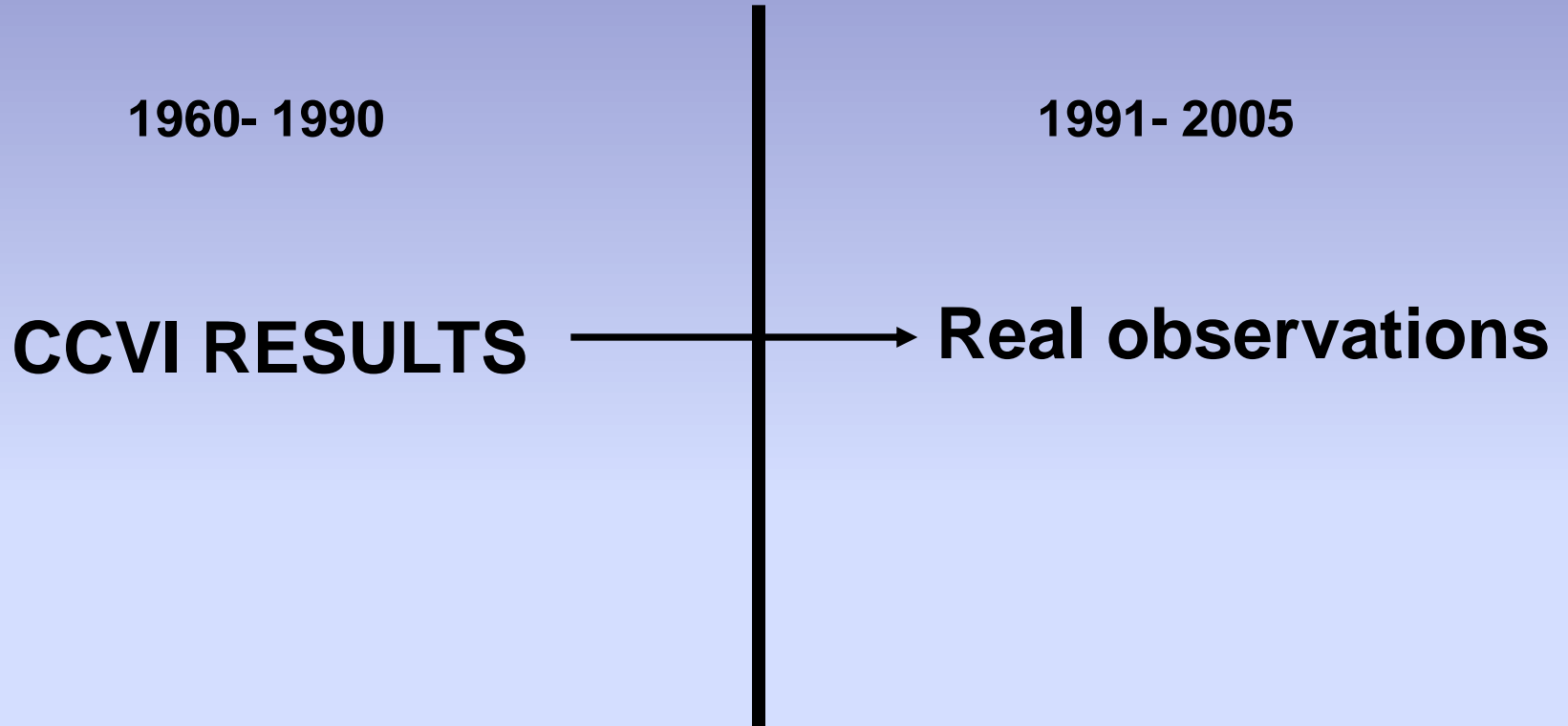
Does the index need to be adapt for Quebec ?

1- The CCVI at different geographic scales.



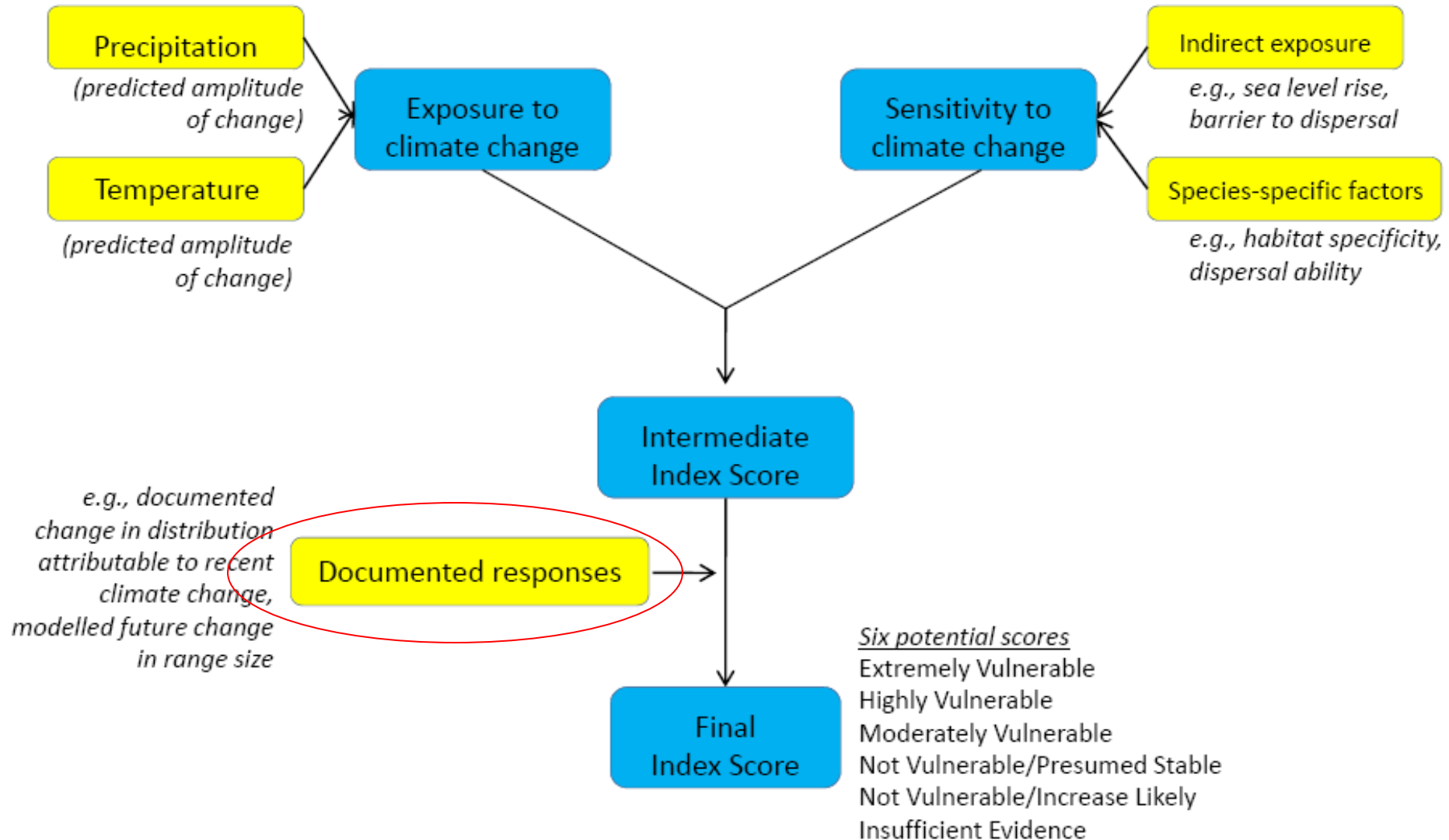
Does the index need to be adapt for Quebec ?

2- Does the Index is calibrated for Quebec?



Does the index need to be adapt for Quebec ?

3- How the implementation of modeling can affect the output of the CCVI?



Thanks

Nicolas Casajus and Catherine Périé (MRNF)

CC-Bio joint venture partners:



Yanick Gendreau, scholarship