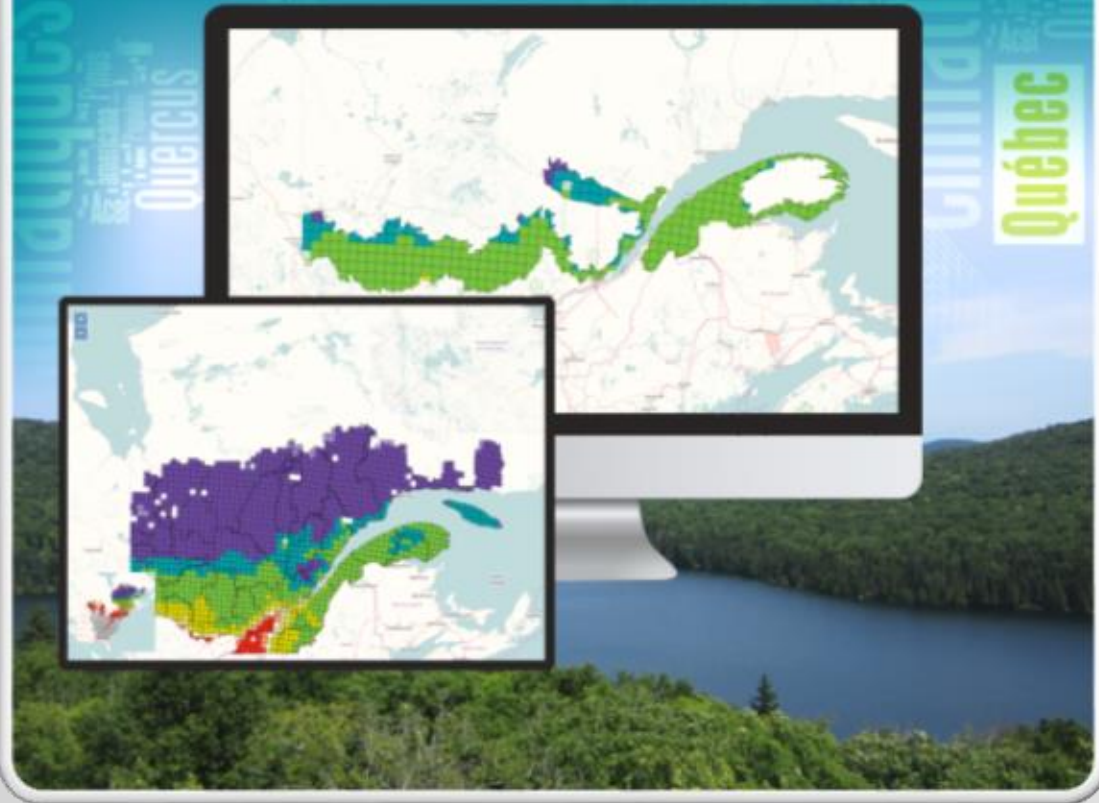


**Atlas interactif :**  
changements climatiques et habitats des arbres



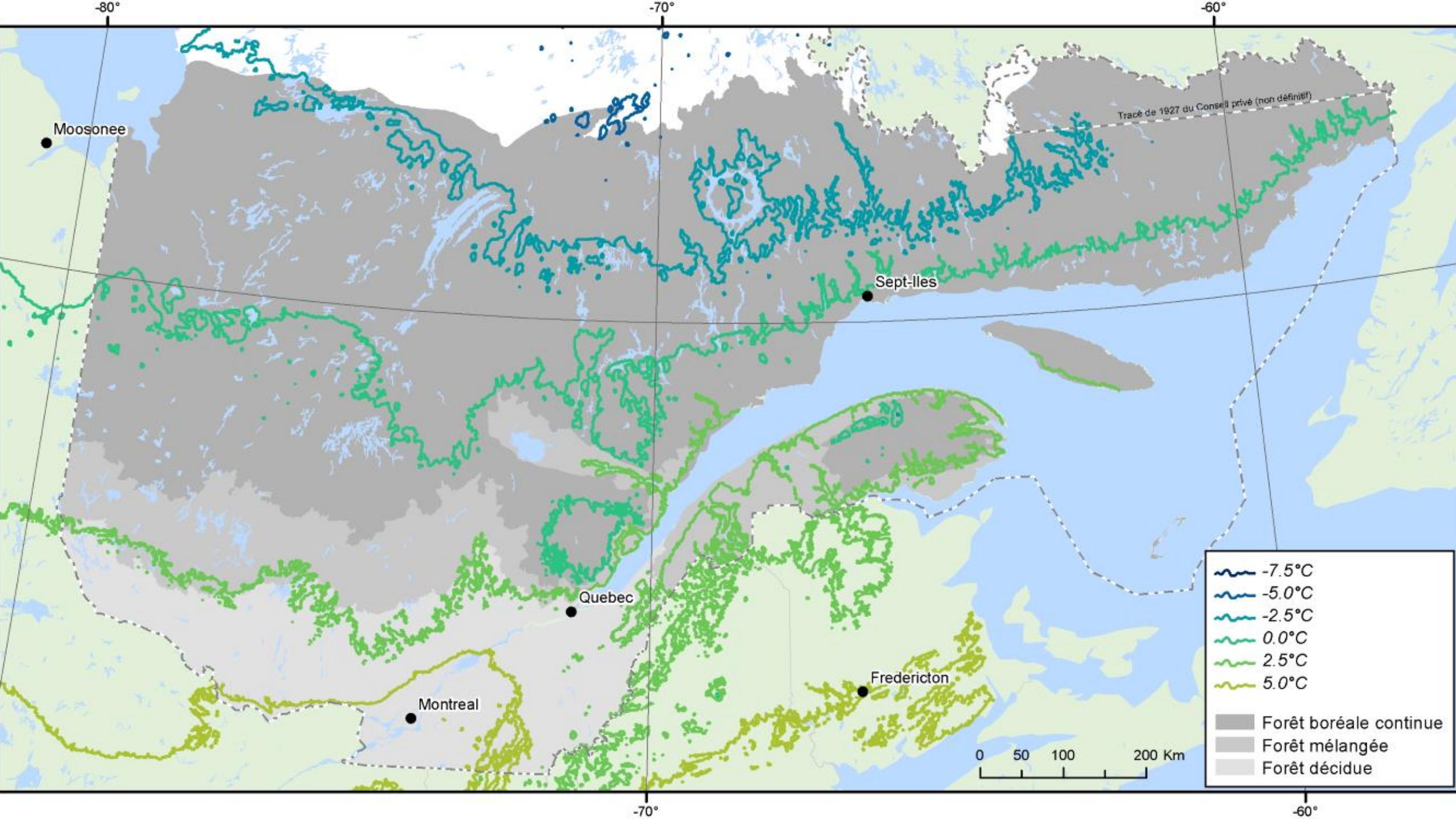
# INTERACTIVE ATLAS: IMPACTS OF CLIMATE CHANGE ON TREE SPECIES DISTRIBUTION IN QUEBEC (CANADA)

# QUEBEC'S END-OF-21<sup>ST</sup>-CENTURY CLIMATE

Estimation of future values (2071–2100) for mean temperature and total precipitations for Quebec's managed forests, compared to the baseline period (1971–2000). Values represent the median. The 10<sup>th</sup> and 90<sup>th</sup> percentiles are presented in brackets (N = 139 climatic scenarios).

Climatic anomaly	Yearly	Period	
		Winter (DJF)	Summer (JJA)
Mean temperature (°C)	+3.7 (+2.3 to +5.1)	+4.9 (+3.0 to +6.9)	+3.2 (+1.8 to +4.7)
Total precipitation (%)	+14.0 (+7.0 to +21.1)	+23.0 (+9.0 to +37.1)	-1.5 (-2.7 to +10.3)

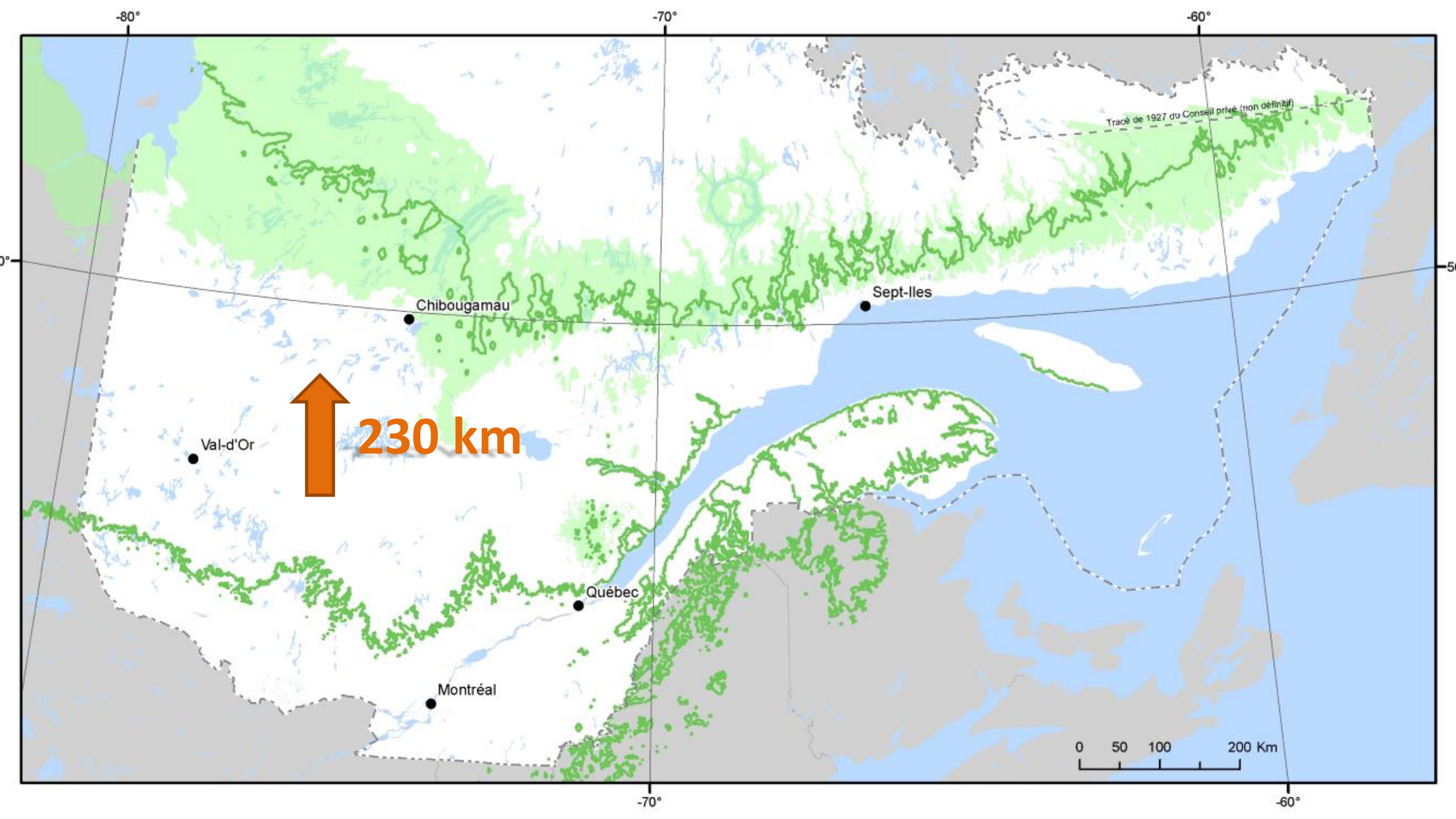
Adapted from Logan *et al.* (2011)











# STUDY AREA

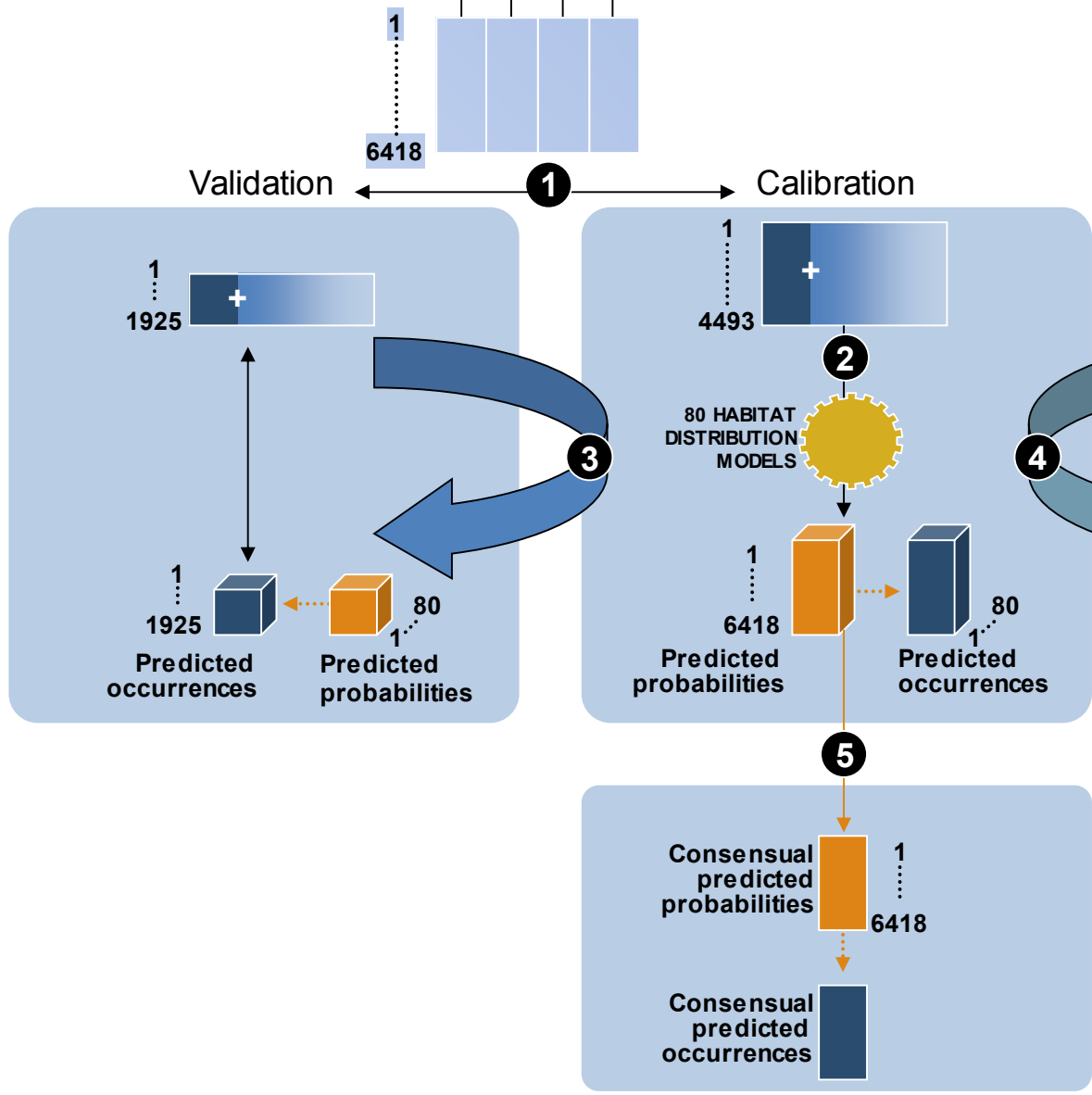


- 2 567 200 km<sup>2</sup>
- 6418 cells (400 km<sup>2</sup> each)
- Boundaries determined by:
  - Forest mapping
  - +12.5 °C isotherm;
  - Data availability:
    - MFFP
    - USDA : Climate change atlas

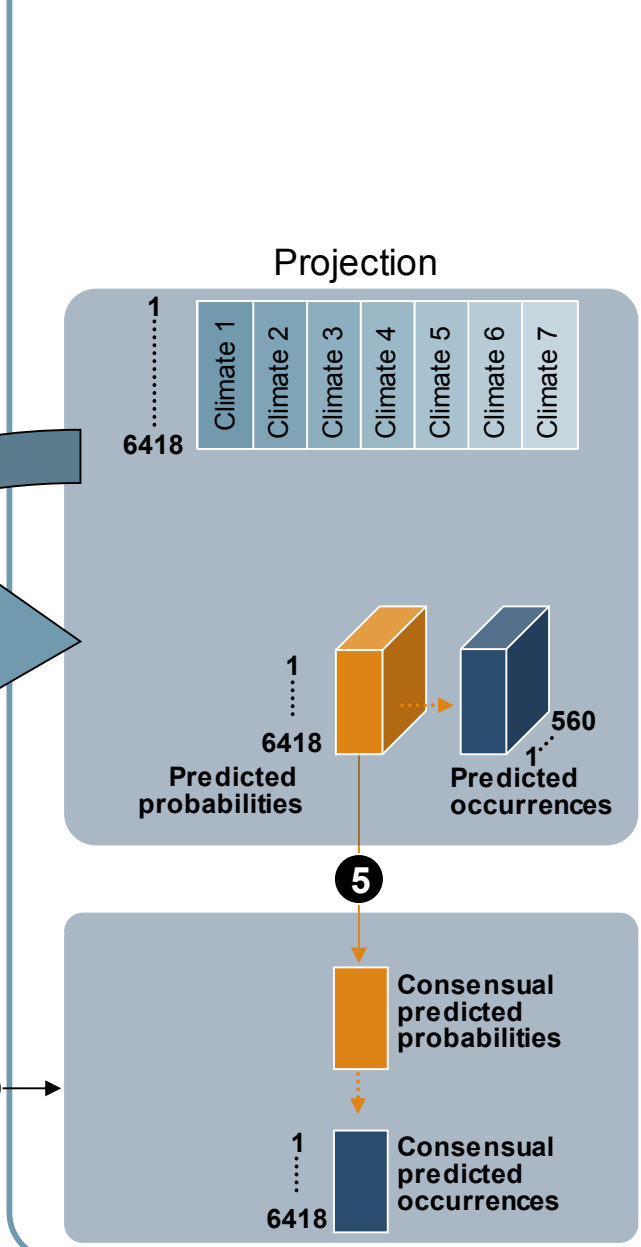


# 1960–1990 PERIOD


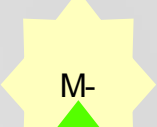

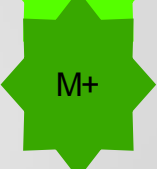

Observed occurrences      Environmental characteristics



# YEAR 2050 or 2090



# FORECASTED CHANGES IN SPECIES HABITAT

Habitat	Baseline period (1961–1990)	Future (2050 or 2080)
loss	 P suitable	unsuitable
continuation	 M- suitable	less suitable
	 M suitable	suitable
	 M+ suitable	more suitable
gain	 G unsuitable	suitable

# FORECASTED CHANGES IN SPECIES HABITAT

Habitat	Baseline period (1961–1990)	Future (2050 or 2080)	
loss	P	suitable	unsuitable
	M-	suitable	less suitable
continuation	M	suitable	suitable
	M+	suitable	more suitable
gain	G	unsuitable	suitable

**risk**

**Opportunity**

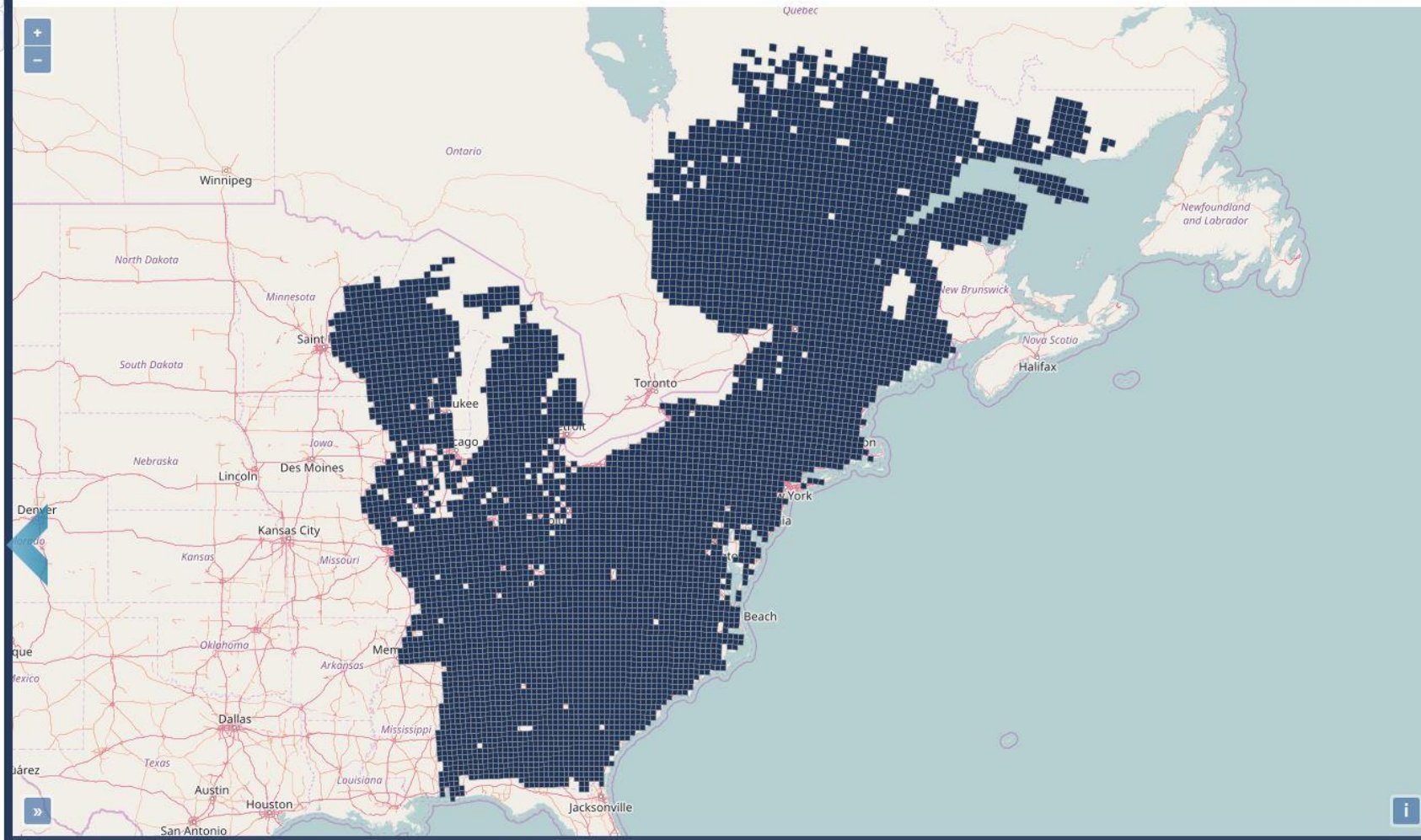
# INTERACTIVE ATLAS

+ Une espèce, une thématique

+ Deux espèces, une thématique

+ Une espèce, deux thématiques

### Carte de visualisation des espèces



- Une espèce, une thématique

Afficher les informations supplémentaires

Sélectionner un territoire

▸ Écorégions (NE Am. Nord)

▸ Cadre bioclimatique (Québec)

▸ Unités de gestion (Québec)

Balsam fir

Nom

Scientifique

Français

Anglais

Devenir modélisé de l'habitat en 2080

+ Deux espèces, une thématique

+ Une espèce, deux thématiques

Attributs

Faible

Niveaux de confiance

Moyen

Élevé

Absence d'habitat

Perte d'habitat

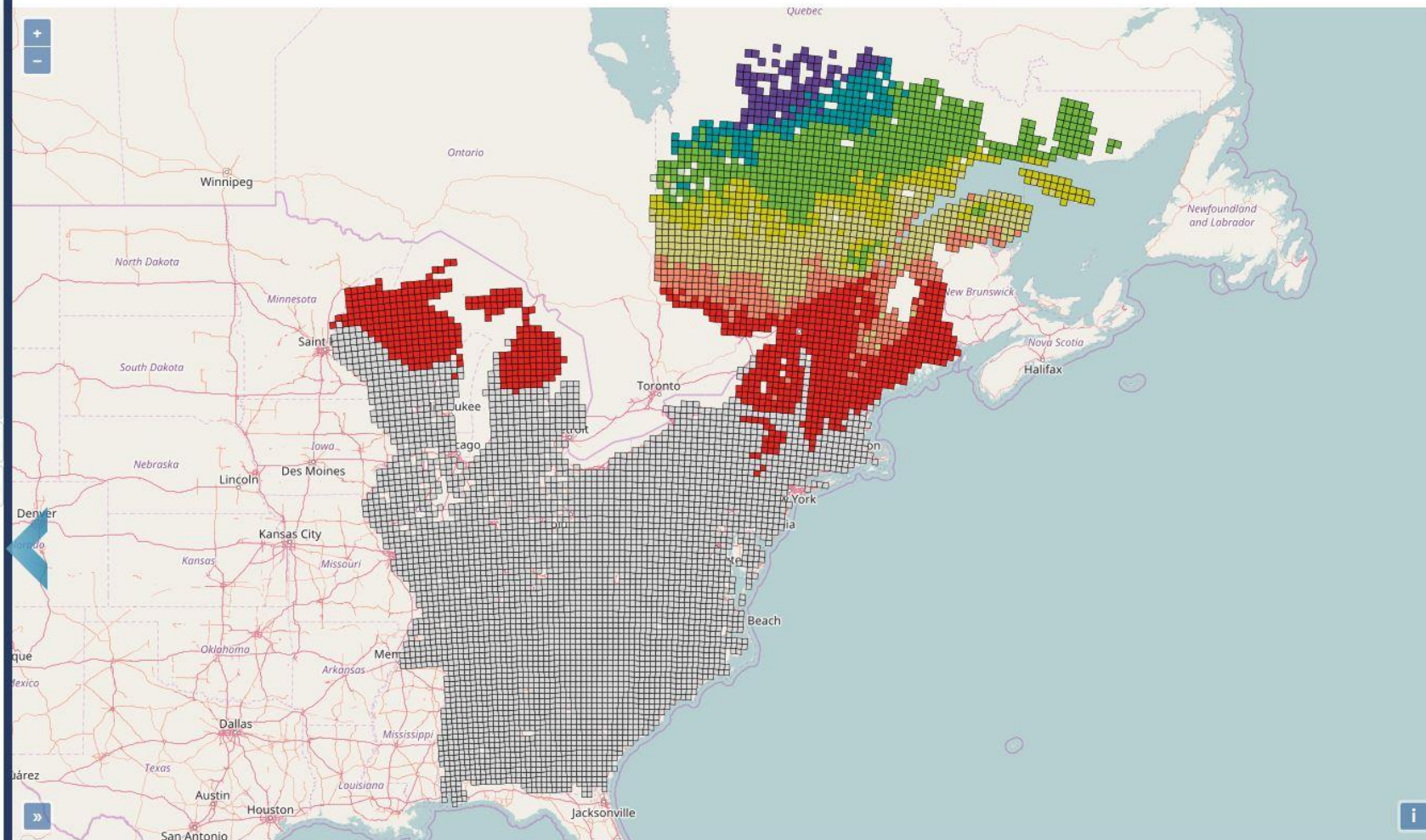
Habitat moins favorable

Habitat aussi favorable

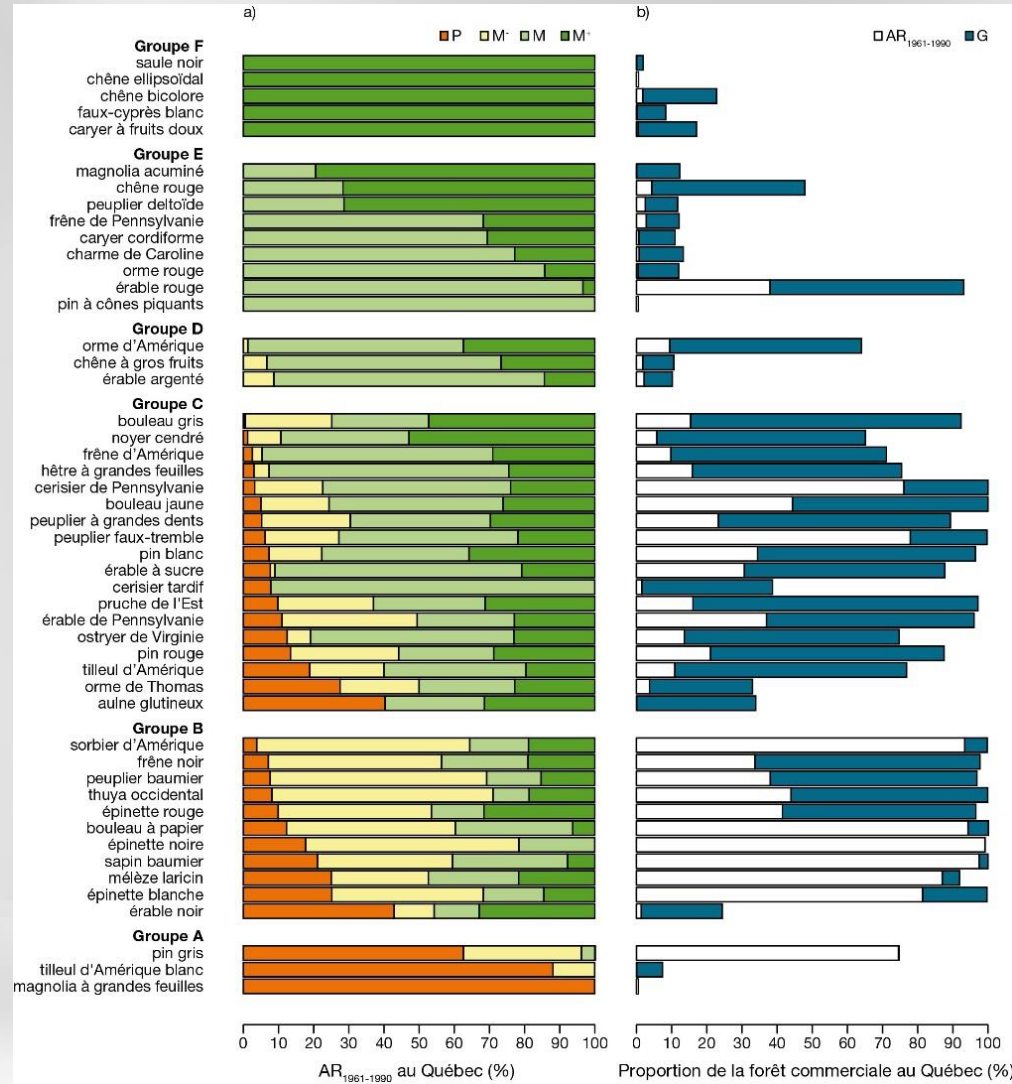
Habitat plus favorable

Nouvel habitat

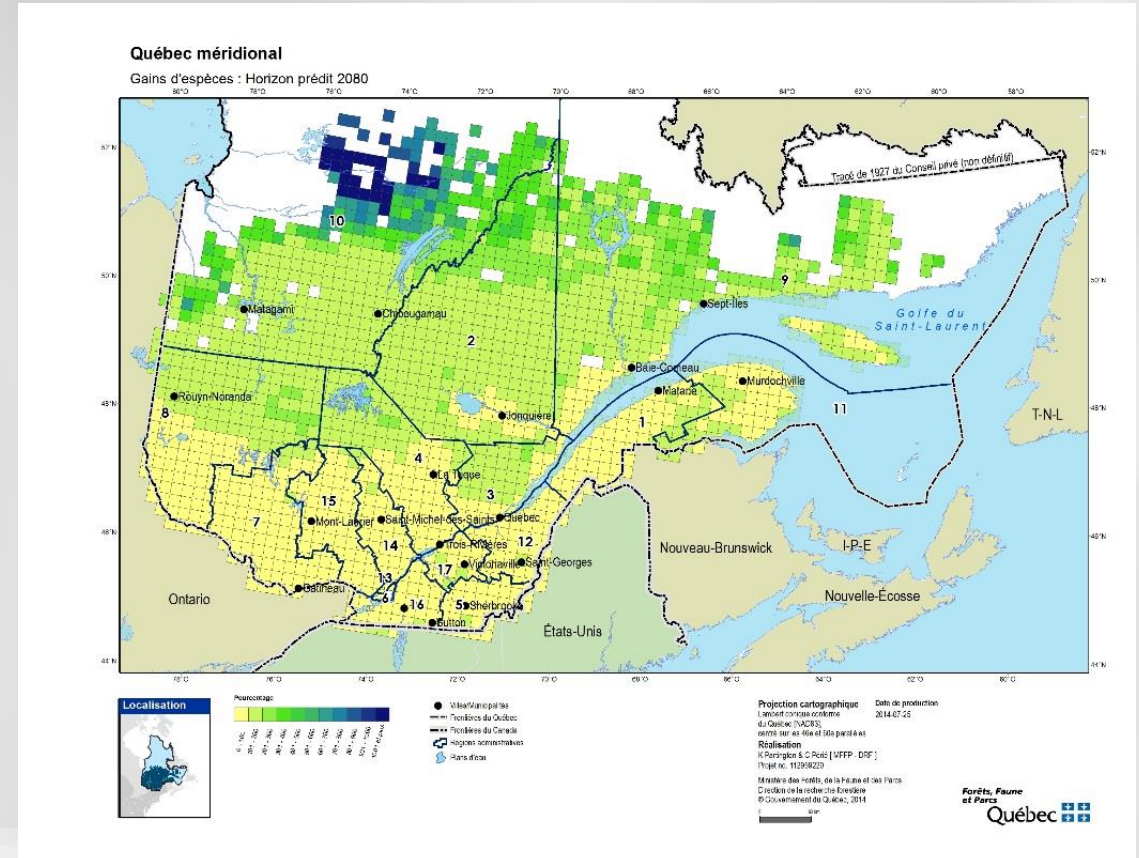
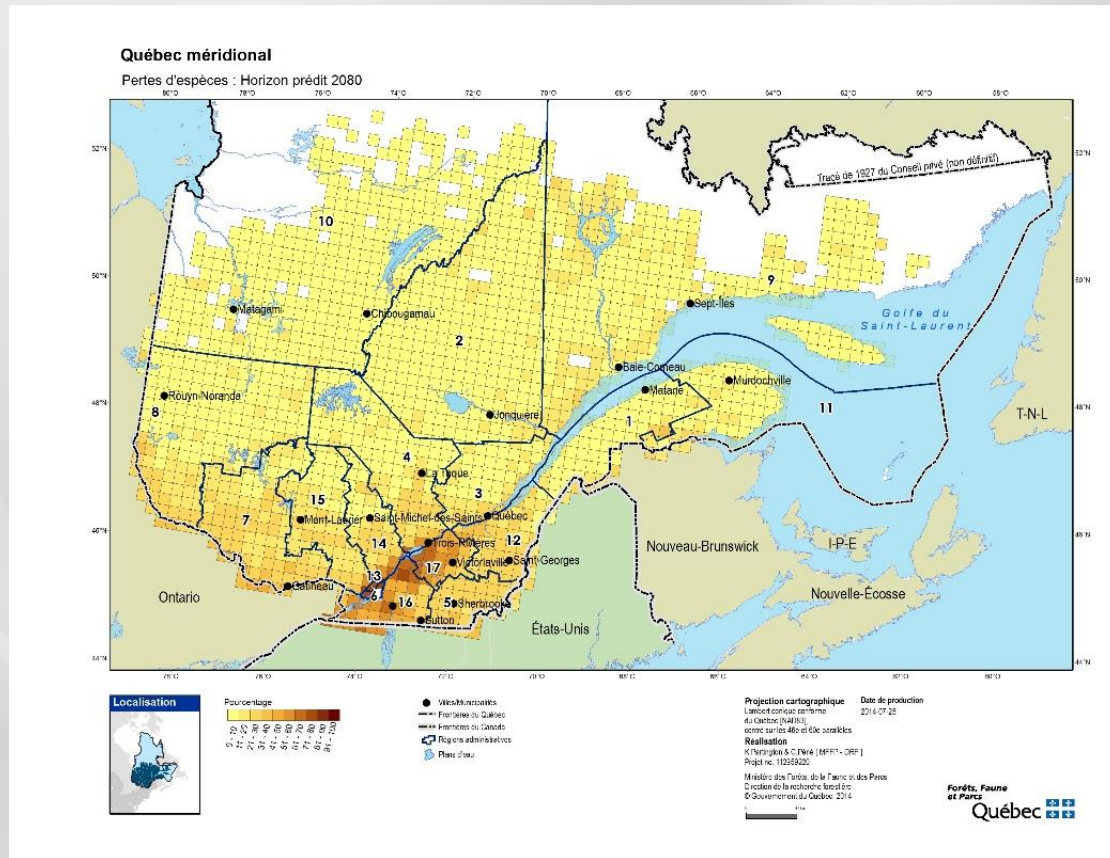
## Balsam fir Devenir modélisé de l'habitat en 2080



# SPECIES VULNERABILITY

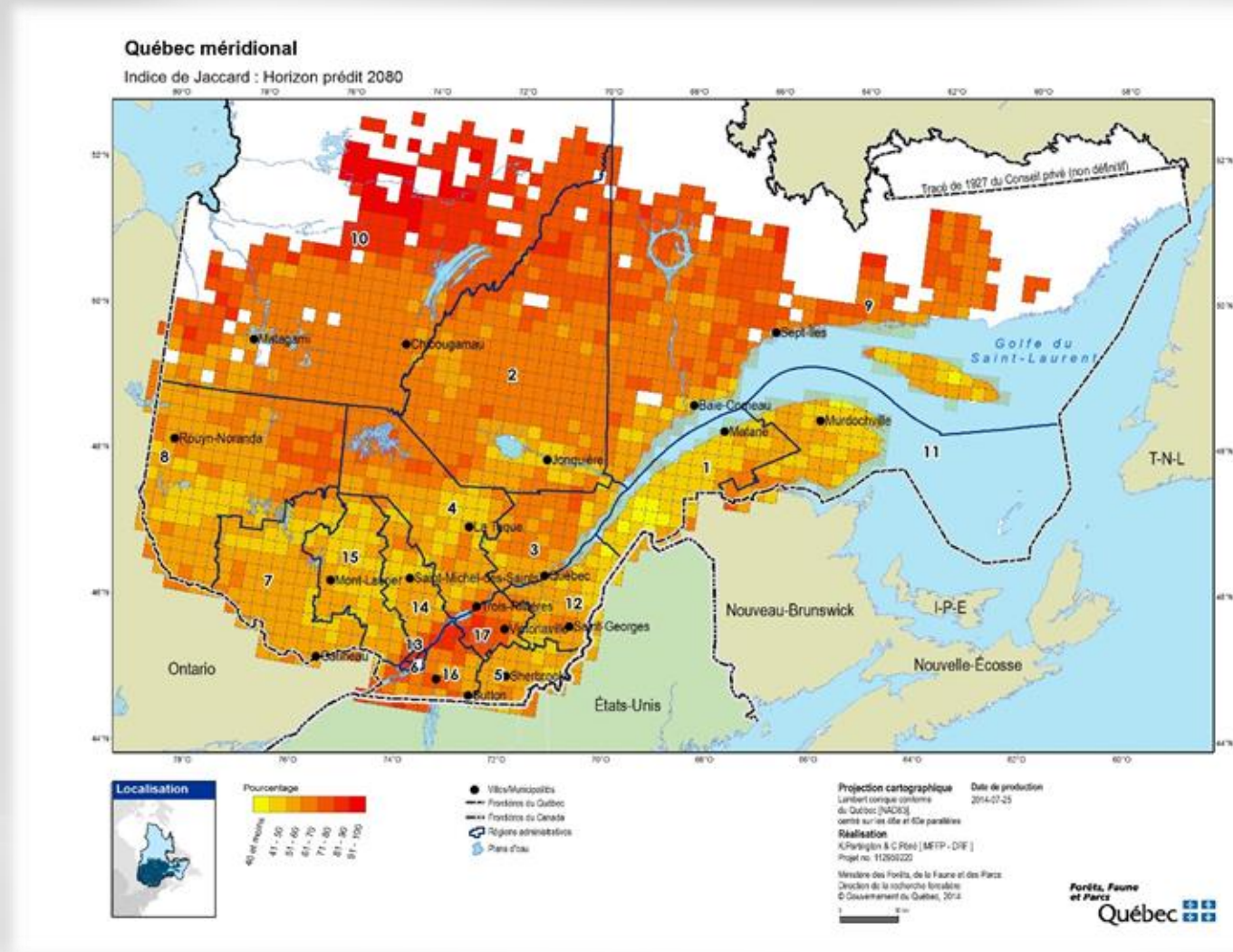


# A WIND OF CHANGES...



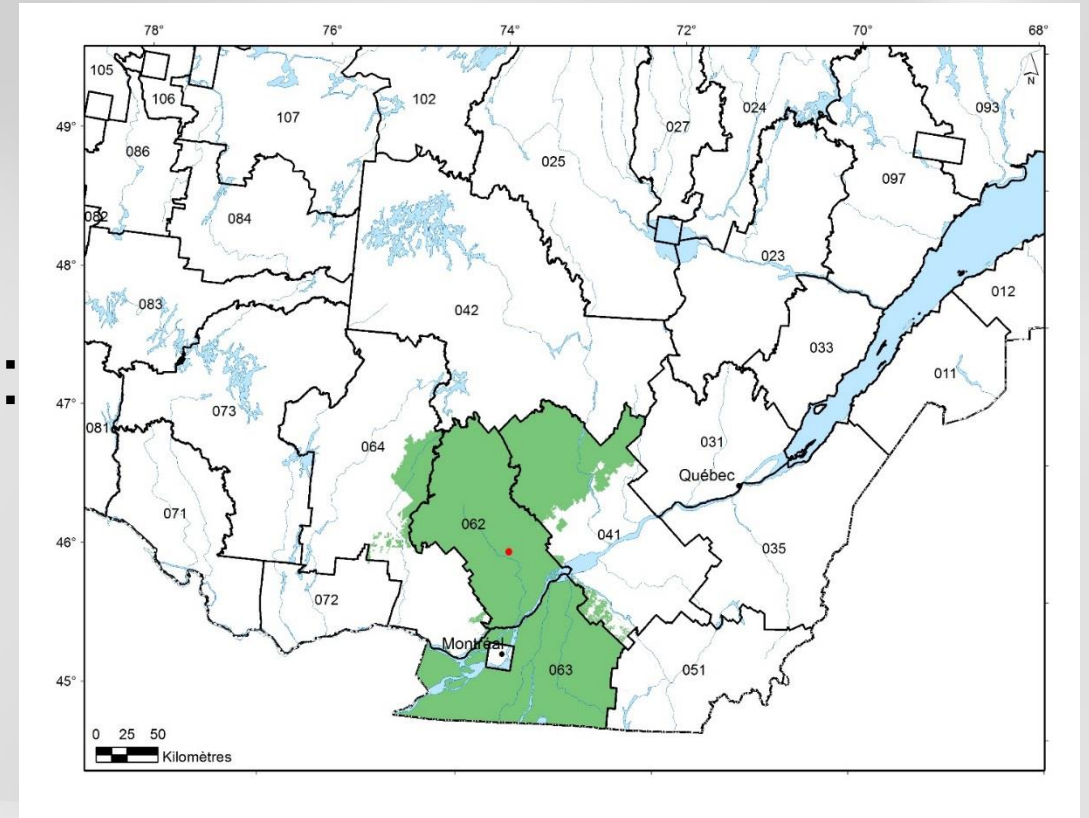


# A WIND OF CHANGES...



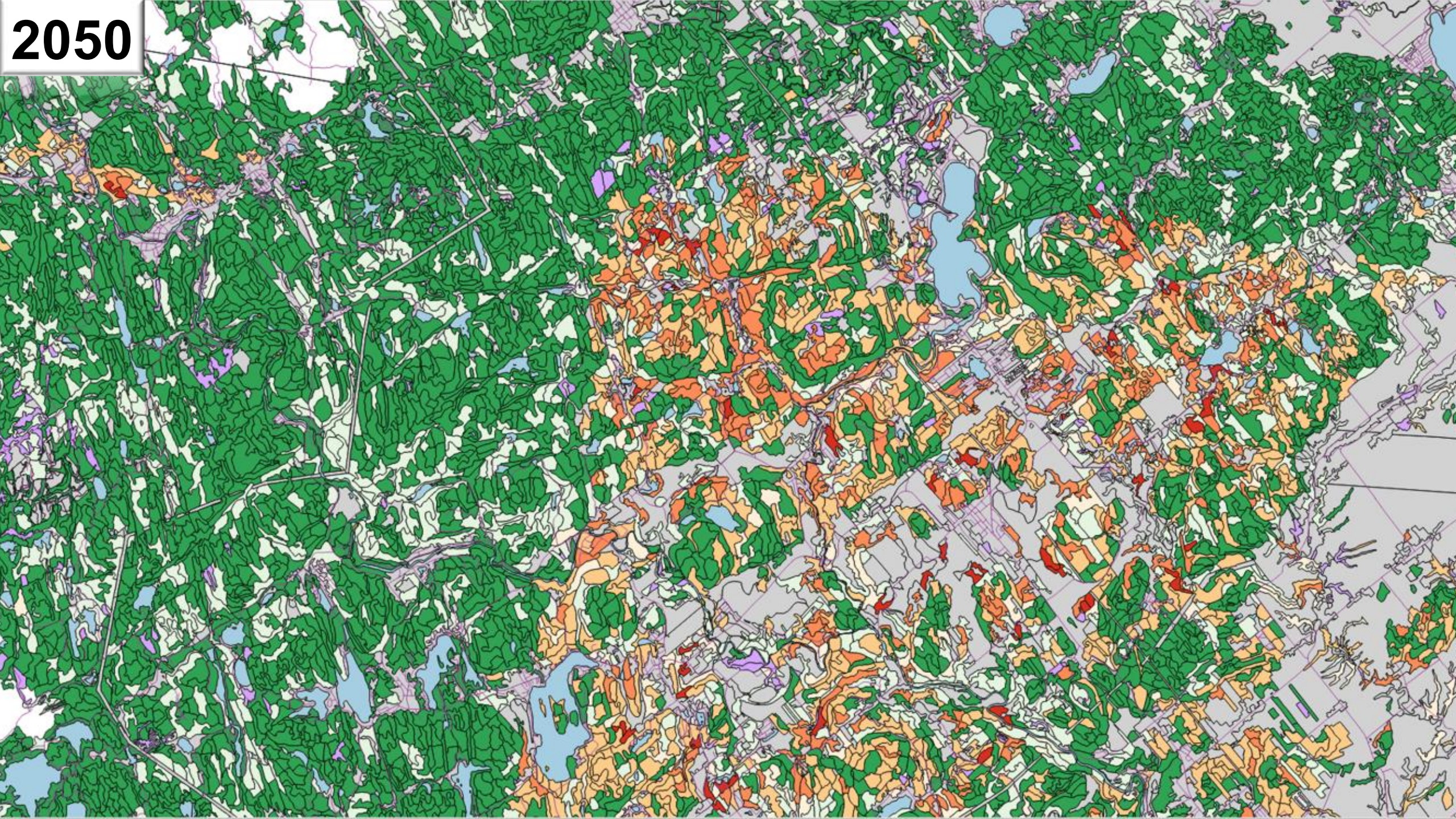
# STAND VULNERABILITY TO CC

- Forecasted changes in species habitat (Interactive atlas)
- 4<sup>th</sup> decennial survey of permanent and temporary plots:
  - Species and basal area (%)

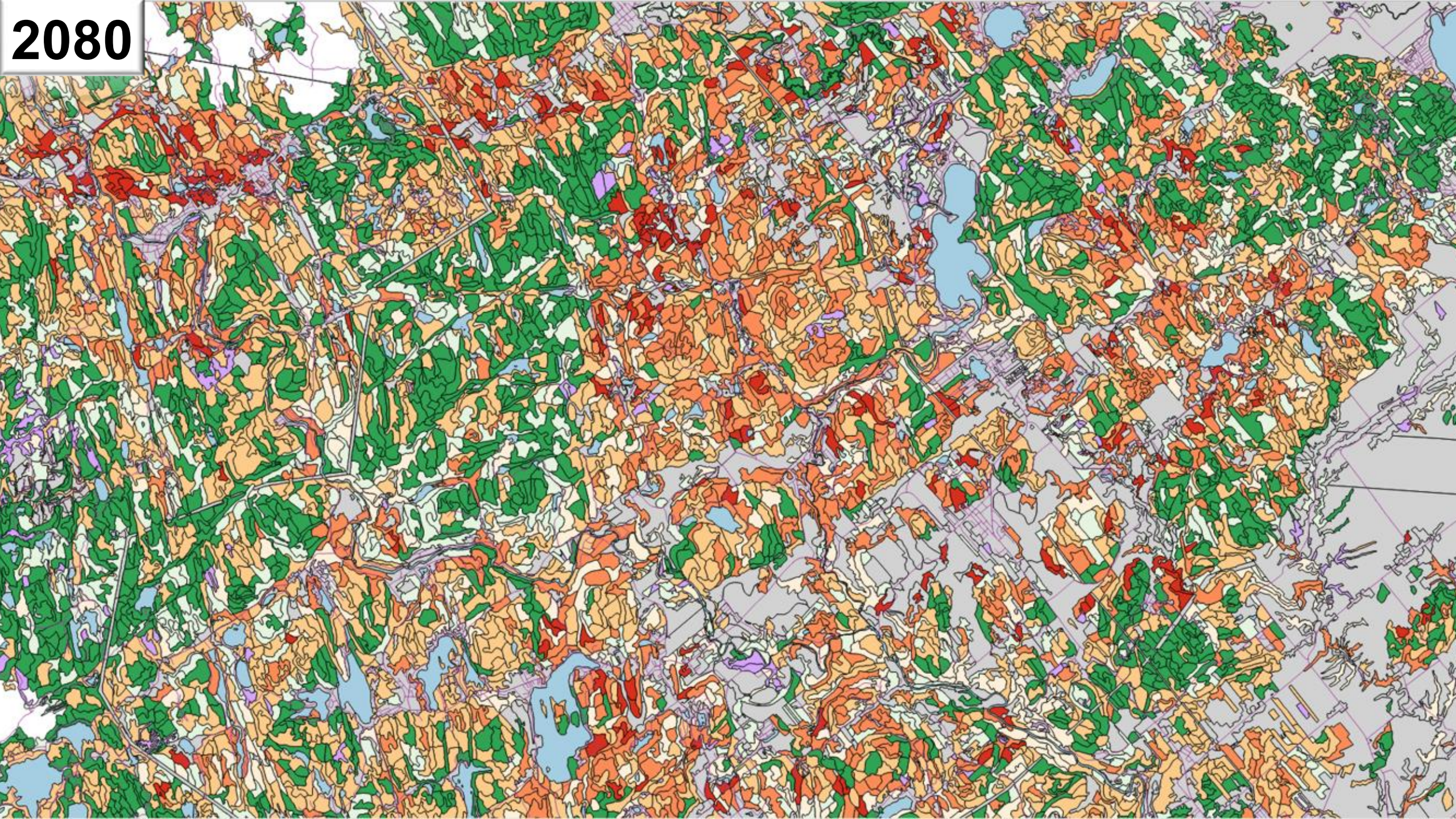


# STAND VULNERABILITY TO CC

Non-forest land	
Regeneration	
Proportion of stand basal area for which the effects of CC on habitat maintenance are known	Risk that the habitat will be less suitable for some stand species
0% – 60 %	no
	yes
60% -100 %	no
	yes – in which proportion?
	10% – 40% basal area
	41% – 70% basal area
	71% – 100% basal area



**2050**






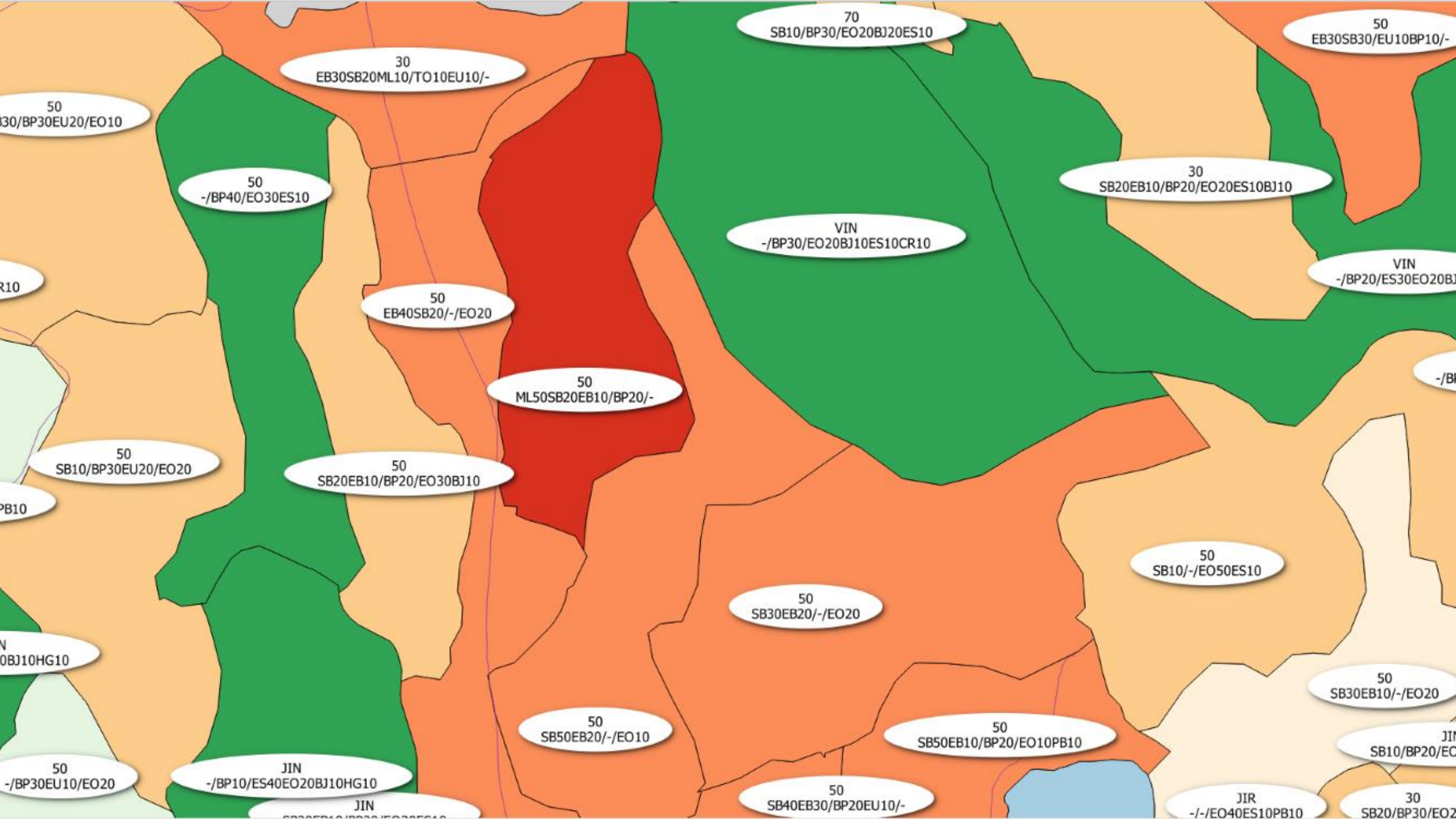
2080

# STAND VULNERABILITY TO CC

Zoom : scale 1: 3000

**Less suitable / Continuation / More suitable**

ML50SB20EB10	/ BP20	/ -	
-	/ BP20	/ EO60ES10	
EB10SB10	/ BP20	/ EO20	



# AND TOMORROW...

- Assisted migration
- Silviculture adapted to the context of climate change
- Climate change adaptation strategies for the forest sector
- Strategies for conservation of genetic resources



SOME QUESTIONS?

