

Transformation des forêts au XX^e siècle dans la sapinière à bouleau jaune de l'Est

Avec exemples des bassins versants des
rivières Rimouski et Mitis

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Université du Québec à Rimouski

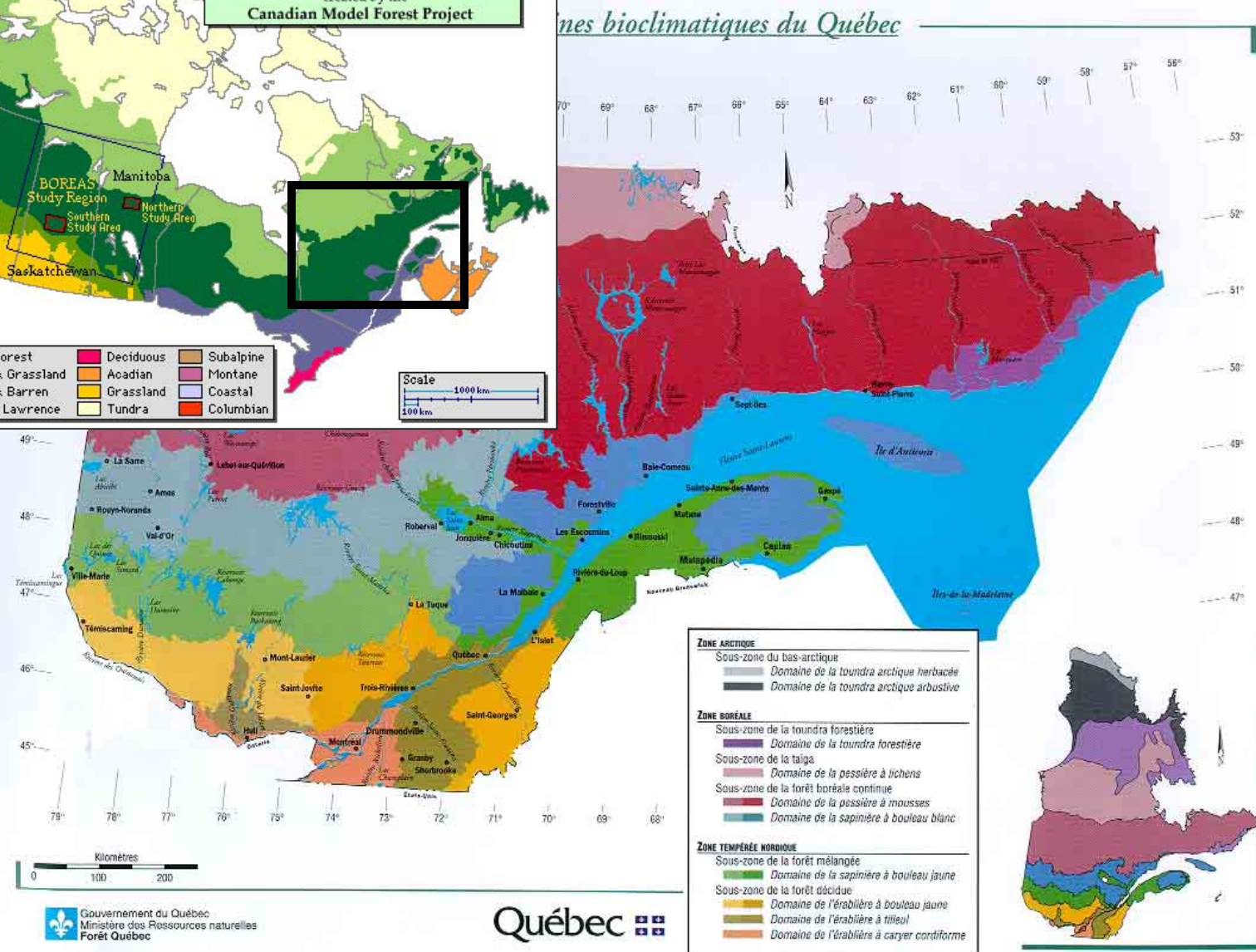
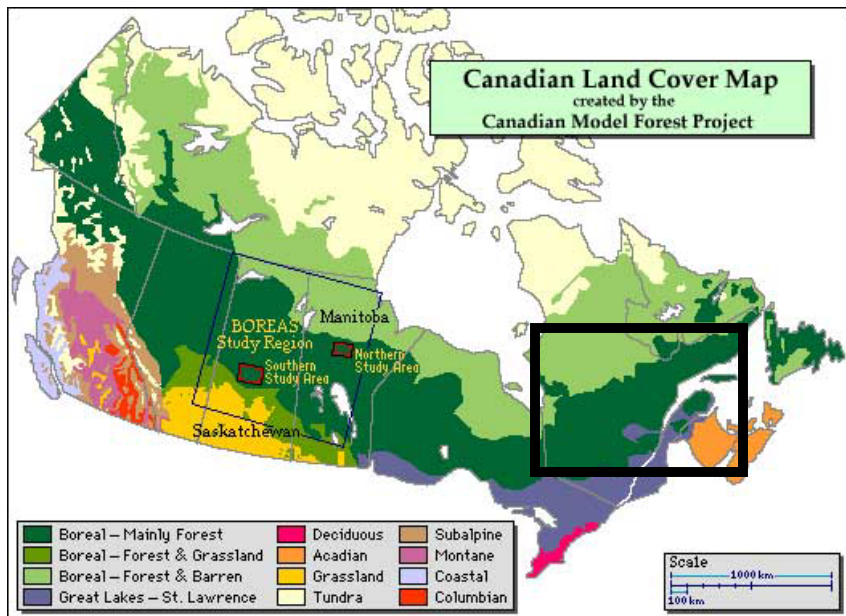
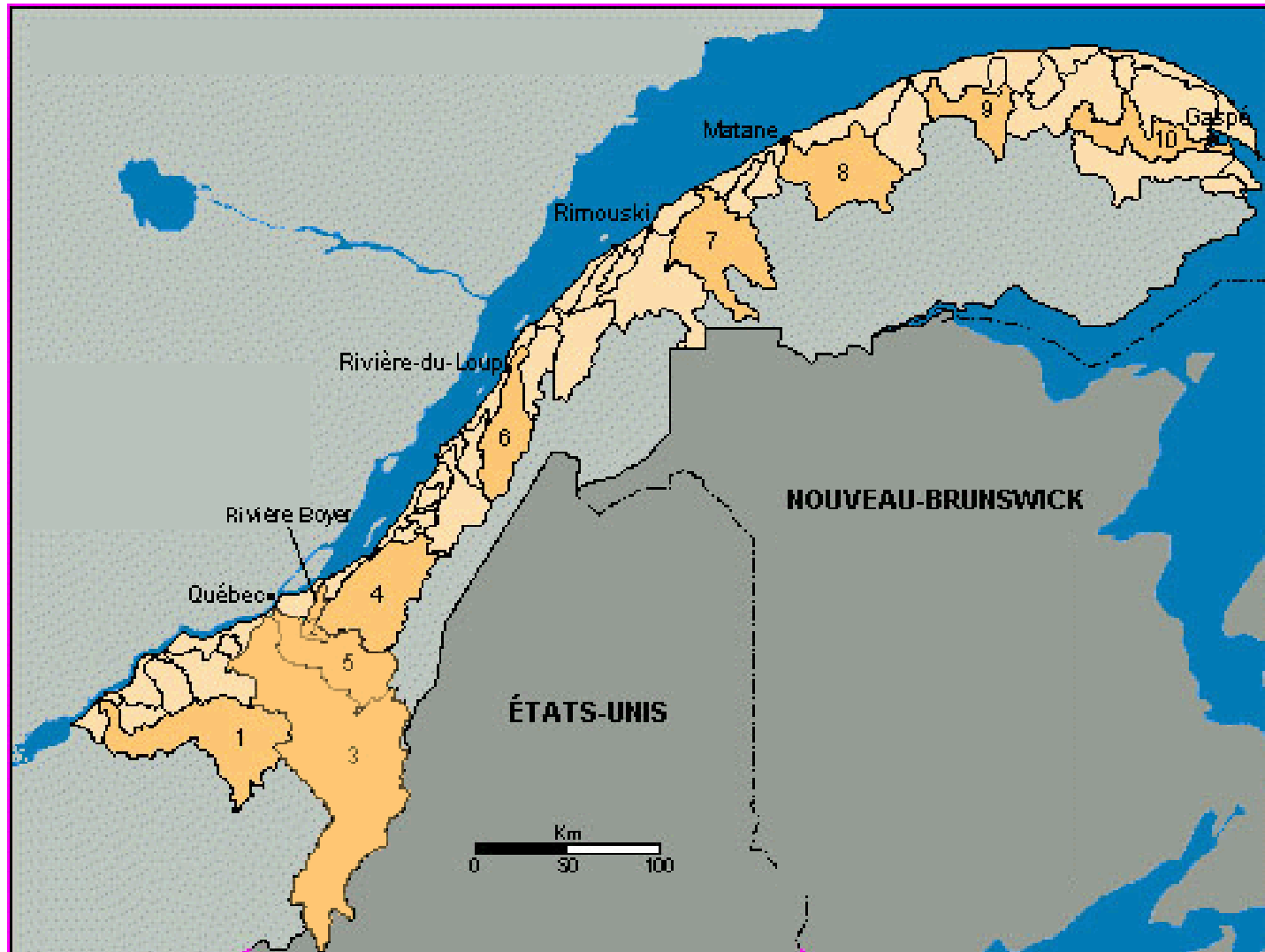
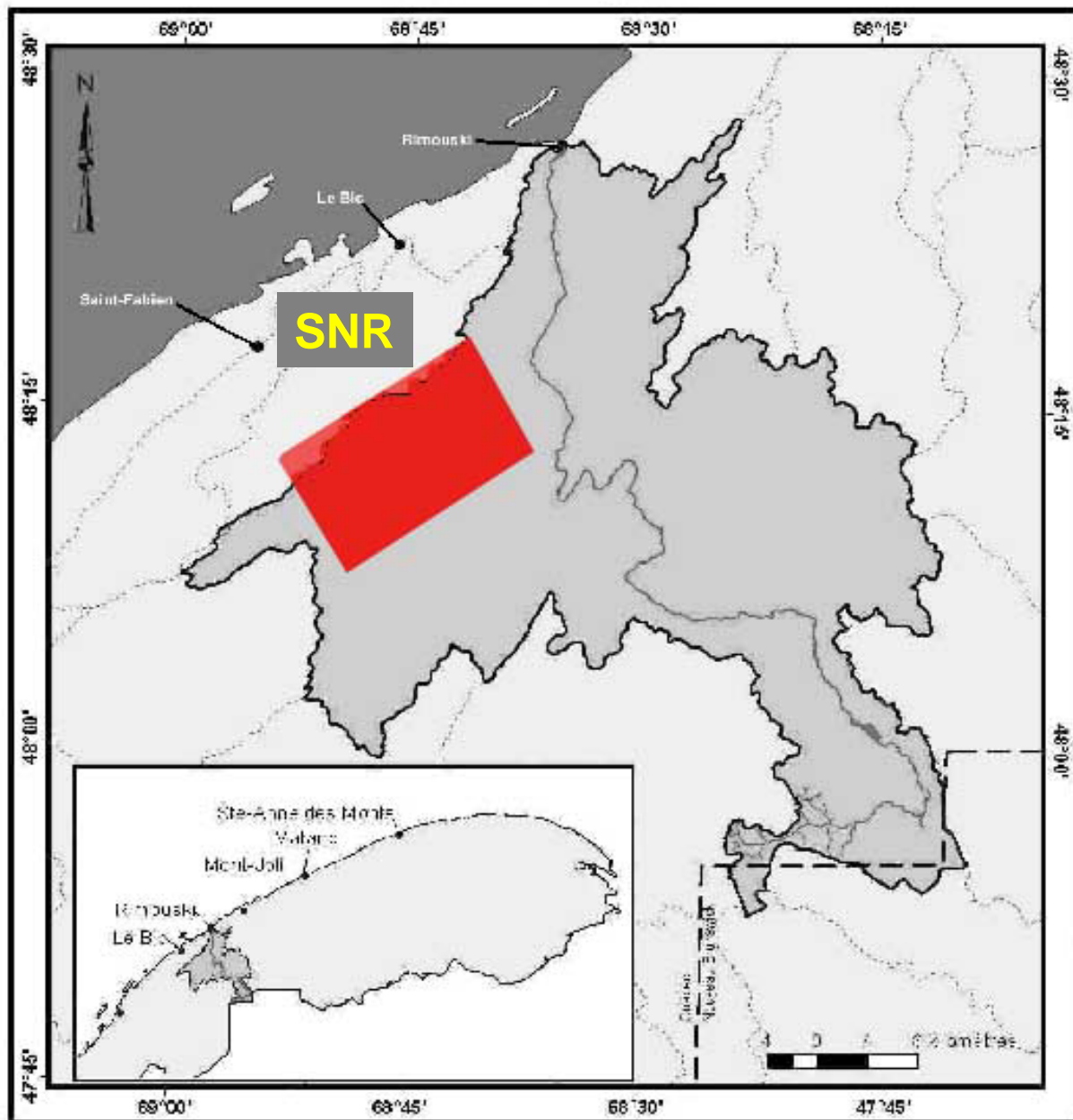
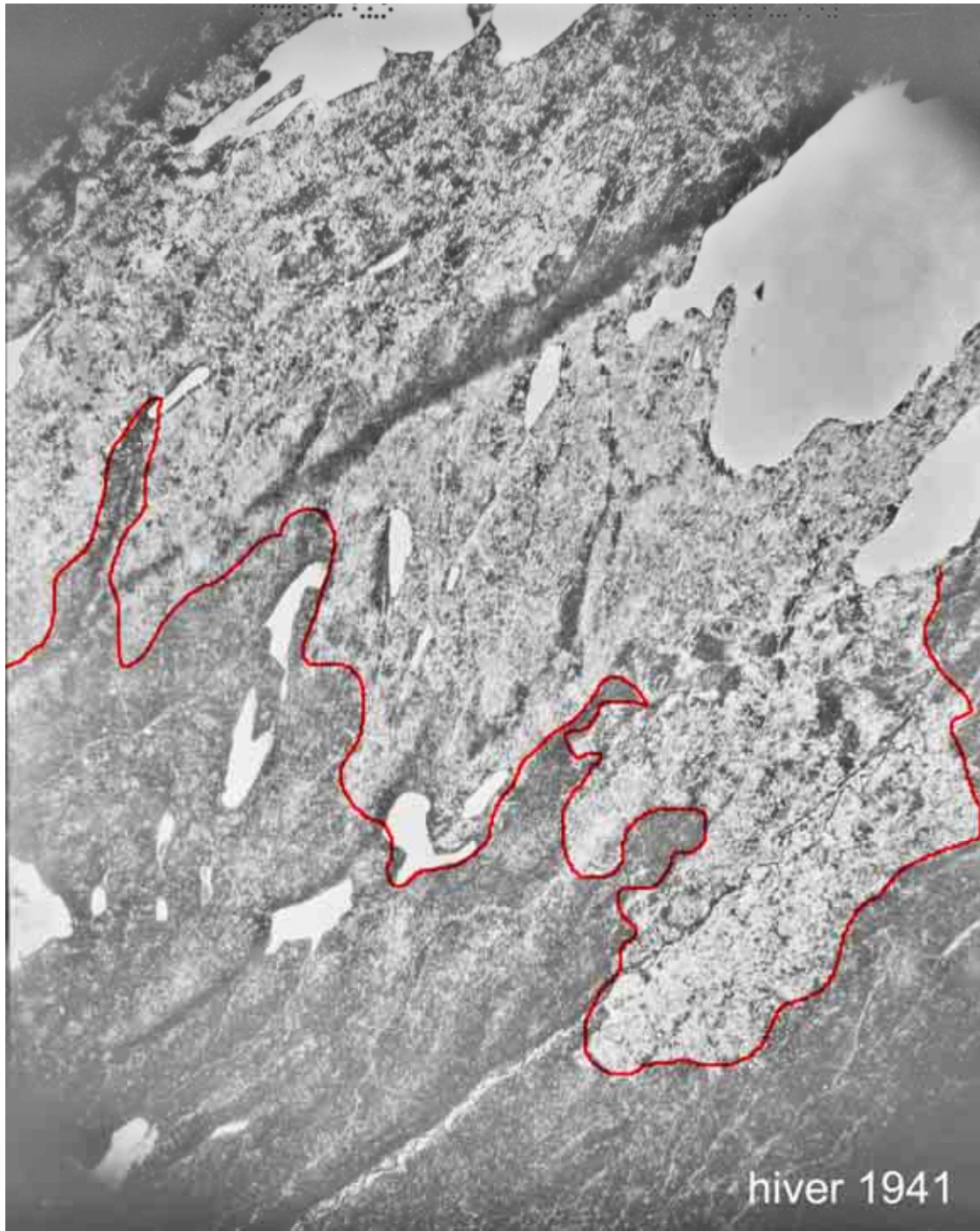


Fig. 1 Localisation du domaine bioclimatique , Sapinière à bouleau jaune, Québec.

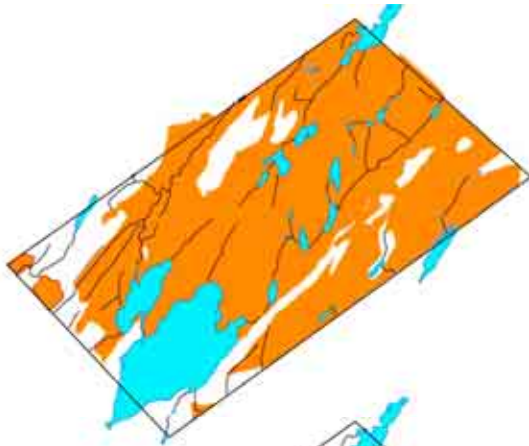




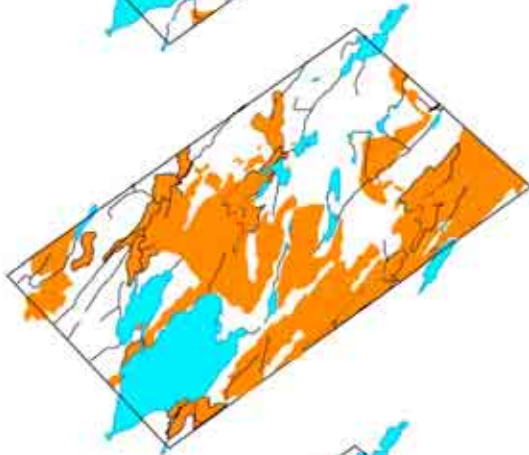


hiver 1941

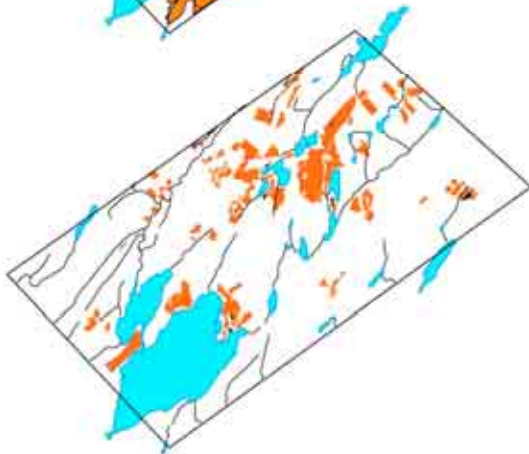
I
1936-1948



II
1974-1985

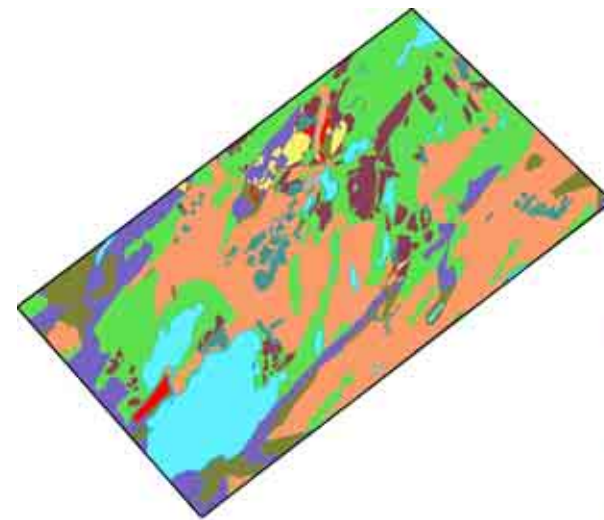


III
1991-2000



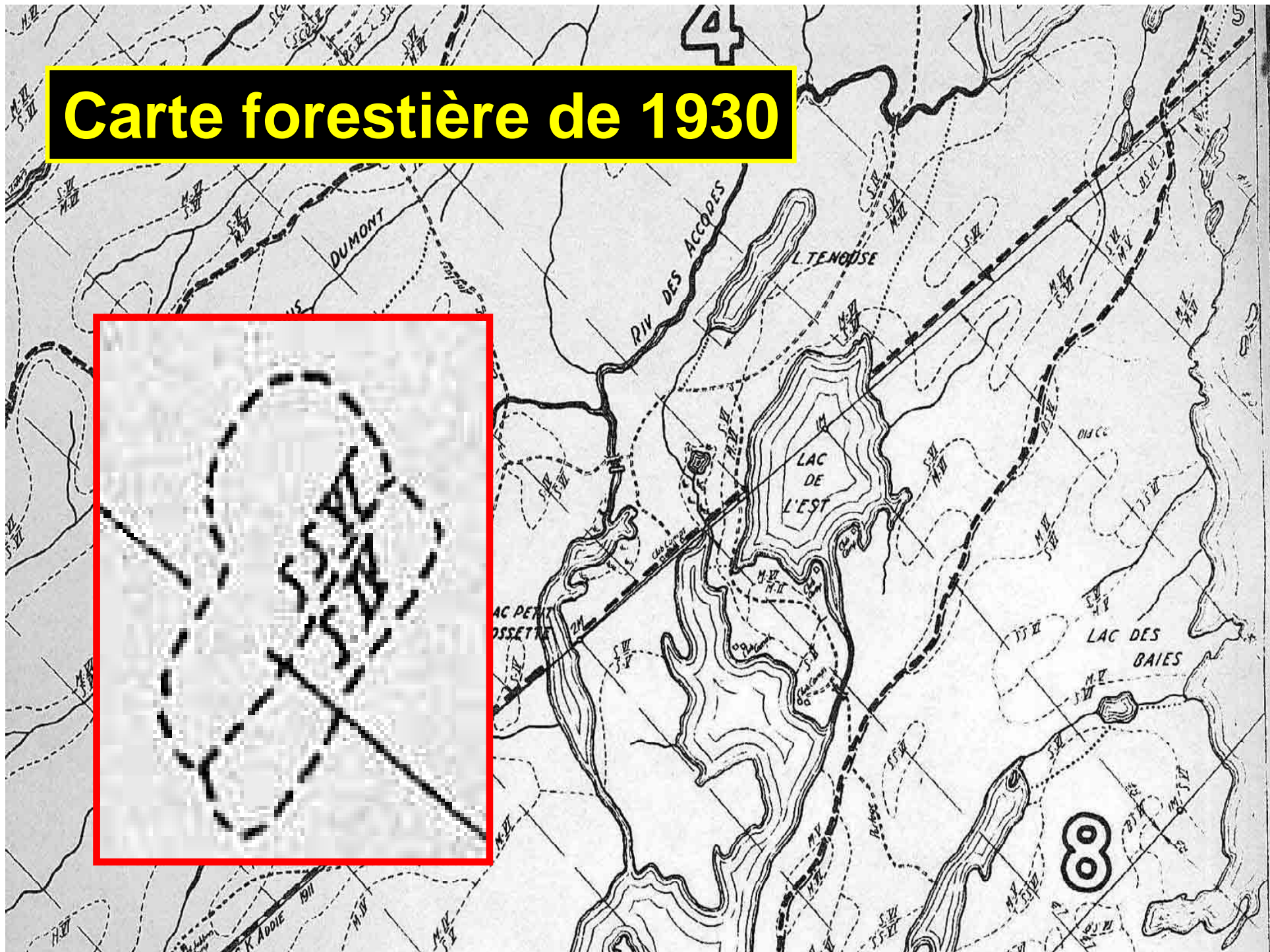
0 3 280 m

Nbre de coupes	% du territoire
0	2.8
1	55.9
2	36.9
3	4.3



- Aucune coupe
- I
- I et II
- I, II et III
- I et III
- II
- II et III
- III
- EAU

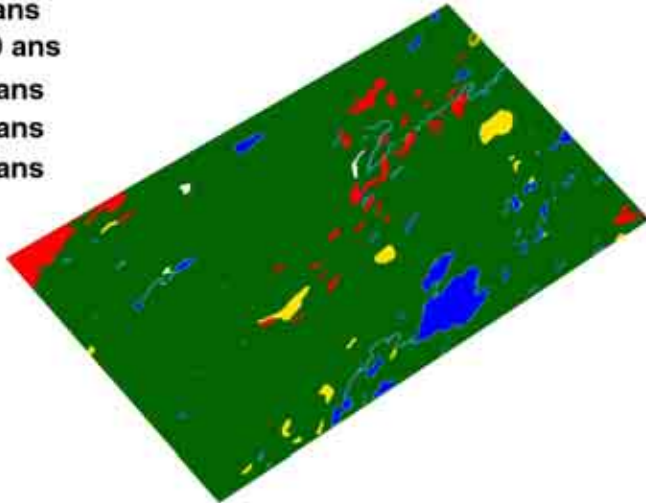
Carte forestière de 1930



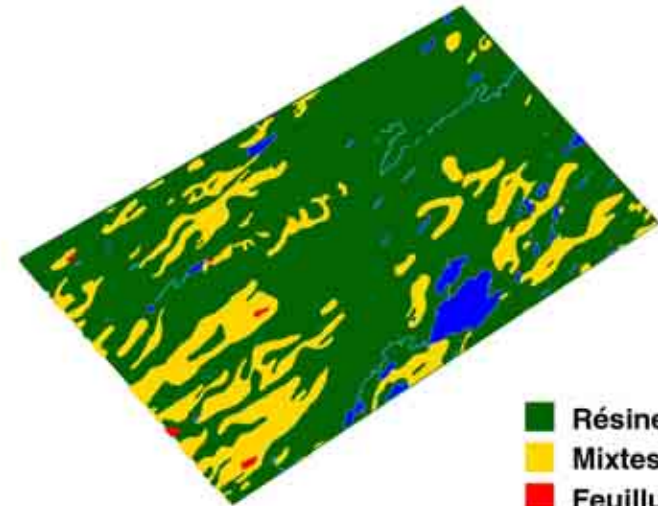
Évolution de l'âge et de la composition du couvert forestier à la Seigneurie de Nicolas Riou, 1930-1995

Âge en 1930

- >100 ans
- 80-100 ans
- 60-80 ans
- 40-60 ans
- 20-40 ans

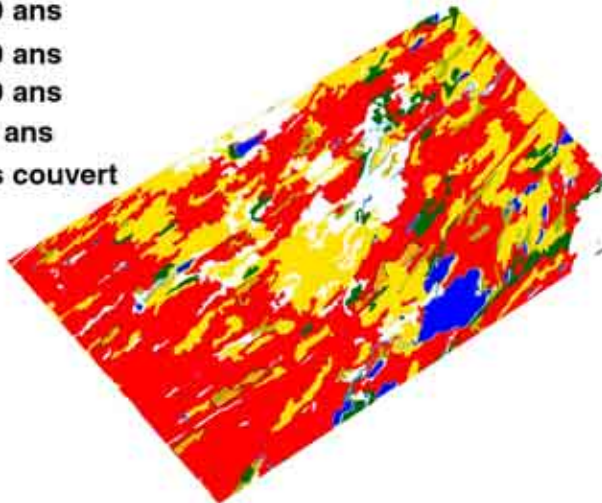


Composition en 1930



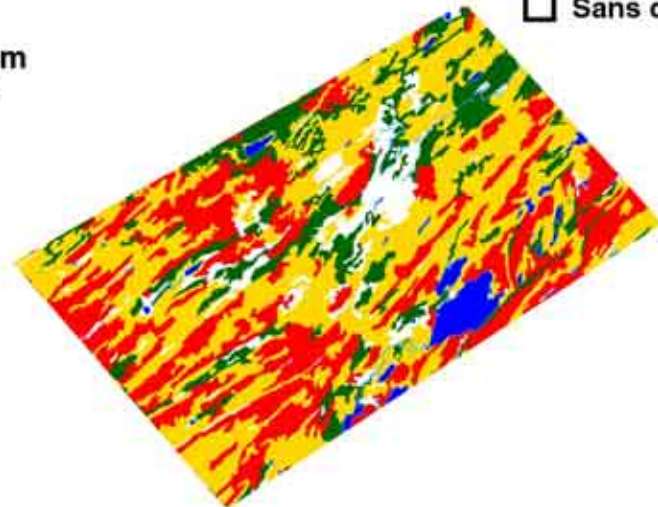
Âge en 1995

- >90 ans
- 70-90 ans
- 50-70 ans
- 30-50 ans
- < 30 ans
- Sans couvert

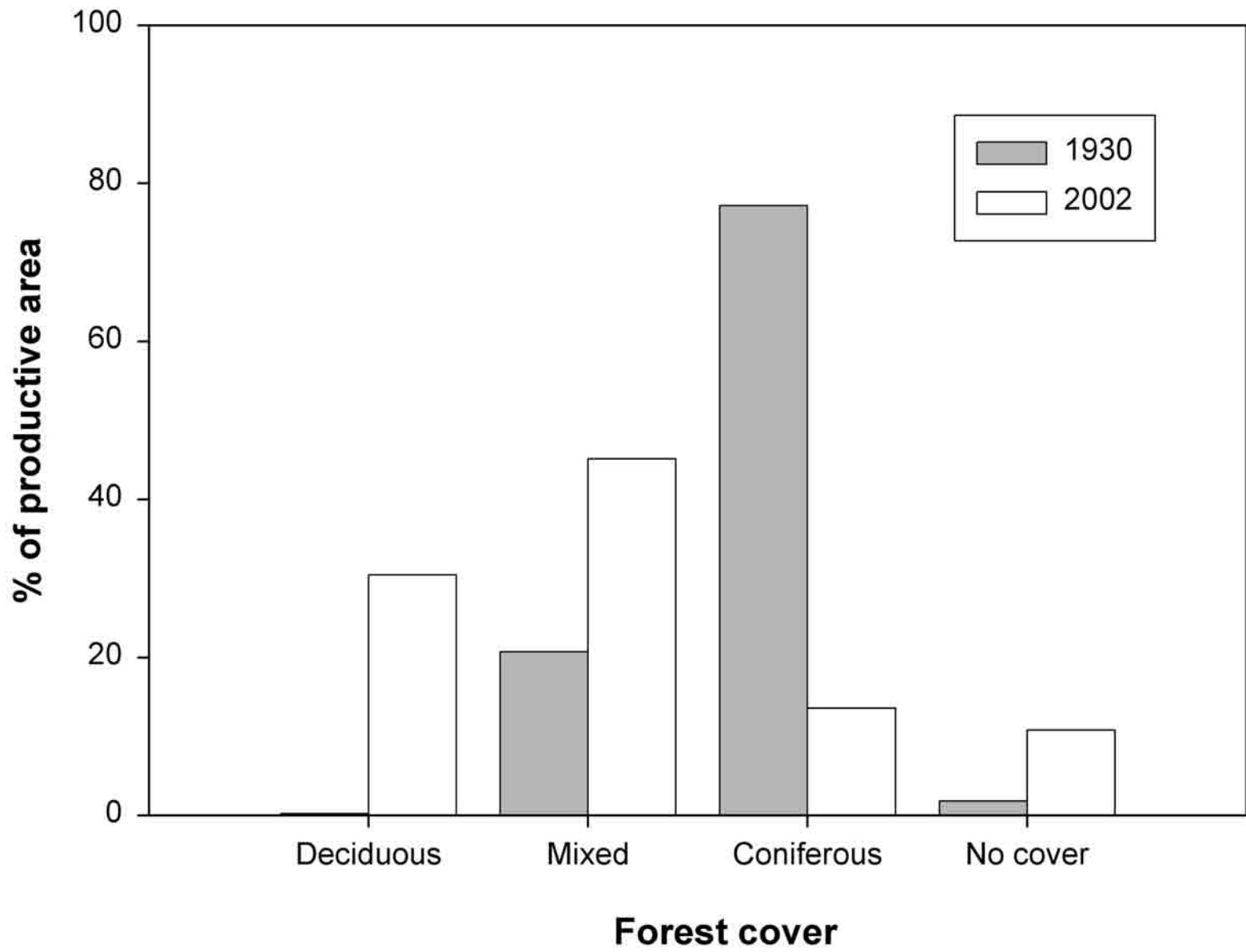


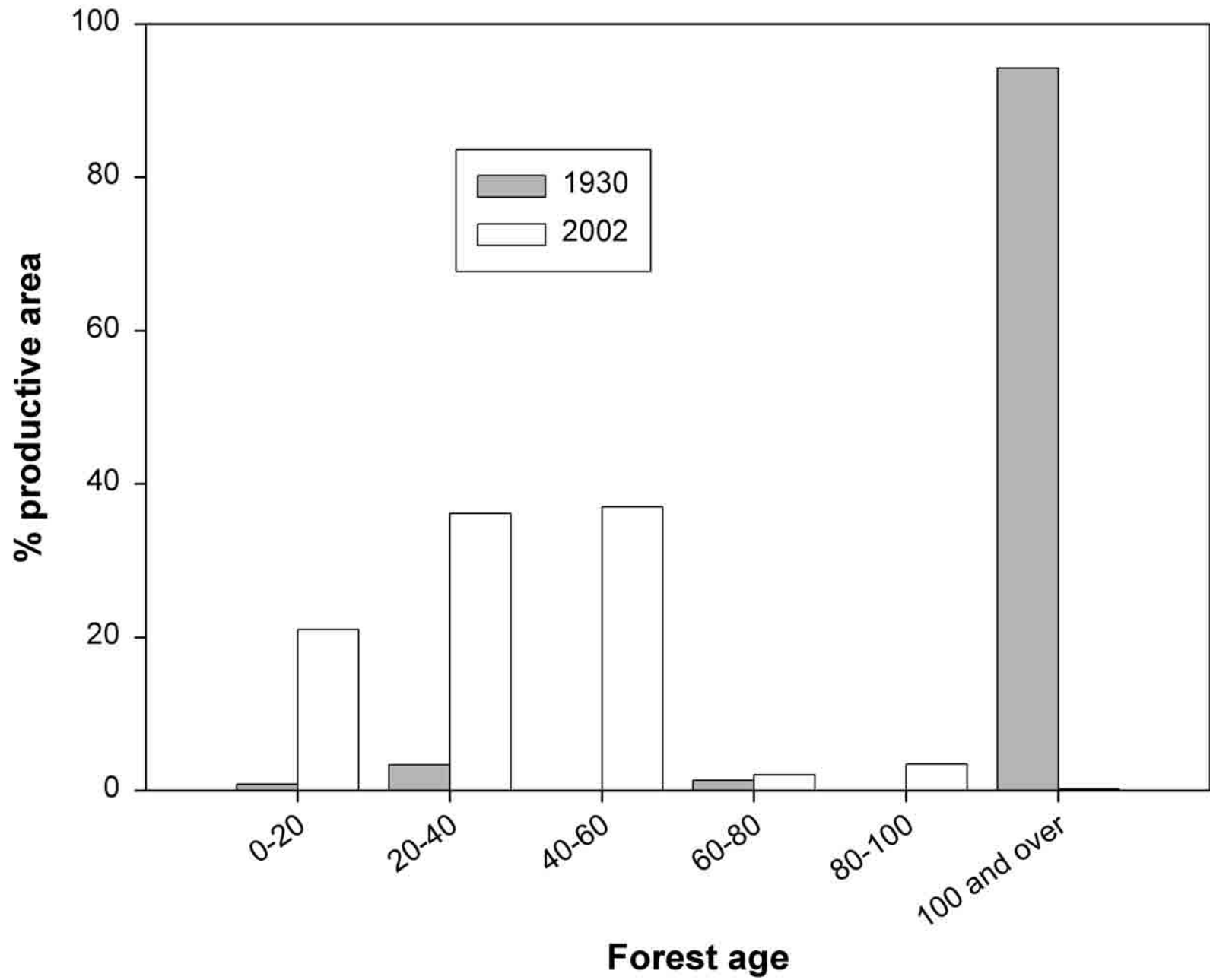
0 5 km

- Résineux
- Mixtes
- Feuillus
- Sans couvert



Composition en 1995





Transition des types de couvert entre 1930 et 2000 à la seigneurie Nicolas-Riou

1930

2000

	Résineux	Mélangés	Feuillus	Sans couvert	Eau
Résineux	15.3	45.8	23.3	12.0	3.5
Mélangés	4.3	39.1	52.8	4.1	1.0
Feuillus	0	45.5	54.5	0.0	0.0
Sans couvert	19.3	26.5	26.5	20.5	8.4
Eau	8.5	19.3	9.5	4.5	58.0

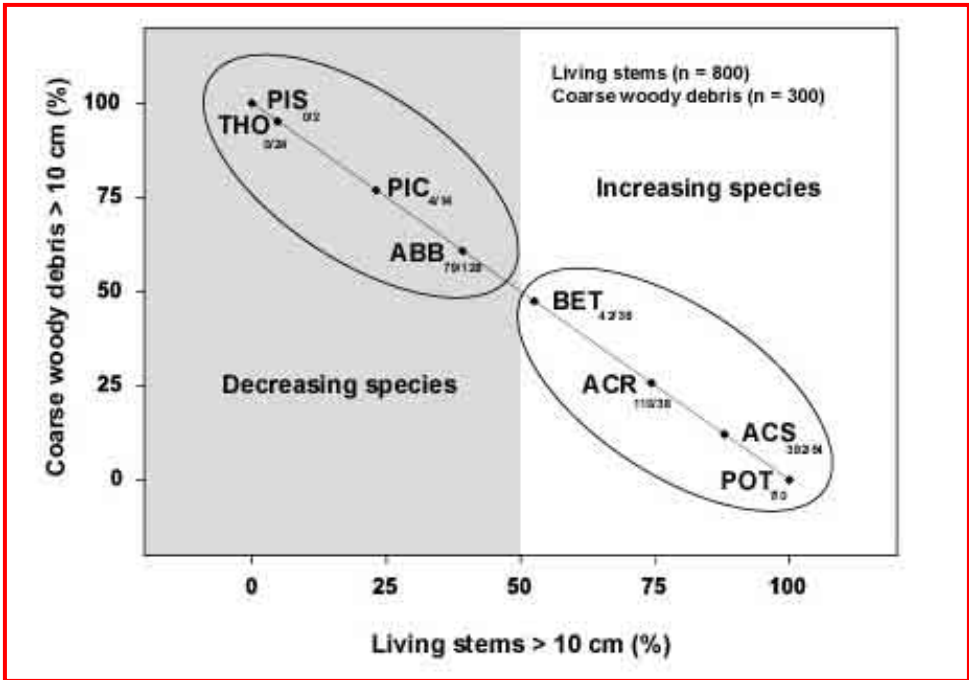
Changements de composition et de structure des forêts à l'échelle des sites ?

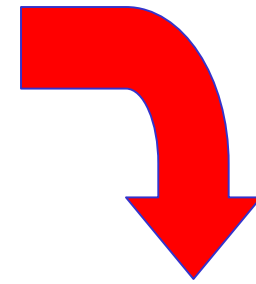
Hiver 1941



Printemps 2003



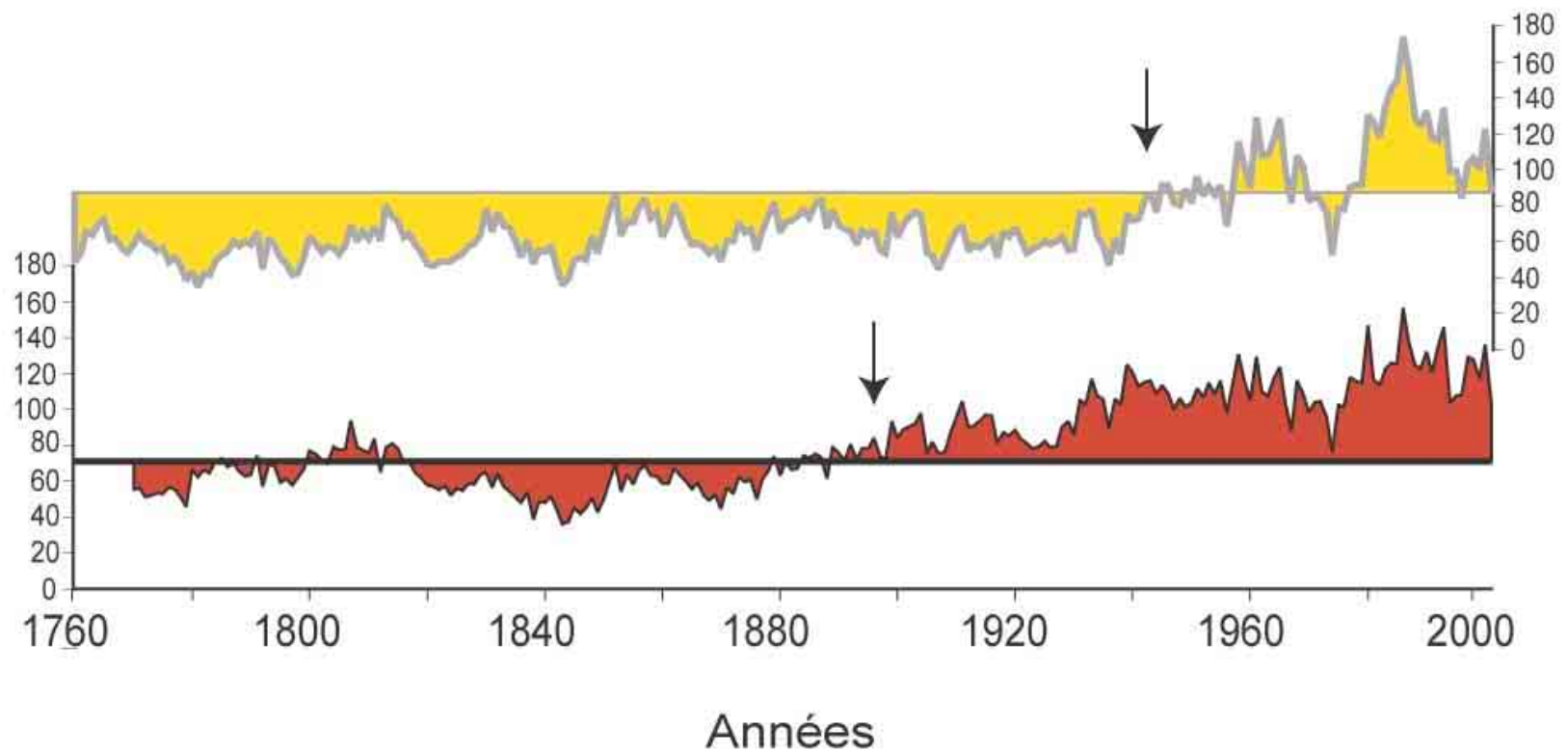
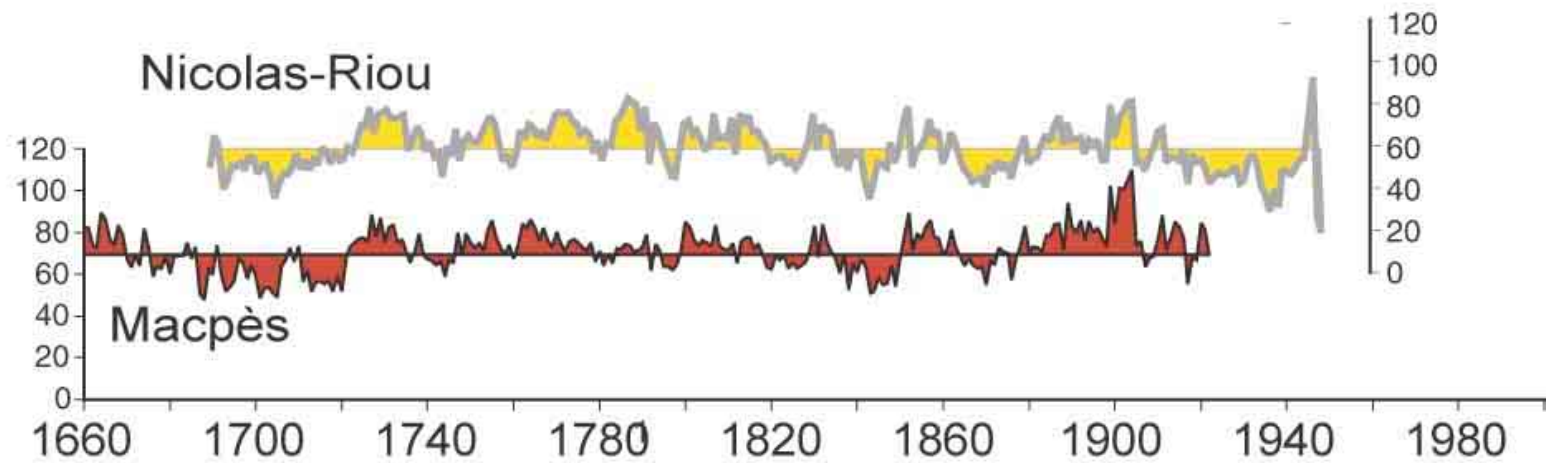


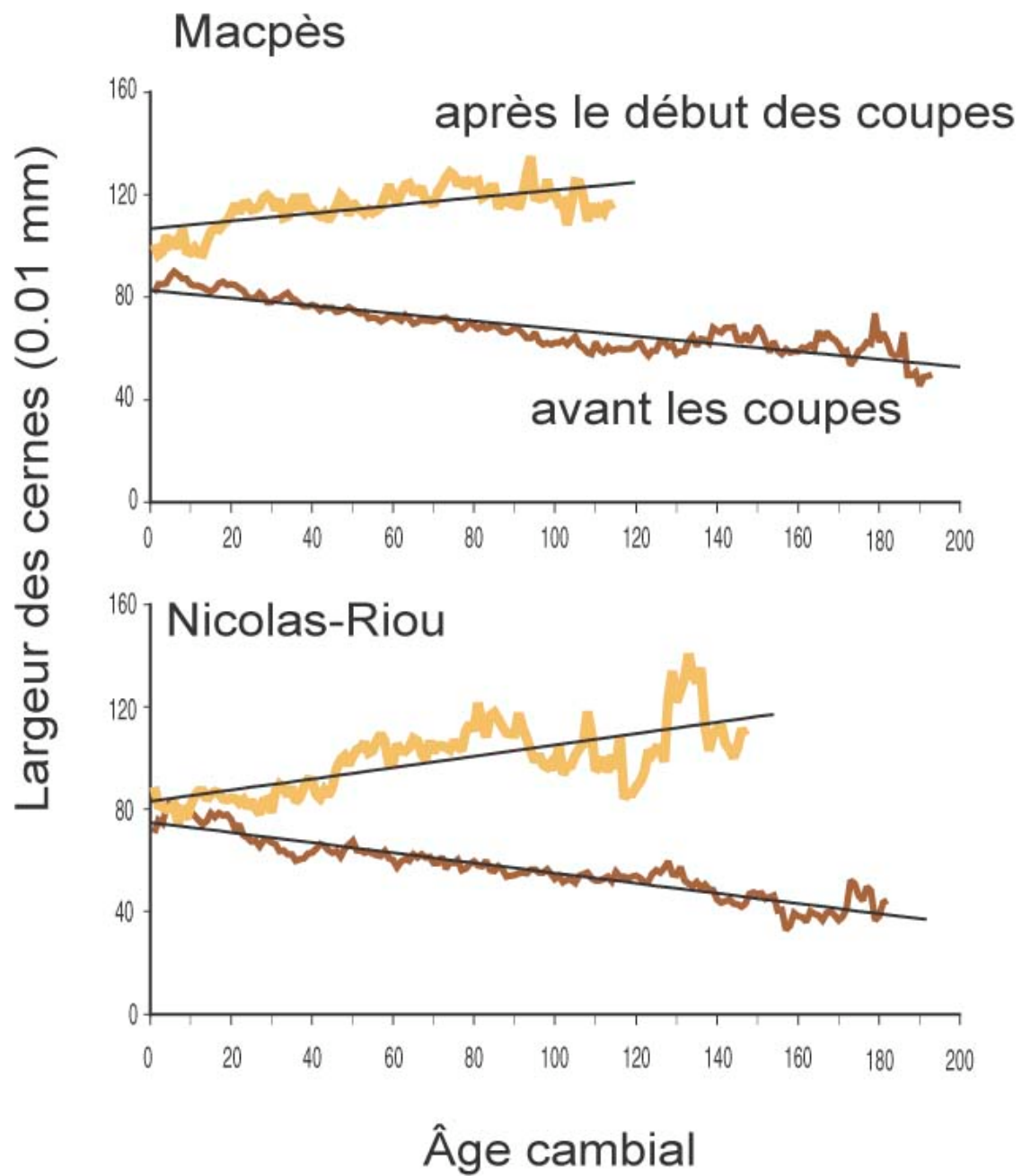


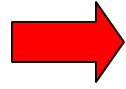


Changements dans le fonctionnement des écosystèmes forestiers ?

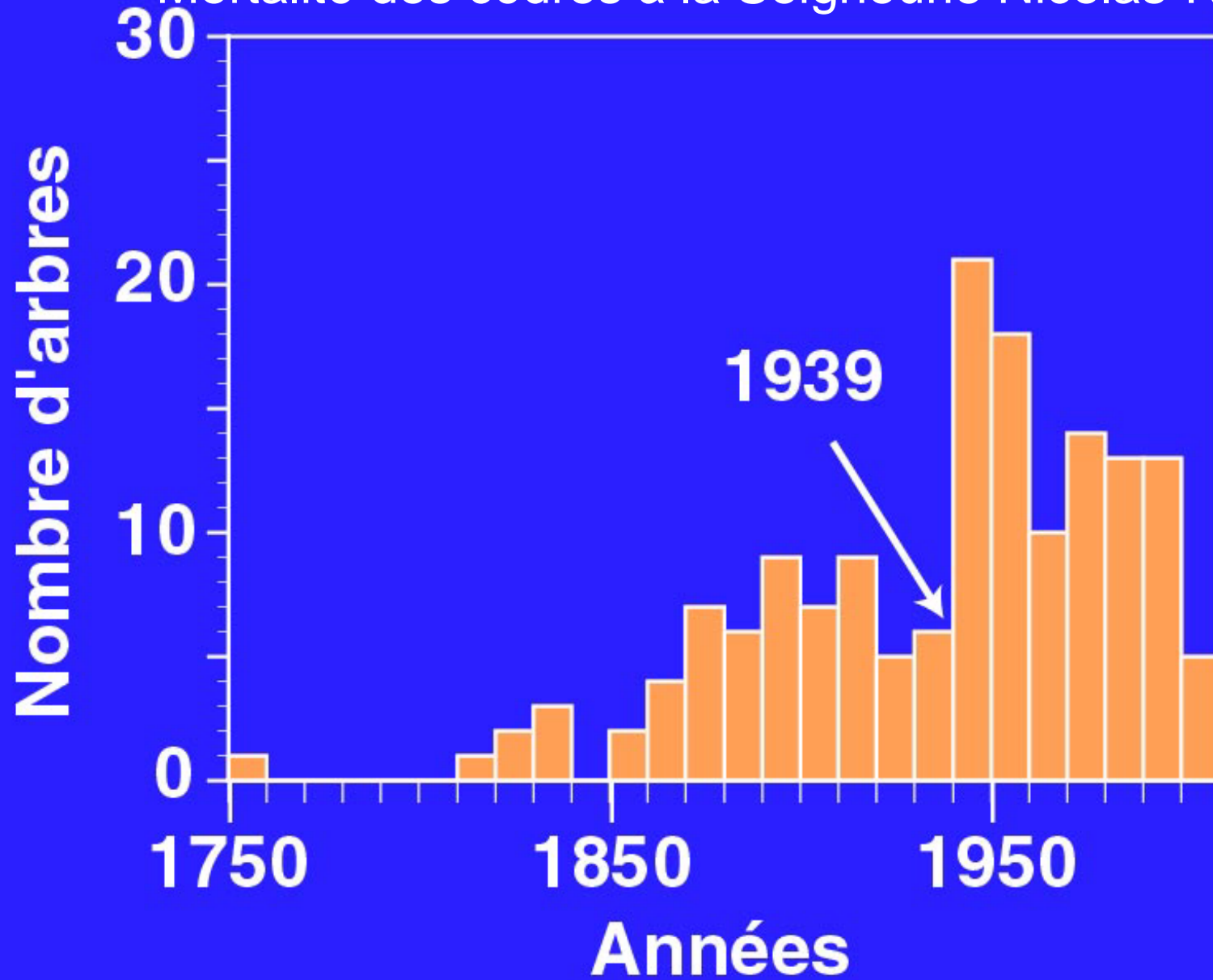
Largeur des cernes annuels de croissance (0.01 mm)





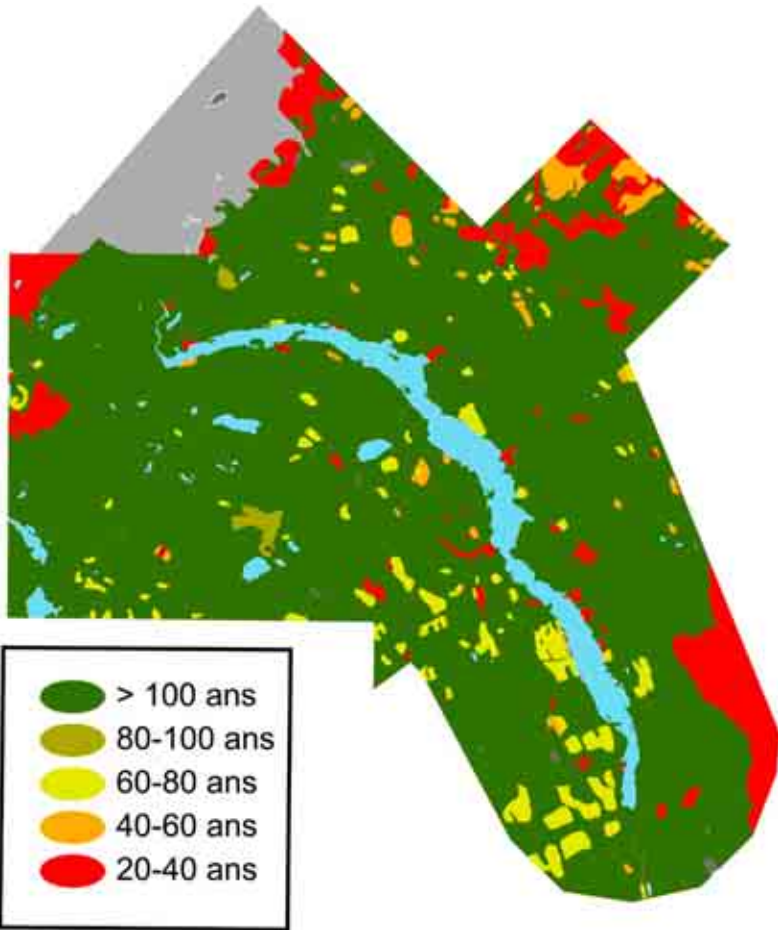


Mortalité des cèdres à la Seigneurie Nicolas-Riou

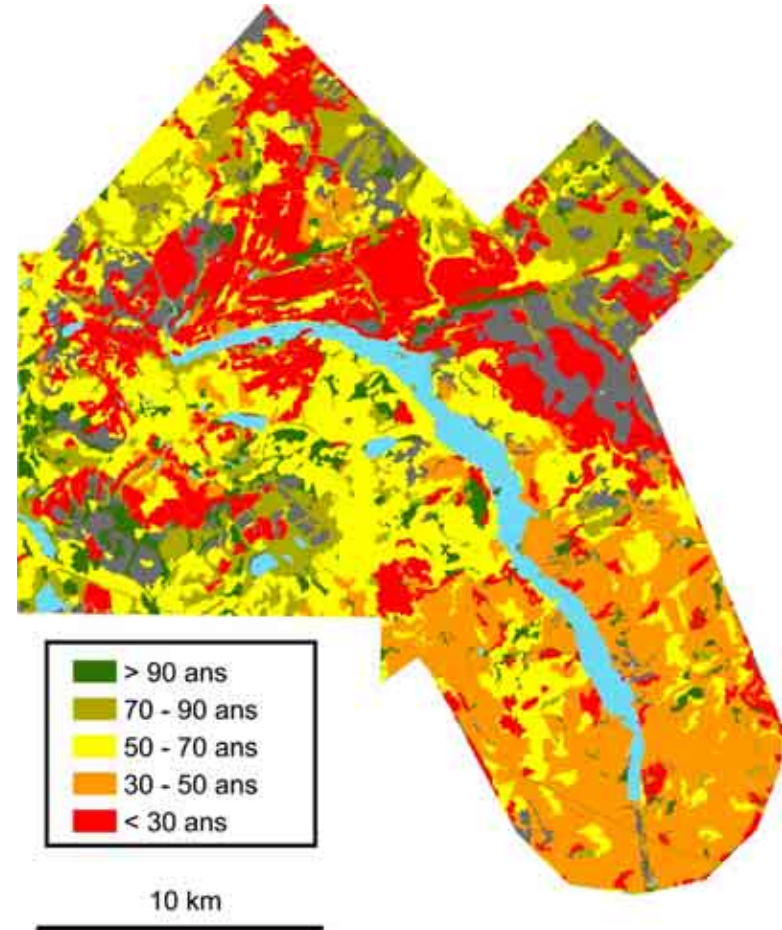


**Changements de la répartition des types
de couverts à l'échelle des paysages ?**

1930



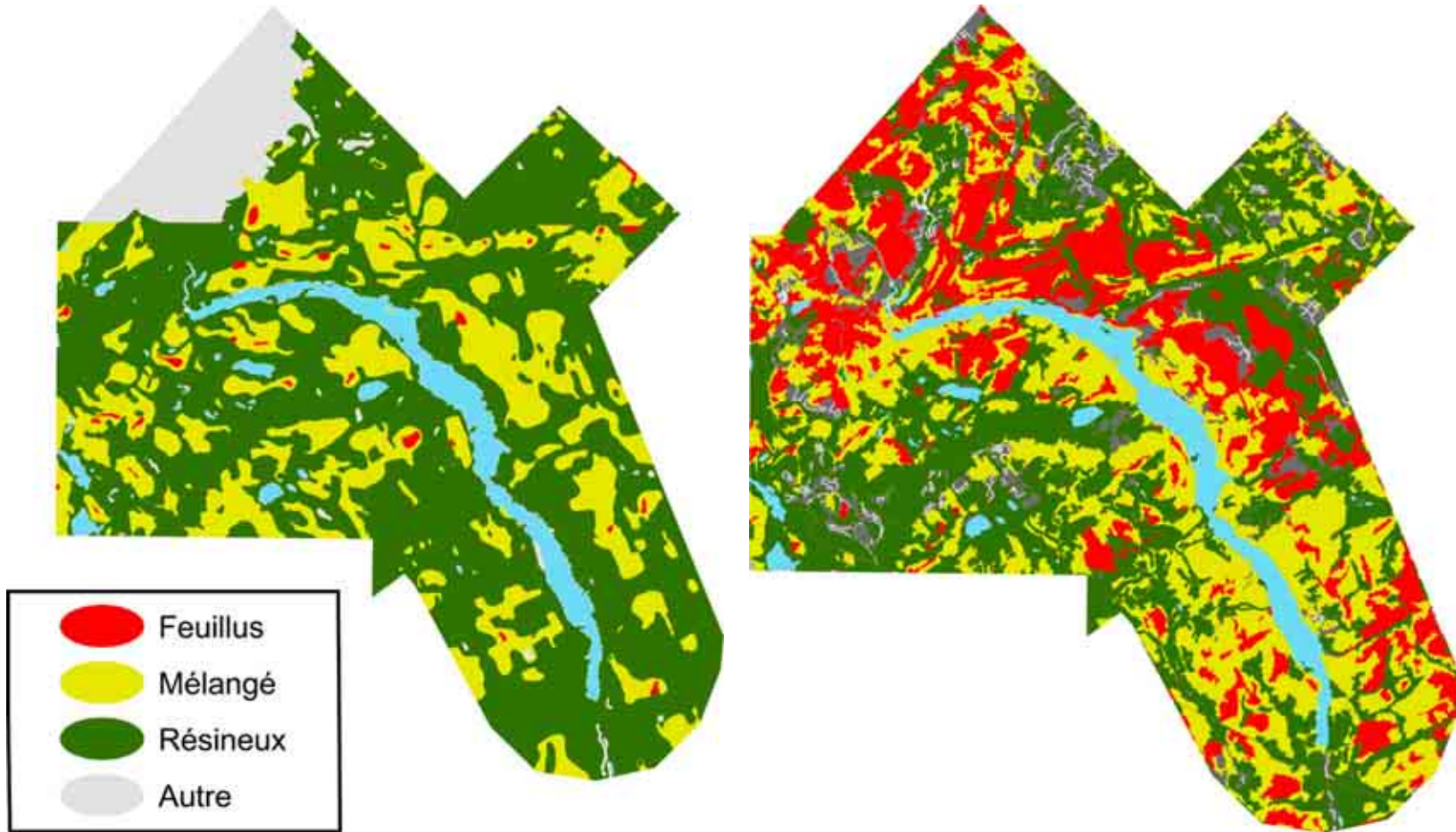
2000



Portion sud-est du bassin de la rivière mitis

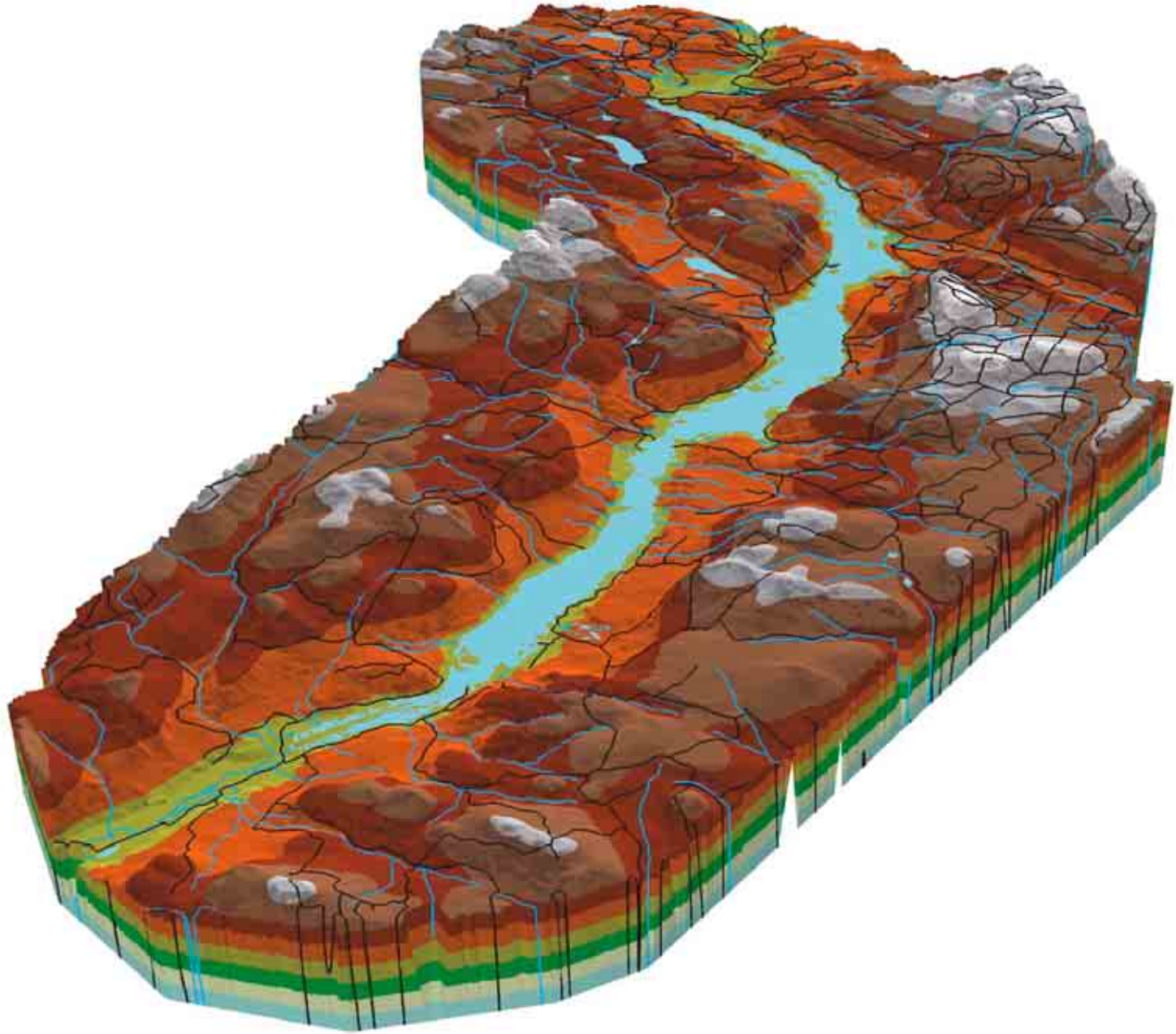
1930

2000

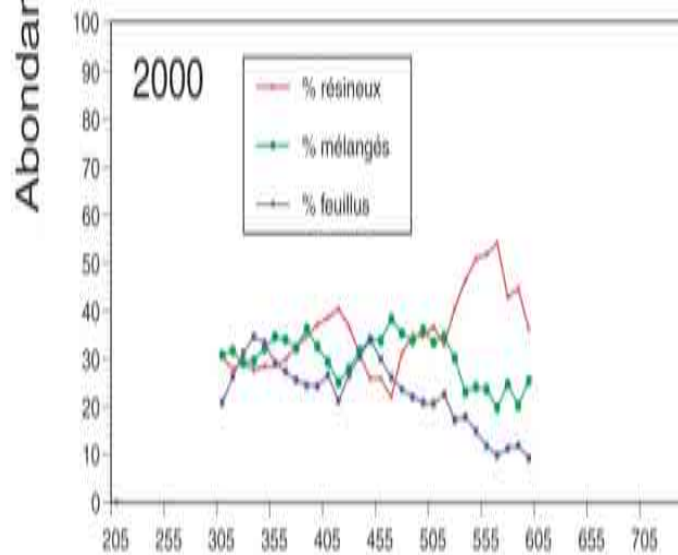
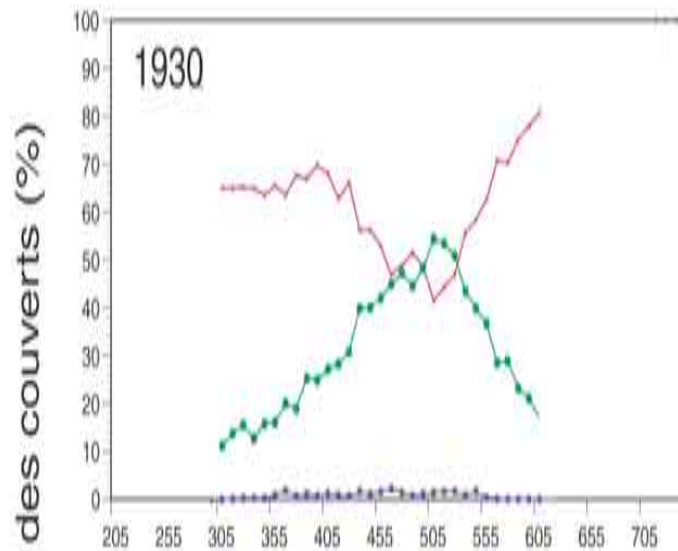


Transition des types de couvert entre 1930 et 2000
Dans le bassin de la rivière Mitis

		2000			
		Résineux	Mélangé	Feuillu	Autres
1930	Résineux	0,398	0,305	0,167	0,130
	Mélangé	0,211	0,385	0,346	0,058
	Feuillu	0,105	0,321	0,523	0,051
	Autres	0,161	0,142	0,264	0,433

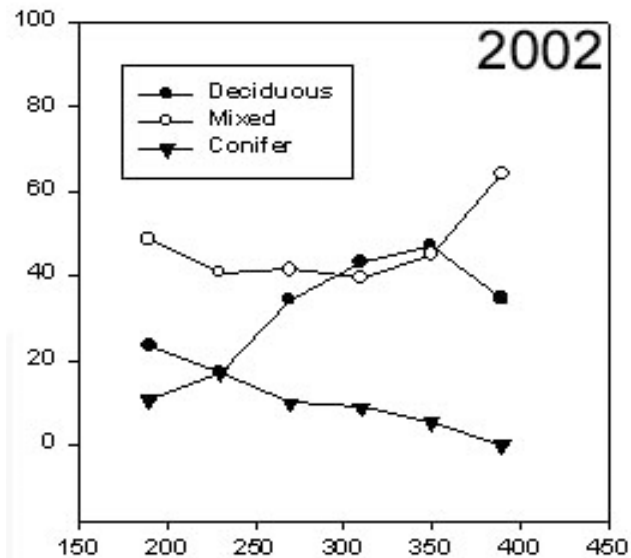
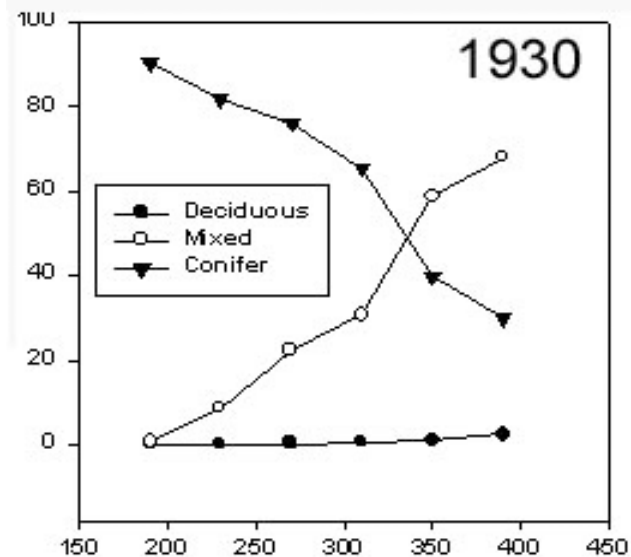


Mitis

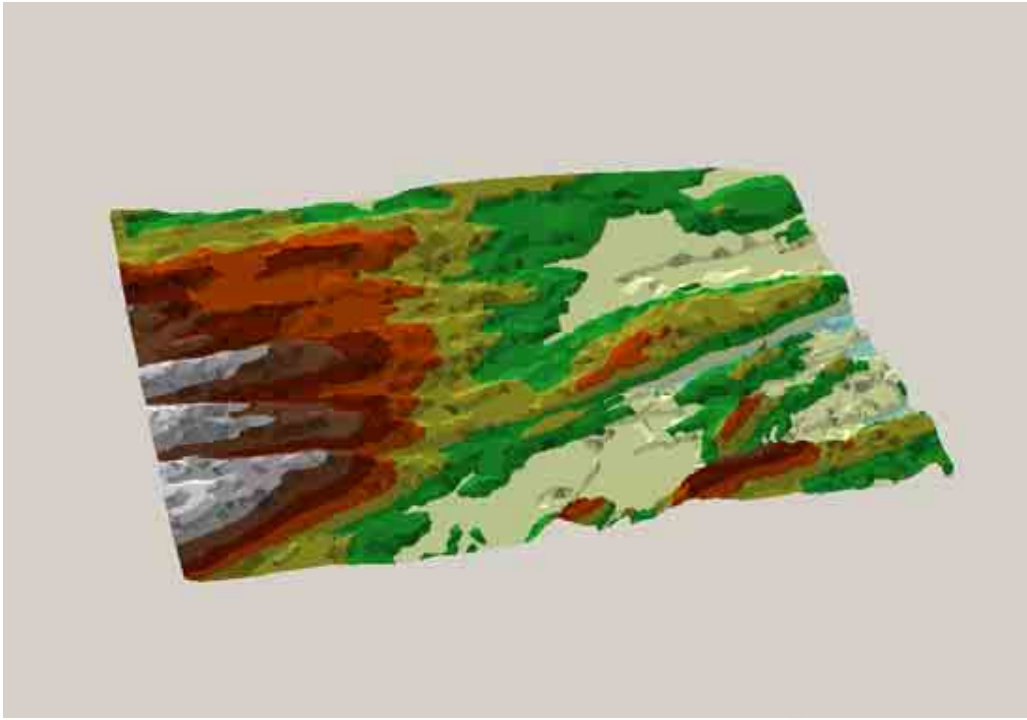


Altitude (m)

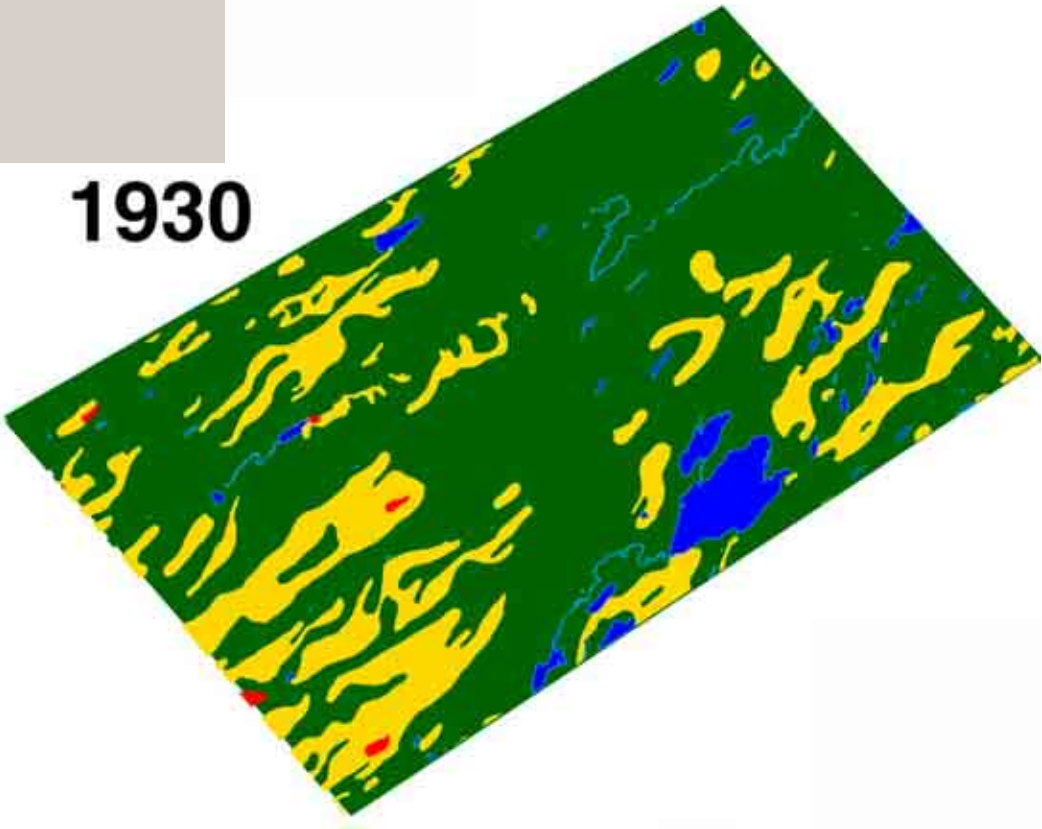
Nicolas-Riou



Altitude (m)



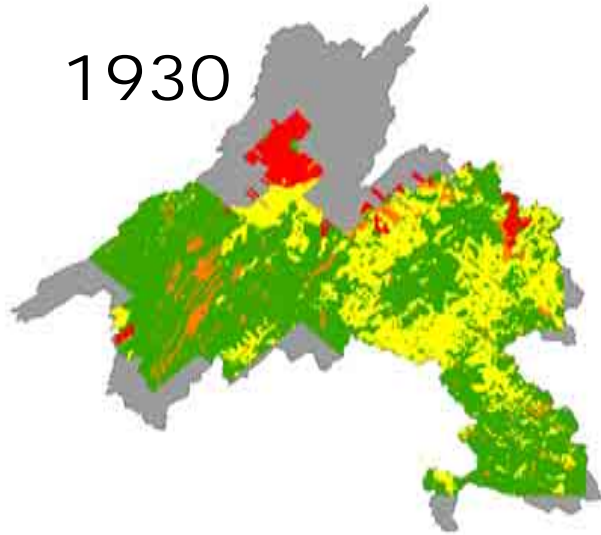
1930



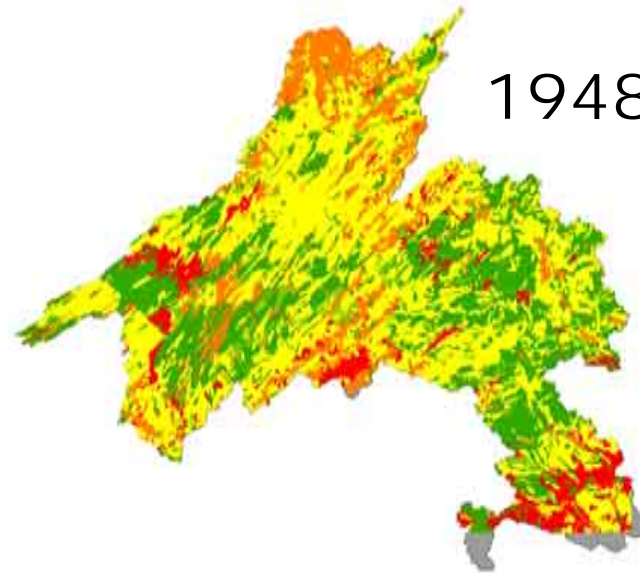
Changements à l'échelle régionale ?

Structure d'âge du couvert forestier

1930



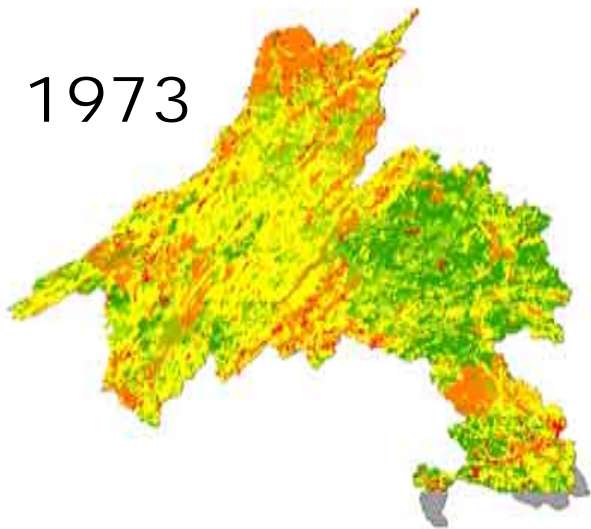
1948



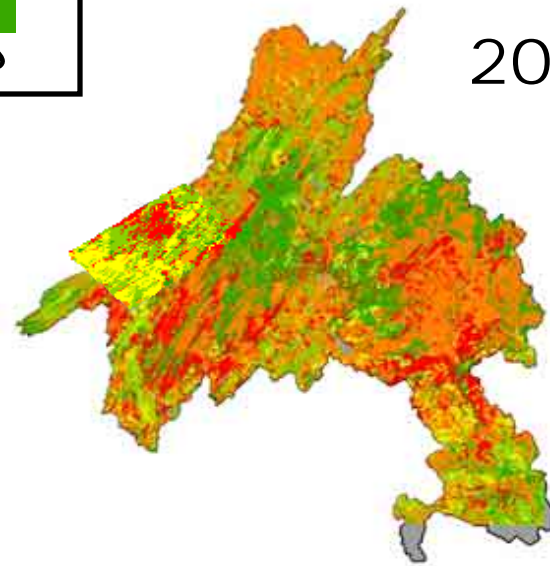
Légende:



1973

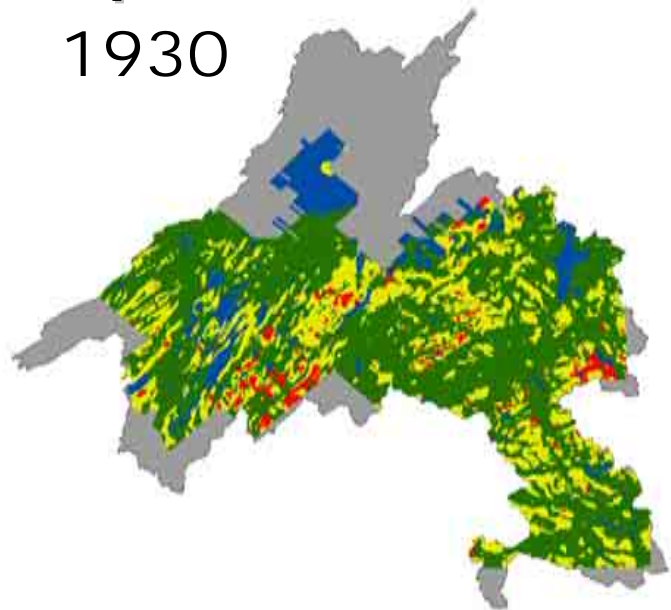


2000

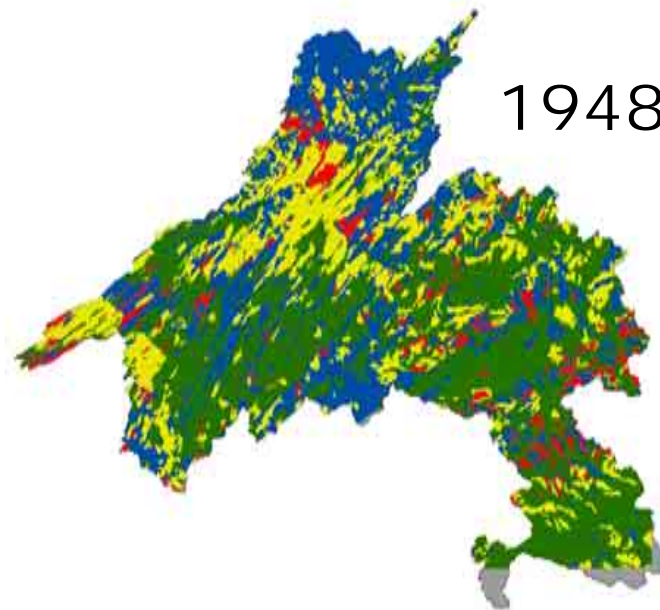


Composition du couvert forestier

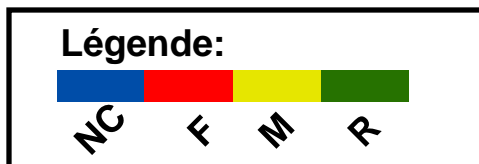
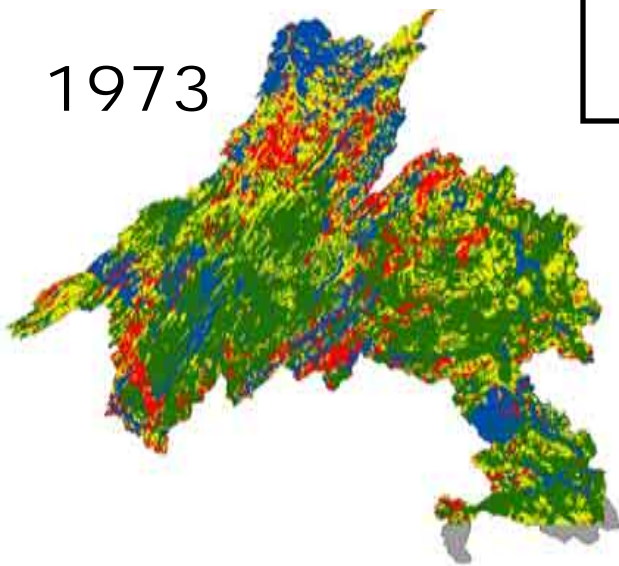
1930



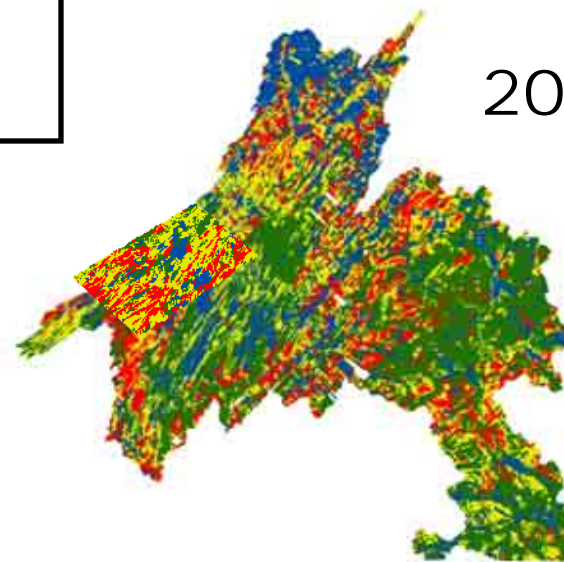
1948



1973



2000



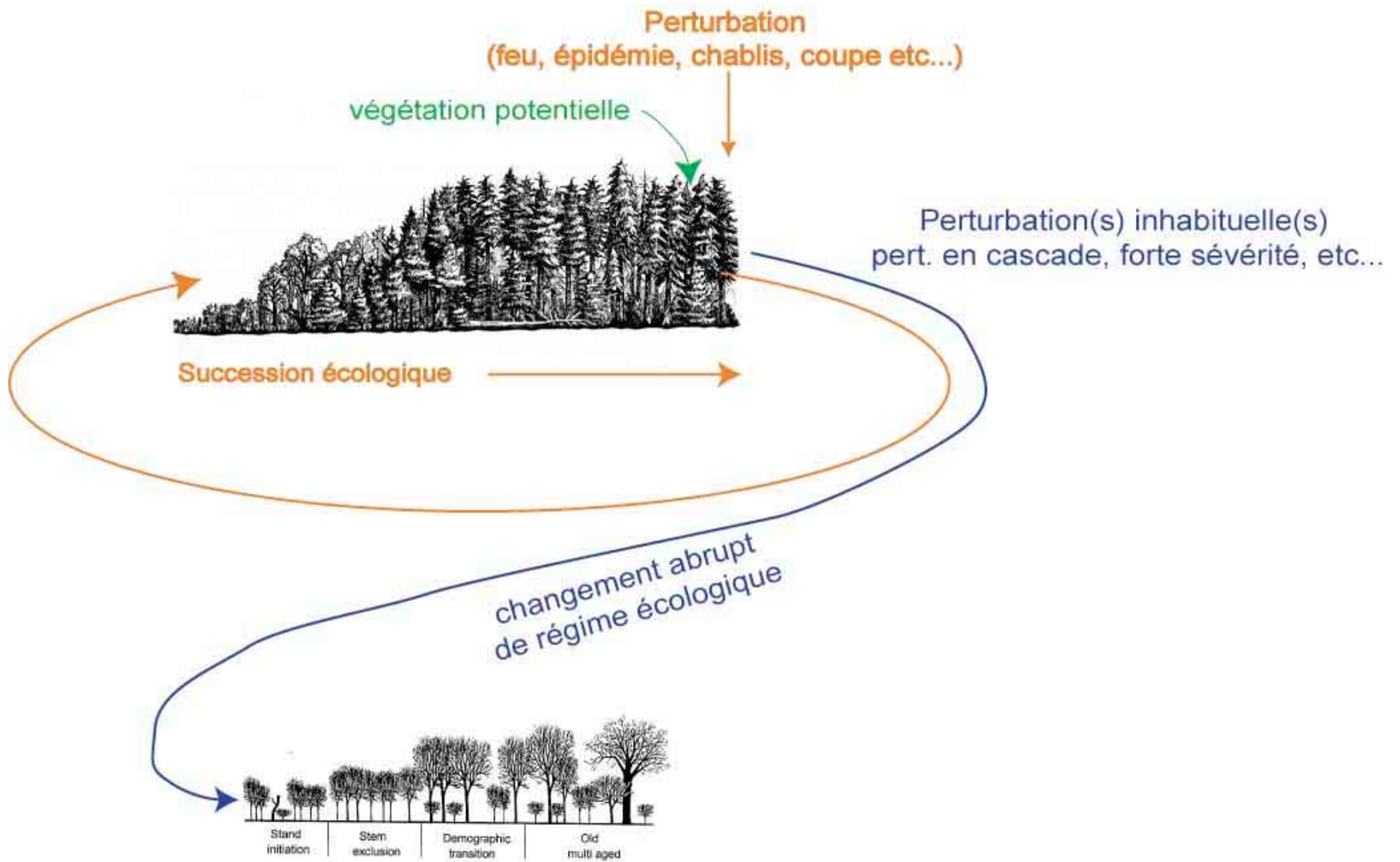
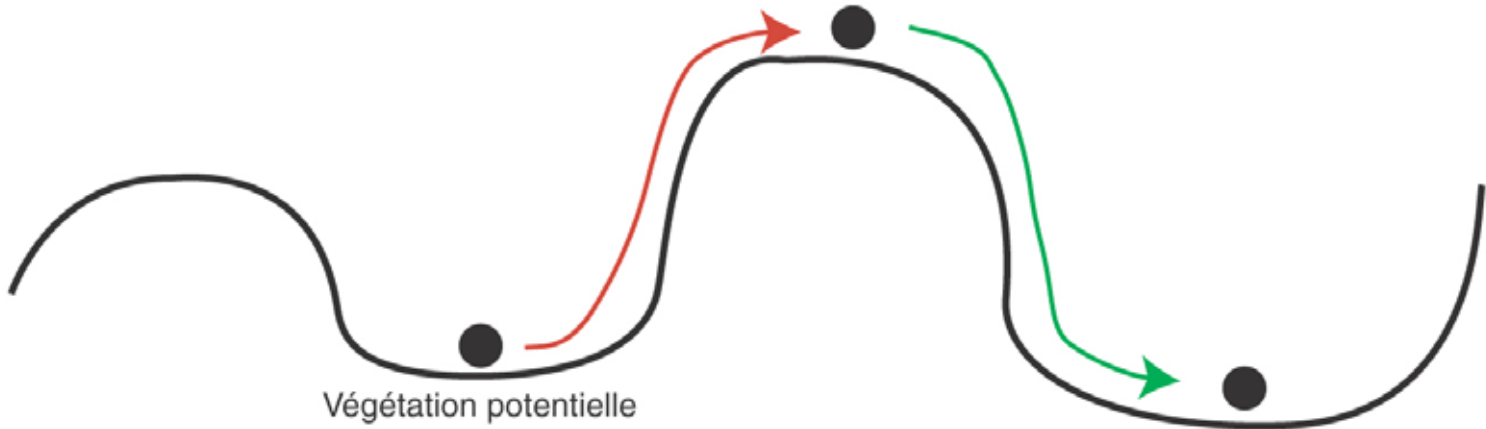


Figure 4.1. Four basic stages of stand development.

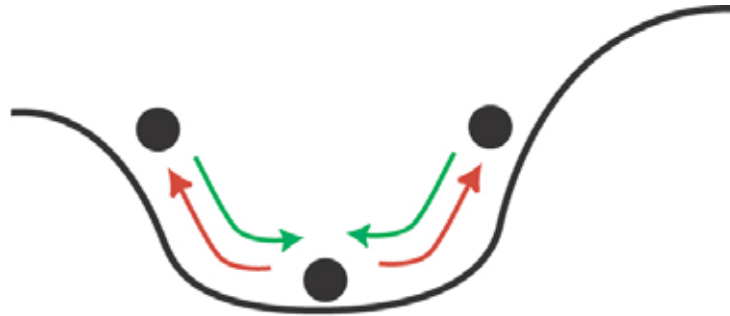
Qtée inhabituelle de perturbation
(sévérité et / ou fréquence)



Végétation potentielle

changement abrupt de végétation potentielle

Perturbation ↑

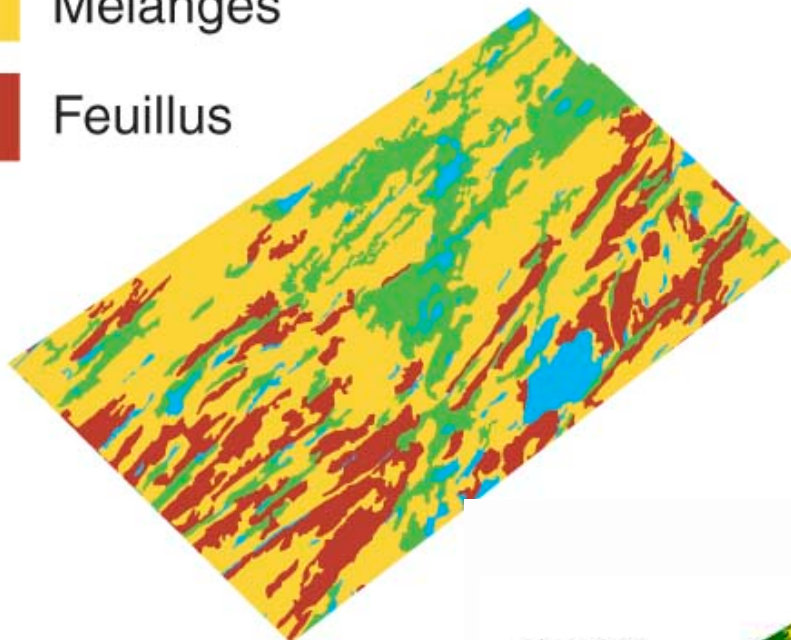
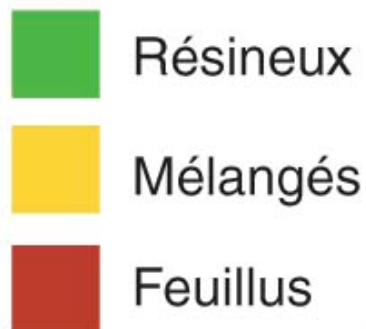


Végétation potentielle

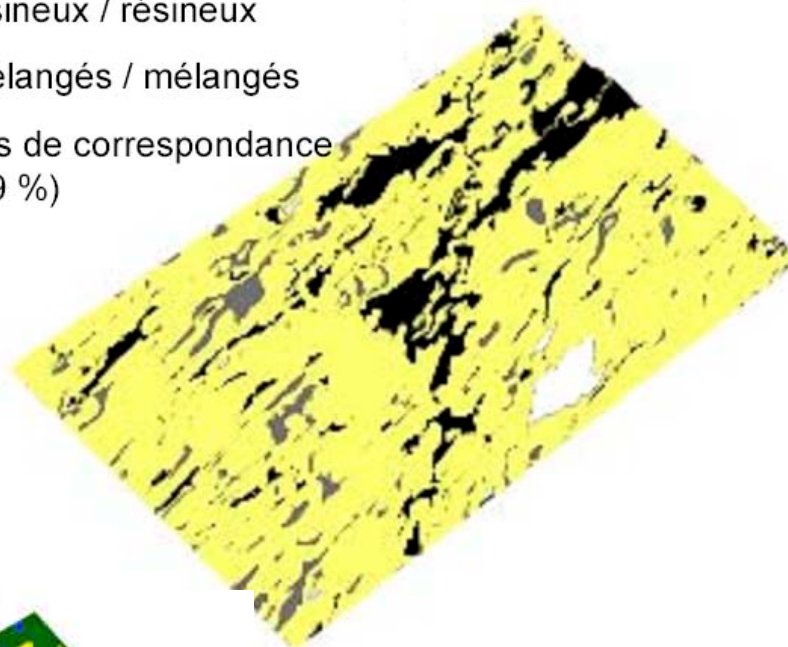
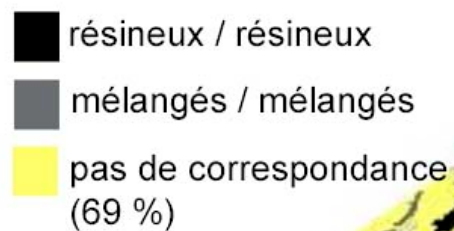
Succession ↓



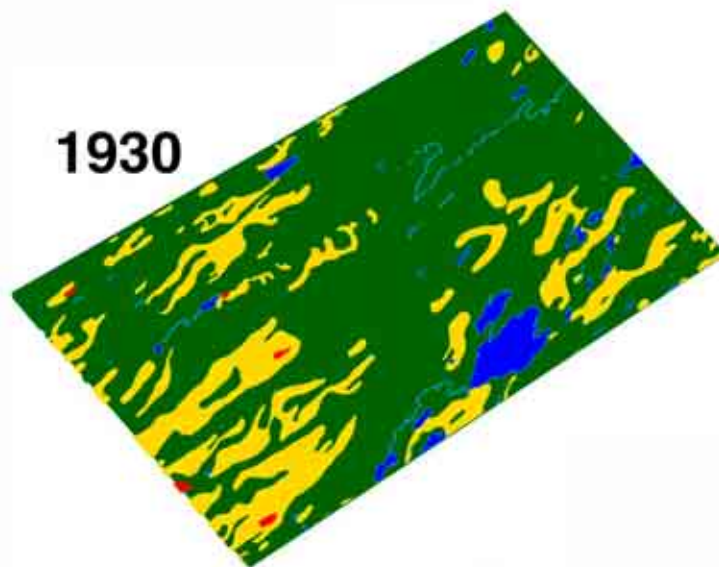
Végétation potentielle, Seigneurie Nicolas-Riou



Lien entre le couvert de 1930 et la végétation potentielle



1930



????

- Le système de classification écologique est-il erroné ?
- Les coupes ont-elles fait basculer la forêt dans un nouveau régime écologique?

Perturbations de faible sévérité / fréquence
(feu, épidémie, chablis, etc...)

végétation potentielle
avant le début des coupes



Coupes en cascade
(1850-2000)

Succession écologique
pré-coloniale



changement abrupt
de régime écologique

Nouvelle végétation potentielle

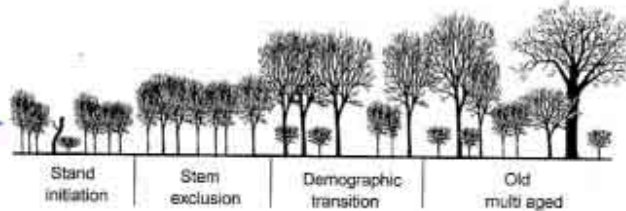
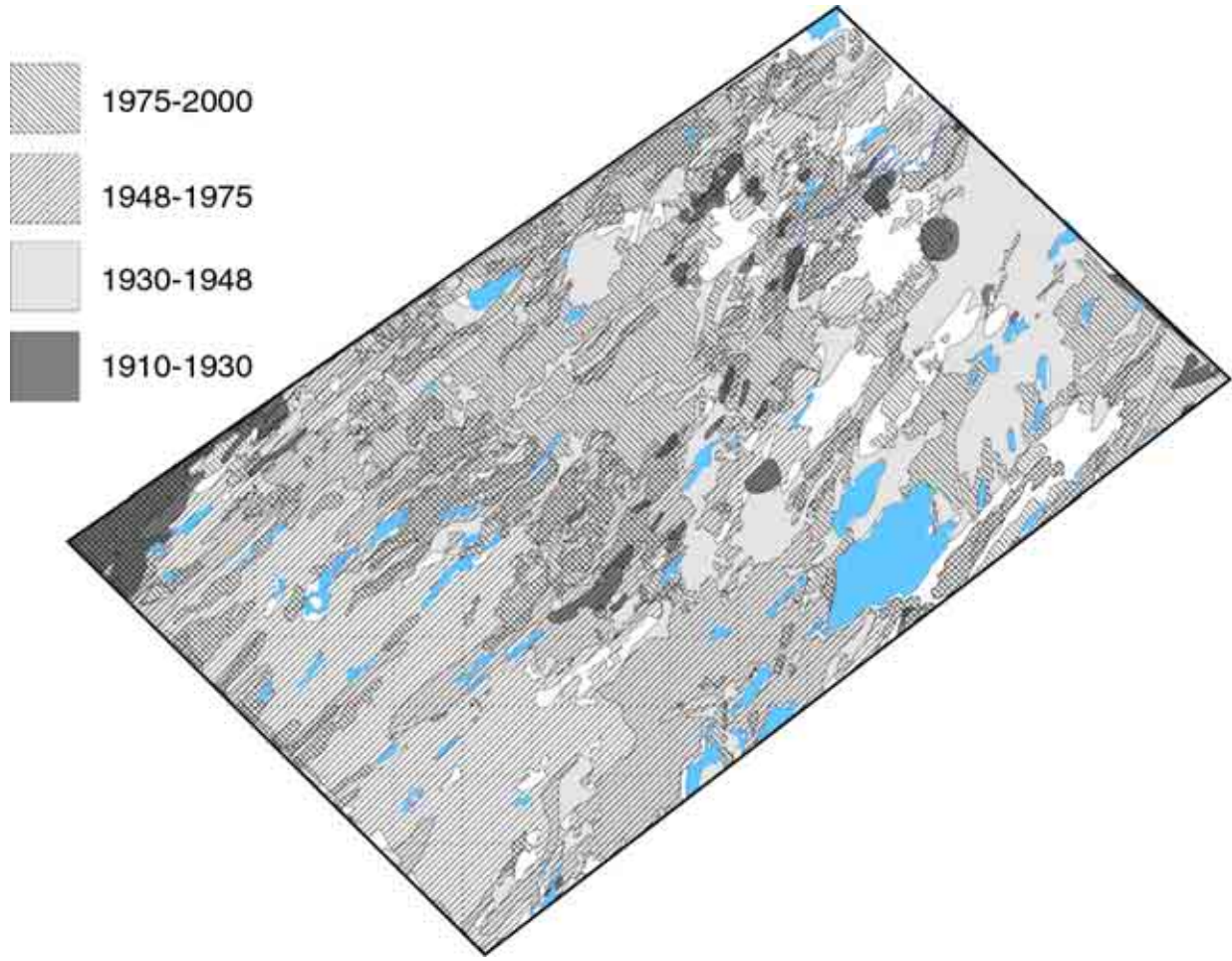
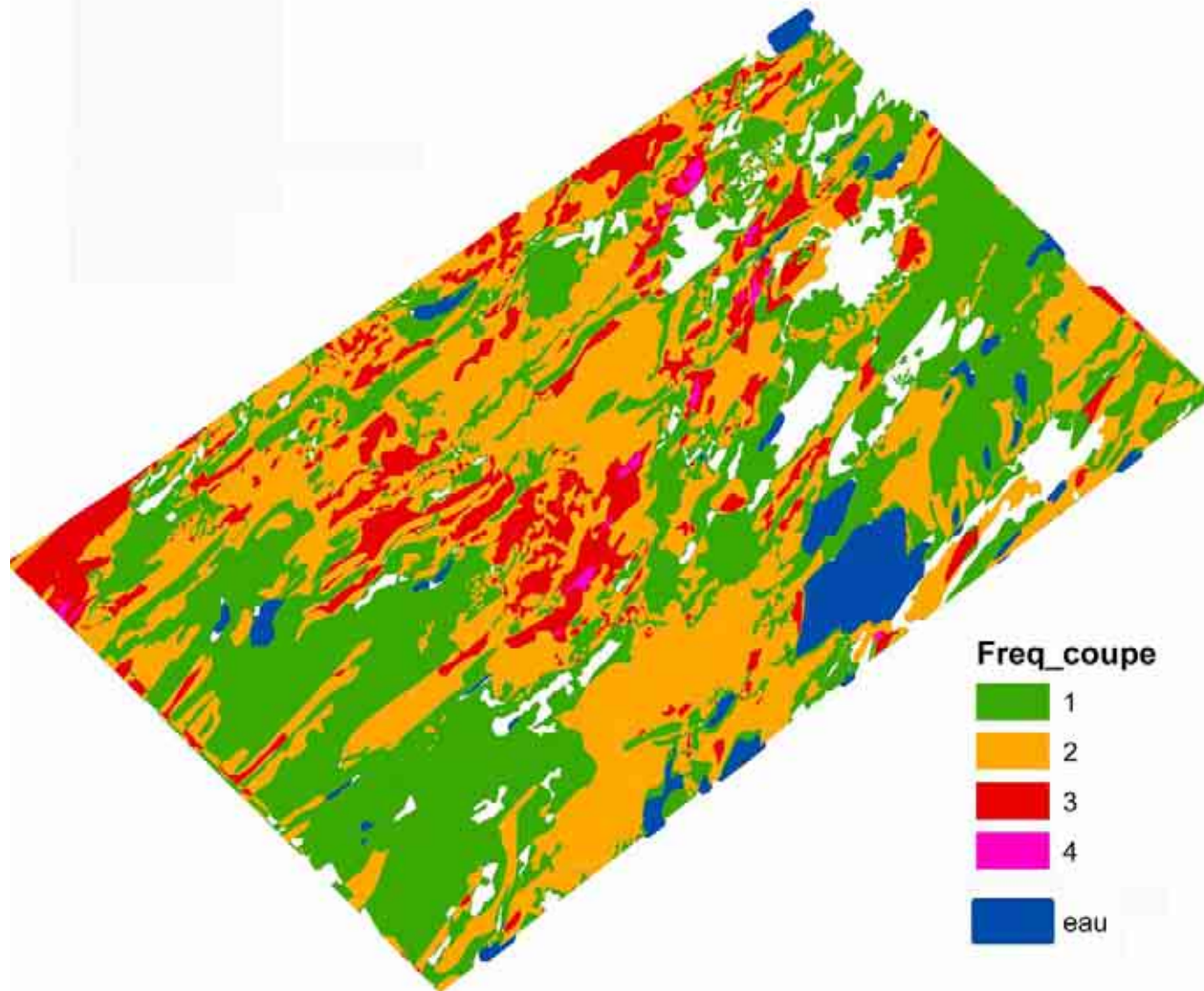


Figure 4.1. Four basic stages of stand development.

Nouvelle succession







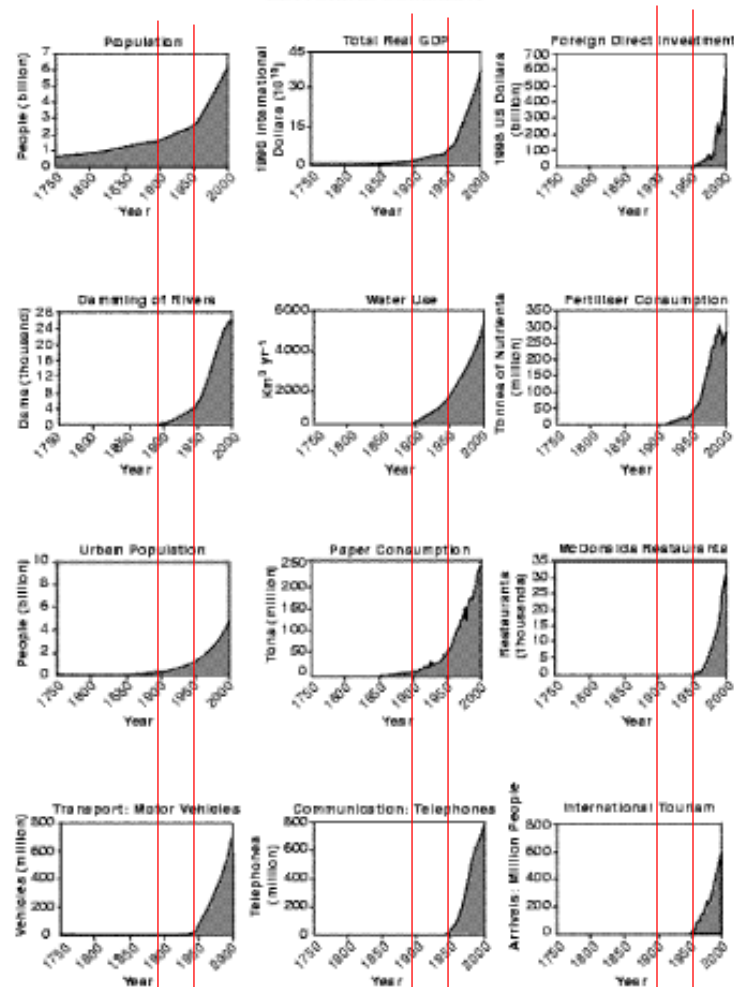


Figure 1. The increasing rates of change in human activity since the beginning of the Industrial Revolution (Steffen et al., 2003). Significant increases in the rates of change occur around the 1950s in each case and illustrate how the past 50 years have been a period of dramatic and unprecedented change in human history. (U.S. Bureau of the Census, 2000; Nordhaus, 1997; World Bank, 2002; World Commission on Dams, 2000; Shiklomanov, 1990; International Fertilizer Industry Association, 2002; UN Centre for Human Settlements, 2002; Pulp and Paper International, 1993; MacDonaldis, 2002; UNEP, 2000; Canning, 2001; World Tourism Organization, 2002).

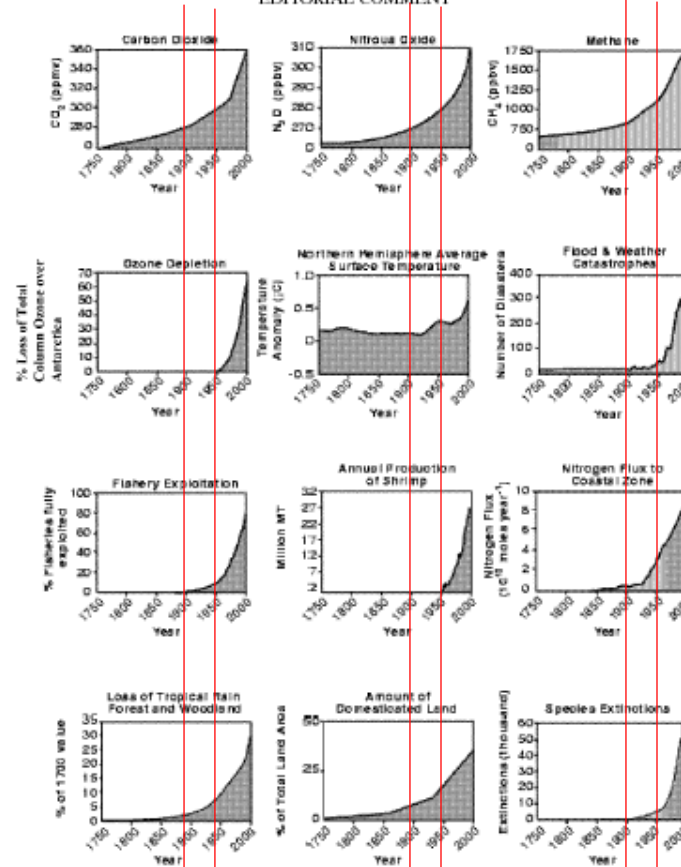
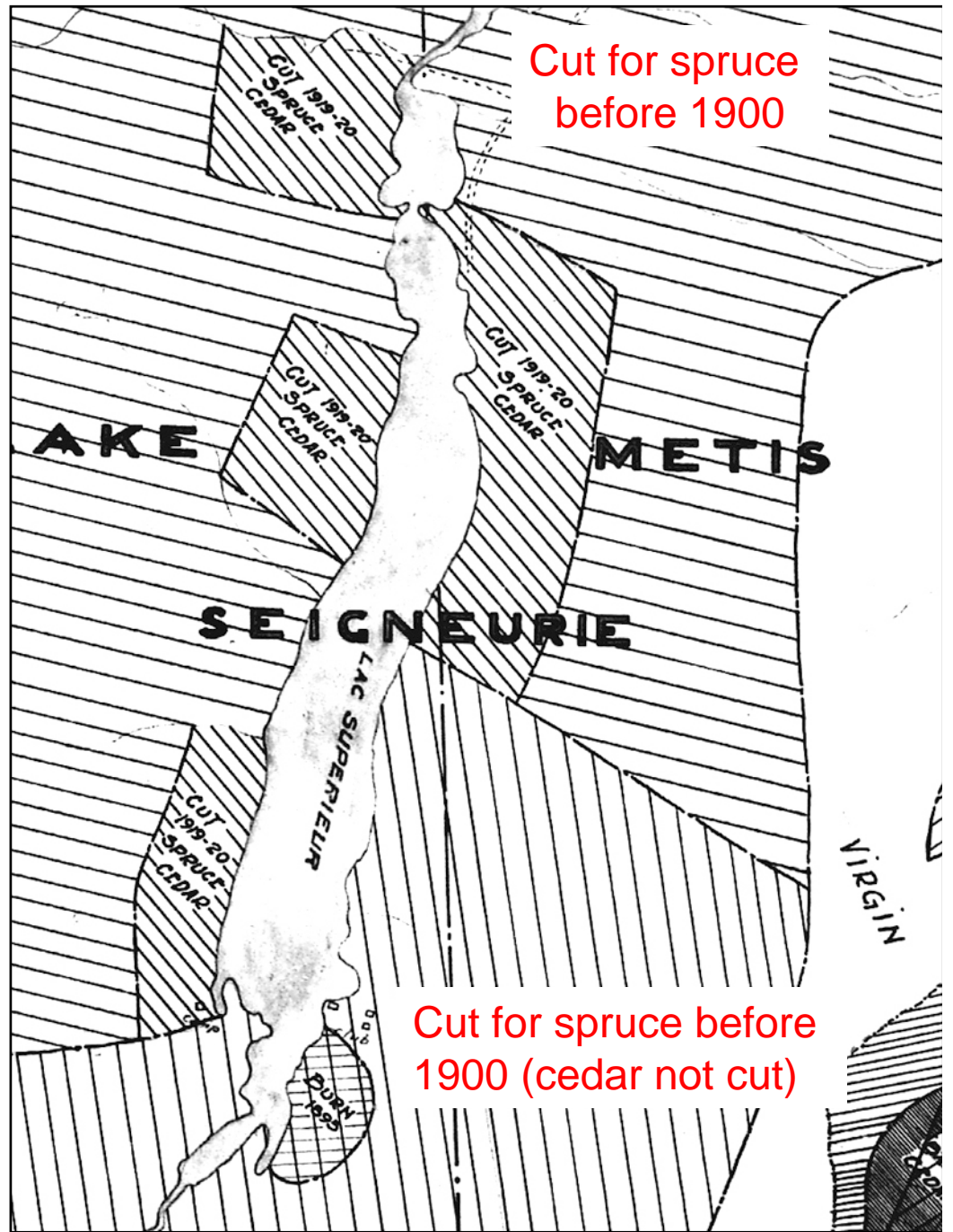
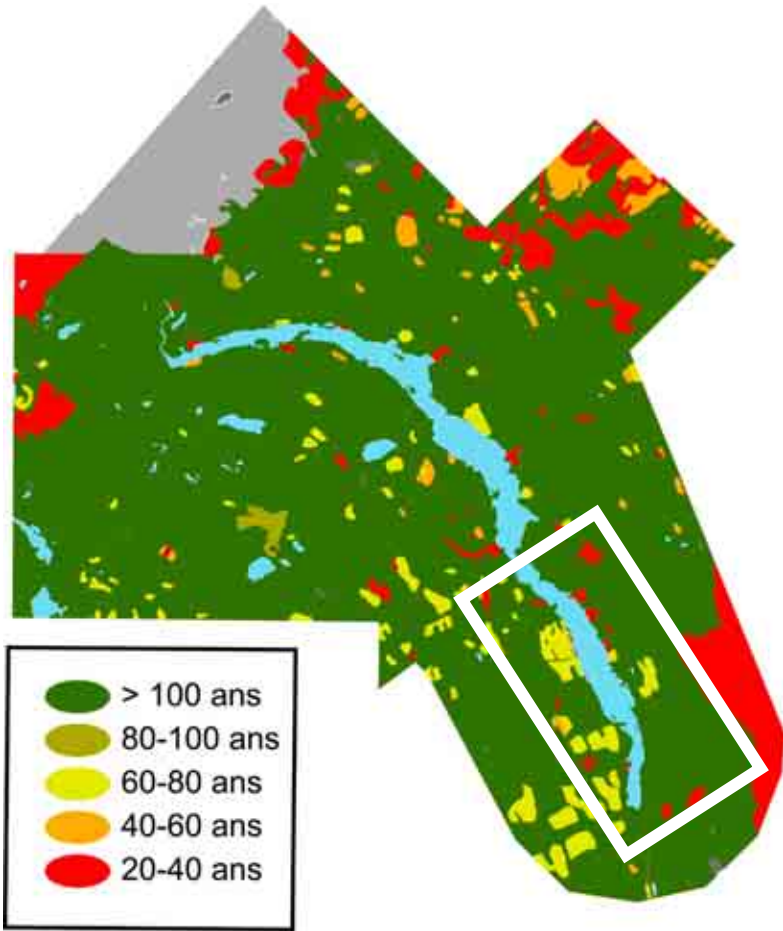


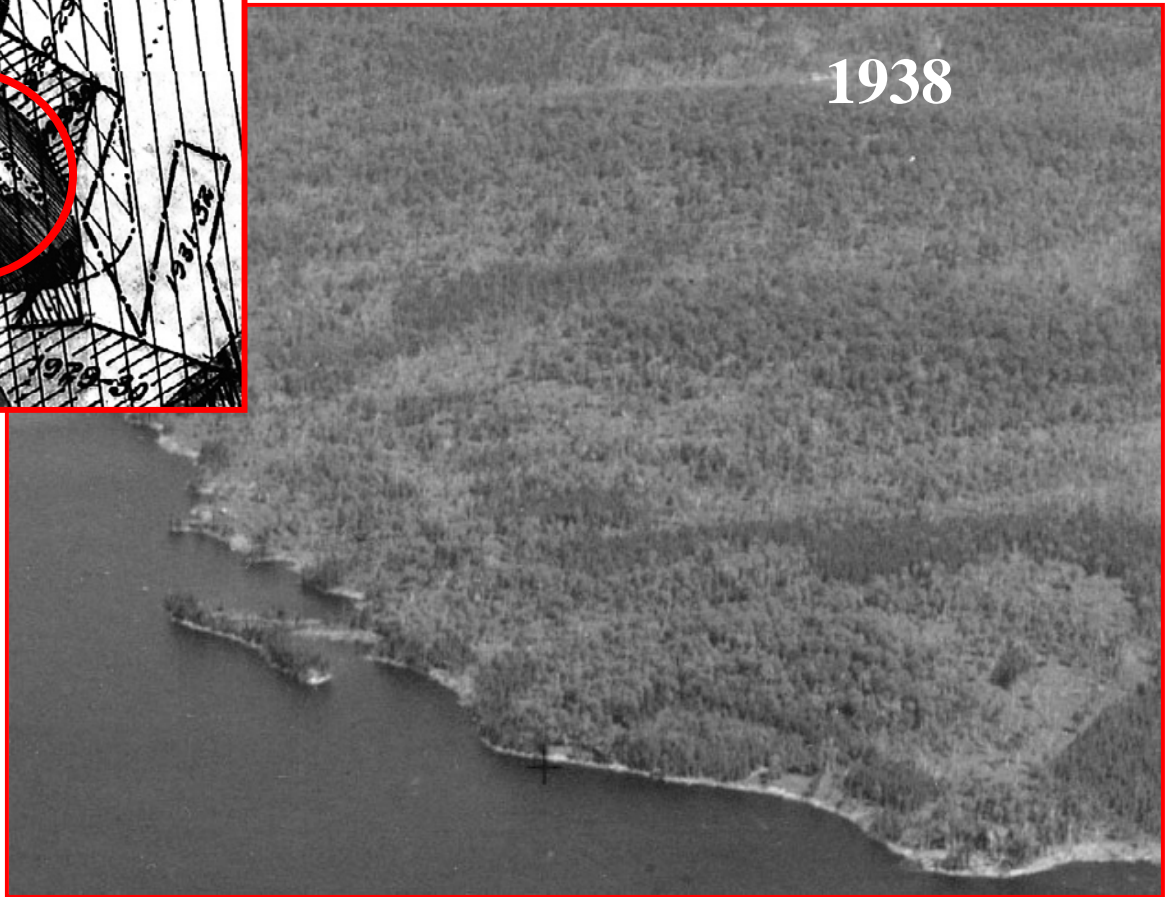
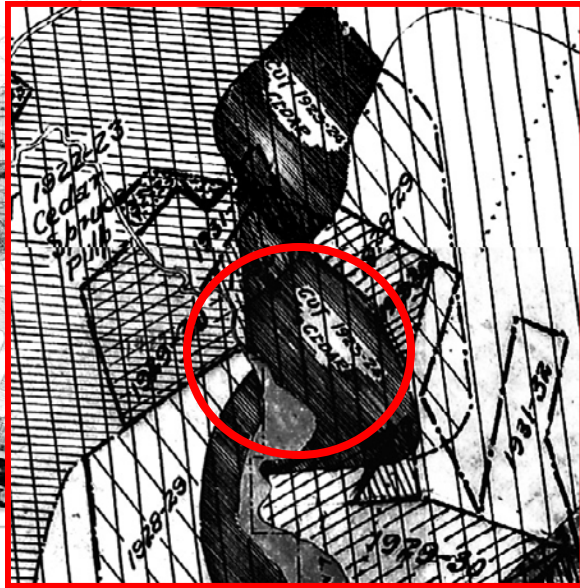
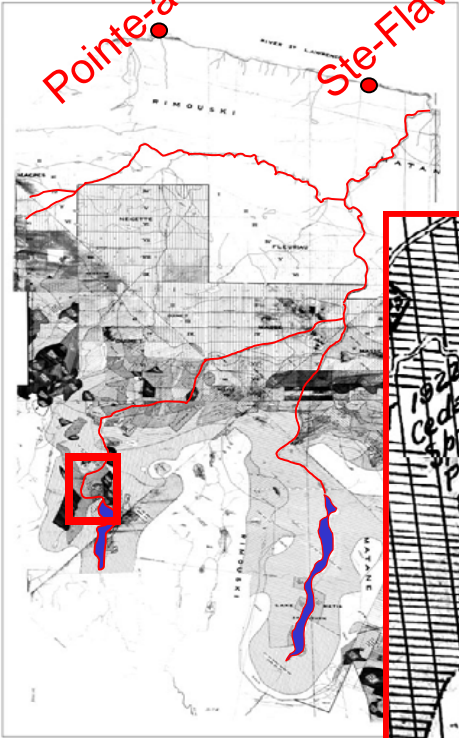
Figure 2. Global-scale changes in the Earth System as a result of the dramatic increase in human activity (Steffen et al., 2003): (a) atmospheric CO_2 concentration (Etheridge et al., 1996); (b) atmospheric N_2O concentration (Machida et al., 1995); (c) atmospheric CH_4 concentration (Blunier et al., 1993); (d) percentage total column ozone loss over Antarctica, using the average annual total column ozone, 330, as a base (Image: J. D. Shanklin, British Antarctic Survey); (e) northern hemisphere average surface temperature anomalies (Mann et al., 1999); (f) natural disasters after 1900 resulting in more than ten people killed or more than 100 people affected (OFDA/CRED, 2002); (g) percentage of global fisheries either fully exploited, overfished or collapsed (FAOSTAT, 2002); (h) annual shrimp production as a proxy for coastal zone alteration (WRI, 2003; FAOSTAT, 2002); (i) model-calculated partitioning of the human-induced nitrogen perturbation fluxes in the global coastal margin for the period since 1850 (Mackenzie et al., 2002); (j) loss of tropical rainforest and woodland, as estimated for tropical Africa, Latin America and South and Southeast Asia (Richards, 1990; WRI, 1990); (k) amount of land converted to pasture and cropland (Klein Goldewijk and Battjes, 1997); and (l) mathematically calculated rate of extinction (based on Wilson, 1992).

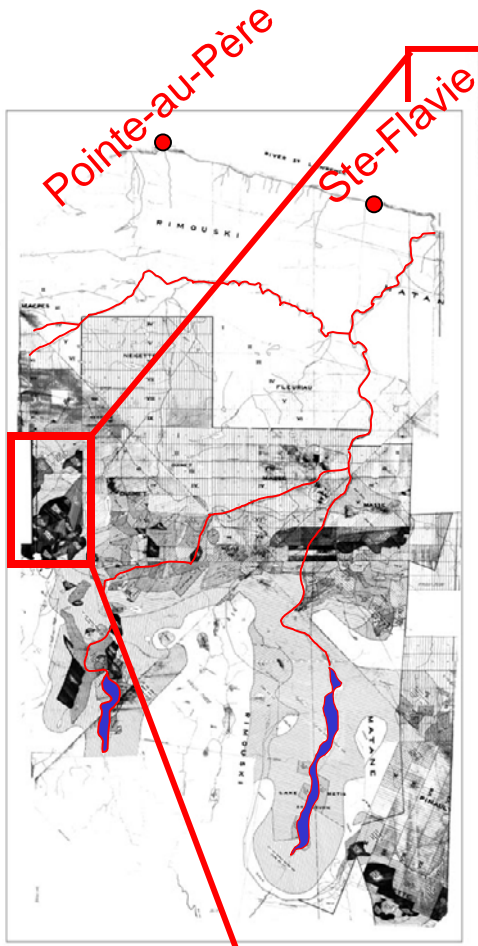
La suite des recherches:

- Reconstitution de l'histoire des coupes dans les bassins versants des rivières Rimouski, Mitis et Matane (documents d'archive, cartes, etc)
- Y-a-t-il un lien entre la fréquence et la sévérité des coupes passées et la perte d'intégrité écologique?



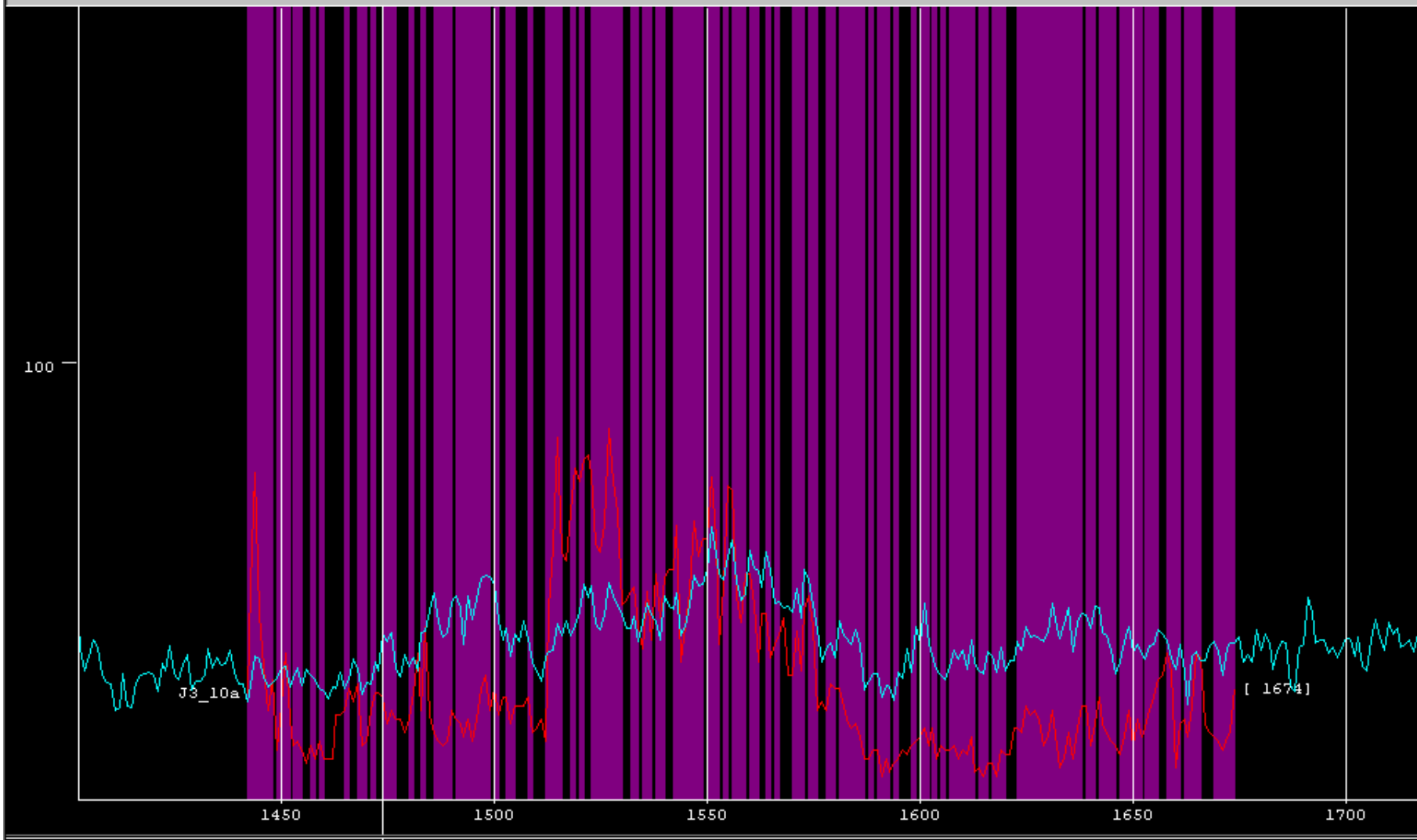
Pointe-au-Père
Ste-Flavie





La suite des recherches:

- Reconstitution de la composition et la structure des forêts d'origine par datation dendrochronologique des billes de bois coulées lors de la période de drave











Le site de récupération est en amont des scieries

Moulins



Site de récupération

Merci aux partenaires

CRFH



François Boulianne (CRFH)

Alain Caron (UQAR)

Yvan Desgagnés (Boralex)

Annaig Mosnier (CRFH)

FQRNT

RGDF

Bionord

Archives Nationale du Québec

La forêt modèle du Bas-Saint-Laurent

Fondation de l'Université du Québec à Rimouski

Chaire de recherche sur la forêt habitée (UQAR)

Reseaux de centres d'excellence sur la gestion

durable des forêts



BAS-SAINT-LAURENT



RÉSEAU DE
FORÊTS MODÈLES
MODEL FOREST
NETWORK



Fonds de recherche
sur la nature
et les technologies

Québec

