



EUROPEAN FOREST INSTITUTE

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30/10/2015

# European Forest Institute EFI

## Regional office on planted forest EFIATLANTIC

# Activities



With and for member countries, member organisations, EU, international processes, stakeholders



## *Main Topic : Sustainability and risks in **planted forests***

Main priorities from strategic agenda :

1. Integrated management of forest risks
2. facilitate adaptation to climate change & enhance mitigation role
3. sustainable intensification of wood production
4. economic viability & ecosystem services



Future-oriented integrated  
management of European  
forest landscapes

# INTEGRAL

## FUTURE-ORIENTED INTEGRATED MANAGEMENT OF EUROPEAN FOREST LANDSCAPES

Wind risk modelling for decision makers -  
**France**



EUROPEAN  
COMMISSION

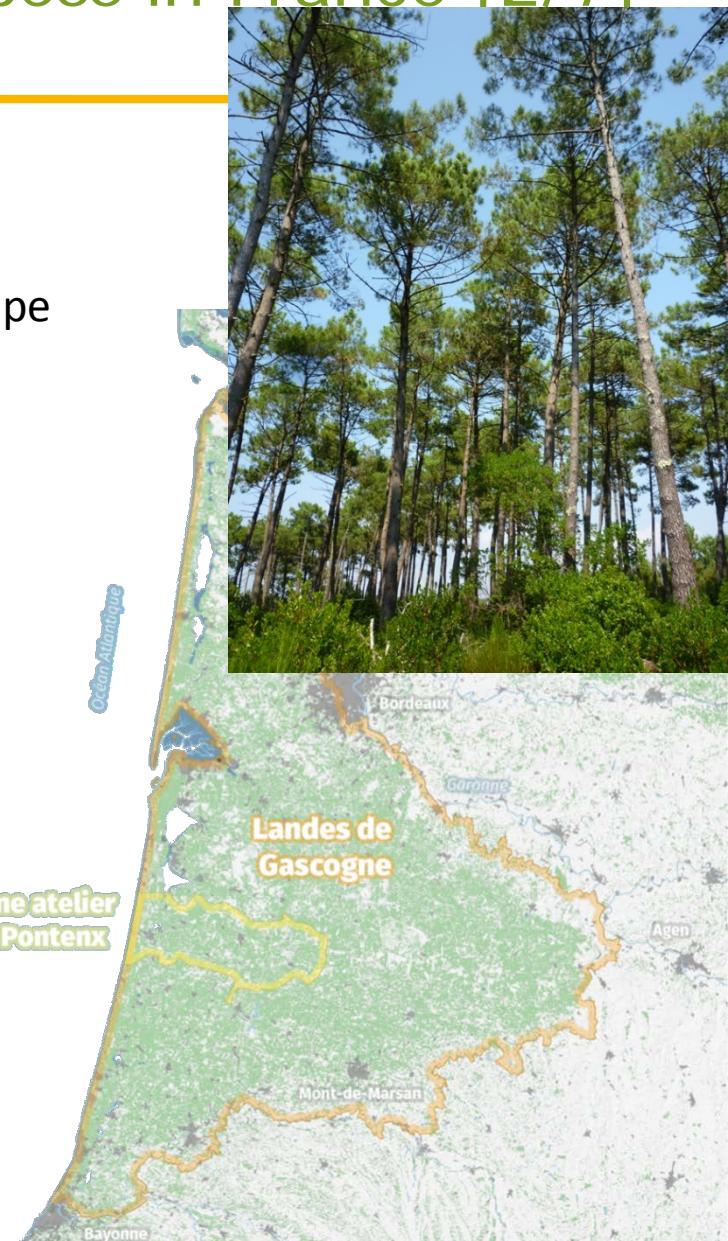


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**Philippe Deuffic (Irstea)**

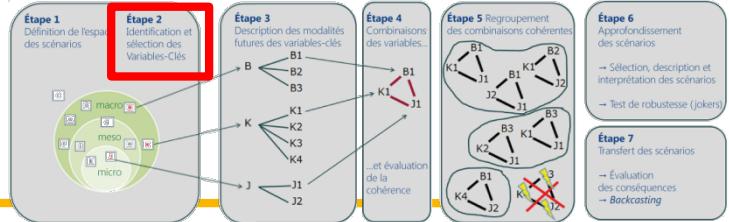
# Summary of WP2.2/scenario process in France [2/7]

## Main challenges for this project

- To make a foresight study on a large forested landscape on a large area
- This requires :
  - Scenario for future socio economic context
  - Understanding of forest owners behaviour according to socio economic context
  - Capacity to modelise forest stand on large areas
  - Capacity to address many ecosystem services and landscape parameters

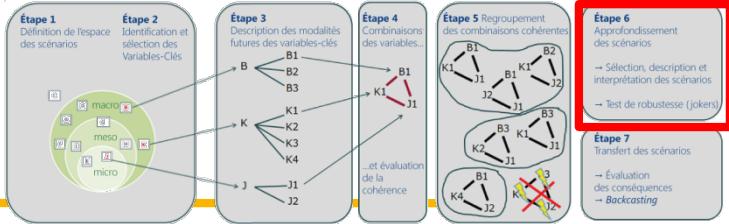


# Scenario building process

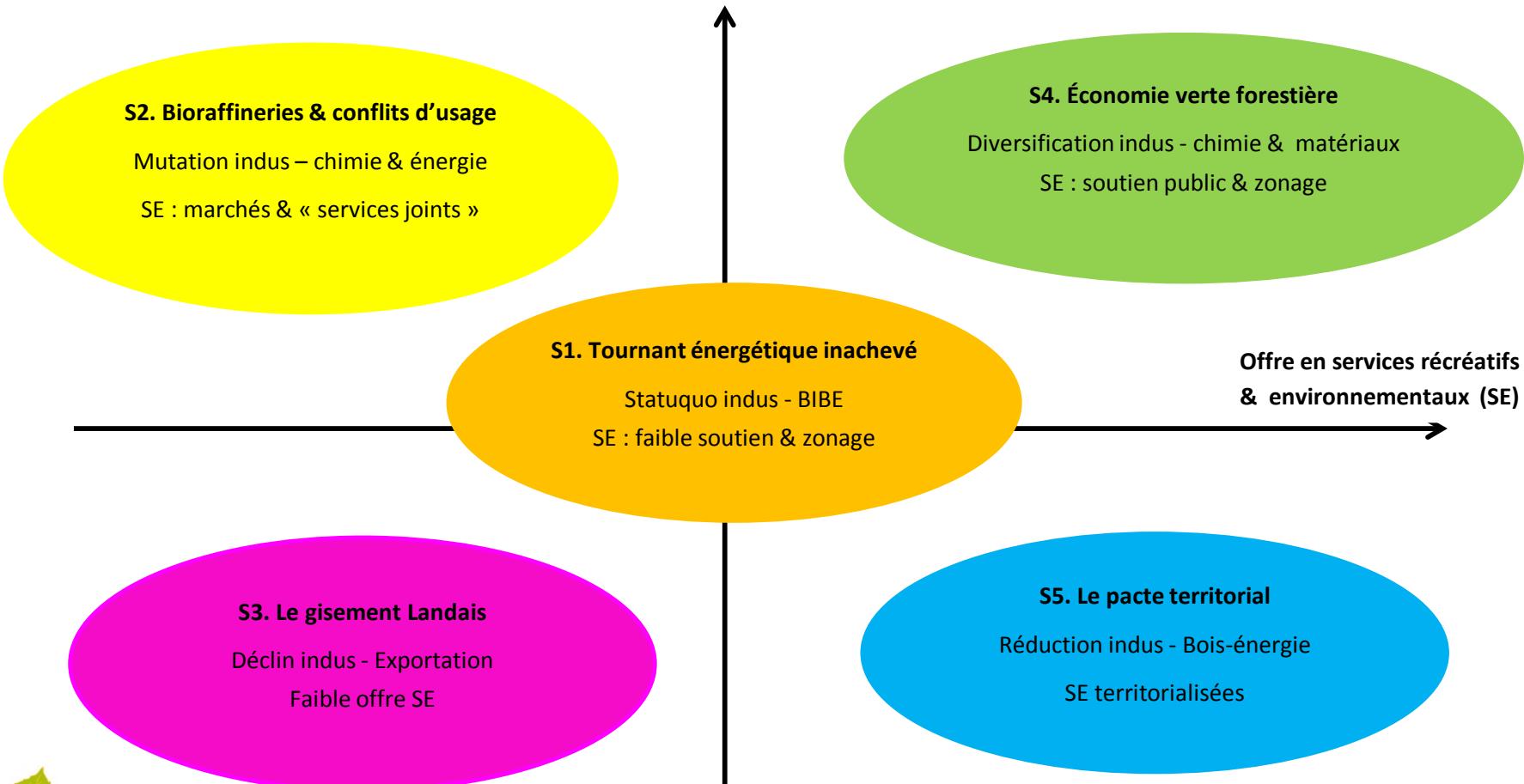


Prix des bois (Pin maritime)	Tissu industriel (structure & produits)	Sylviculture (modèle & gestion)	Propriété forestière (type & mode de gestion)	Services éco- systémiques (Offre)	Gouvernance (action publique & dynamique sectorielle)	Organisation territoriale (usages des sols & dynamiques spatiales)	Représentations sociales de la forêt	Type de gestion du risque incendie
Weak - uniform	Industrial mutation - biomass	Moderately diverse	Delegating individuals	Weak offer	Remote steering	Coastal attractiveness, inland sanctuary	Coexistence of 'nature' & 'production' visions	Strong collective fire management - incentives for insurance
Recovery - energy driven	Industrial decline - exported added value	Fast	Rise of larger legal entities	Public-led, market-based, ES offer	Coordinated, FWC-oriented, governing	Coastal attractiveness, agricultural pressure	Segregation of 'nature' & 'production' visions	Weakening of fire management institutions - no incentives for insurance
Recovery - timber driven	Industrial diversification - timber-led	Diverse - fast	Grouping owners	Public-led, zoning-based, ES offer	Differentiated governing	Diffuse urbanization	Synergies via ES reframing	...
...	Pulpwood dominance - energy	Pulpwood dominance - energy	...	Private-led marketing of ES	...	...	Production 1st	...

# Logique d'ensemble des cinq scénarios



## Tissu industriel régional (structure & produits)



# Forest owner types

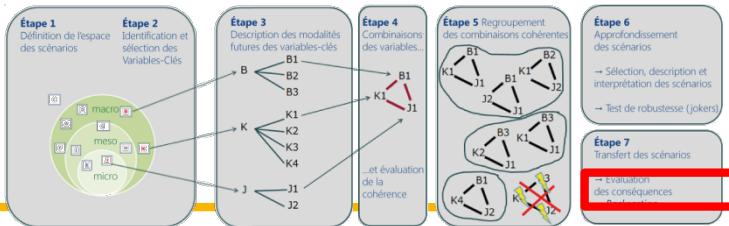
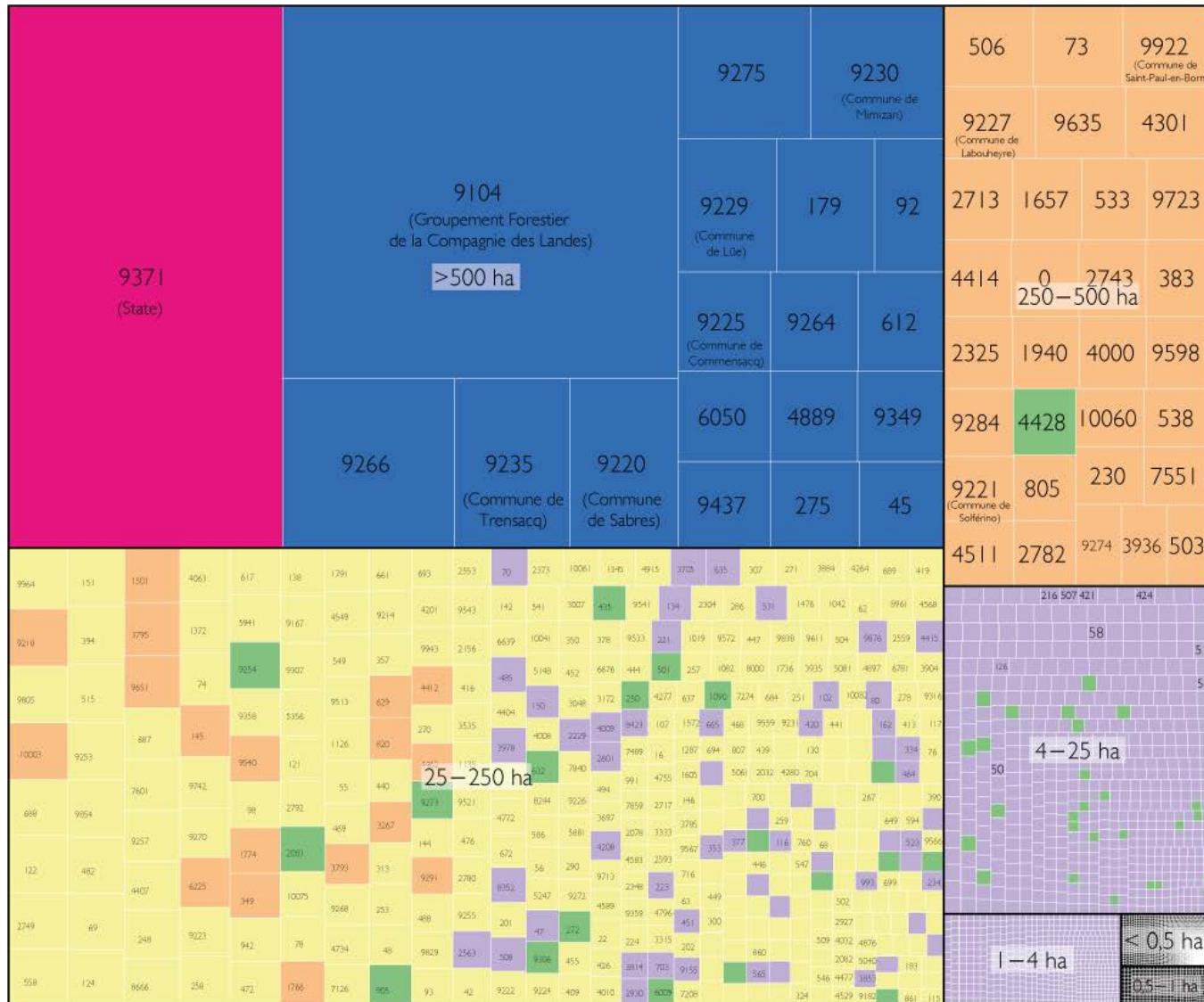


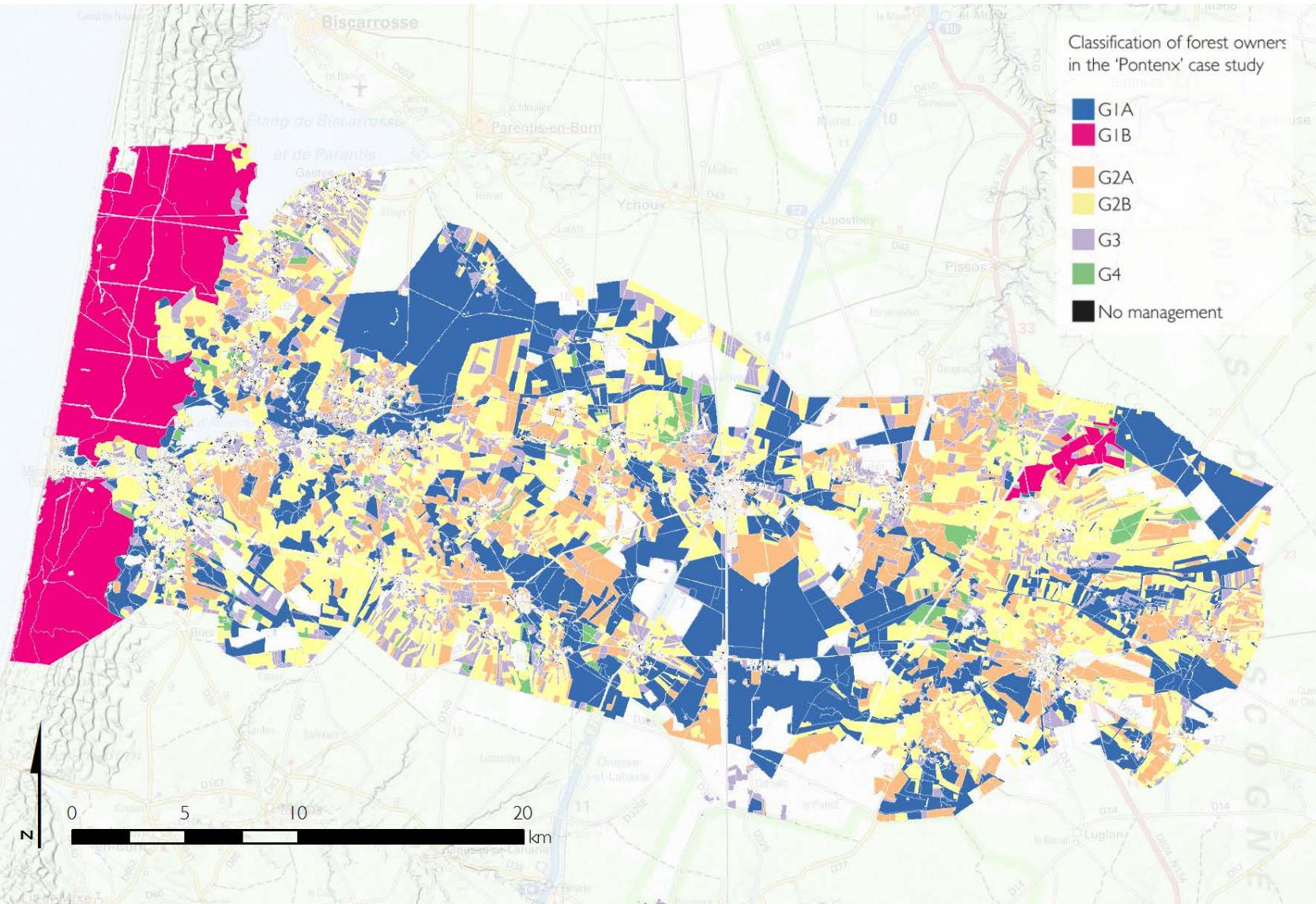
Table 9: Forest Owner Types in Pontenx and share of case study area in their ownership

Name	Description	Share of case study area
G1A: The forest entrepreneur	Owners and managers of large properties (>500 ha).	30 %
G1B: The public manager	Variant of 1a, managers of the state-owned operator ONF.	12 %
G2A: The traditionalist, full-time	250-500 ha.	16 %
G2B: The traditionalist, part-time	25-250 ha.	27 %
G3: The passive outsider	Mostly 1-25 ha.	12 %
G4: The environmentalist forester	Close-to-nature forestry.	2 %
No management	Smallest patches, below 1 ha	1 %

# Random distribution on forest size



# Localisation des propriétés [2/2]



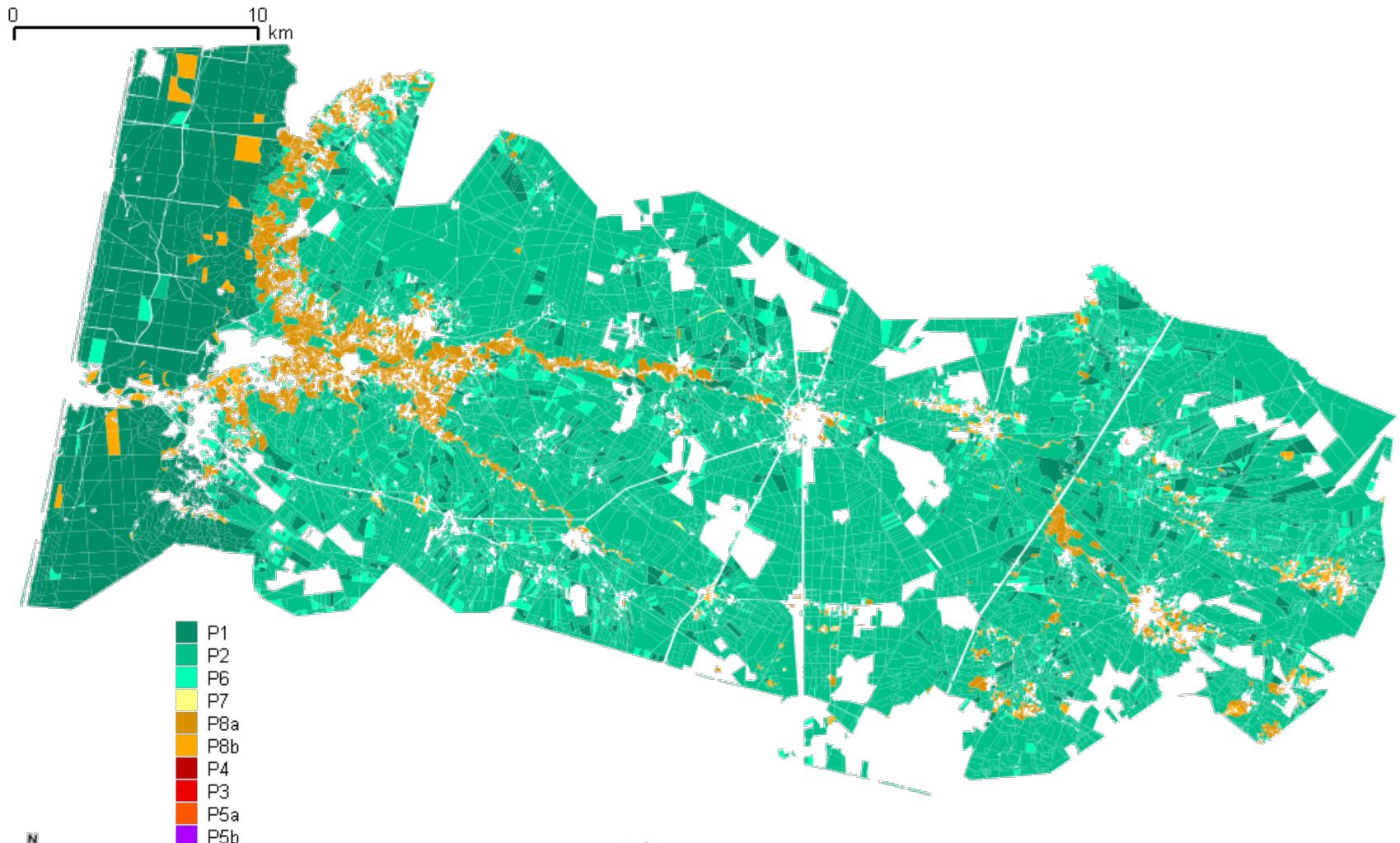
# Sylviculture by forest owner

Table 11: Potential uptake on available forest management programs in Pontenx

Management programs		Relevant for owner types...					
Name	Description	G1A	G1B	G2A	G2B	G3	G4
Prog 1: Pine / high-quality	High-quality timber. 60 years. Broadleaves preservation, diversified wooded undergrowth	✗	✓	✗	✓	-	✓
Prog 2: Pine / standard	Classic silvicultural scenarios. 45 years	✓	✗	✓	✓	✓	✗
Prog 3: Pine / short-term	Management dedicated to pulpwood, 25 years	✓	-	✓	✗	✗	-
Prog 4: Pine / half-dedicated to biomass	Biomass at 9 years, Timber at 35 years	✓	-	✓	✓	✗	-
Prog 5a: Pine / biomass	High-density, short term silvicultural scenario aimed at biomass production. 8-12 years	✓	-	✓	✗	-	-
Prog 5b: Broadleaves / Eucs	Short-term coppices of <i>Eucalyptus gundal</i> ( <i>gunnii</i> x <i>darlympleana</i> )	✓	-	✗	✗	✗	-
Prog 6: Pine / no management	Site preparation and regeneration, followed by a minimal involvement (no thinning, erratic harvest)	✗	✗	✗	✗	✓	-
Prog 7: Broadleaves / Locust	Plantation and coppices of <i>Robinia Pseudoacacia</i>	✓	-	✗	✗	✗	-
Prog 8a: Broadleaves / riparian Oaks	Even-aged management of <i>Q. pedunculata</i> (and other oaks) in riparian areas	✗	✓	✗	✗	✗	✓
Prog 8b: Broadleaves / lowland Oaks	Even-aged management of <i>Q. pedunculata</i> (and other oaks) on the sandy plateau	✗	✓	✗	✗	✗	✓

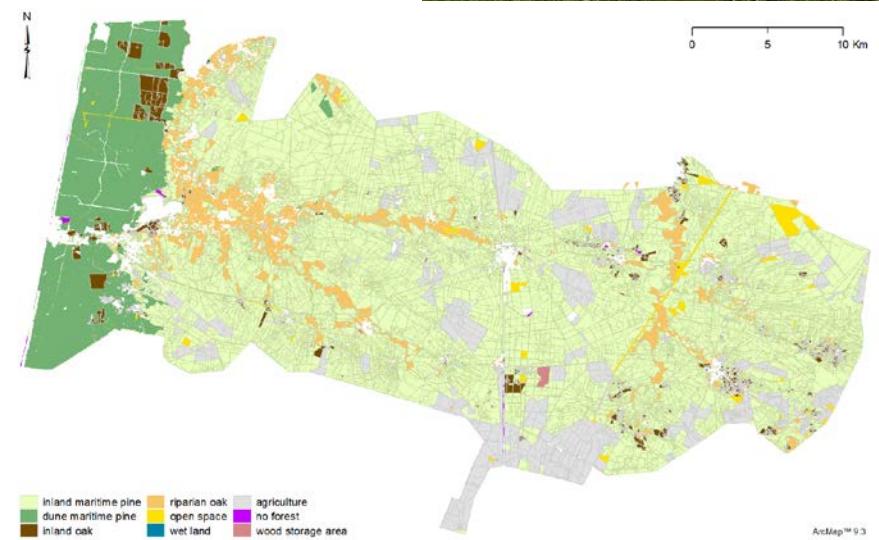
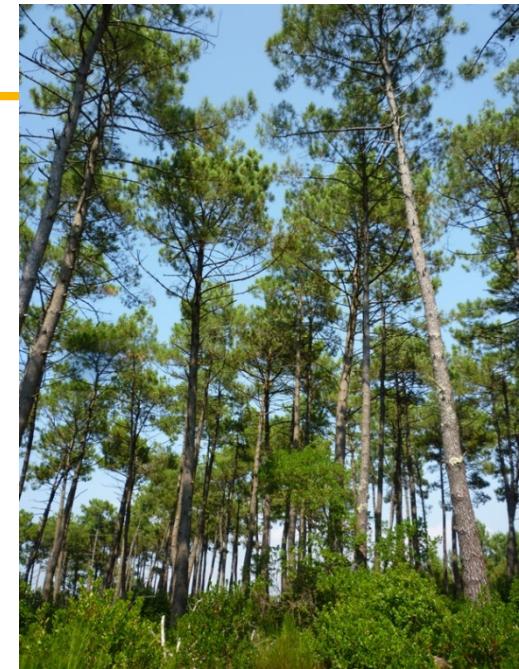
Authors: Irstea & EFI-Atlantic

# Management plan under business as usual



# The need for landscape parameters

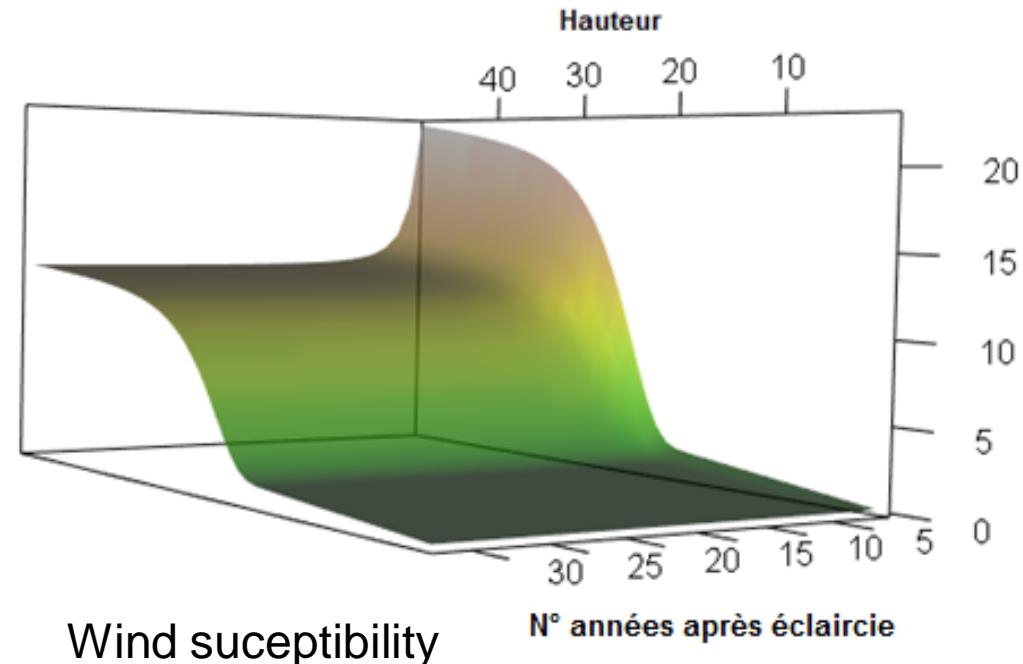
- To support decision by stakeholder we need to provide information on :
  - Timber production
  - Timber quality
  - Non wood ecosystem services
    - Carbon sequestration
  - Risk evolution
    - Fire suceptibility
    - Wind suceptibility
- The need for simplified tools :
  - 15000 virtual stands
  - NO need for long chain of models
  - NO need for individual tree data



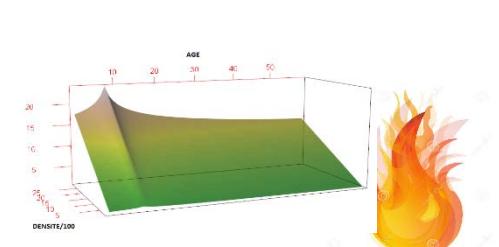
# An expert based equation for pine forest stands

From litterature we confirmed that the wind susceptibility is linked to the following parameters :

- Tree species
- Mean tree height
- Number of years from last thinning
- (Tape function)
- As young stand could be damaged also, regular increase of risk with age
- significant increase when the critical wind speed regularly observed



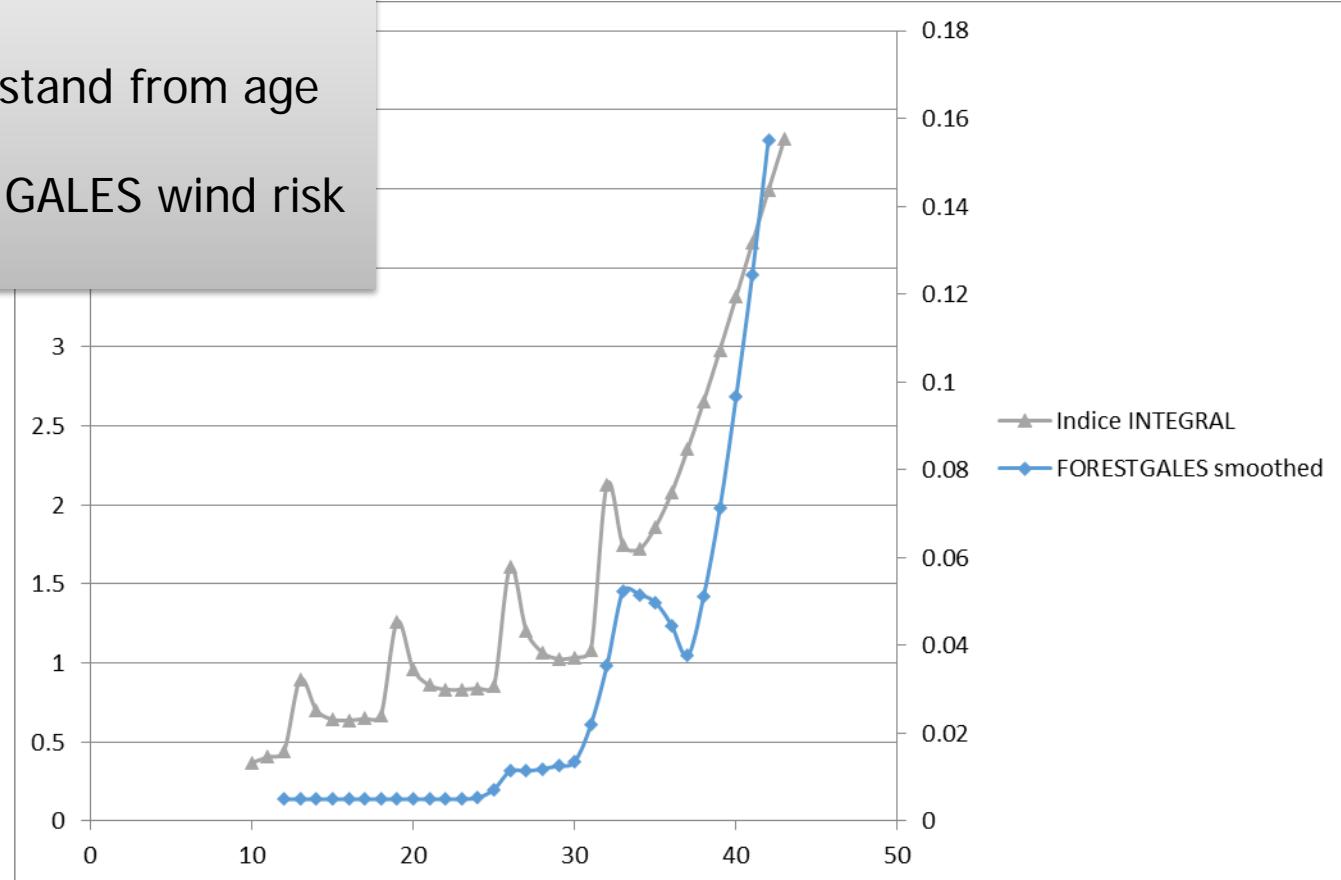
Wind susceptibility



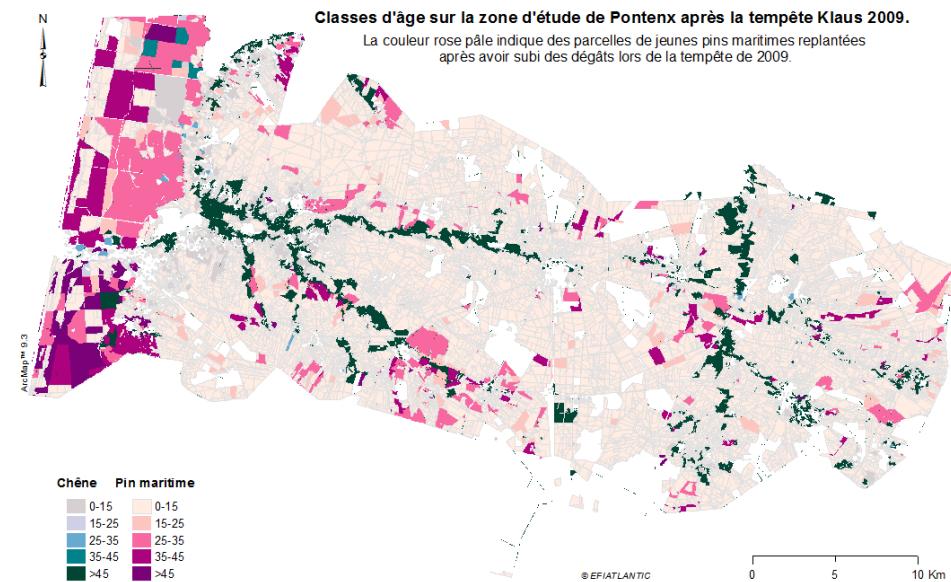
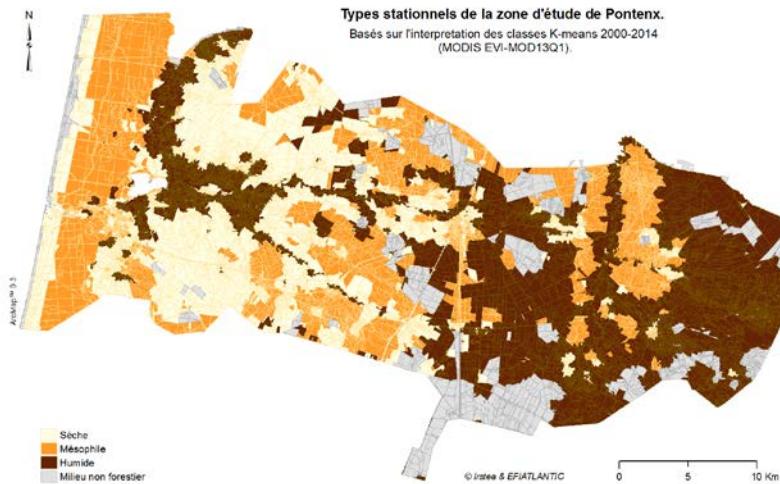
# An expert based equation for pine forest stands

Validation using CAPSIS and forest GALES

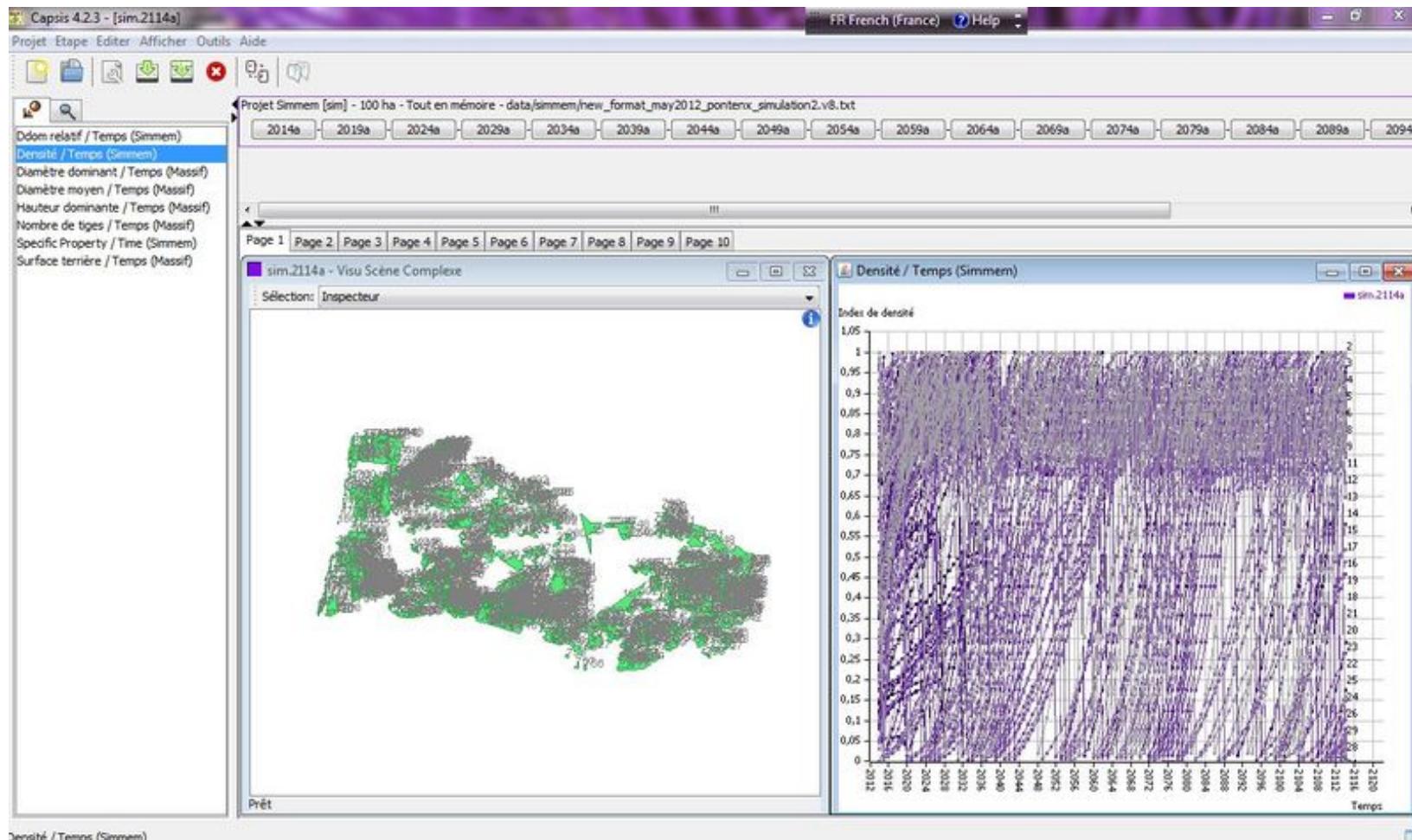
- Simulation of a virtual stand from age 0 to 45
- Evolution of the forest GALES wind risk
- Evolution of the proxy



# INPUT DATASETS

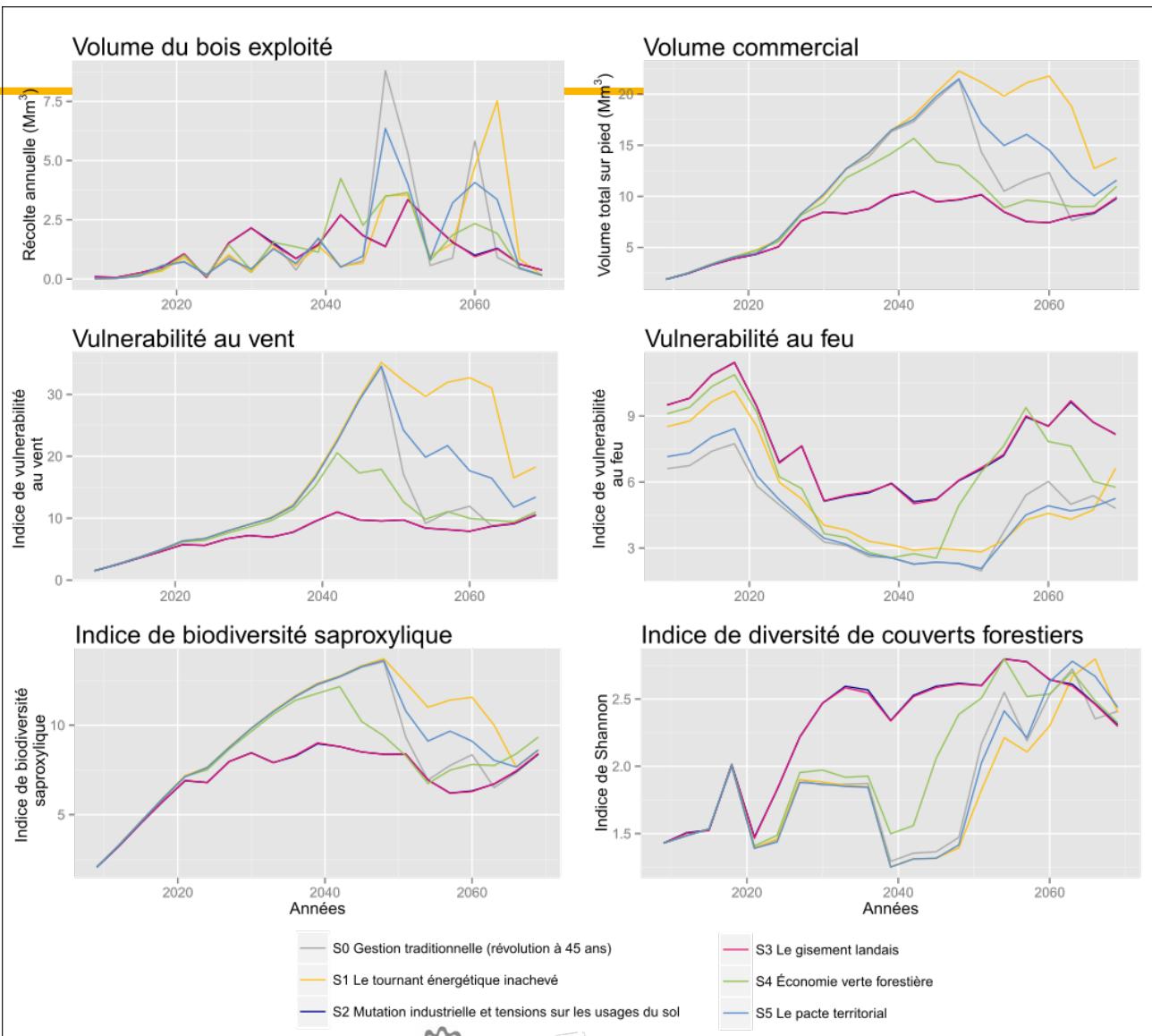


# SIMMEM tool for landscape simulations



Lemoine model, fagacee

# Evolution of landscape indices

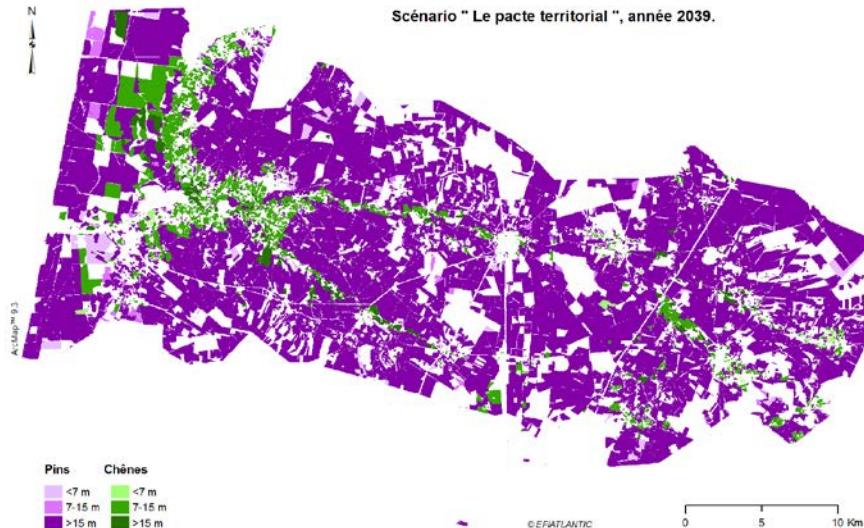


# Des indices pour les Services Ecosystémiques...

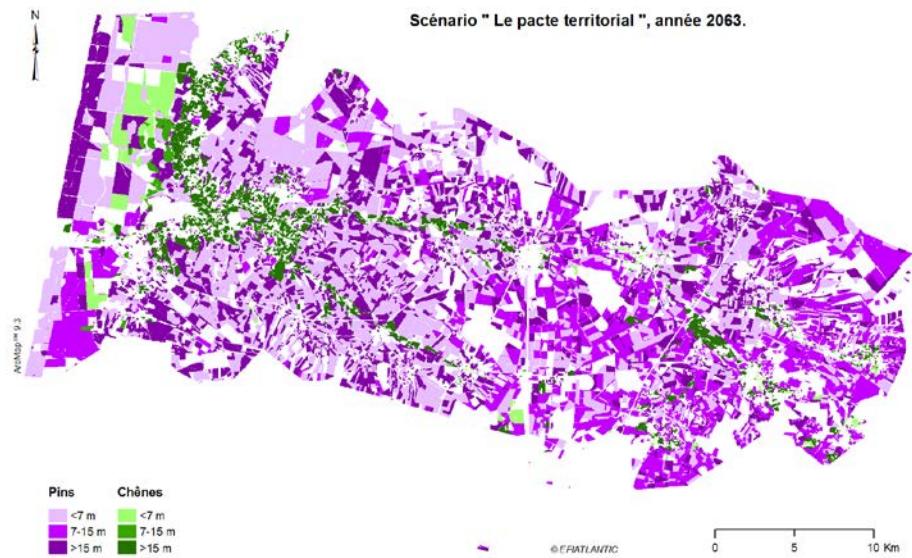
## Indice de diversité de Shannon

La simulation du paysage de la zone de Pontenx prend en compte seulement la couverture forêt pour le calcul de SHDI: les plantations de pins maritime ont été divisées en trois catégories différentes afin de mieux saisir leur rôle au sein de la diversité du paysage, en particulier pour l'avifaune:

- peuplements jeunes (<7 m),
- classe intermédiaire (7-15 m),
- peuplements âgés (> 15 m) (van Halder et al., 2008)
- les peuplements de chêne ont été divisés selon des classes similaires.



SHDI = 1.3



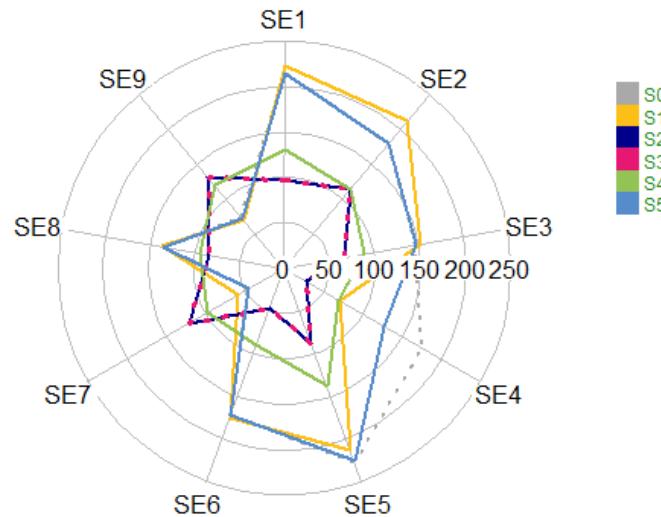
SHDI = 2.8

# Evolution of wind susceptibility

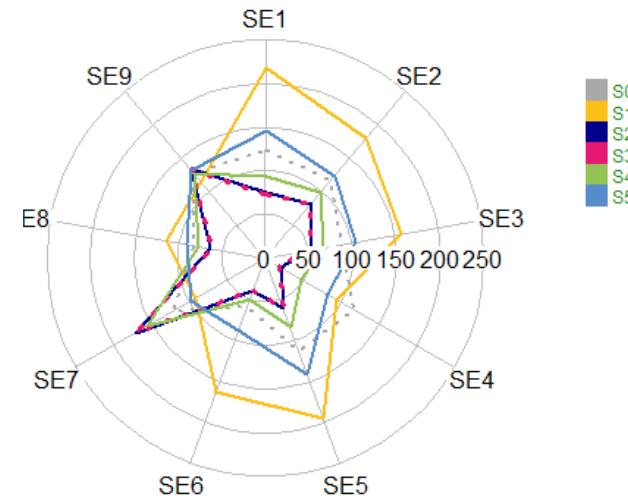


# Services Écosystémiques : une évolution contrastée selon les scénarios

2048



2060



- SE1-Volume total sur pied (m<sup>3</sup>)
- SE2-Valeur total sur pied €
- SE3-Carbone total sur pied
- SE4-Volume total exploité (m<sup>3</sup>)
- SE5-Volume unitaire (m<sup>3</sup>)
- SE6-Indice de vulnérabilité au vent
- SE7-Indice de vulnérabilité au feu
- SE8-Indice de biodiversité saproxylique
- SE9-Indice de diversité de couverts forestiers

# Conclusion

- To make a foresight study on a large forested landscape on a large area :
  - Limited detailed input data -> requires simplified tools
  - Good level of precision to illustrate choices consequences in a quantitative way
  - A tool to combine ecological constraints and forest owner behaviour
  - Possible improvement for wind risk index :
    - More species
    - Dune/plateau site segregation
    - To consider edge effects
    - Matrix of trade-offs
    - More automatic accurate data



# Thank you

## Outils et méthodes

### SIMULATION DE L'ÉVOLUTION DE LA DYNAMIQUE FORESTIÈRE DANS LES LANDES DE GASCOGNE SOUS DIFFÉRENTS SCÉNARIOS SOCIOÉCONOMIQUES

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