Intensive Study Site

proposed by BIOGECO, Partner 1a

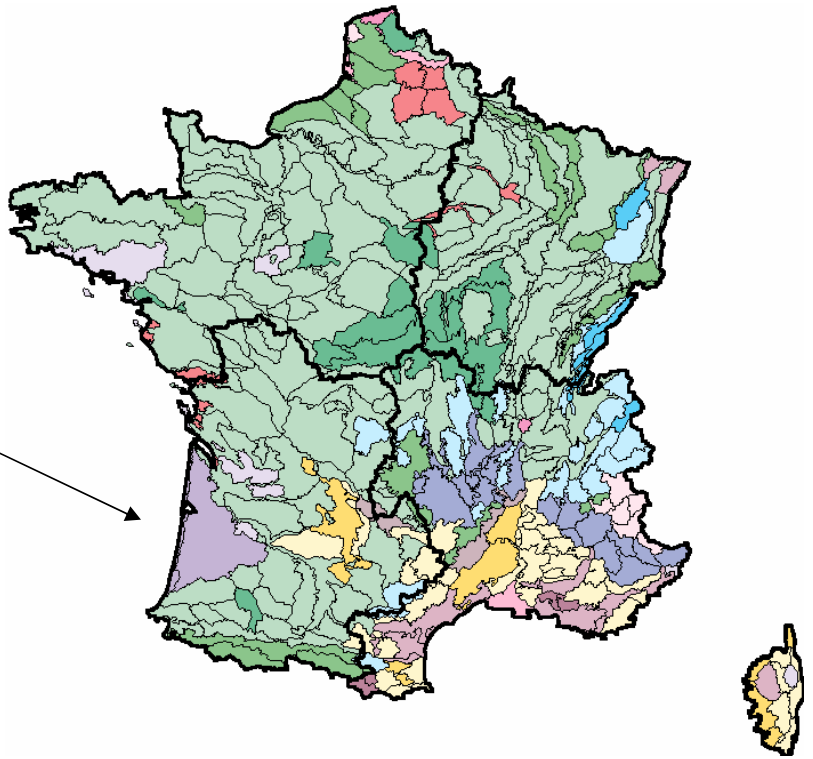
Landes of Gascony

Terrestrial ecosystem = Intensively managed

General information

Located in south-western France
W 01°05' - N 44°13'

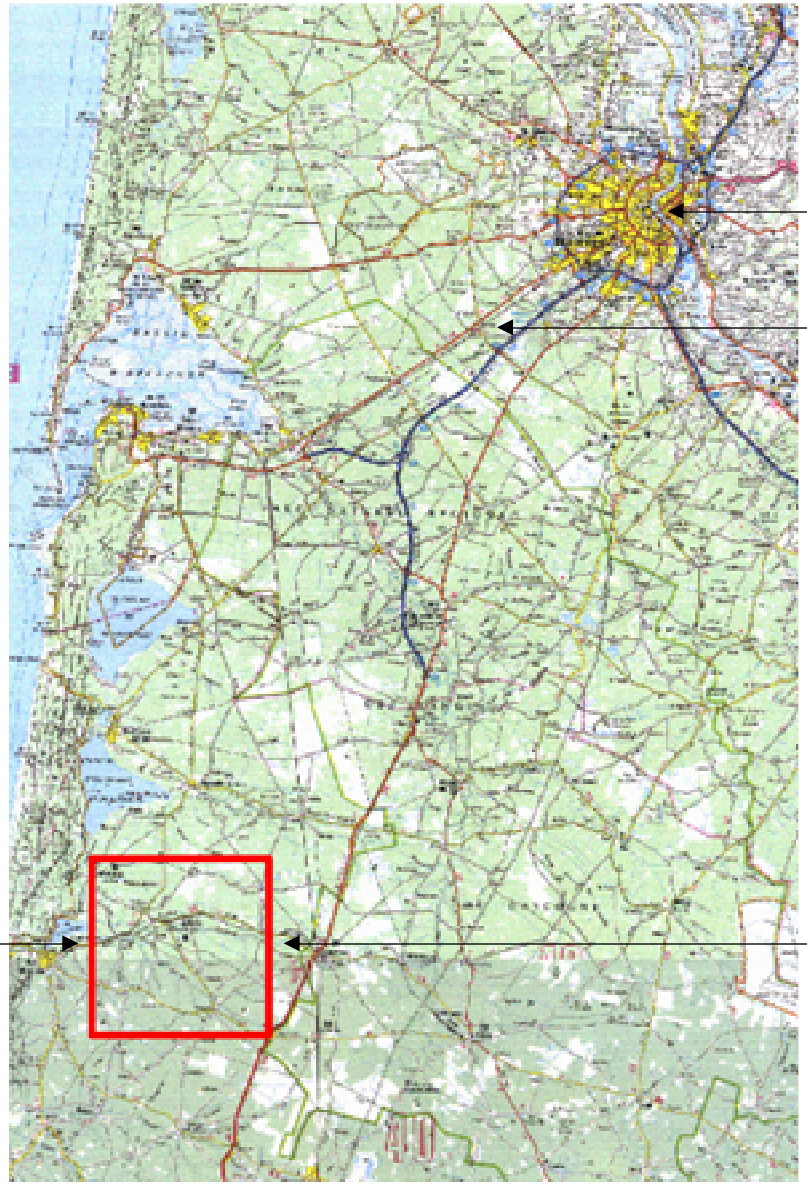
In the heart of the largest artificial forest in Europe



1 million ha of maritime pine
- **pure, even-aged stands**
- **plantation (improved varieties)**
- **fertilization, thinning**
- **clear cutting (50 years)**

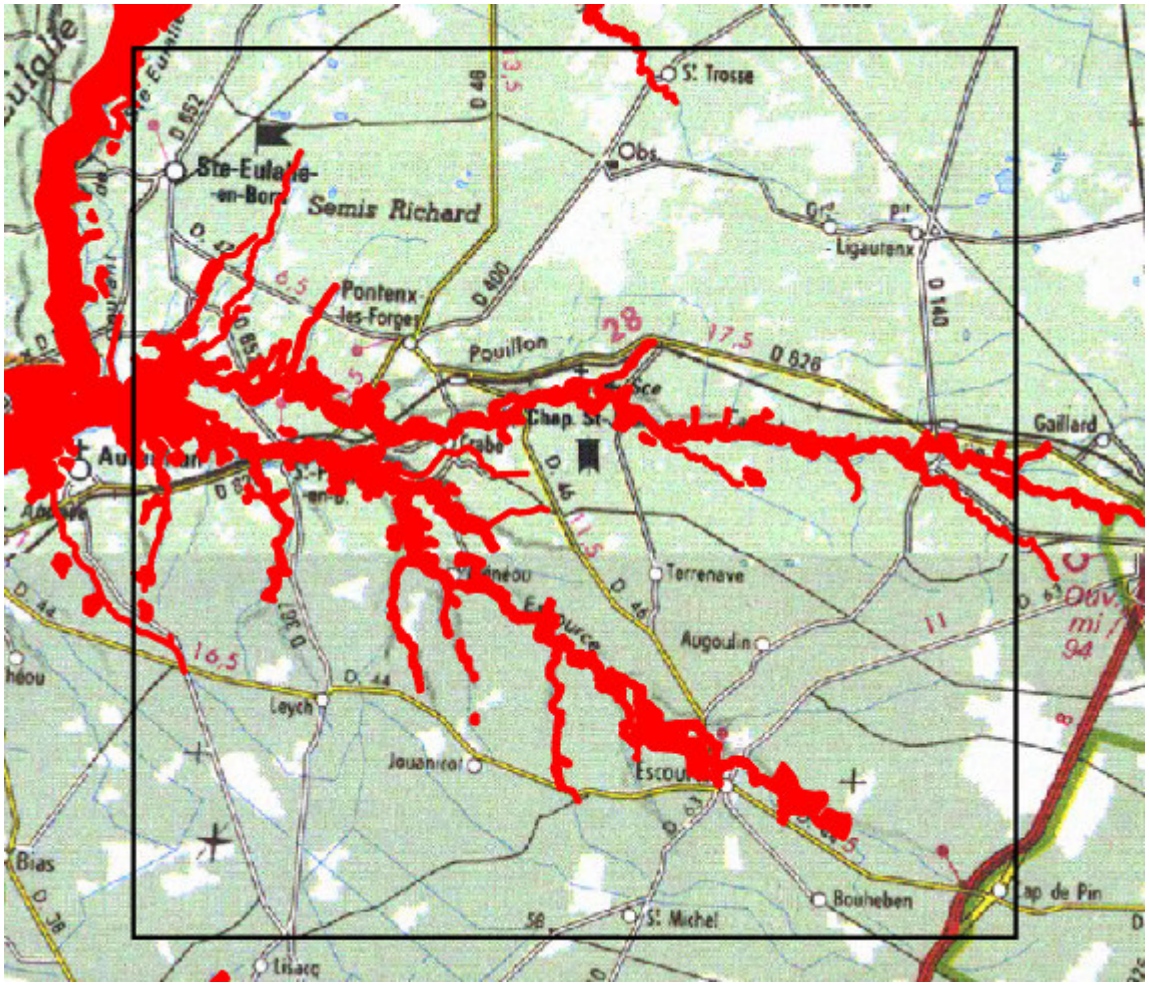
Terrestrial ecosystem represented by the ISS: Intensively managed

General information



Ownership - Legal status

90% privately owned since XIXth century



Natura 2000 sites

Ecological information

Model tree species in the proposed ISS:

Pinus pinaster

einstein.uab.es

Quercus robur

classes.hortla.wsu.edu

Quercus pyrenaica

www.cidadevirtual.pt

Target tree species:

Alnus glutinosa, Fraxinus excelsior, Betula alba, B. pendula,
Castanea sativa, Corylus avellana, Crataegus monogyna
Prunus avium, P. Serotina, P. Spinosa
Salix acuminata, S. arenaria, S. Repens
Sorbus domestica, S. Torminalis
Fagus sylvatica,
Quercus suber

Conservation value : species diversity

Maritime pine plantation

60

110

120

40

60

Riparian forest

Emys orbicularis

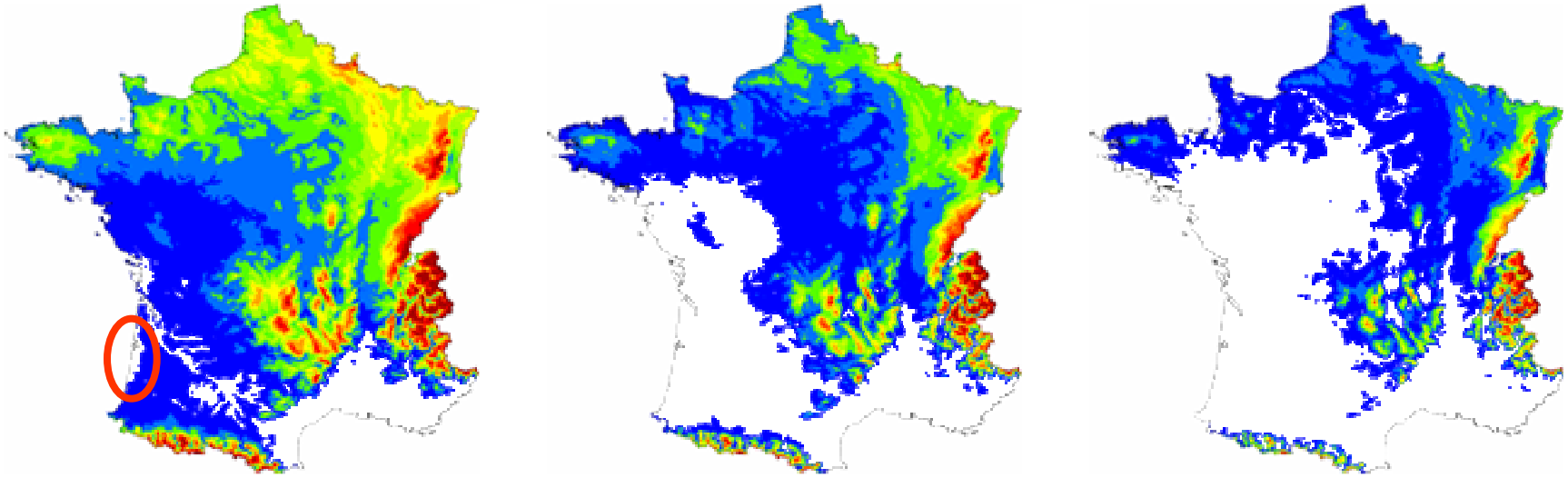
Lutra lutra

Rhinolophus ferrum-equinum

Osmunda regalis

Conservation value : genetic diversity

***Fagus sylvatica* at its rear edge in European plains**



Actual climate | Climate 2050 | Climate 2100

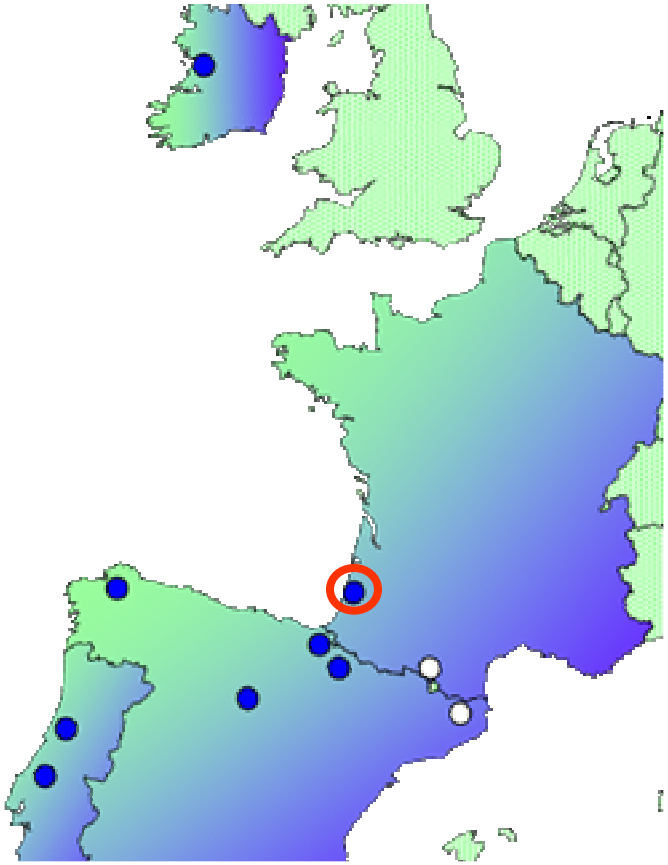
Badeau et al. 2005

***Quercus suber* at its leading edge**

Relation with other networks

FORSEE

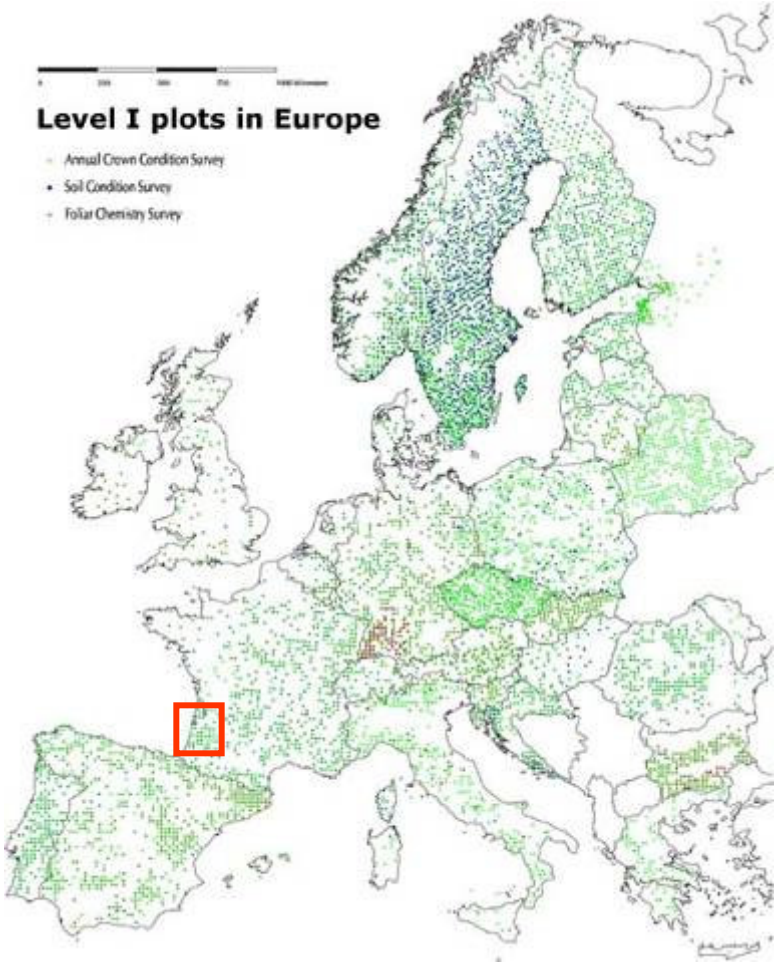
A network of pilot zones to improve criteria and indicators of Sustainable Forest Management



1 pilote zone

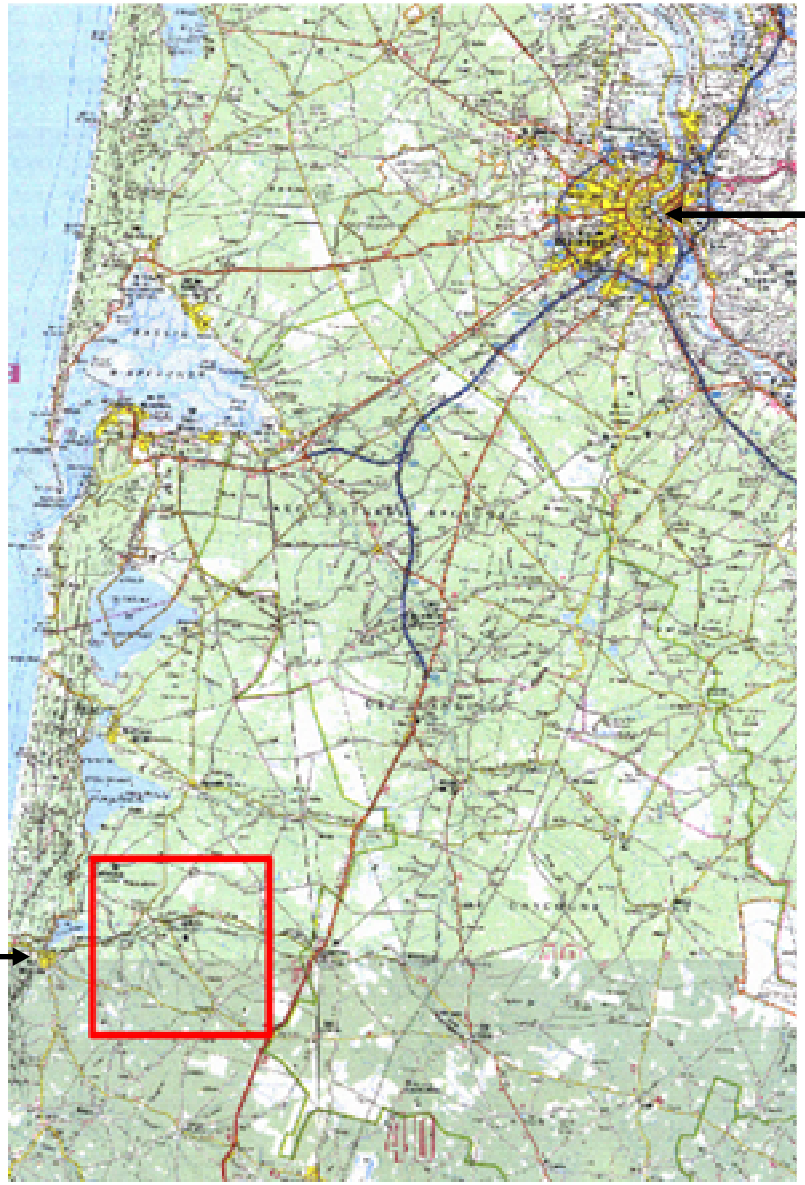
ICP Network

Large scale forest condition monitoring



5 monitoring plots

Interest for local managers, education…



Bordeaux

- 1st education centre for forestry in France (7 Masters)
- 10 wood-forestry labs

arbora

Association pour la Recherche sur la Production forestière et le Bois en Région Aquitaine

MEDIA FOREST

Promotes scientific results to forest stakeholders

Local expertise and facilities of the correspondent

Biodiversity – Genes - Communities

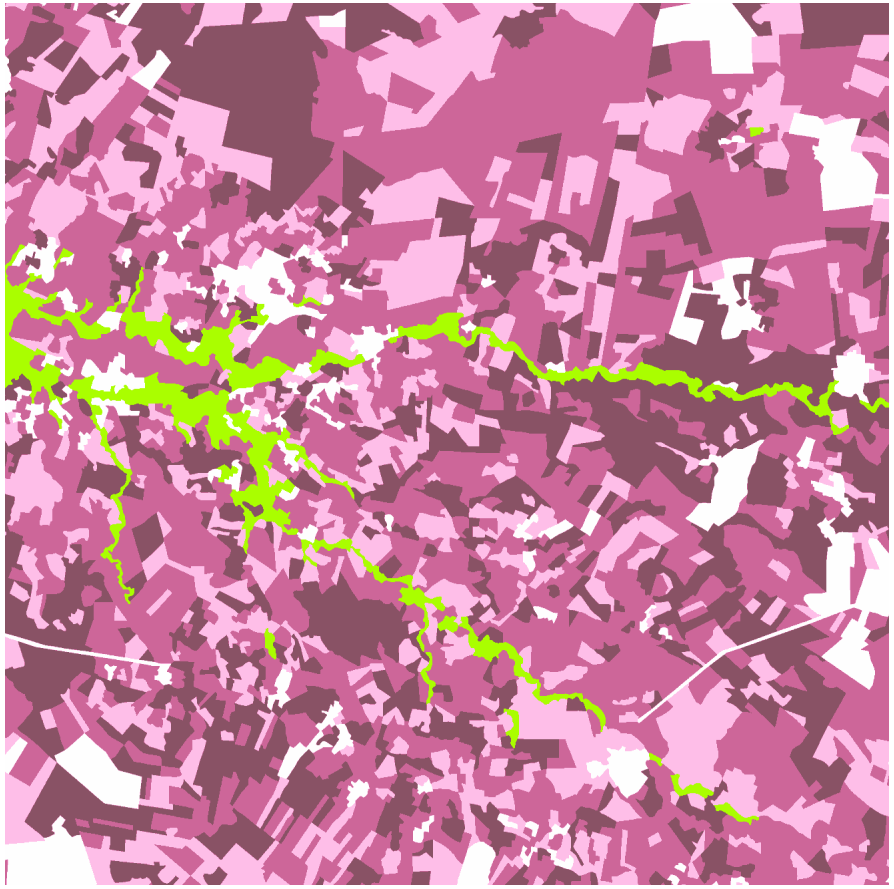
Expertise
- forest genetics and genomics
- functional and communities ecology
- epidemiology and modeling

Main models
- trees: pines, oaks
- associated species: vascular plants, insects, fungi, birds

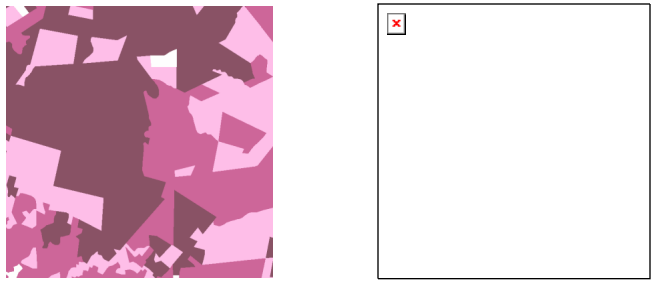
Facilities
- GPS, GIS, Database software and managers

Within site diversity

Matrix of maritime pine plantations



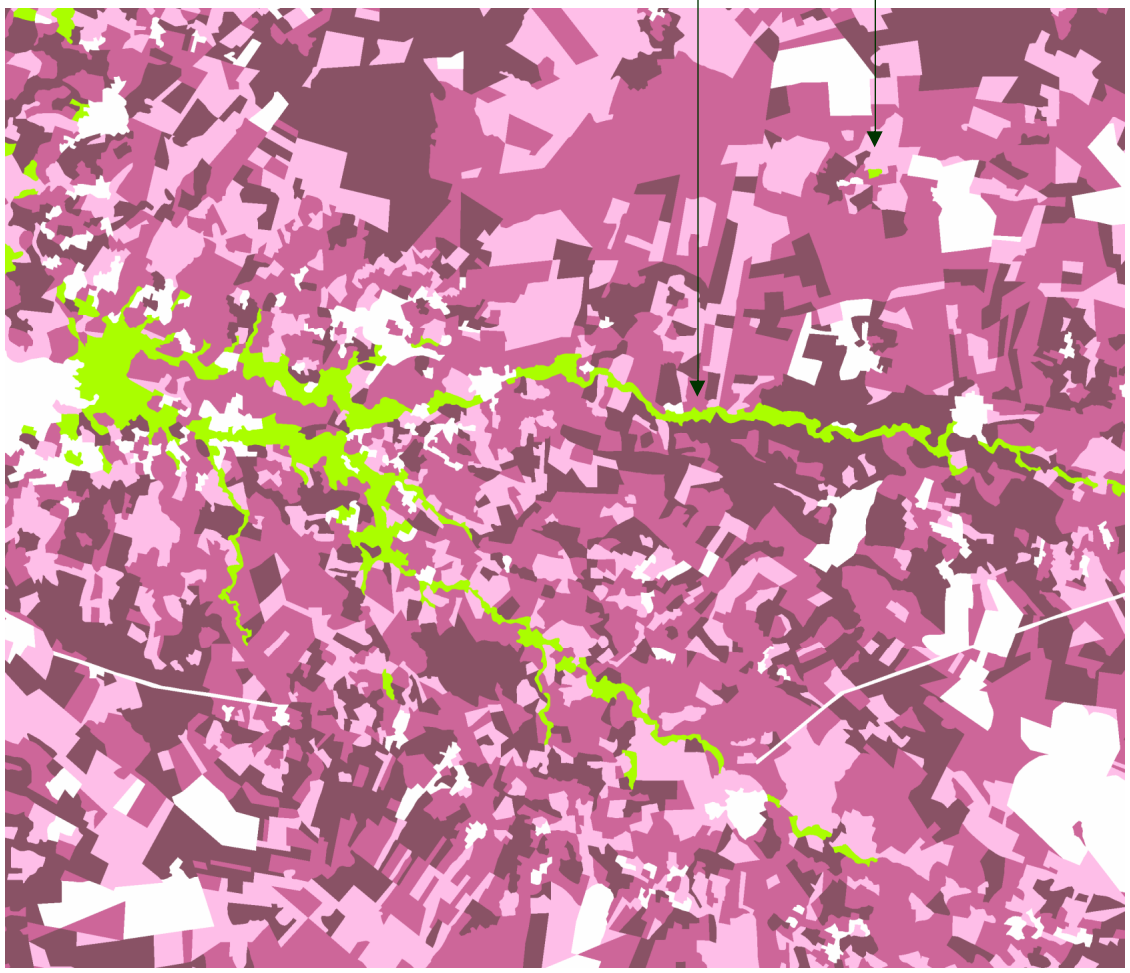
Contrasted stand structures



Contrasted landscape fragmentations

Deciduous tree species as :

- -individual trees within pine stands
- -isolated patches
- -riparian forest



Within site diversity

Many generalist species
Some forest species associated with deciduous trees

False ringlet

All sites
P. tithonus (69.0)
G. rhamni (45.1)
O. venata (33.8)
E. aurinia (19.7)
P. icarus (11.3)
B. circe (5.6)

Maritime Pine stands
M. dryas (66.2)
C. pamphilus (47.3)
C. oedippus (45.2)

Deciduous woodlands
P. aegeria (88.6)
M. jurtina (71.7)
A. paphia (15.2)
L. reducta (13.7)

Young - open stands
C. argiades (57.3)

Old -closed stands
L. phlaeas (42.6)

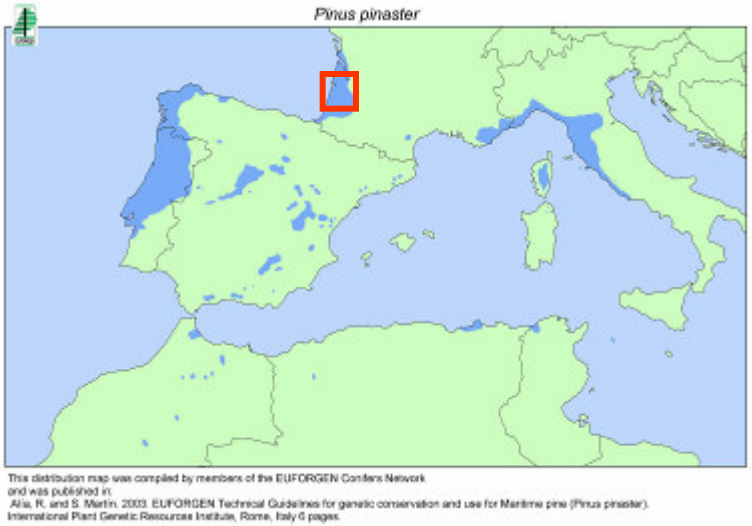
Speckled wood butterfly

Within site comparability

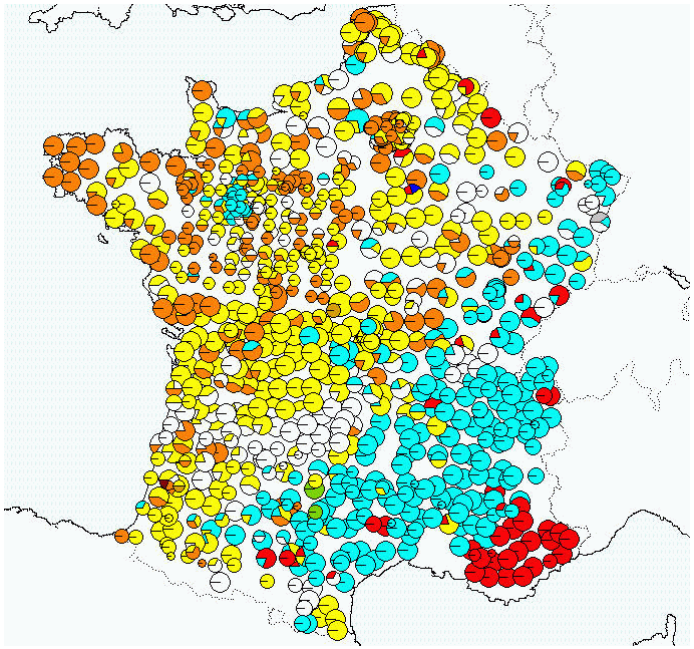
- **1 type of soil: podzol**
- **0 slope** (0m – 83m)
- **3 site conditions: dry – mesophilous – humid heaths**

➔ **Pine stand = pseudo-replicate of forest composition and structure**

Gene-pool

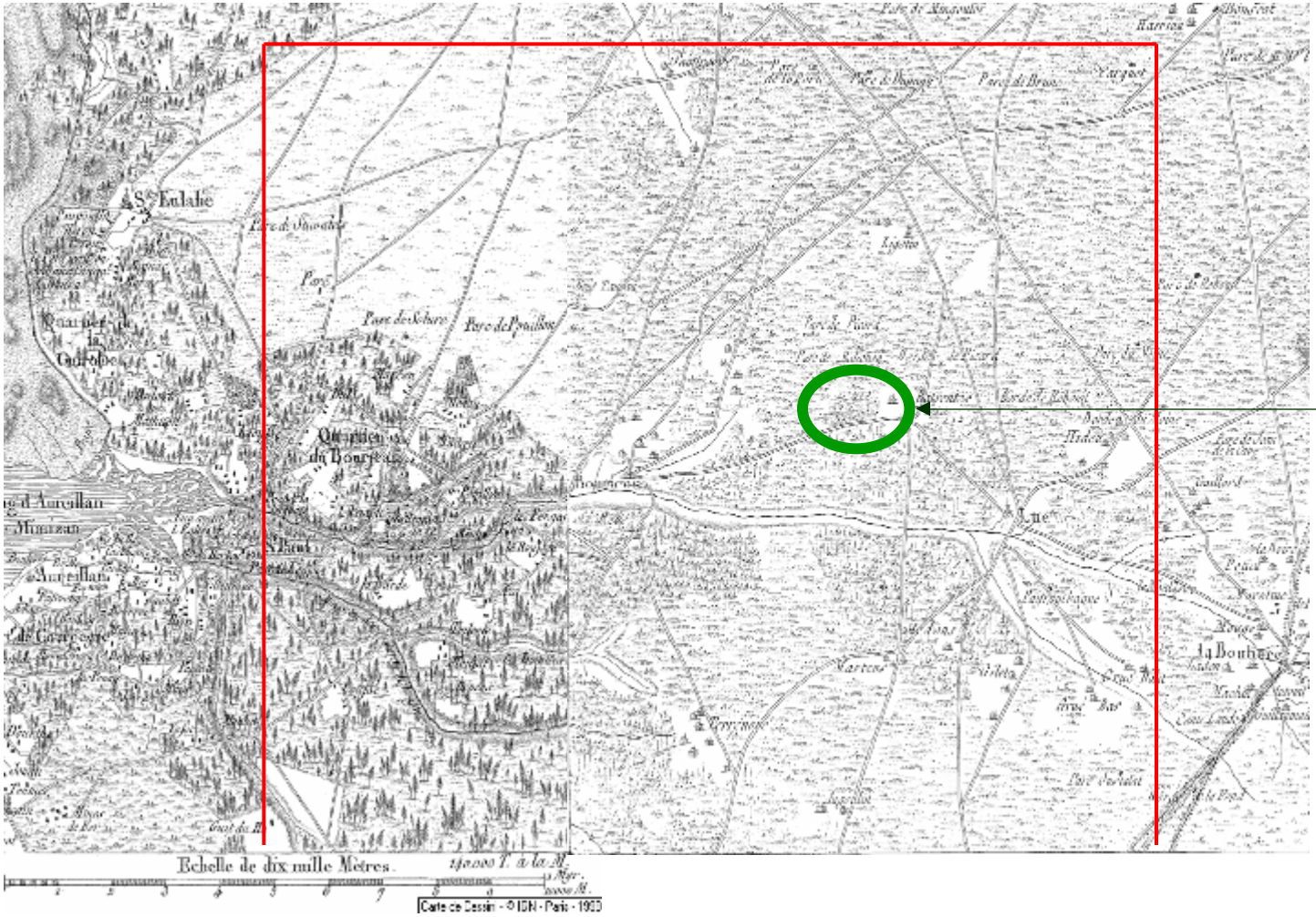


Within the natural range of *Pinus pinaster*



Atlantic haplotype of *Quercus robur*

Historical records



Historical map (from Cassini, 1760-1789)

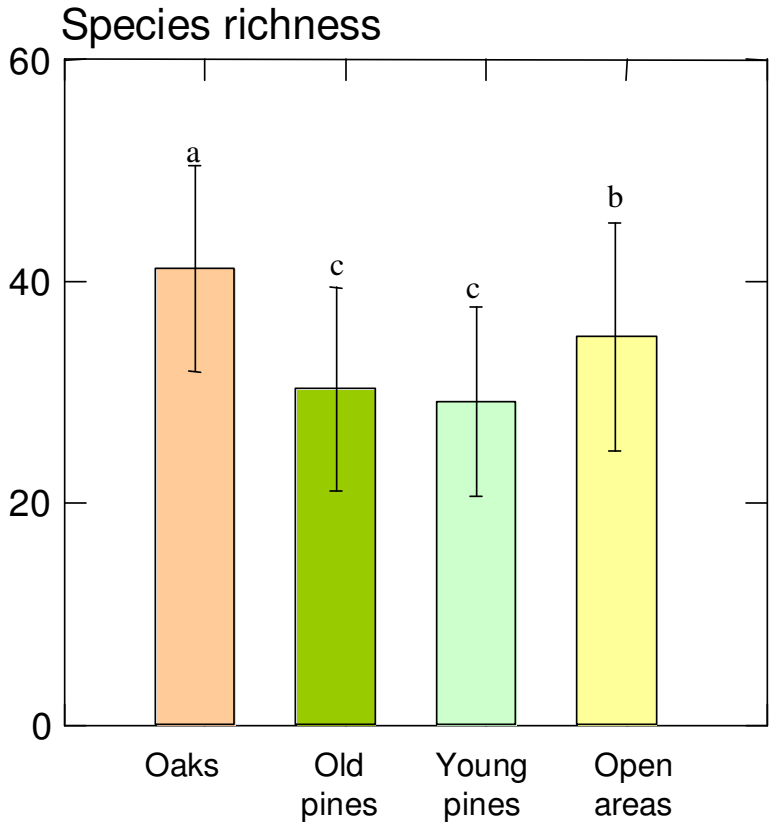
Past research and available datasets

Comparison of species diversity between forest types

- pine stands of different structure (canopy height and cover)
- deciduous woodlands (patches, riparian)
- open habitats (clear-cut, firebreak)

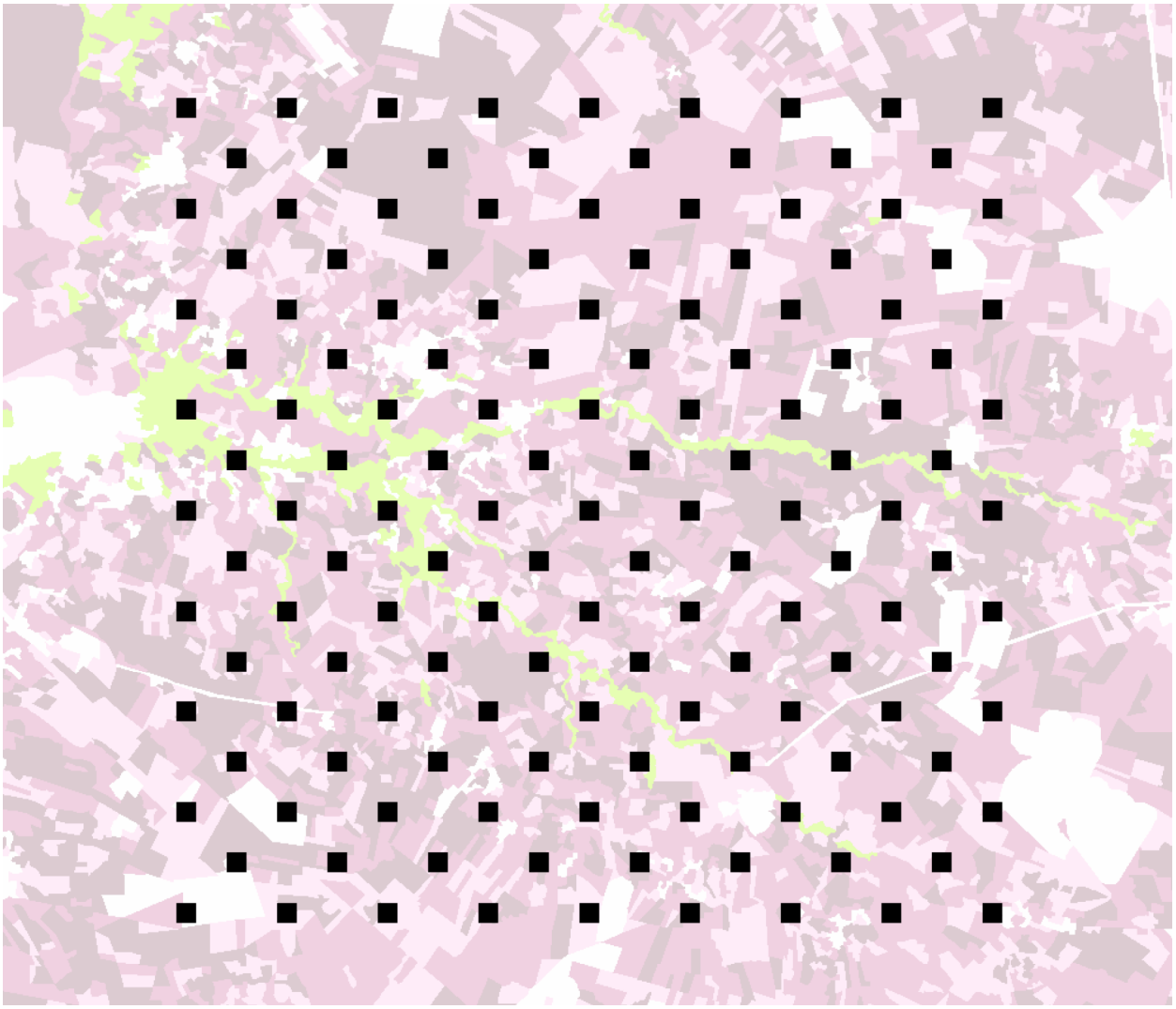
in 6 different taxa

- vascular plants
- carabid beetles
- saproxylic beetles
- butterflies
- spiders
- birds



Past research and available datasets

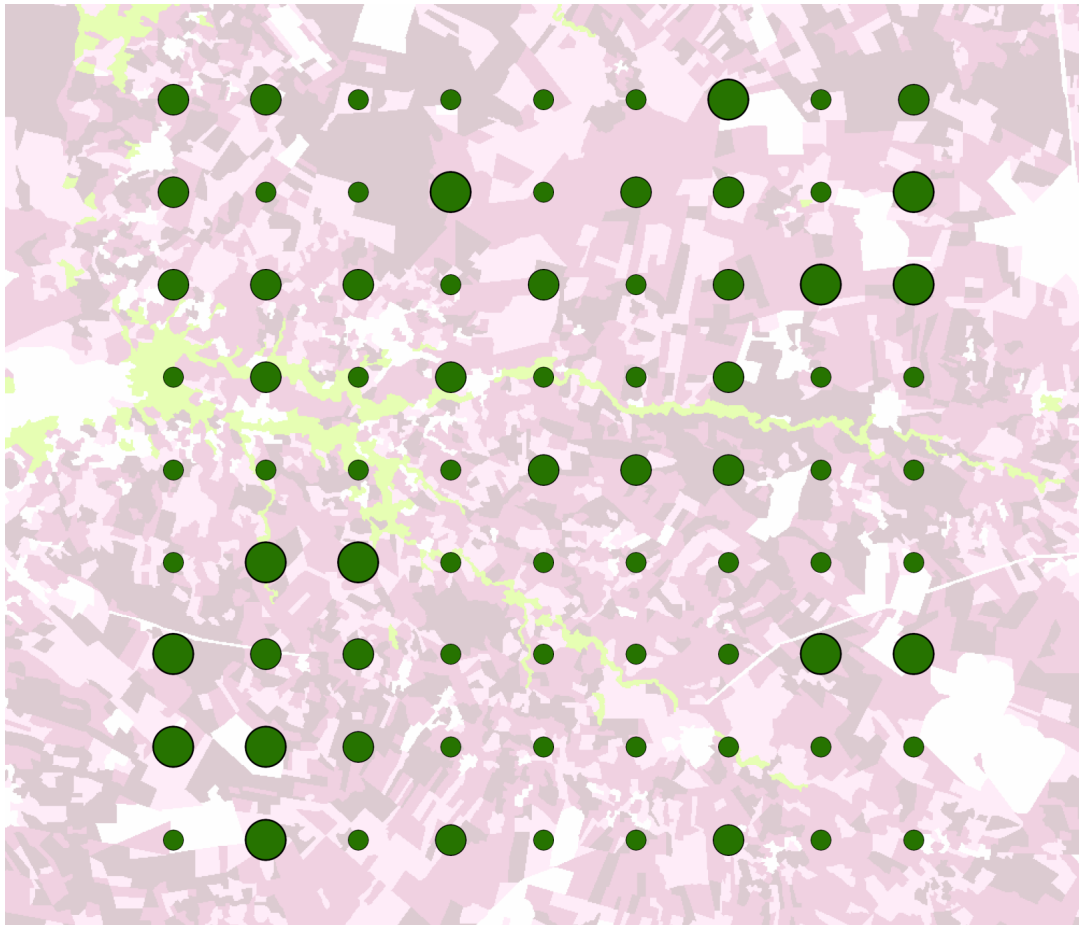
Network of 145 ISP to monitor forest condition



Grid 1.4 km
11 000 trees

Past research and available datasets

Sub-sample of 81 plots for the long-term monitoring of the Pine Processionary Moth (PPM) population dynamics



Main interest for JERA 3, JERA 4, IA1.4

1. **Large monoculture of maritime pine**
   + long-term monitoring of main defoliator (PPM)
   ➔ dynamics of herbivore – tree interactions
   (2 EVOLTREE model species, robust dataset, large-scale network)

2. **Diversity of deciduous trees** (EVOLTREE model and target species)
   in 3 forms: individual, patches, riparian remnants
   within a matrix of pine plantation
   ➔ dynamics of diversity *vs.* population size and isolation
   ➔ how cultivated forests interfere with processes
   (fragmentation, gene flow disruption, understorey disturbance)
   (buffer adverse conditions, corridors, habitat complementation)

3. **Uniformity of environmental conditions and pine stand management**
   ➔ ecological manipulation
   (stand = understorey vegetation, forest gaps for regeneration)
   (landscape = gradient of distance from deciduous patches, contrasted fragmentation)

Main interest for JERA 3

Tree – insect herbivore interactions

- Genetic variation of insect herbivores within contrasted landscapes
- relationships genetic diversty of tree + herbivory (pines & oaks)
- role of insect herbivory on geographic mosaic of coevolution in oaks

Dynamics of diversity in patchy populations of deciduous trees

- genetic and specific diversity in relation with population size and isolation
- impact of cultivated forest on diversity of deciduous trees and associated sp.
- genetic diversity of trees at rear or leading edges of natural range

Main interest for JERA 4, IA1.4

- Comparison of diversity in ancient *vs.* recent broadleaved patches
- Pollen and seed flows of deciduous trees in contrasted landscapes
- Plasticity *vs.* local adaptation to climate change, insect defoliation
- Impact of afforestation on diversity in neighboring remnants

- Spatially explicit real data to test demo-genetics models at the landscape level in response to land-use changes