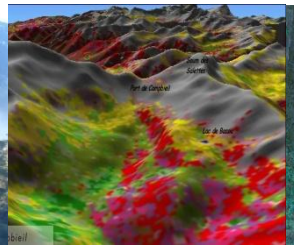
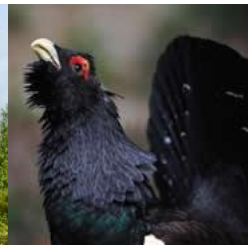
Forests and the European context

Sandra LUQUE

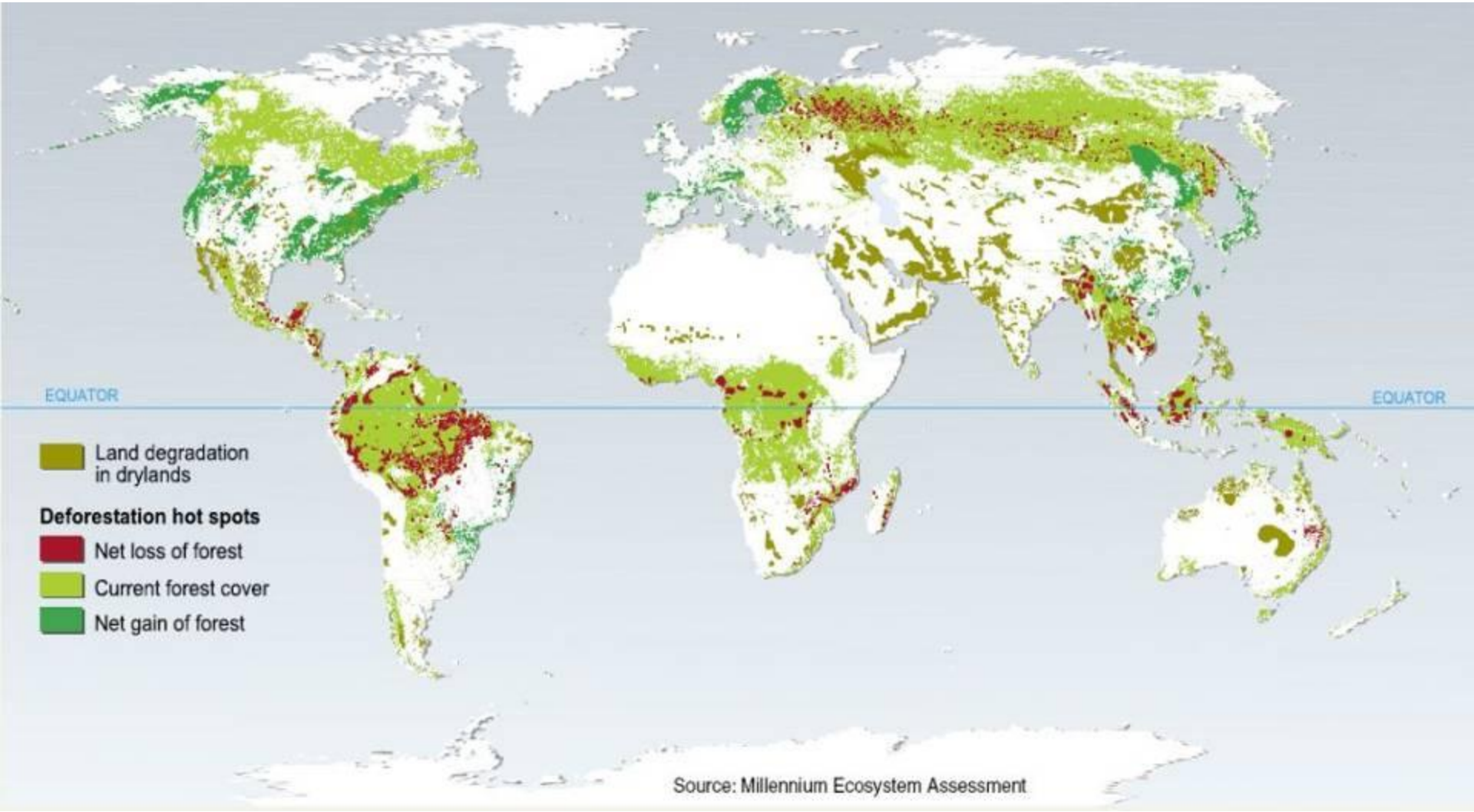





The Global Context

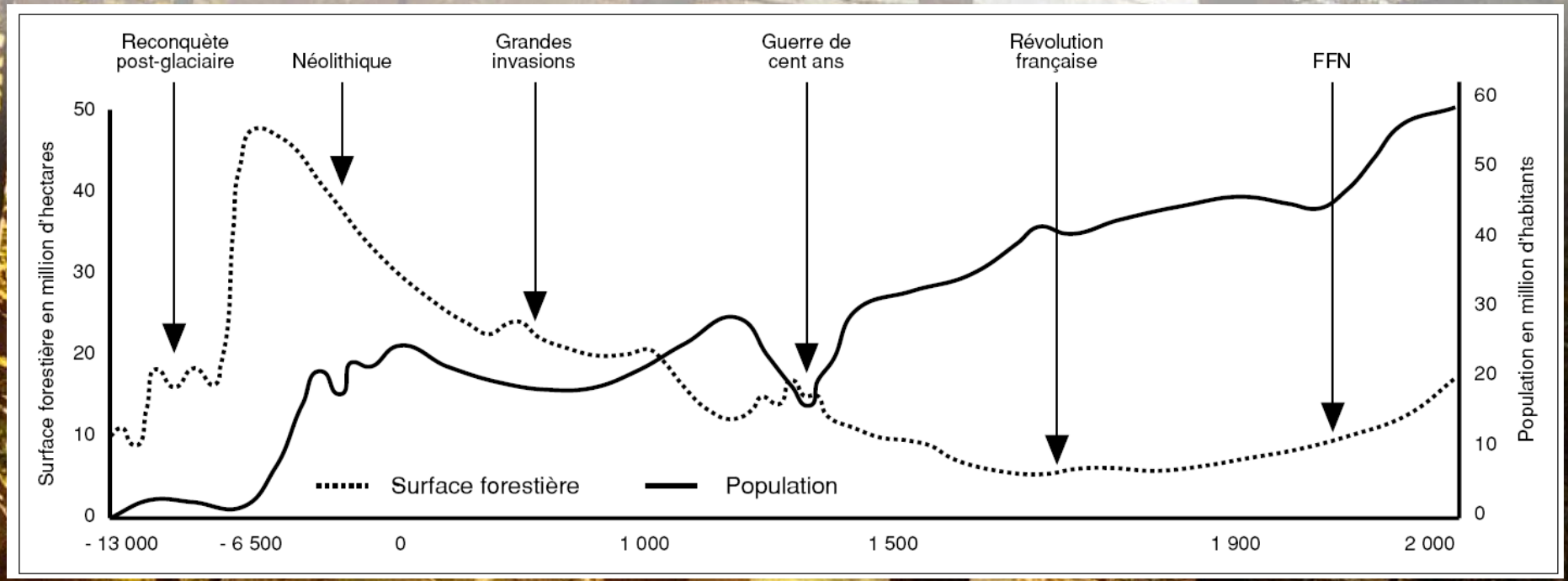
Land-Use Change



State of the French forest

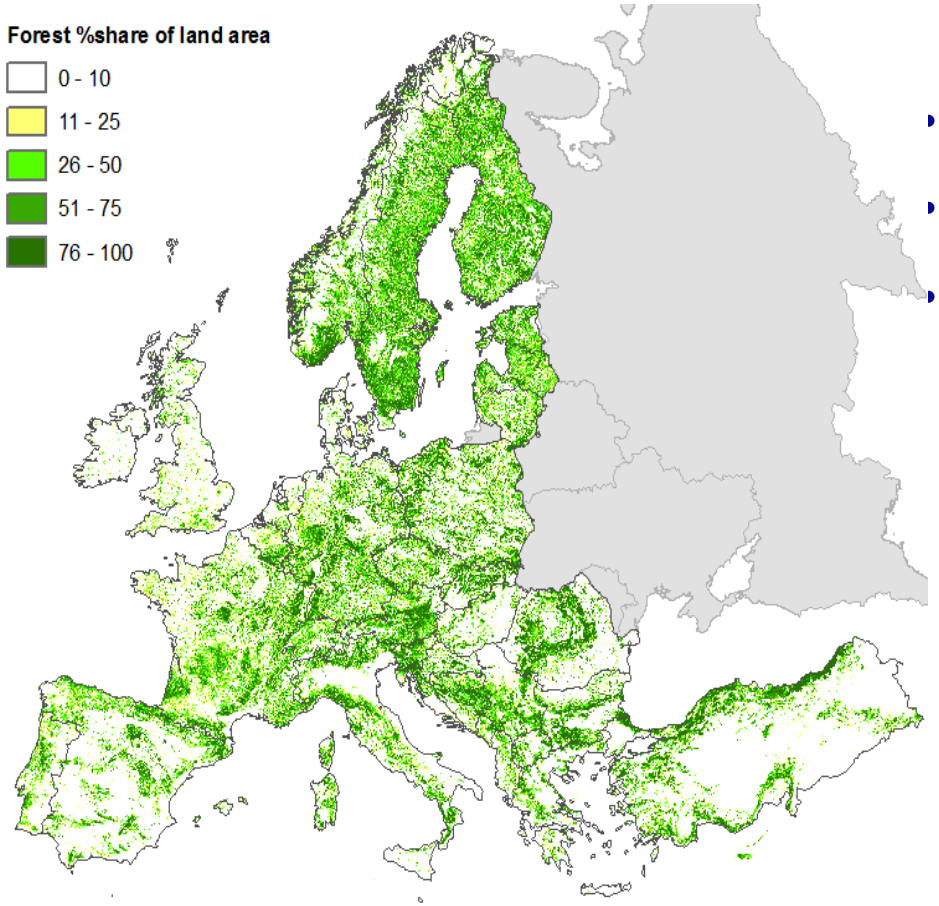
French forests yesterday and today

A forest that is booming at present (increase rate **0.6% annually**)



French forests areas largely increased over the two last centuries. In a world of shrinking forests worldwide, **Europe is expanding its forest area through afforestation**. Knowledge is needed on forest structural and temporal changes, as this represents an important challenge for shaping future forest management policies, particularly in terms of forest related services and trade-offs.

Facts on EU Forests



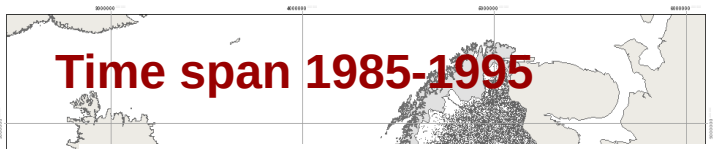
- **~= 40% of EU land cover (4% of the world forest surface)**
- **account for -9% GHG emissions**
- **16 million forest owners**
- **3.5 million people work in the forest sector**

➢ Compared to other regions in the world only South America has a higher percentage of forest cover than Europe. Last 20 years, the forest area has expanded in all European regions and has gained 0,8 million hectares per year

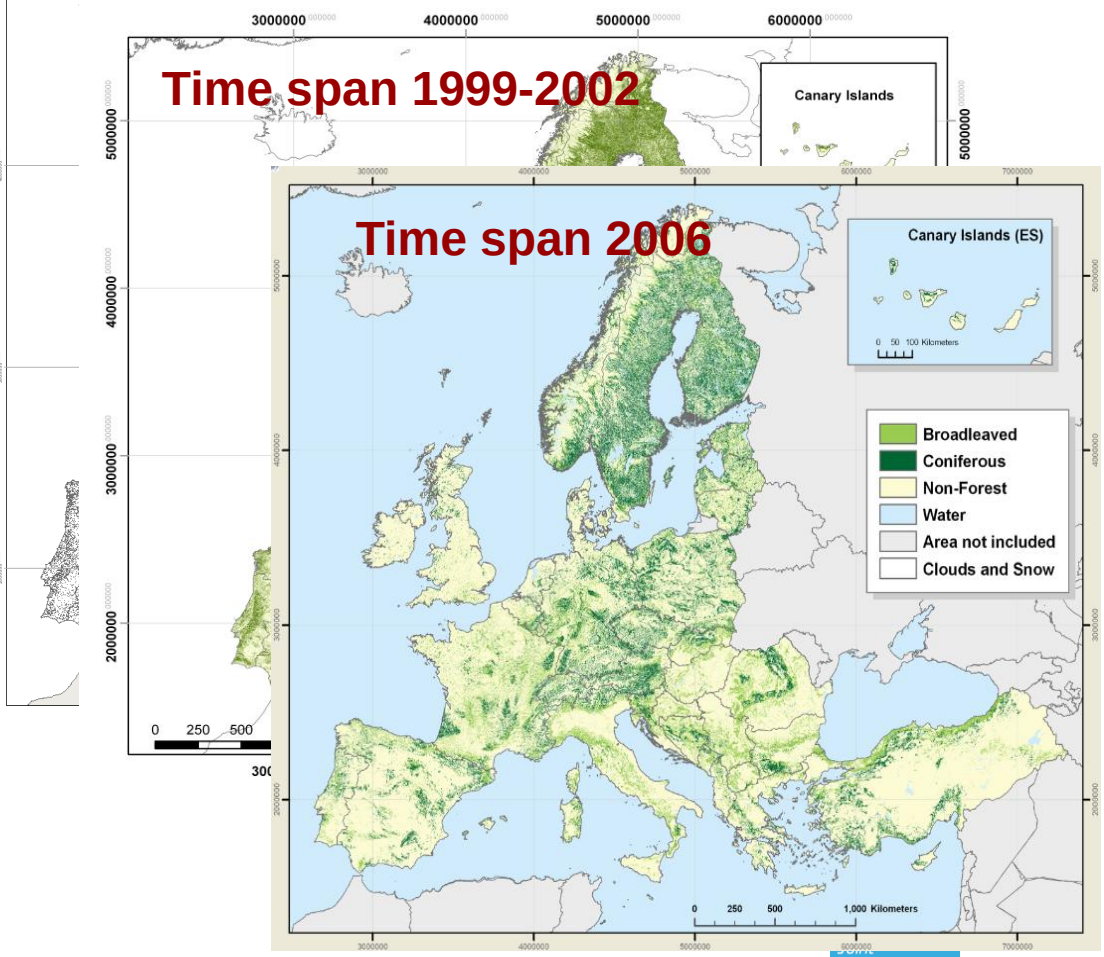
➢ Most forests in Europe have a **management plan**: over 155 million hectares of forests are under management plans, representing over 70% of the forest area in Europe

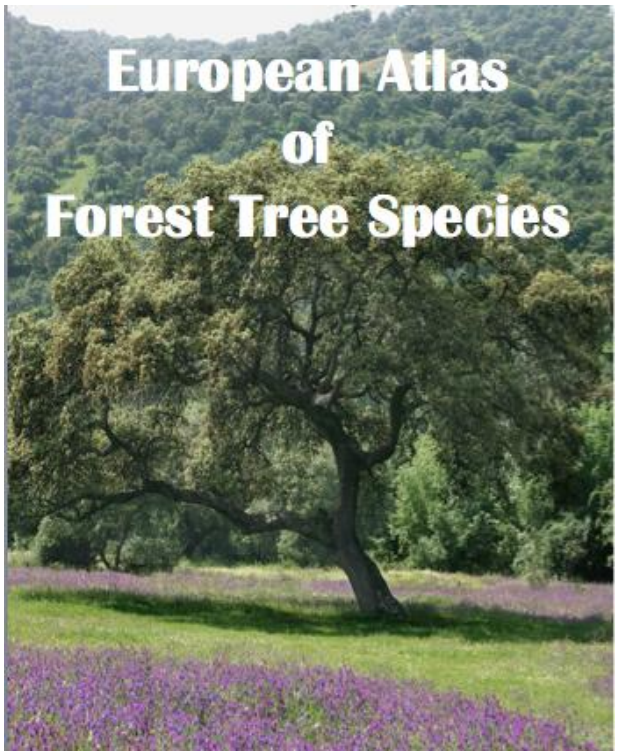
European Commission

European Forest Mapping



Time span 1985-1995





Collaboration with EEA in future mapping 2012, ... Copernicus

Joint Research Centre

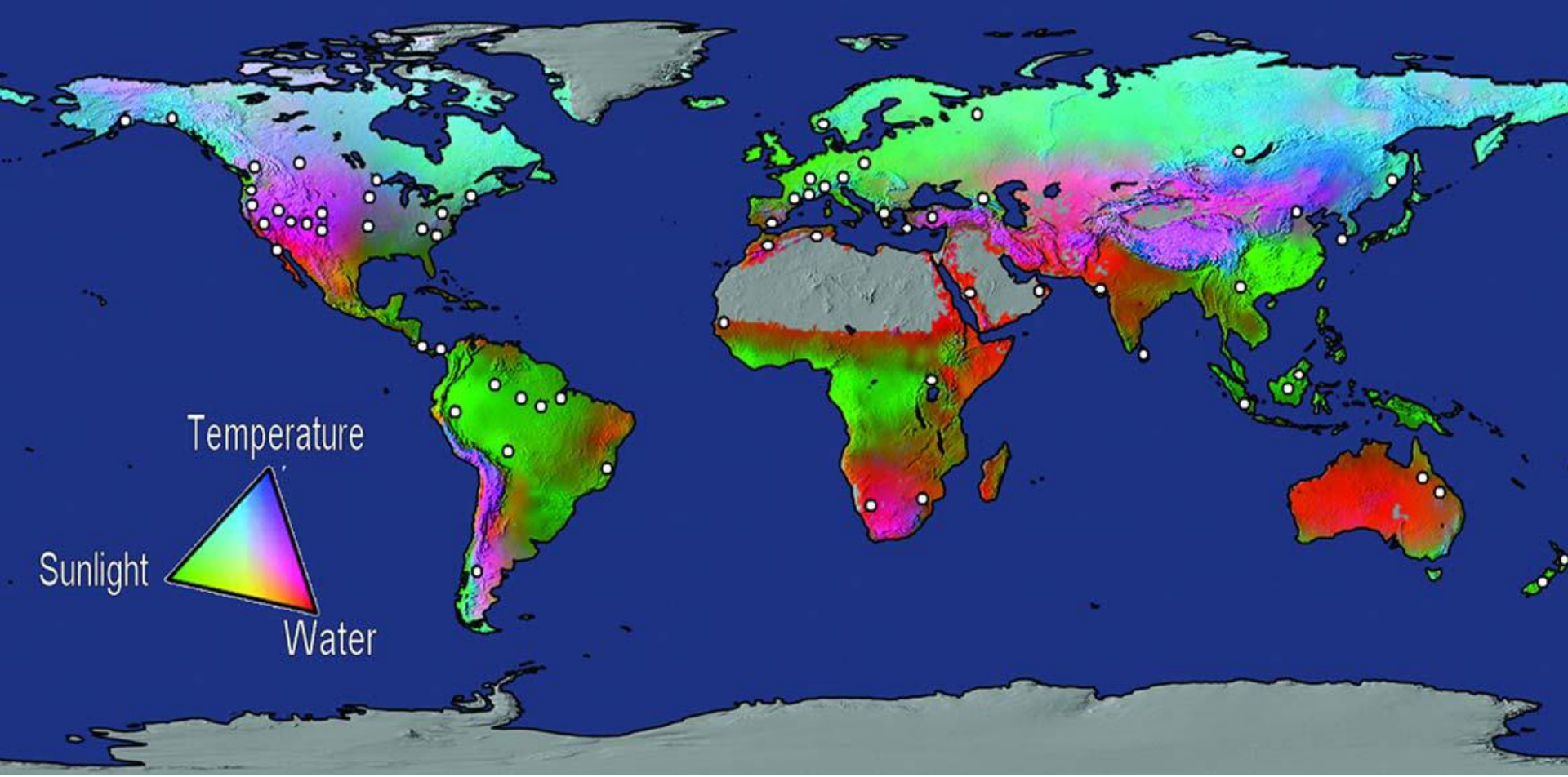
Facing Climate Change Impacts

Increased growth rates in the North

Higher risk of storm and insect damages

Shifting species suitability

More intense and frequent forest fires



(Allen et al 2009) drought and heat-induced tree mortality

White dots indicate documented localities with forest mortality related to climatic stress from drought and high temperatures. Background map shows potential environmental limits to vegetation net primary production (Boisvenue and Running, 2006).
Drought and heat-driven forest mortality often is documented in relatively dry regions (red/orange/ pink), but also occurs outside these regions.

Understanding how we influence forest health and function is a key challenge for the future

Science 21 August 2015:
Vol. 349 no. 6250
DOI: 10.1126/science.349.6250.800

FOREST HEALTH IN A CHANGING WORLD

By **Andrew Sugden, Julia Fahrenkamp-Uppenbrink, David Malakoff,** *and* **Sacha Vignieri**

Forests and woodlands cover about 20% of Earth's land surface, spanning all but the highest latitudes. In the millennia since humans dispersed across all forested continents, we have transformed large areas of natural forest. Historically, our greatest impacts were made in temperate regions, but they now extend to forests in the tropics and the boreal zone. Only a fraction of the forests present centuries ago have escaped human influence; in many regions the forest is gone, has regrown as secondary forest, or consists of managed and plantation forests. Humans have also introduced new species, including pests and pathogens of trees. Other influences—such as climate warming that causes tree species to shift geographically and anthropogenic drought that causes forest dieback—take effect more slowly and may occur far from their source.

Even though modern forests are generally much altered from their natural state, their "health" still matters. It will dictate whether forests persist and function into the future, sustaining wildlife, producing timber, sequestering carbon, and performing other services.

Yet forest health is difficult to define. Forests experience plenty of natural disturbances: fire, weather variations, competition between plant species, and attacks by insect pests and pathogens. They also experience longer-term successional change. When we speak of threats to forest health, we tend to imply the impacts of humans. However, it may not always be obvious whether human activity or a forest's natural dynamics are at play in, for example, the dieback of a stand or the outbreak of an insect herbivore.

Recognizing the signs of ill forest health and teasing apart the causes are important both for sustaining the services that humans rely on and for the effective conservation of forest biomes. Understanding how we influence forest health and function is a key challenge for the future, as we increasingly realize the importance of forests to the maintenance of a healthy planet.

Mountain pine beetle infections are becoming more intense as weather warms in coniferous forests, like this one in central British Columbia. Infected trees die slowly, resulting in a forest full of various levels of colorful dieback.

PHOTO: TOM MEBEELY/ALL CANADA PHOTOS/CORBIS

Forests under pressure

EU forest fires: economic loss of 2 billion Euro per year

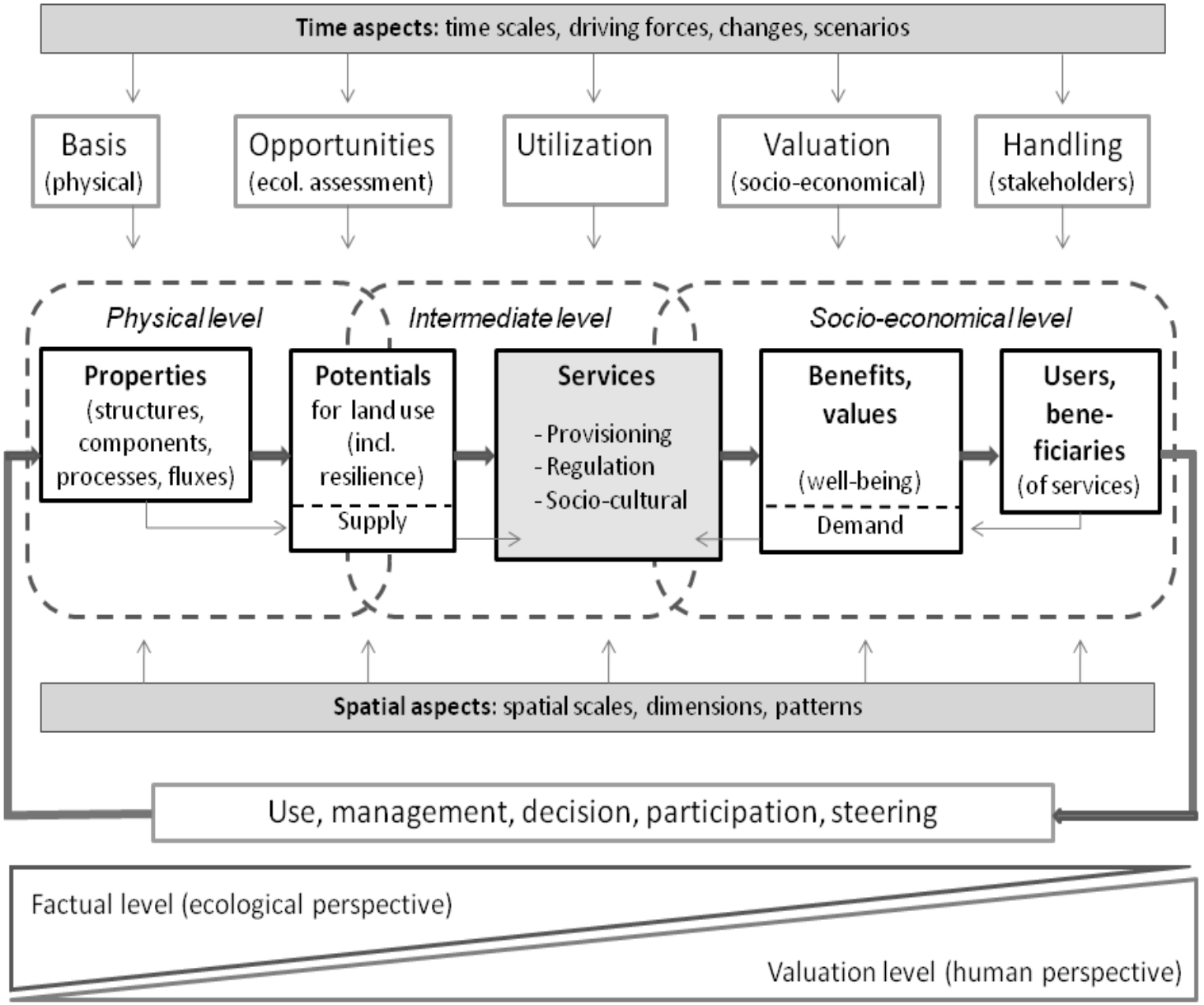
A failure to act to reduce the impacts of climate change could cost Europe dear in lives lost and economic damage, according to a European Commission study. *LONDON, 13 July 2014* – **Inaction over climate change costs lives**. And in the case of European inaction, it is estimated that this could one day cost 200,000 lives a year. That is the warning in a new European Commission (EC) study, which also says that failing to take the necessary action could burn 8,000 square kilometres of forest, and commit European taxpayers to at least €190 billion (US$259 bn) a year in economic losses

Adaptation is emerging topic

- Double strategy:
  - Accelerating mitigation measures
  - Adaptation of landscapes

The new agreement adopted at the Paris Climate Change Conference in December 2015 will enter into force in 2020

- **Understand Processes**
- **Find SOLUTIONS**



Conceptual framework for the assessment of ES with a particular focus on space and time aspects (from Grunewald & Bastian, 2015)

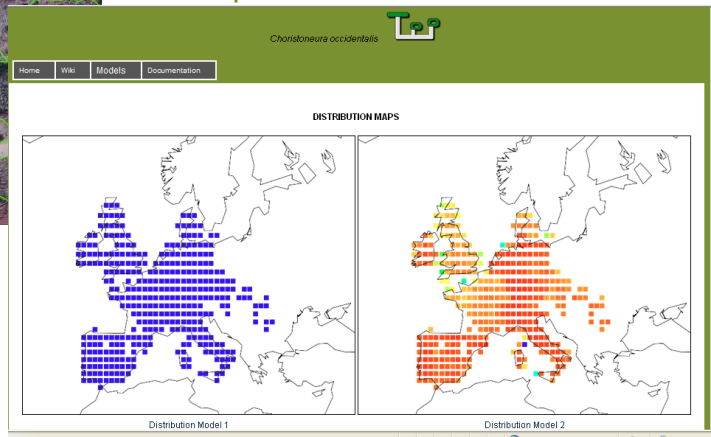
Forest Information System for Europe

Forest Disturbances

Forest Fires monitoring - EFFIS

Forest storm damage assessment

Forest pest risk assessment

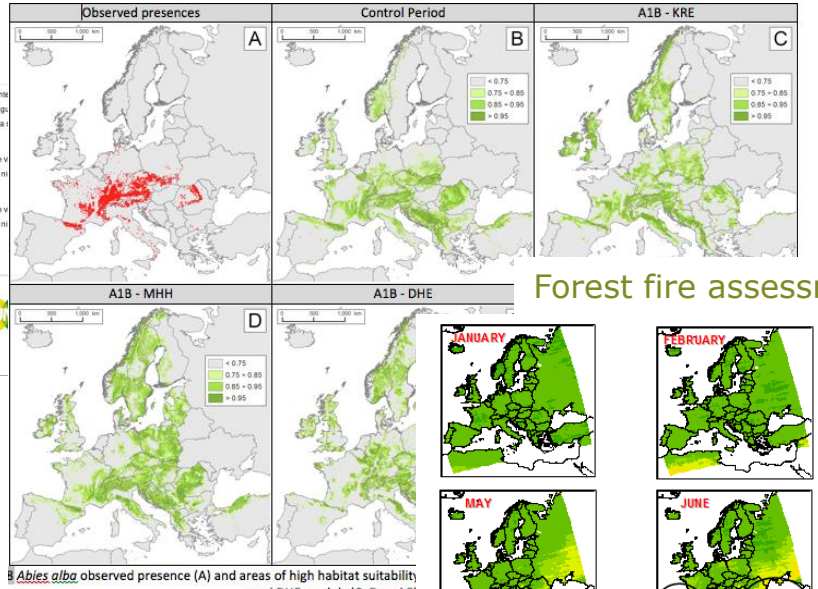


Joint Research Centre

Forest Information System for Europe

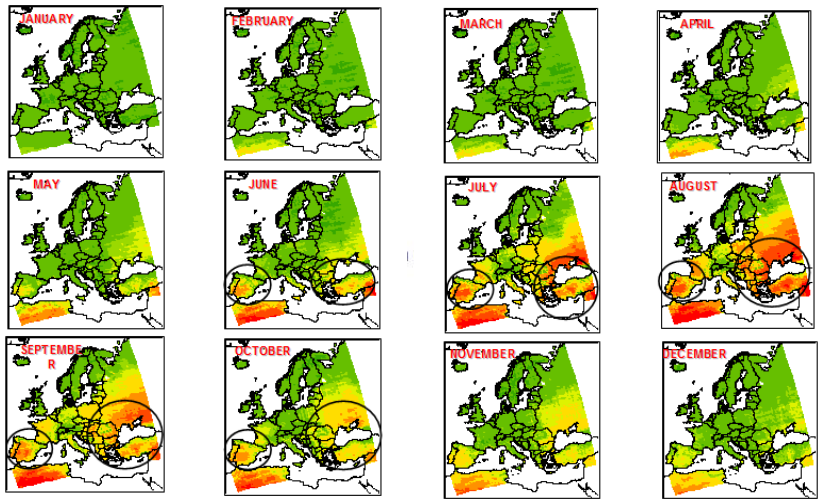
Forest & Climate Change

Forest species distribution & suitability under cc



Abies alba observed presence (A) and areas of high habitat suitability
and DHE models (C, D and E)

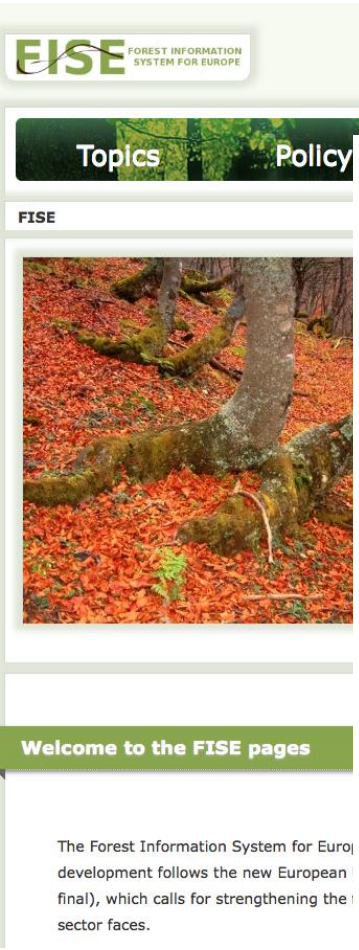
Forest fire assessment under cc

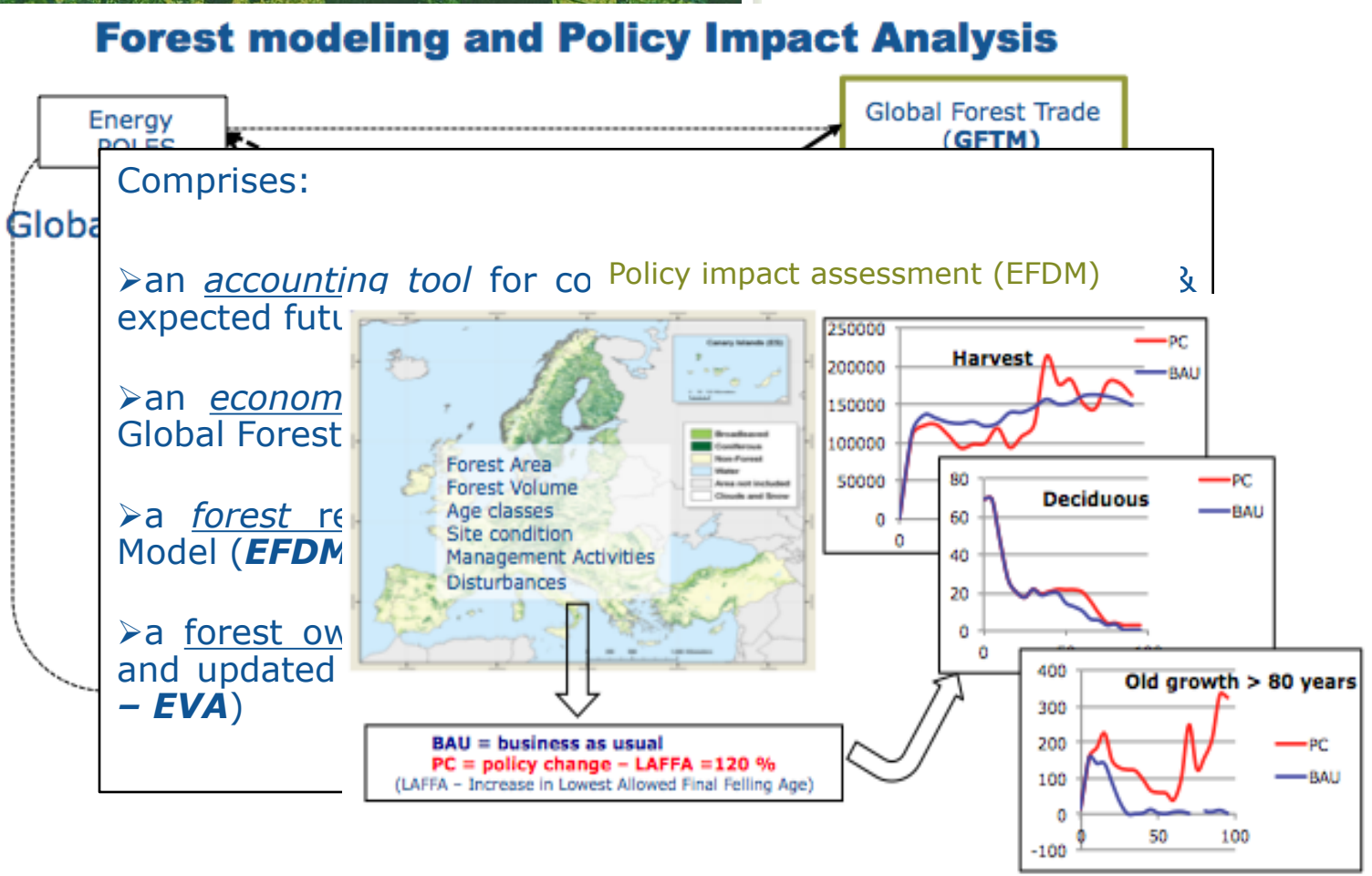


Joint Research Centre

Forest Information System for Europe

Forest & bio-economy

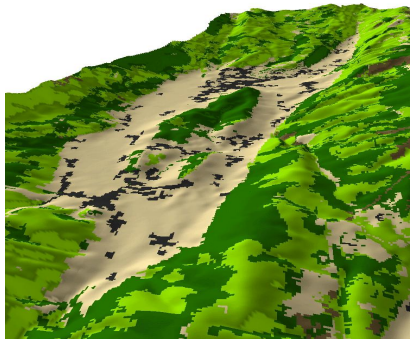


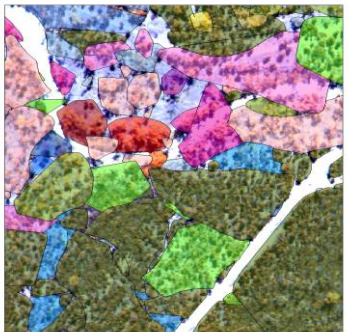


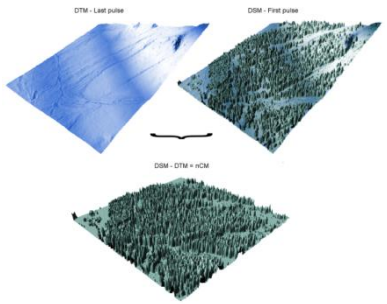
Selecting future adaptive management options implies

- the consideration of **trade-offs** between forest resource use & environmental objectives
- the understanding of synergies between forest goods and services (FGS) that occur during forest conversion.

"*… the large impact of past management practices on the spatial heterogeneity of forest dynamics underpins the need to assess FGS provisioning at the landscape scale*" (Christian Temperli, Harald Bugmann, and Ché Elkin 2012)







Mountain Forests, France

Scénario 2 : « Forest Mixification municipalities Autrans & Méaudre

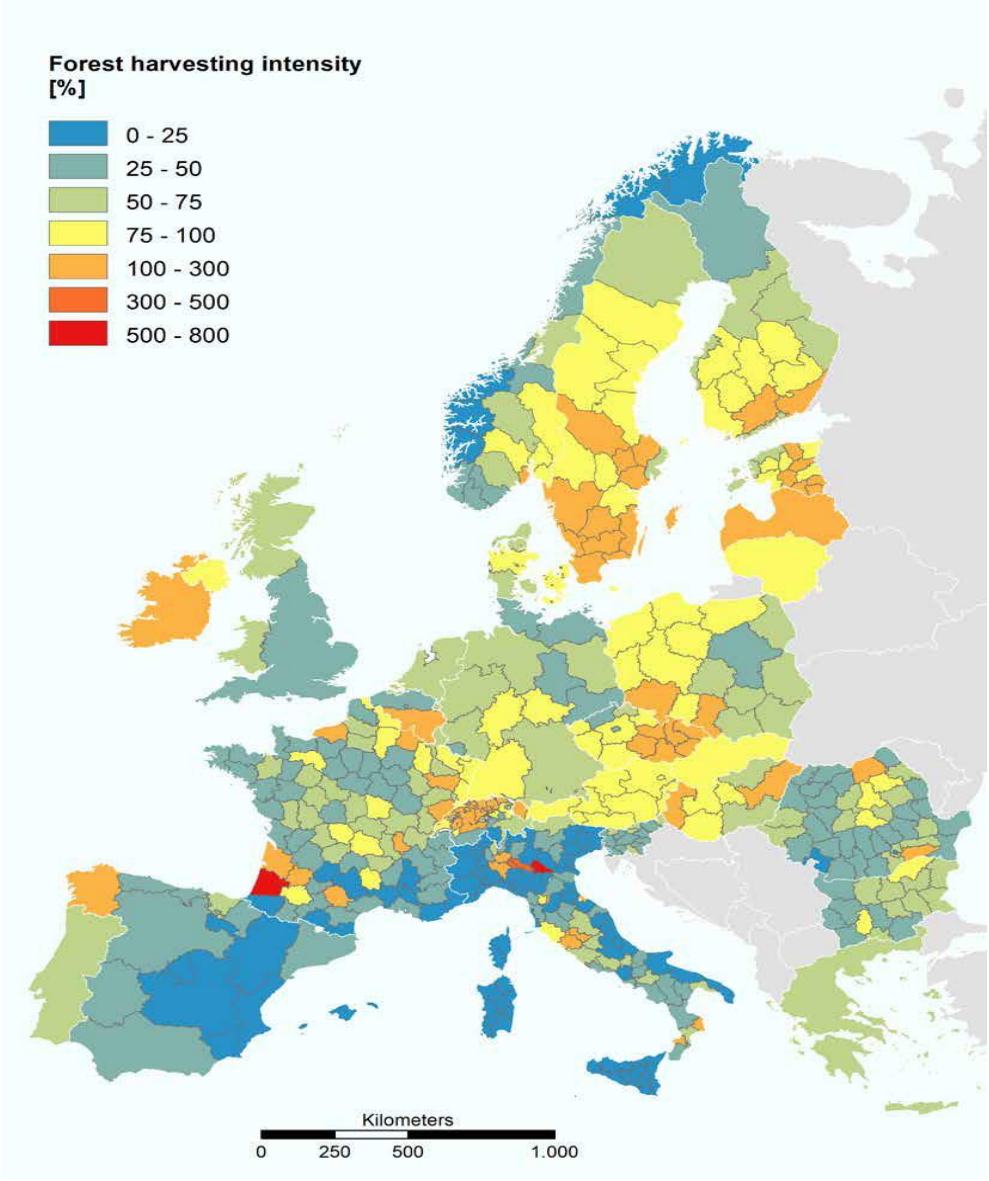
Evolution of the spatial heterogeneity of Tree mixture in the municipalities of Autrans & Meaudre 2009 -2050

Level of potential	SC2 (Ha)	SC2 (%)	SC2a (Ha)	SC2a (%)	SC2b (Ha)	SC2b (%)
Nodata	10,660	9%	12,852	6%	8,418	14%
Low	10,897	9%	25,193	11%	4,550	7%
Medium	44,524	38%	97,450	43%	20,382	33%
Hard	50,192	43%	83,146	37%	26,905	44%
Very hard	1,538	1%	7,370	3%	0,792	1%
Total	118	1	226	1	61	1

Evolution of the level of production potential based on scenarios

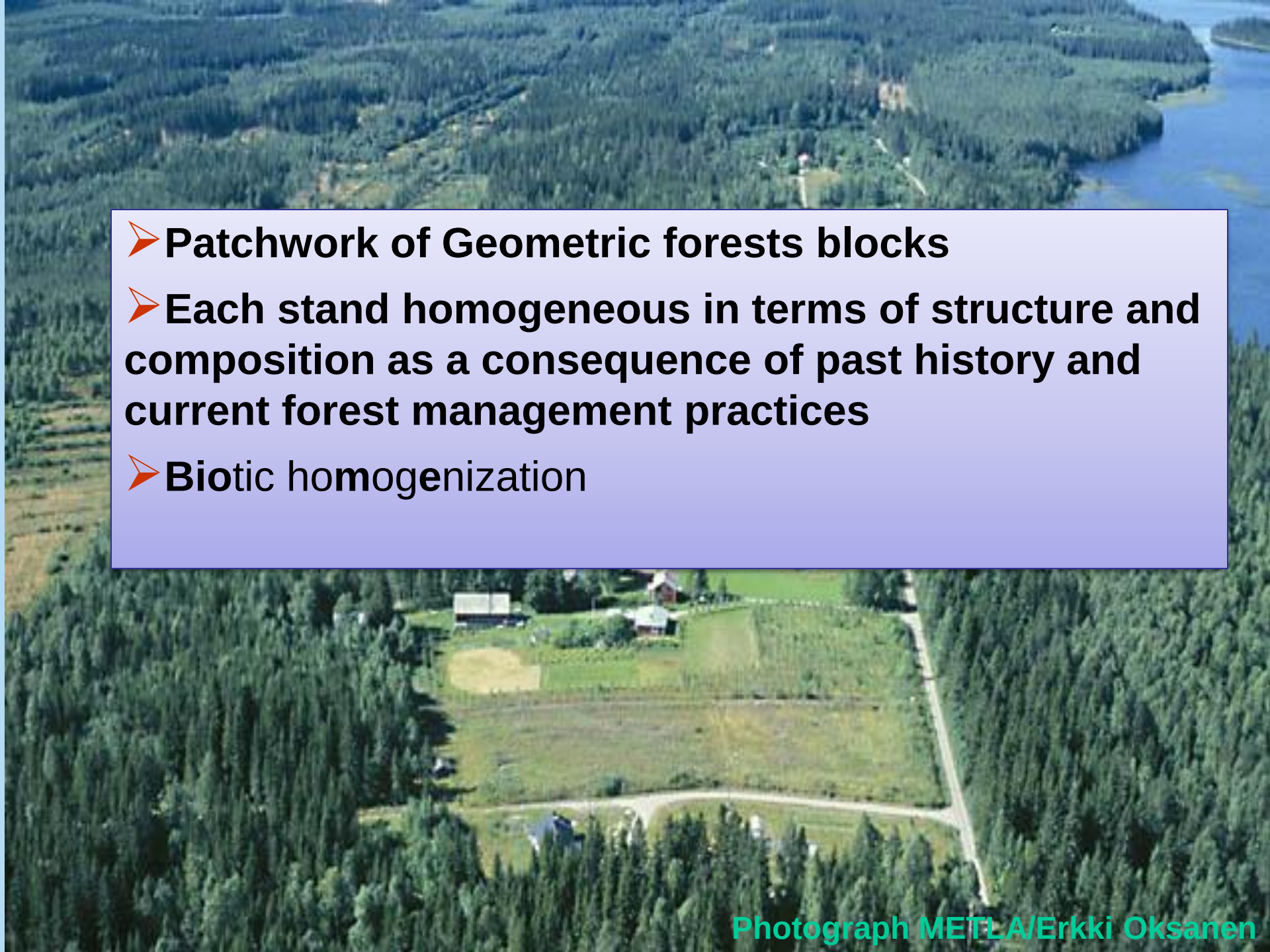
Parmentier, 2013; Parmentier et al 2014

Forest harvesting intensity



- Regional variation of forest harvest intensity (in % of volume increment) in the EU and EFTA, showing the average for 2000–2010 (Levers et al. 2014)
- Highest harvesting intensities are found in southern and eastern parts of Finland and Sweden, the Baltic countries, Ireland and the mountain ranges of central and easte Europe. The extremely hig harvesting levels in southwest France are due to a series of extreme storm events

EFTA: European Free Trade Association



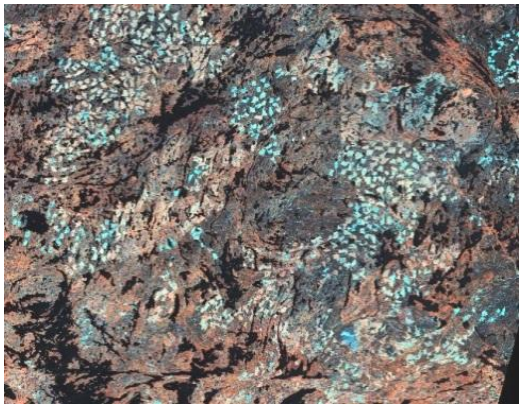
- **Patchwork of Geometric forests blocks**
- **Each stand homogeneous in terms of structure and composition as a consequence of past history and current forest management practices**
- **Bio**tic ho**m**og**e**nization

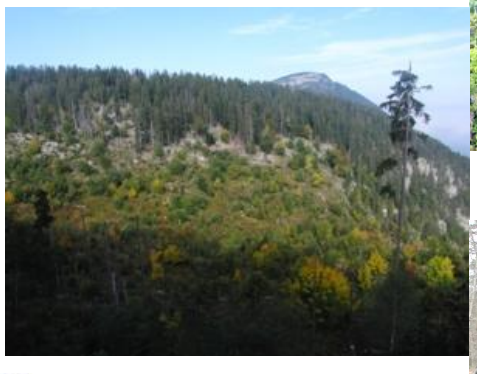
Photograph METLA/Erkki Oksanen

Forest management effects on spatial heterogeneity in forest landscapes

- Forest management actions can dramatically alter the composition and spatial configuration of the forested landscape

- Potentially significant effects on biodiversity





Redon et al *Landscape Ecology 2014*

Understanding the importance of spatial heterogeneity

1. What types and levels of ***spatial heterogeneity*** contribute to sustained production of ecosystem services and what types and levels do not?
2. Where on the landscape do suites of ecosystem services respond similarly or in opposite directions to anticipated changes, and what are the mechanisms behind such ***synergies and tradeoffs***?
3. What are the implications for ***resilience and vulnerability*** of ecosystem services of anticipated trajectories of landscape change?
4. To what degree can ***landscape pattern*** be ***purposefully managed*** to enhance the resilience of ecosystem services in the face of changing drivers?
5. How well will understanding of ***past*** **landscape dynamics** and ecosystem services inform the future?

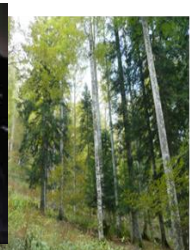
Turner et al 2012

A landscape should provide a living society

Forest landscape

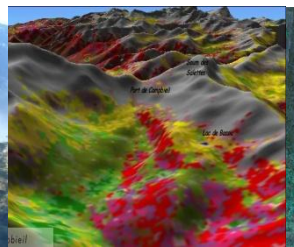
Include more than trees

holistic vision towards adaptive management & trade offs

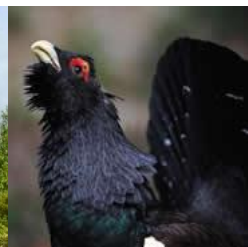


Scaling up:

Understanding Landscape Patterns into processes in order to design climate proof landscapes



The Sentinels

Sentinel-1 (A/B) – SAR imaging
All weather, day/night applications, interferometry

Launch S-!: 3 Apr 2014 / Spring 2016

Sentinel-2 (A/B) – Multi-spectral imaging
Land applications: urban, forest, agriculture,…
Continuity of Landsat, SPOT

Launch S-2: 23 June 2015 / mid 2016

Sentinel-3 (A/B) – Ocean and global land monitoring
Wide-swath ocean color, vegetation, sea/land surface temperature, altimetry

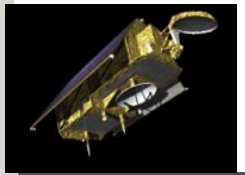
Launch S-3: Autumn 2015 / 2017

Sentinel-4 (A/B) – Geostationary atmospheric
Atmospheric composition monitoring, trans-boundary pollution

Launch: 2019

Sentinel-5 precursor/ Sentinel-5 (A/B) – Low-orbit atmospheric
Atmospheric composition monitoring

Launch S5-Precursor: 2015 / 2020



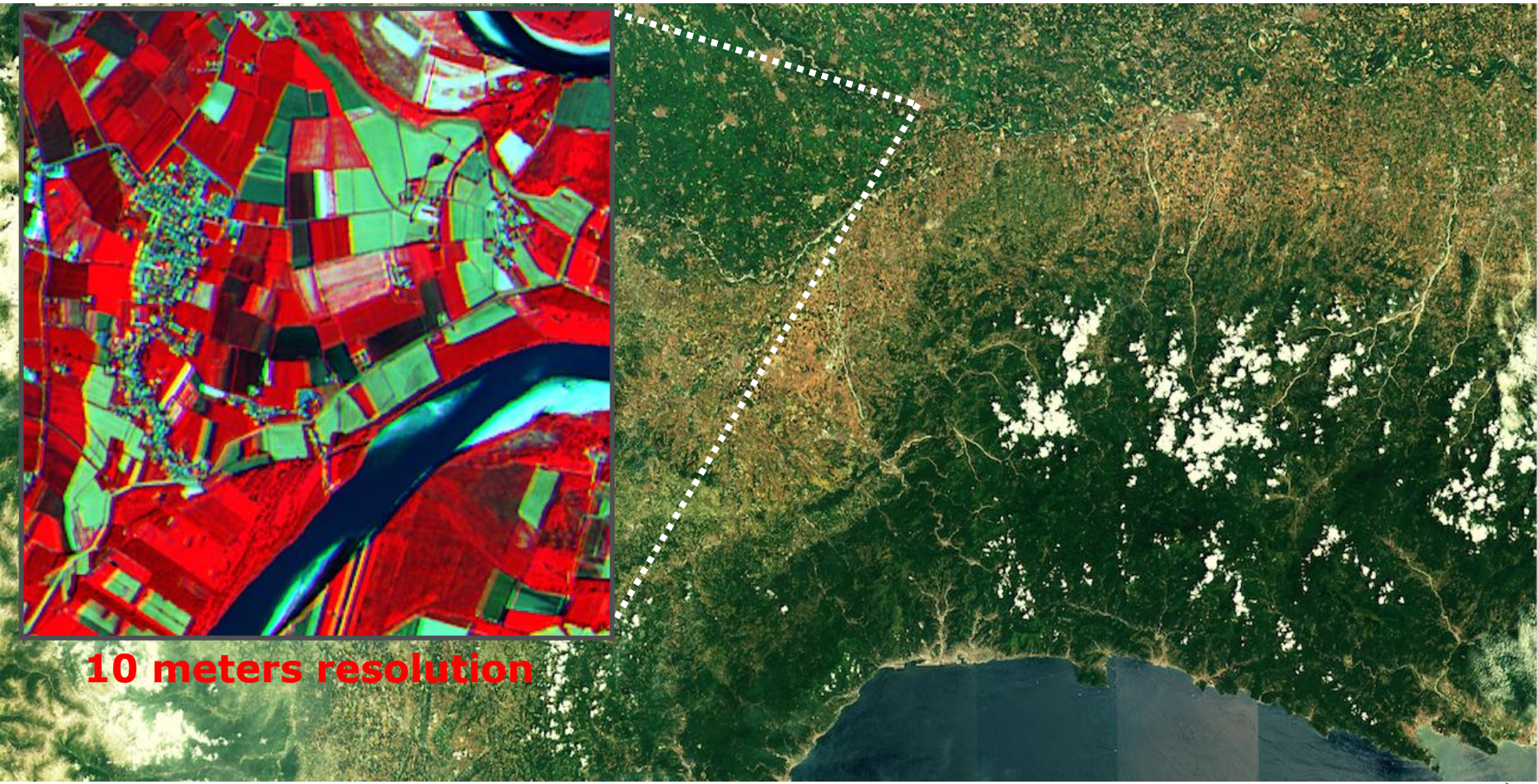
Sentinel-6 (A/B): Jason-CS – Low inclination Altimetry
Sea-level, wave height and marine wind speed

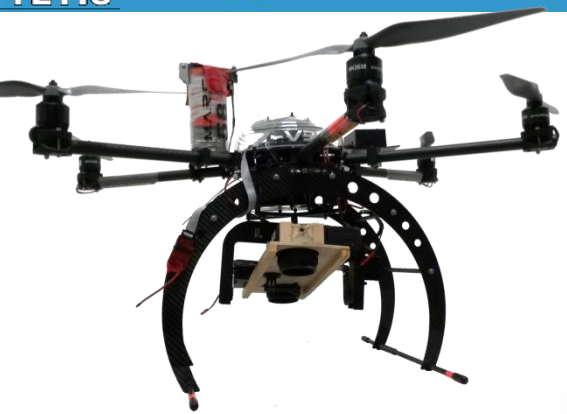
Launch 2019

Copernicus
European Space Agency

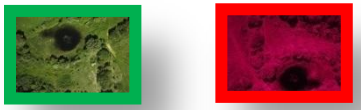
Sentinel-2 Swath & Resolution

10 m resolution for field scale mapping





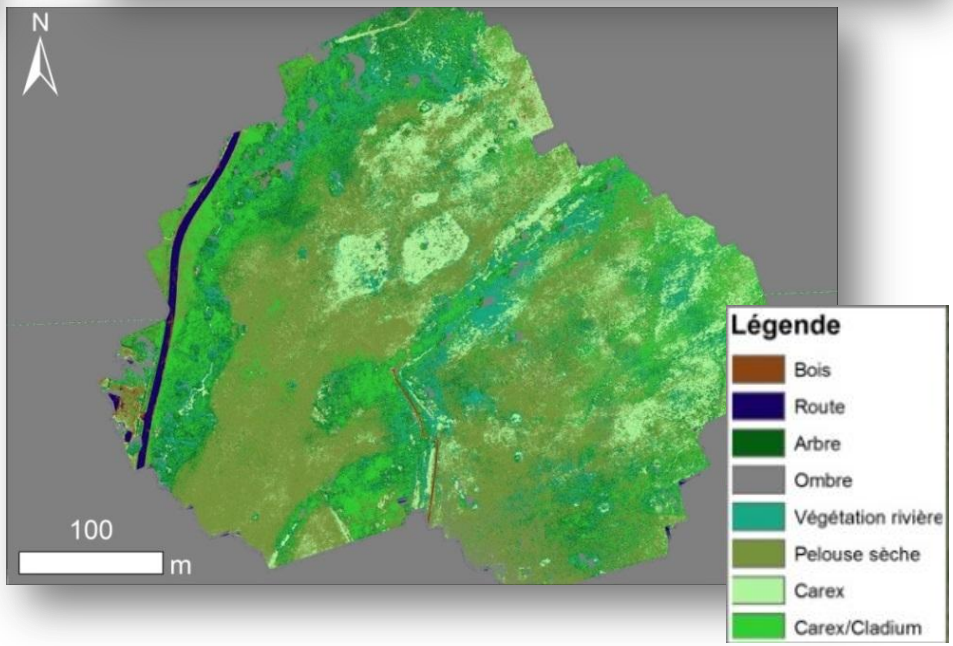
Vegetation mapping
Savoie, France



Visible

PIR

Résolution : 2.5 cm



Provide options to adapt landscapes to prevent or diminish impacts

FORUM DISCUSSION

Key questions :

- **Forests** : real potential to adapt, real potential to mitigate?
- **Actors** : real capacity to change practices?
- **Forest sector** : real contribution to sustainable developement within the climate change context?









ROUTLEDGE HANDBOOKS

earthscan from Routledge

Routledge Handbook of Ecosystem Services

Edited by Marion Potschin, Roy Haines-Young, Robert Fish and R. Kerry Turner

5th INTERNATIONAL ECOSUMMIT
ECOLOGICAL SUSTAINABILITY
ENGINEERING CHANGE

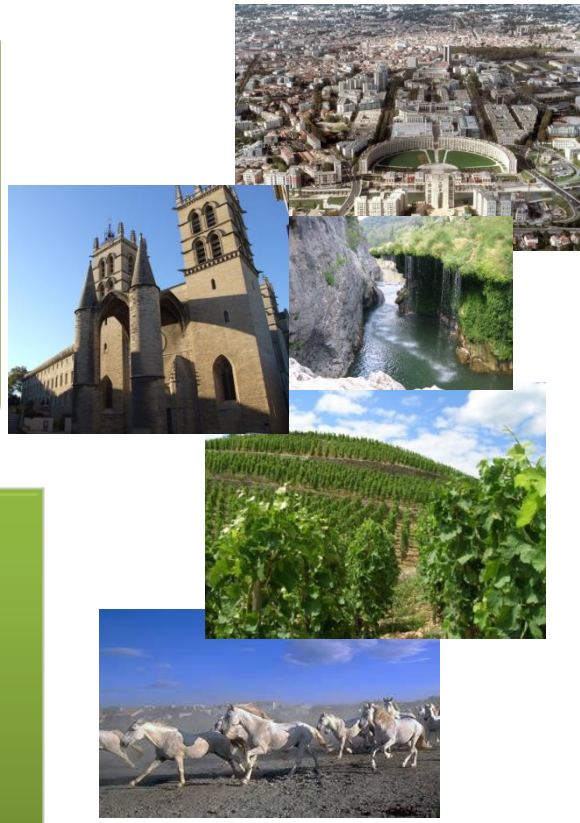
Montpellier, France
29 Aug – 2 Sept 2016

About EcoSummit

This conference series was founded in Copenhagen, as a forum to meet the demands of scientists working in new disciplines such as ecological modelling, ecological economics and ecological engineering, and who required a better understanding of the concepts and methods for a holistic use of ecology in environmental management. Since 1996, EcoSummit has been taken around the world with EcoSummit2012 hosting 1600 participants in Columbus, USA
http://www.ecosummit2016.org/

EcoSummit 2016

EcoSummit 2016 will take place in the beautiful mediaeval city of Montpellier, France, from 29 August – 2 September 2016. EcoSummit 2016 will centre on the ecology of terrestrial ecosystems and all habitats that are integrated within those ecosystems, including river networks, wetlands and coastlines. Focus will be placed on fragile ecosystems that are more likely to suffer the consequences of climate change and anthropogenic pressure



TOPICS

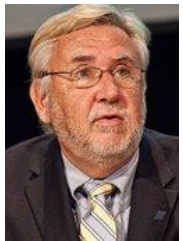
- Ecosystem Creation and Restoration
- Ecological Engineering
- Sustainability and Resilience
- Disturbance ecology
- Anthropogenic pressure
- Ecosystem Services
- Ecological Indicators
- Biodiversity and Biological Conservation
- Climate Change
- Ecological intensification
- Fragile ecosystems and hotspot management
- Forest ecosystems
- Agro-ecology
- Ecological Complexity
- Ecotoxicology
- Ecological Economics
- Ecological Modelling
- Biological Invasions
- Ecosystem Health
- Environmental Policy
- Integrating socio-economics and ecology
- Watershed/River Catchment Management
- Ecohydrology
- Arid lands and desertification

Co-chairs

Dr Alexia Stokes
INRA

Dr Sébastien Barot
(IRD)

Prof Bill Mitsch,
Director, Everglades Wetland Research Park



World Congress Silvo-Pastoral Systems 2016

Silvo-Pastoral Systems in a changing world: functions, management and people

14 different Working Groups,
with international and interdisciplinary convenors

Field visits

Side events: technical + specialized workshops

IUFRO

PORTUGAL
University of Évora, 27-30th September 2016

http://www.silvopastoral2016.uevora.pt/

Call for abstracts open: 30th september 2015 !!!

IUFRO LE – Latin America

IUFRO LE - Latin-American Congress
Second IALE Latin-American Congress

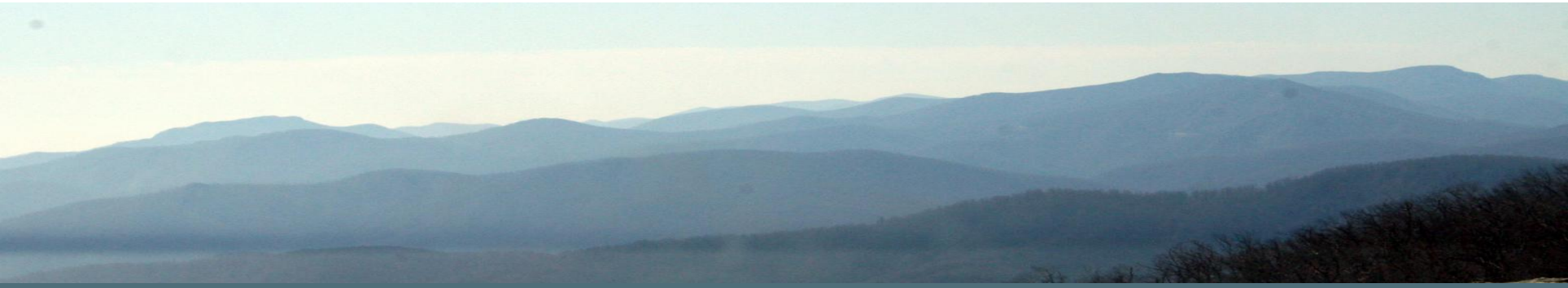
28 November – 2 December 2016
Temuco (Province of Cautín, Chile)

"Bringing our society to the nature: conservation, management and restoration of multi-functional landscapes"

IUFRO

iale
International Association for Landscape Ecology

www.iufrole2016.ufro.cl



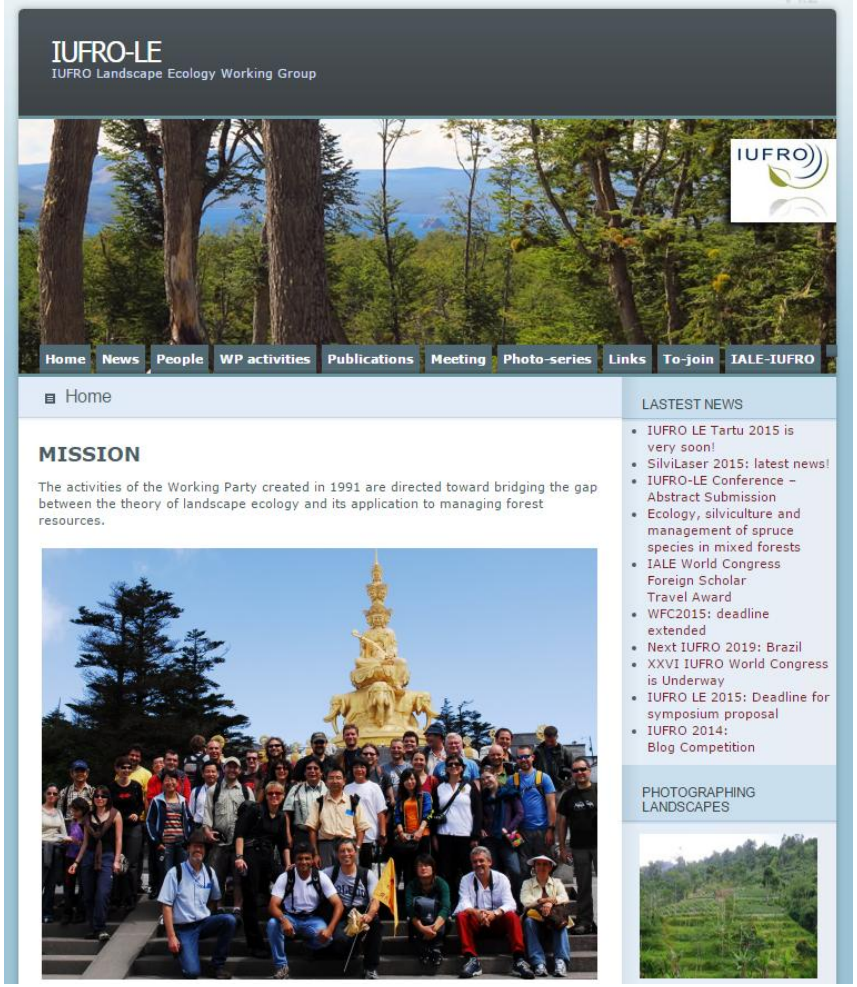
IUFRO 8.01.02 Working Group

Forest Landscape Ecology

Division 8

>> Webpage

iufrole.wordpress.com
http://iufrole.wordpress.com/



Goals

- Updated information
- Interaction between members
- Synergy with other networks
- Atract new members
- Share publications


Thank You!

CHALLENGES

- Which are the trade-offs that can be raised by land-use changes and land management alternatives for ES provision?
- How to account for scale when analysing emerging trade-offs in the ESs provision?
- How to make the choices on land-use actionable in the real world to answer to landscape planning needs?