

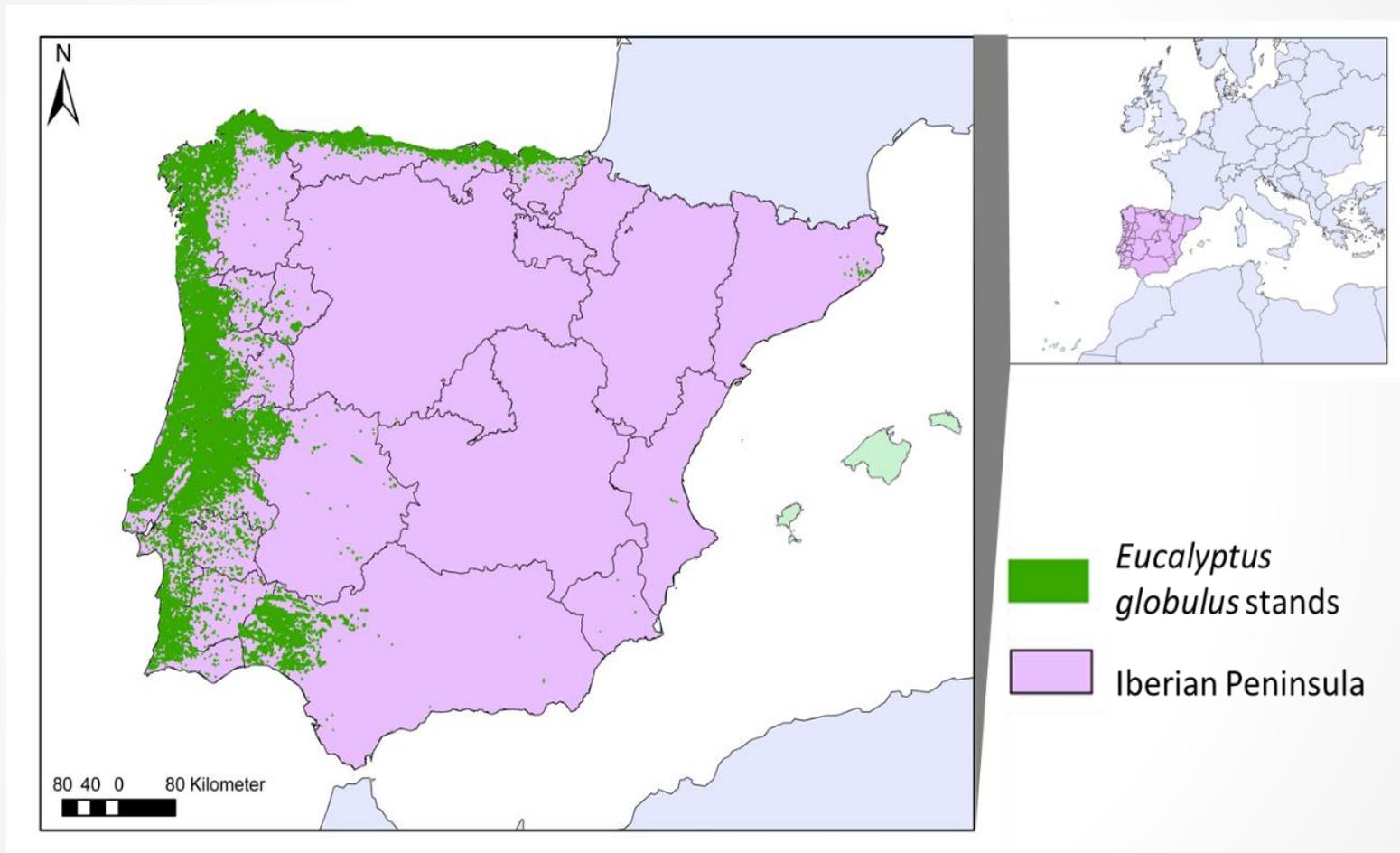
Tasmanian blue gum (*Eucalyptus globulus*) in Portugal

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The Tasmanian blue gum is one of the most widely cultivated broadleaf species of the Planet

- Eucalypt plantations account for one of the largest areas of non-native forests in Europe
- Plantations are mainly located in the Iberian Peninsula (around 1.5 million ha)
- Blue gum is currently the most common tree species in Portugal (812 000 ha; 26 % of the total forest area)
- Around 20 % of eucalypt stands in Portugal are managed by pulp companies, while the remaining area is managed by individual landowners
- It was first introduced to Europe in 1804 and in the 1850's to Portugal



Source: Ortiz 2016

Blue gum plantations are normally coppiced every 10 to 12 years along three rotations

- The main climatic factors limiting the expansion of plantations in Portugal are water availability and low temperatures
- On the best sites, site index can be close to 28 m corresponding to annual increments of more than 30 m³/ha
- Tree breeding programs were developed in the last 50 years, leading to gains in productivity between 25% and 50%
- Genetically improved material is used by pulp companies, but not yet by individual landowners
- There is a growing number of forest owners who have joined forest certification programs (PEFC and FSC)



Blue gum plantations have a high capacity to sequester carbon and to extract water and nutrients

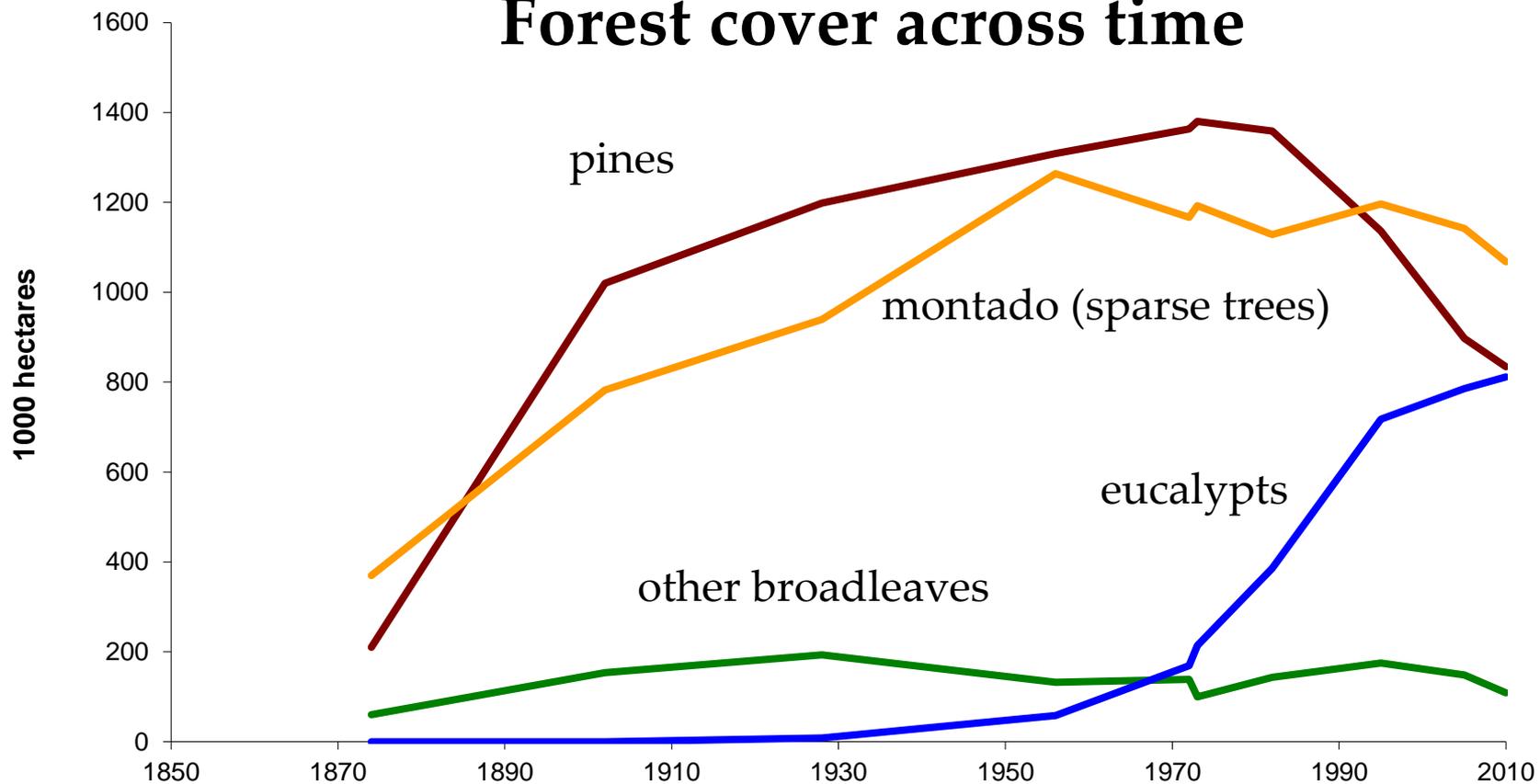
- The high capacity to sequester carbon is offset by the relatively high decay rate of paper products
- It intercepts little water due to the structure of the canopy and to leaf shape
- Run-off can significantly increase in the year following clearcutting
- Plantations are associated with soil water repellency
- Nutrient extraction is high but nutrients can be returned to the soil if residues are not removed
- Management can strongly influence the environmental impacts



Eucalypt plantations are in general less diverse in species richness than other common land use systems

- Several studies have concluded for the lower diversity in animals and plants, when compared to native stands
- Part of these differences can be attributed to management but another part has to do with the exotic nature of eucalypts
- However there is an intermingling of native (and also exotic) plants in abandoned eucalypt plantations, leading to mixed stands
- In 2005, there were 173 000 ha of mixed stands of eucalypts and pines representing an increase of 75% in 10 years
- Mixed stands of eucalypts and pines are very frequent and represent the highest fire hazard among all forest types in Portugal

Forest cover across time



The pulp and paper sector is a very important part of the Portuguese economy

- In 2012, the pulp and paper forest chain contributed to the national GDP with 4.4 %, corresponding 4.9 % of the total national exports and to 1.2 % of employment
- Therefore there are very contrasting views and perceptions about the role and importance of eucalypt plantations in Portugal
 - Urban citizens, who do not directly benefit from the plantations, tend to be against eucalypts
 - Rural landowners are in favor of plantations because of the income they provide
- In the regions of eucalypt expansion there are around 10 million registered land plots (<1ha on average)

Uprising of rural populations against eucalypt plantations in 1989

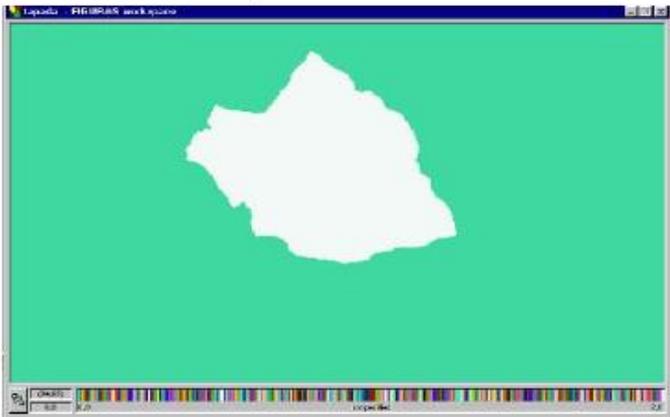


Blue gum is naturalized in Portugal but the assignment of an invasive status has been controversial

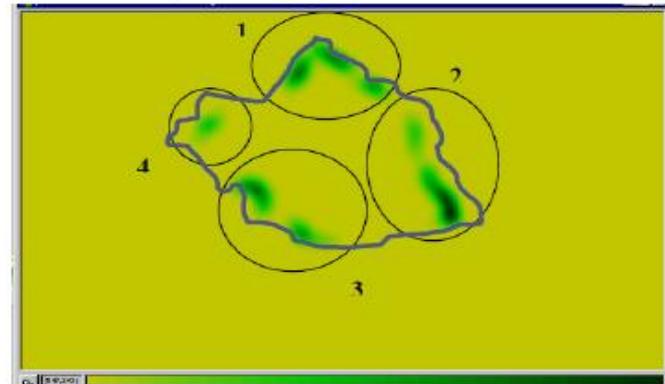
- The still-in-force Decree Law 565/99, contradicts the assessment presented by Marchante et al. (2014) in the Portuguese guide on invasive plants
- Several references from Portugal and Spain present solid evidences of naturalization
- However an invasive status is difficult to assign given
 - Difficulties related with inconsistency and subjectivity of the existing definitions for invasiveness
 - Difficulty to distinguish planted from naturally regenerated plants
- The only known documented case is at Tapada de Mafra, a protected area near Lisbon

Naturally regenerated stands increased 16 times in 23 years (4 ha to 64 ha) hundreds of meters from the nearest propagule donors

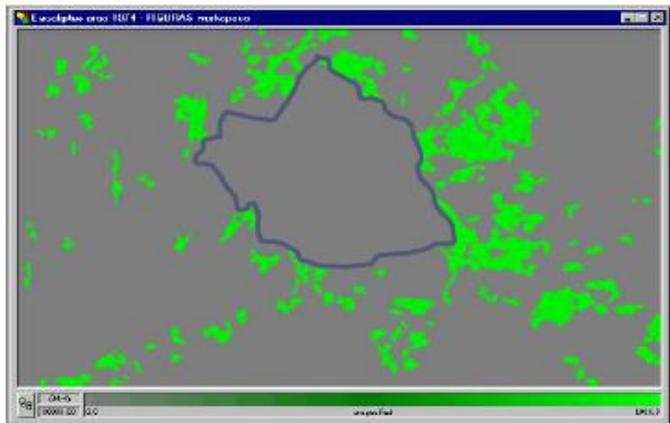
Perimeter of Tapada de Mafra



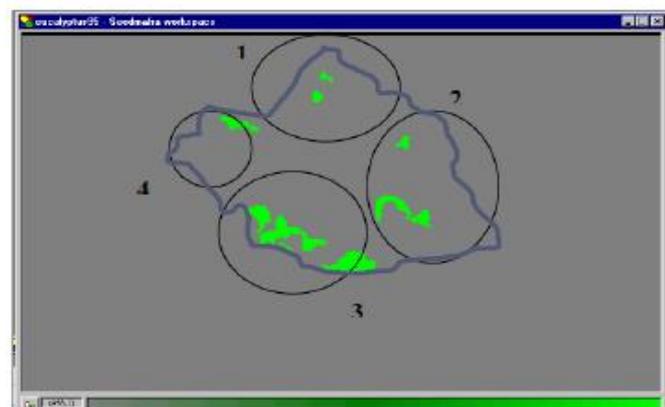
Simulated patches

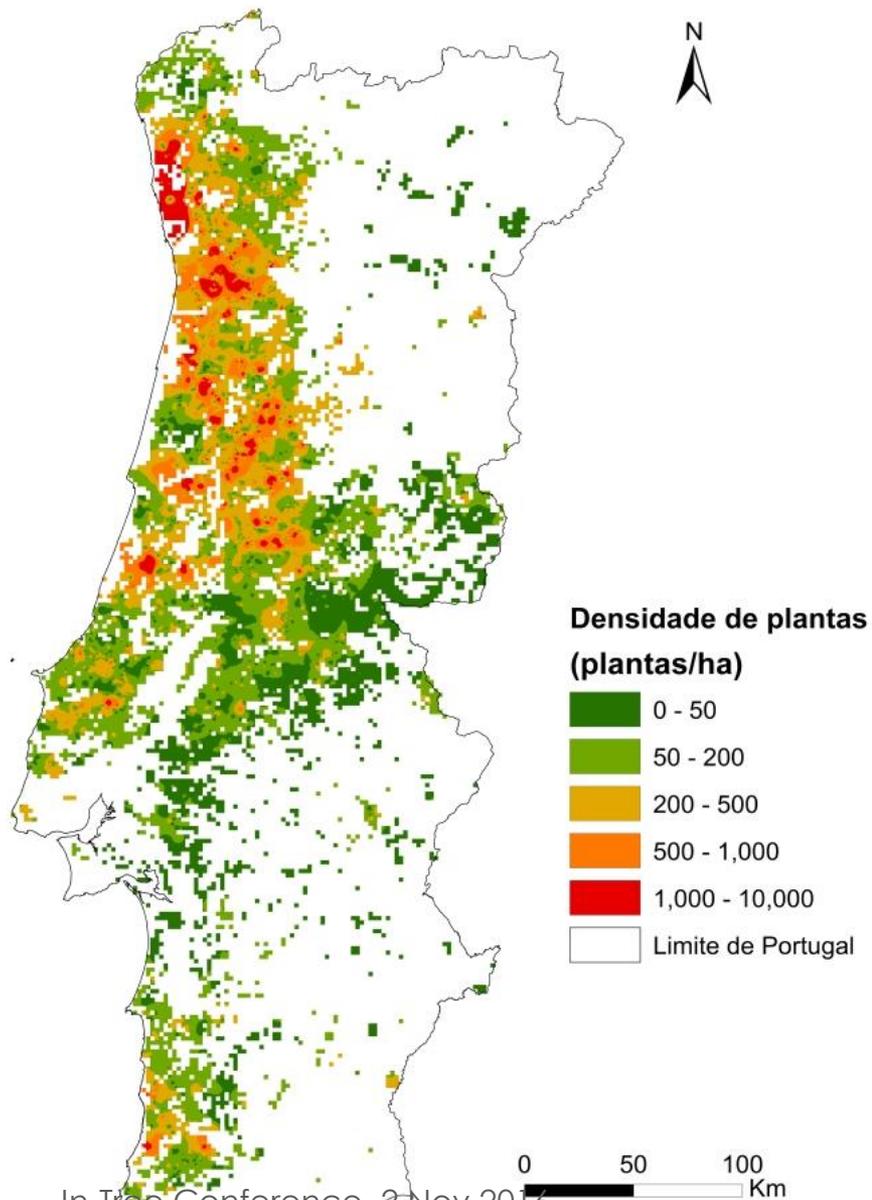


Surrounding blue gum plantations



Observed patches





In-Tree Conference, 2 Nov 2016,
Ascona, Switzerland

E. globulus regeneration was found in 60% of 3111 transects in a countrywide roadside survey



([Catry et al. 2015](#))

Opportunities and risks of a widely cultivated species

- In spite of the economic importance of plantations there are important constraints related with mismanagement
 - low productivity
 - fire hazard
 - abandoned plantations
 - naturalization
- As for the opportunities, the possibilities of forest certification must be stressed as it may improve the productivity and the environmental performance of plantations

Final note on the collaborative nature of this chapter
by Silva and Tomé

Thank you

