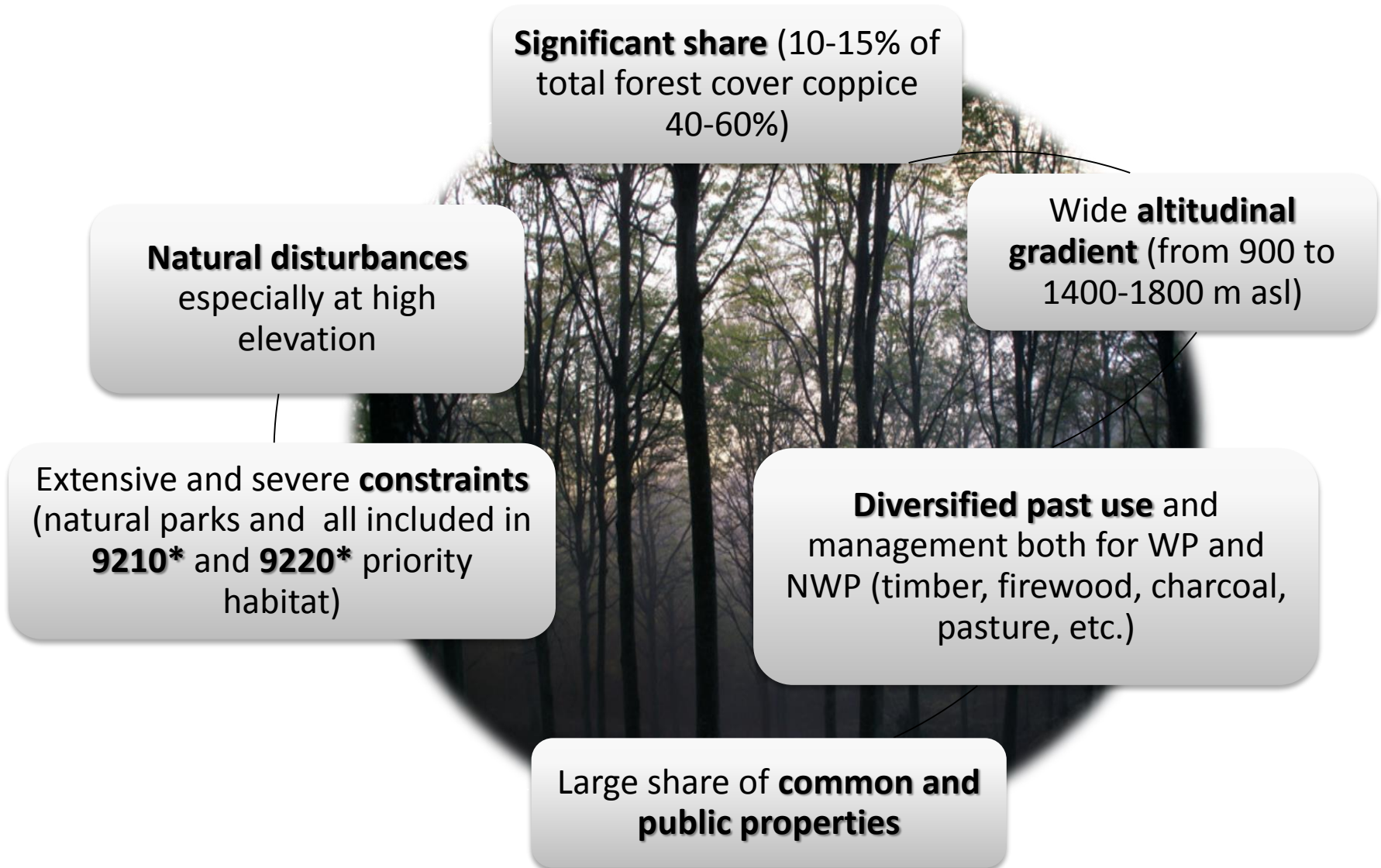


Assetti strutturali e indirizzi di gestione in cedui di faggio oltre turno nell'Appennino centrale: l'esperienza del progetto FORESTPAS2000



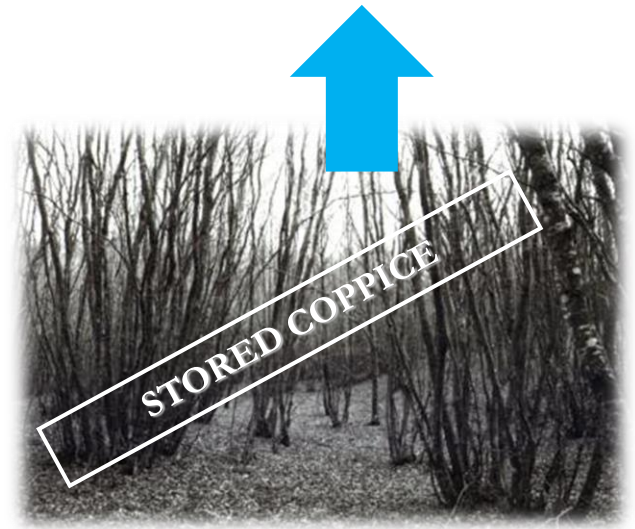
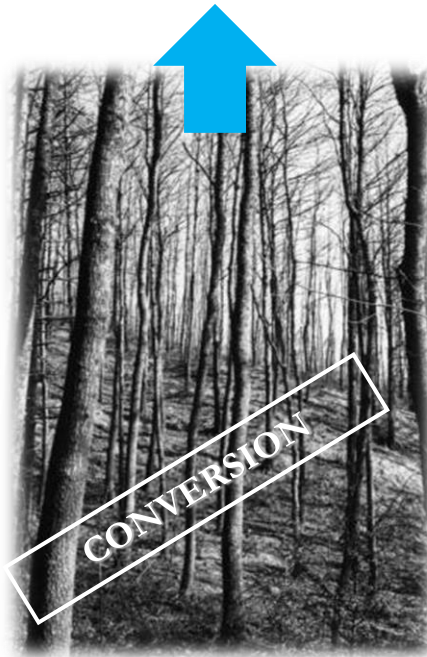
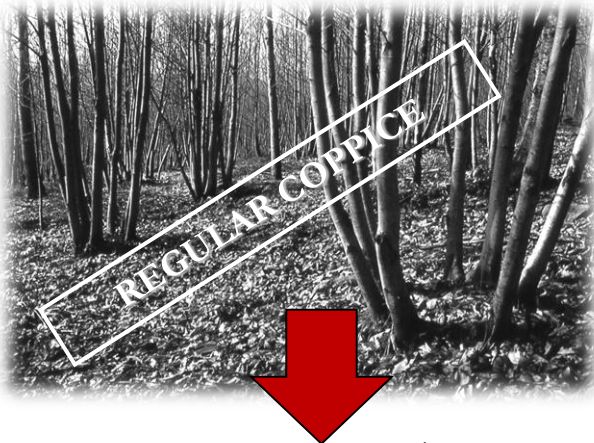
C. Urbinati¹, A. Vitali¹, M. Garbarino^{1,2}, S. Agnoloni³, G. Iorio⁴,
1- D3A – UNIVPM, Ancona ; 2- Agroselviter, - UNITO, Grugliasco (TO), 3 Corpo
Forestale dello Stato, Massa-Carrara; 4 - Comunità Montana Valnerina (PG) - Italy

Beech forests in central Apennines



Coppiced forests of *Fagus sylvatica*

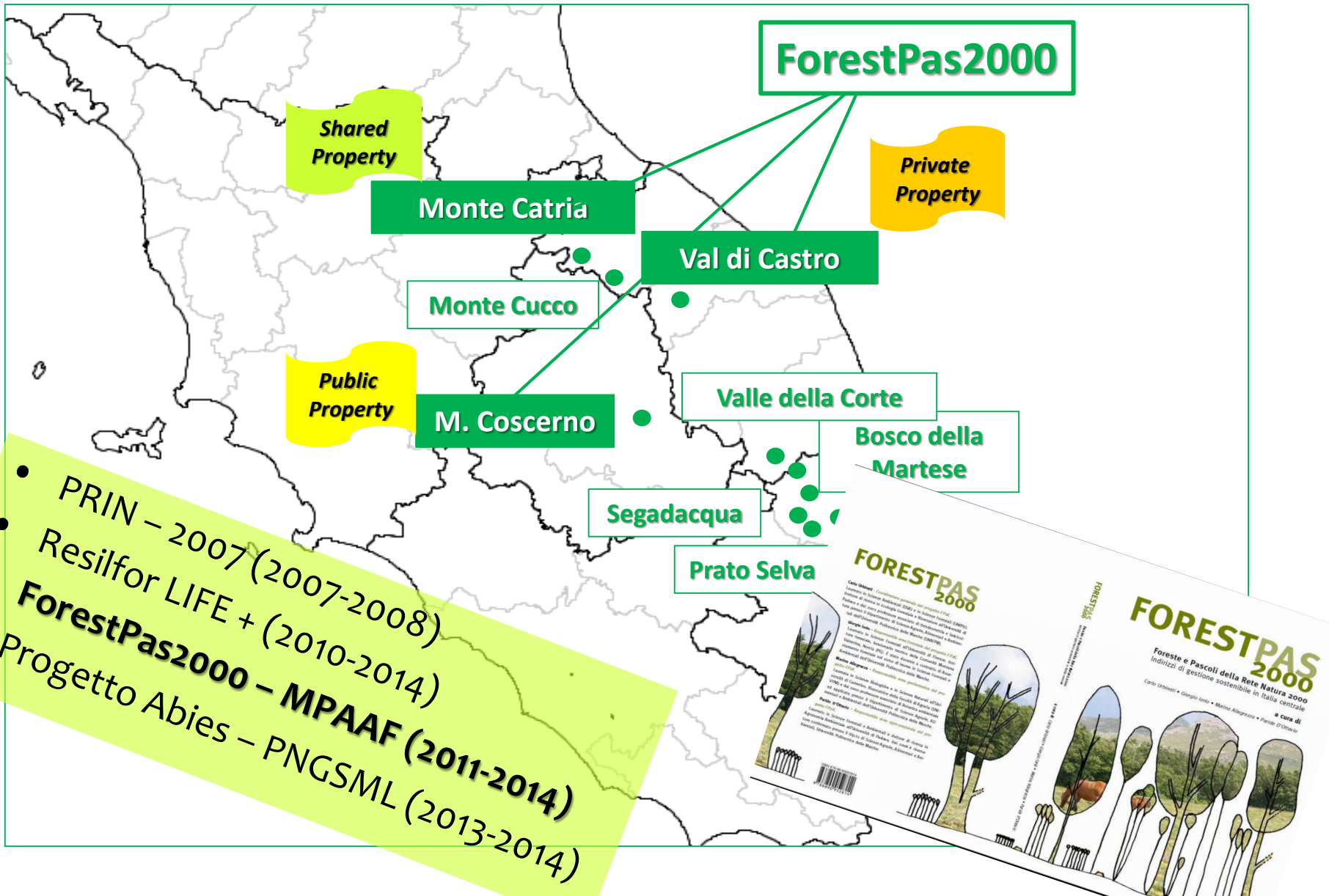
- Significant shifts in recent forest management
 - Reduction of regular active management (from 70% to 45%)
 - Large share of mature (53%) and over stored (38%) stands
 - Increase of **conversion to even-aged high forests** (71 Kha – 151 Kha)
 - Fostered by regional regulations for coppices older than 40 years



(Italian National Inventories 1985 – 2005)

Amorini et al. 2010

UNIVPM research projects on beech forests



Projects goals

- Define guidelines for sustainable management in Central Apennines forest and grasslands of the Natura 2000 based on:
 - Habitat types
 - Structure and functions of ecosystems
 - Land properties of investigates areas
- Include local population in participation process for management priorities
- Increase resilience of forests and grasslands to disturbances

Study area

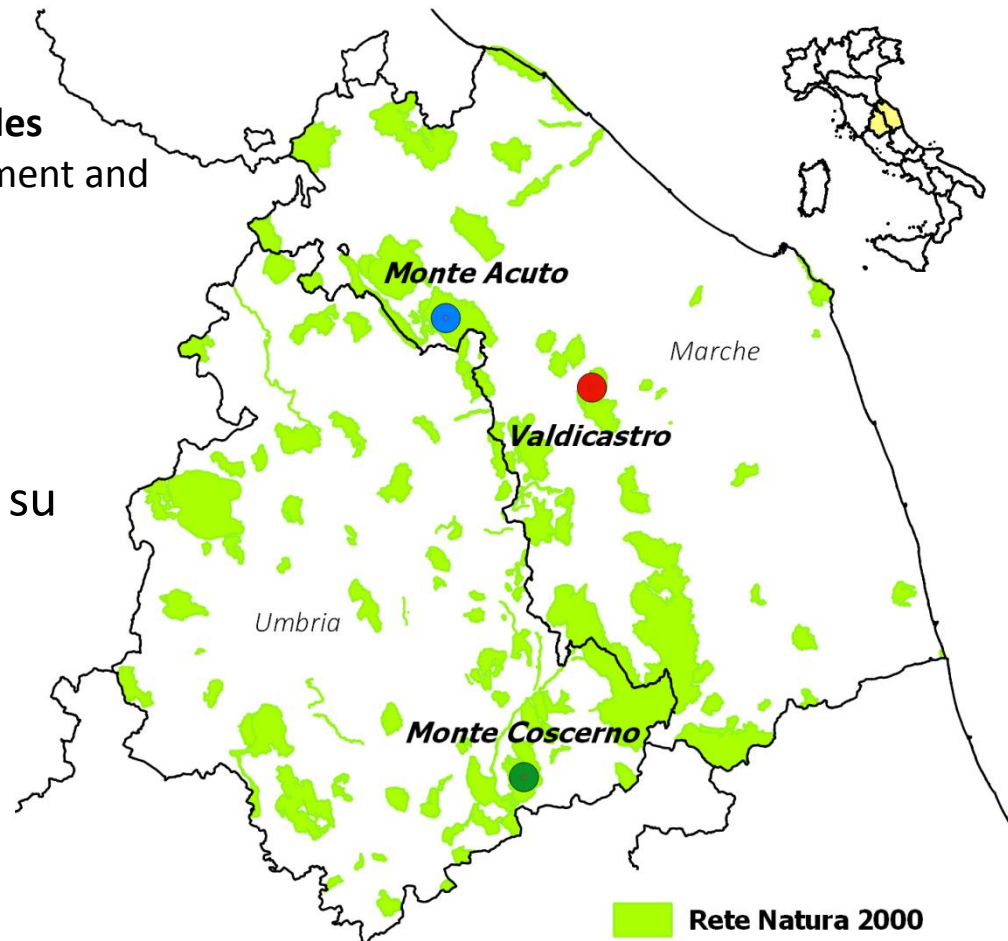
9210*: Faggeti degli Appennini con *Taxus* e *Ilex*

- Diversified past use and management (*timber, firewood, charcoal, pasture, etc...*)
- Significant management shift in the last decades productive to conservation function (abandonment and conversion)

6210(*): Formazioni erbose secche seminaturali e facies coperte da cespugli su substrato calcareo (*Festuco-Brometalia*)
(*stupenda fioritura di orchidee)



1. **Monte Acuto** – Common
2. **Val di Castro** – Private
3. **Monte Coscerno** – Public



Some research questions

- Is the current forest structure showing the legacy of past human management?
- Is the understory vegetation (herbs and shrubs) composition influenced by the structure of the overstory?
- Are the current management actions appropriate for biodiversity and habitat conservation?



Past use of forests



Litter gathering

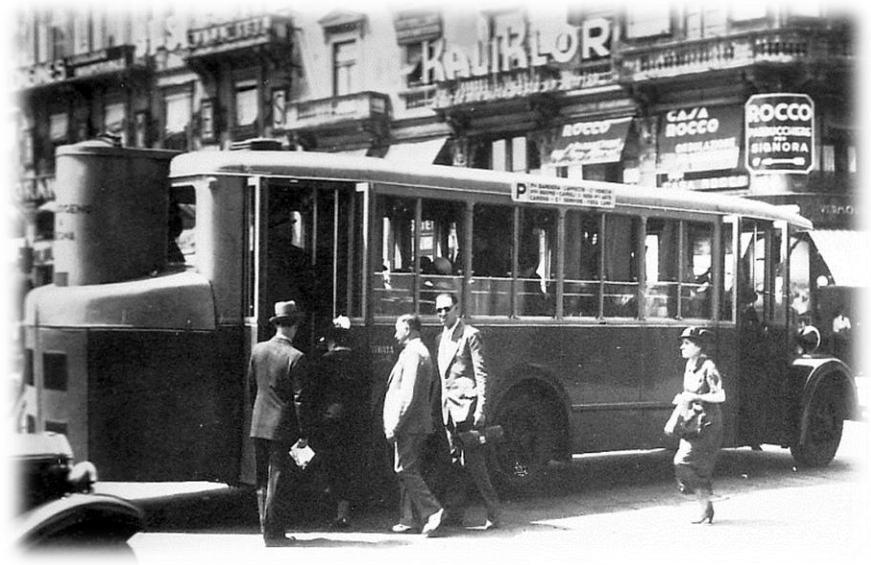
Wood pastures



Temporary crops

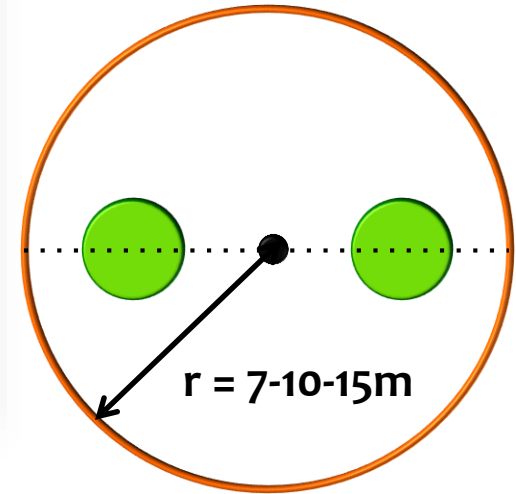


Past use of forests



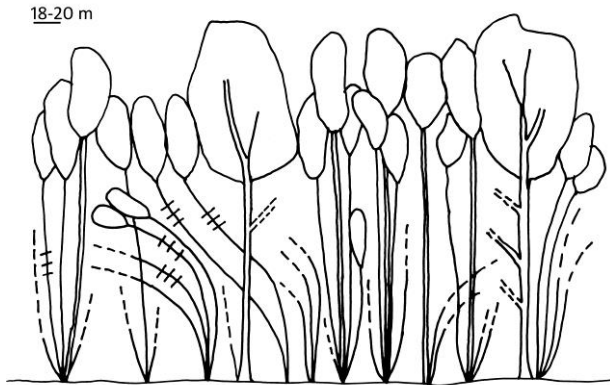
ForestPas2000 - Field measurements

Stratified random sampling:
circular plots randomly
distributed within the forest
cover



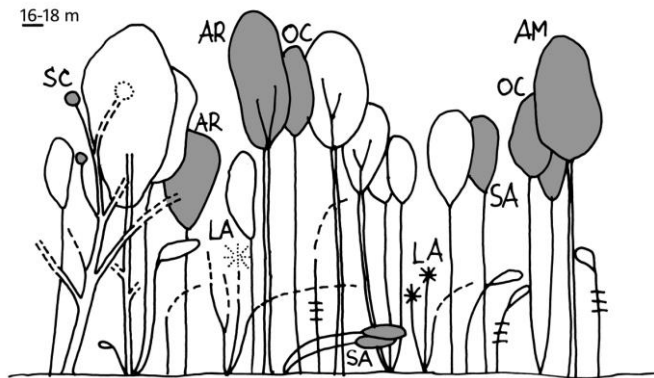
- n. 73 circular plots (variable radius – min. 20 trees):
- **Trees:** Species, origin, Dbh, H and Age (20% of trees)
 - **Seed Regeneration:** species, health, height, density on 2 sub-plots of 1-2 m radius
 - **Dead wood:** N. and volume of stumps, snags, and logs

Structural types



Coppices (C)

Standing volume (177 m³ha⁻¹)



New forests (N)

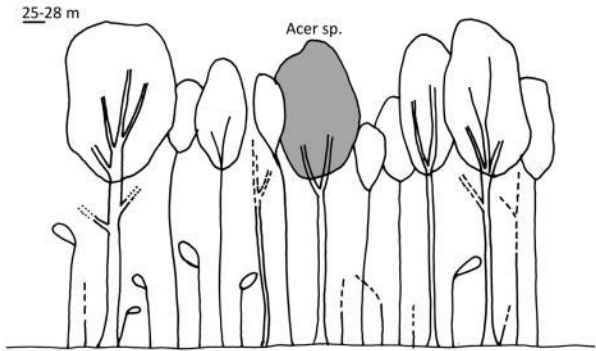
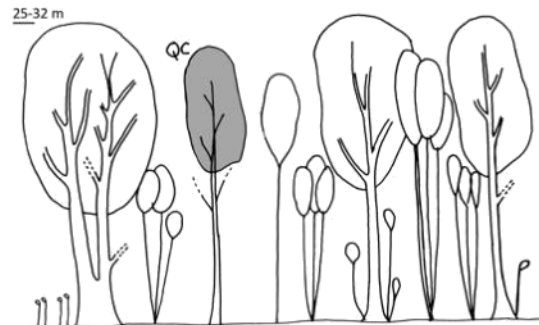
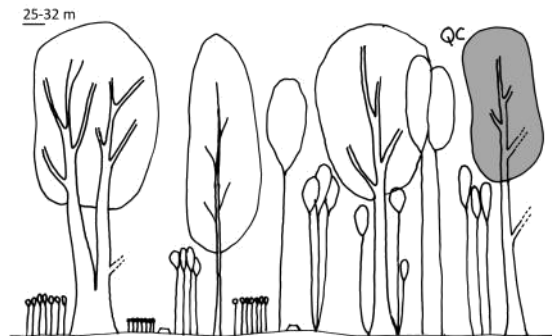
Standing volume (179 m³ha⁻¹)

Without seedlings

Coppices in conversion (M)

Standing volume (250-400 m³ha⁻¹)

With seedlings



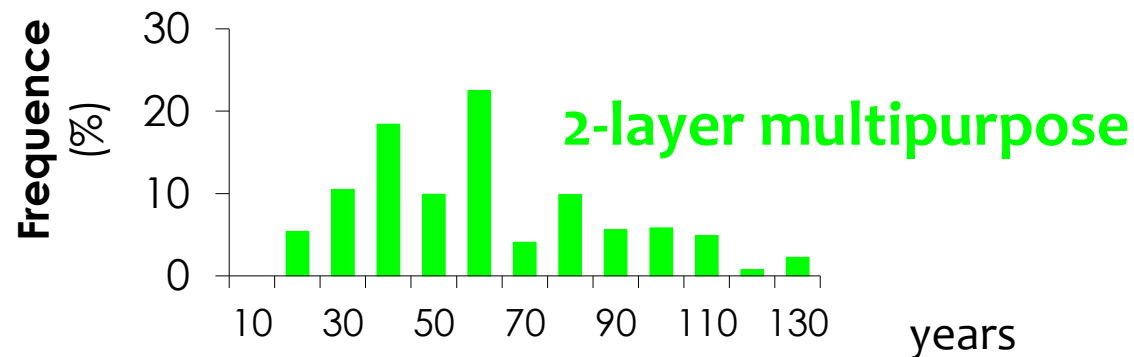
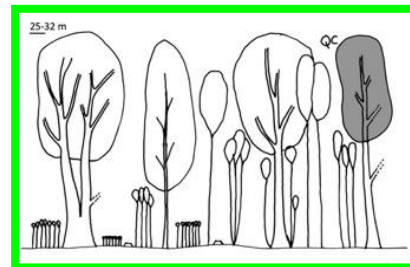
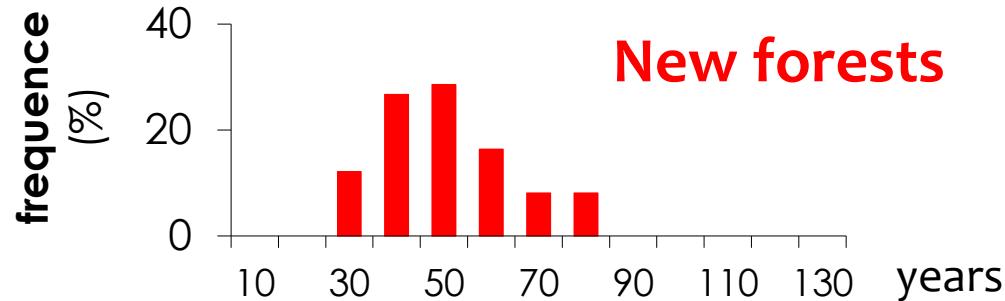
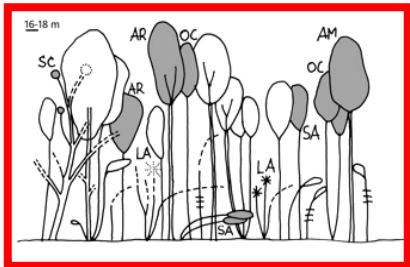
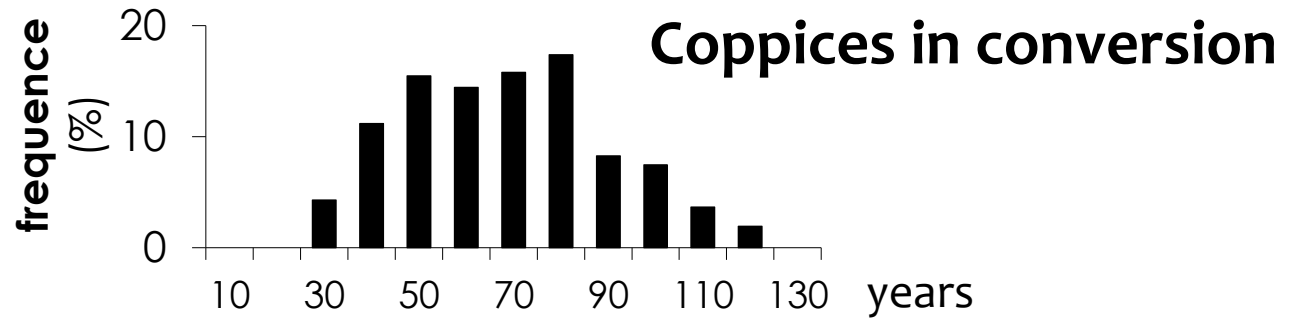
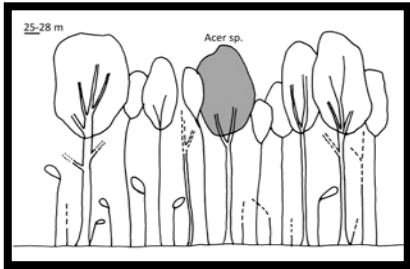
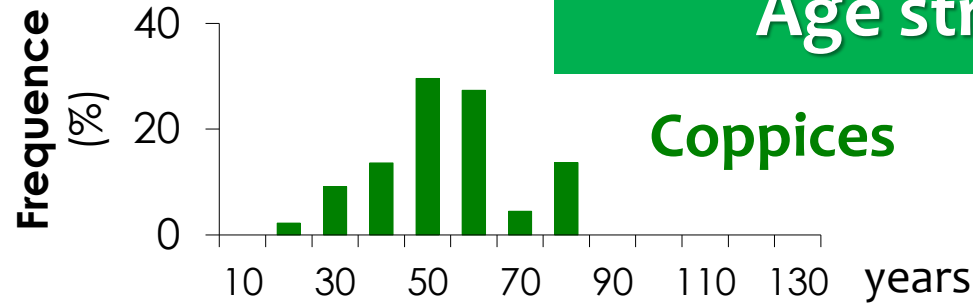
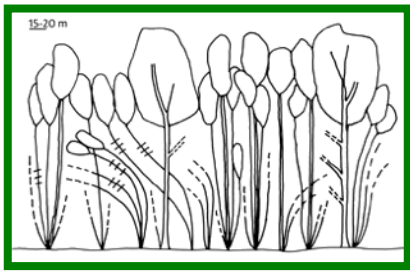
With seedlings

Two-layered multipurpose (P)

Standing volume (430-640 m³ha⁻¹)

With sprouting stumps

Age structures



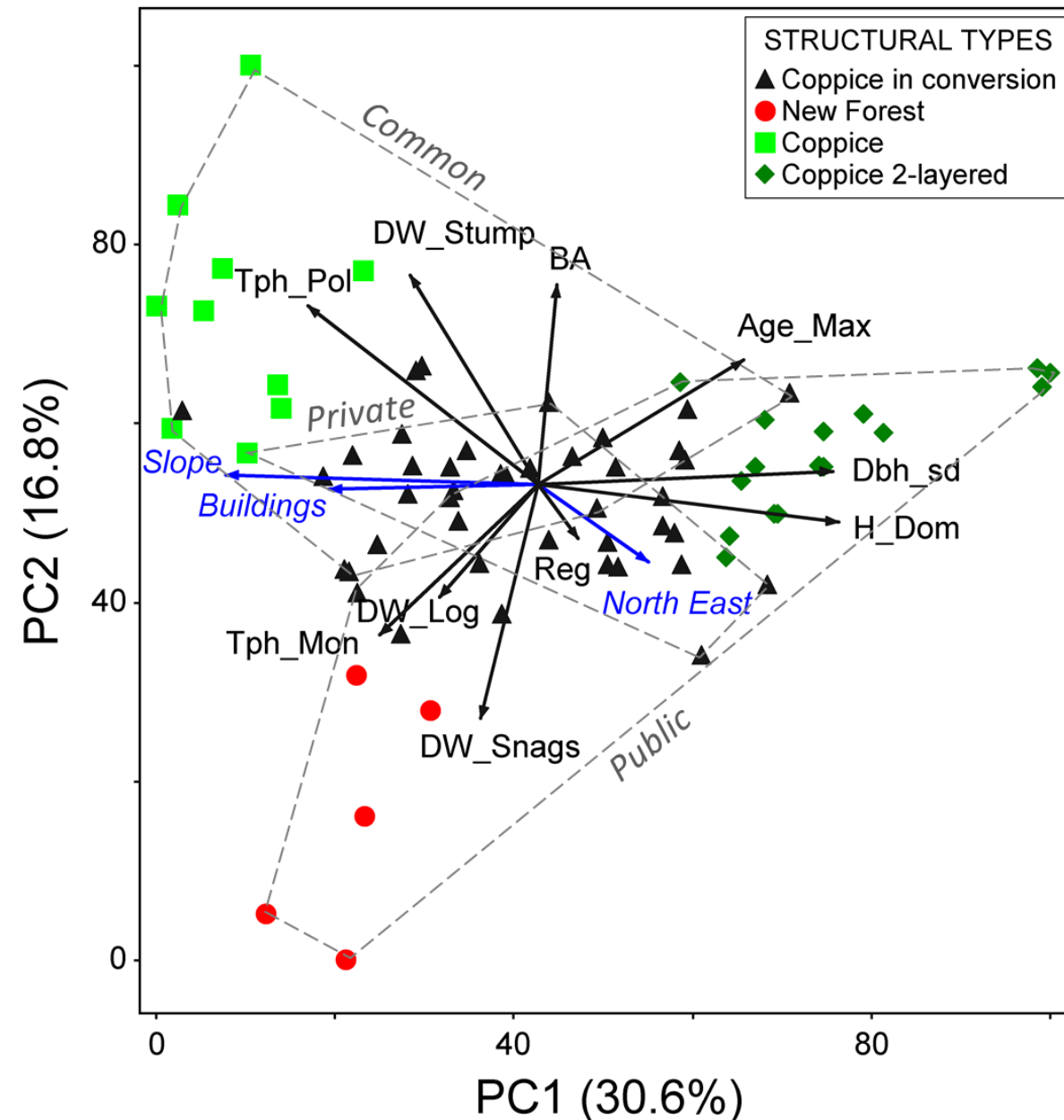
Necromassa FP2K

Faggete FP2K	CWD tot (m ³ ha ⁻¹)	Snag (m ³ ha ⁻¹)	Log (m ³ ha ⁻¹)	Stump (m ³ ha ⁻¹)
Monte Acuto (PU)	13,13	0,19	2,80	10,13
Monte Coscerno (PG)	13,61	10,18	2,34	1,09
Val di Castro (AN)	7,11	1,65	4,15	1,31

Faggete Italia – 7,6 m³ ha⁻¹ (INFC, 2005)



Forest structure vs. Environment



Public properties with higher diversity (DBH St.Dev.) size and age, esp. in double-layered coppices

Most frequent stands; lower density, relatively old trees

On steeper slopes; closer to infrastructures; High CWD (stumps)

On lower slopes; far from infrastructures, larger and older trees (similar to coppice w. standards)

Low basal area, higher species diversity, high CWD (logs and snags)

Forest functions and management changes

Monte Acuto- Catria (Marche)

~~Present~~
Present

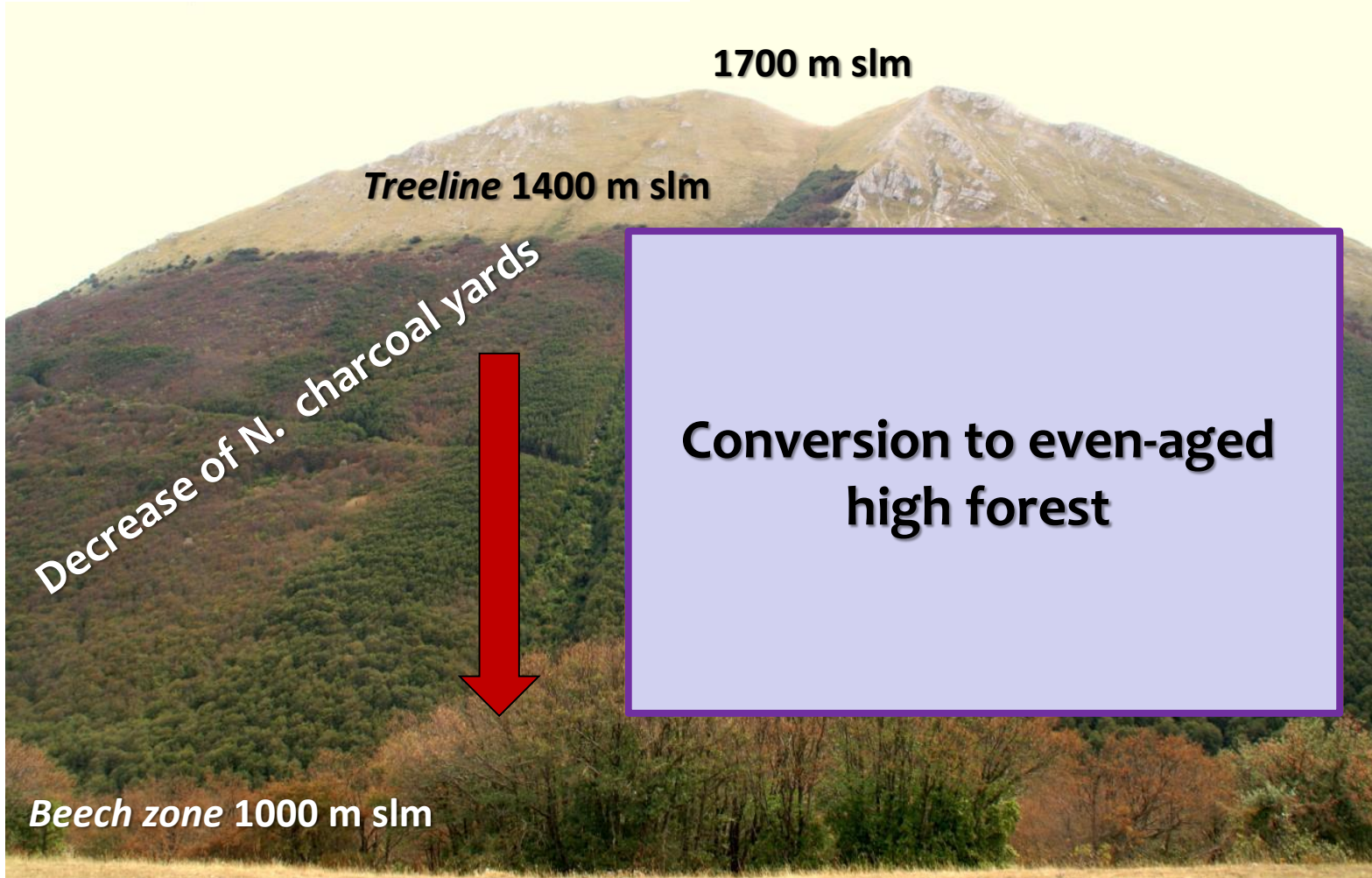
1700 m slm

Treeline 1400 m slm

Decrease of N. charcoal yards

Conversion to even-aged
high forest

Beech zone 1000 m slm



Coppice evenaged conversion: what's for?

Increase of damaged stems with thinning



2 thinnings



1 thinning



Store coppice

76%

43%

14%



No clear goals in conversion:

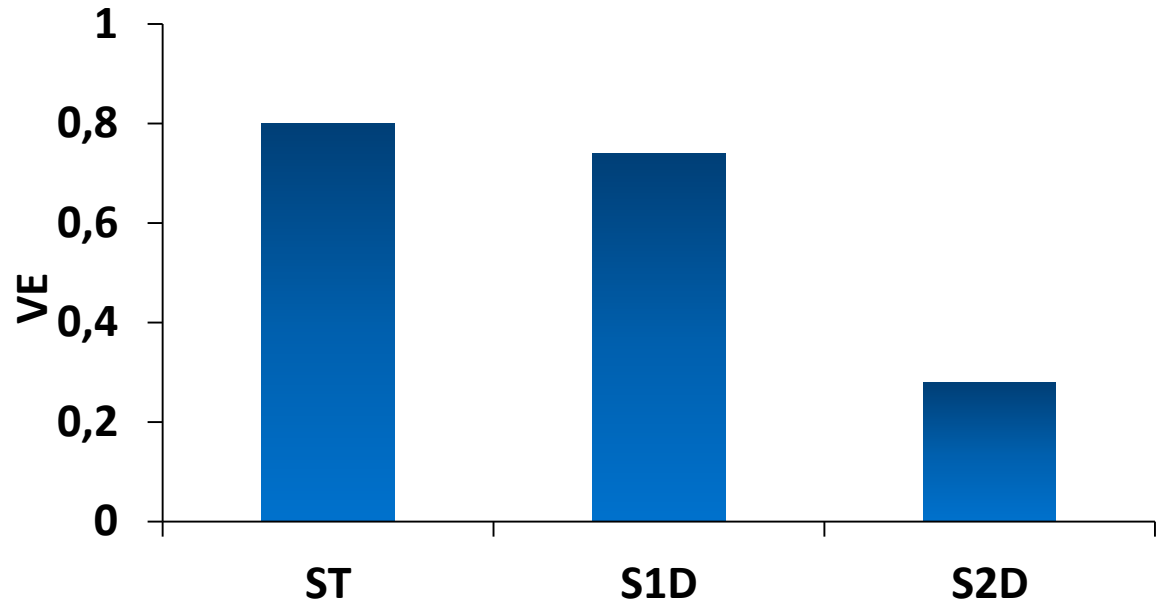
- Opportunity for wood production
- Low timber quality
- High mechanical damage on standing trees

Vertical structure diversity loss

Vertical Evenness

Neumann e Starlinger (2001)

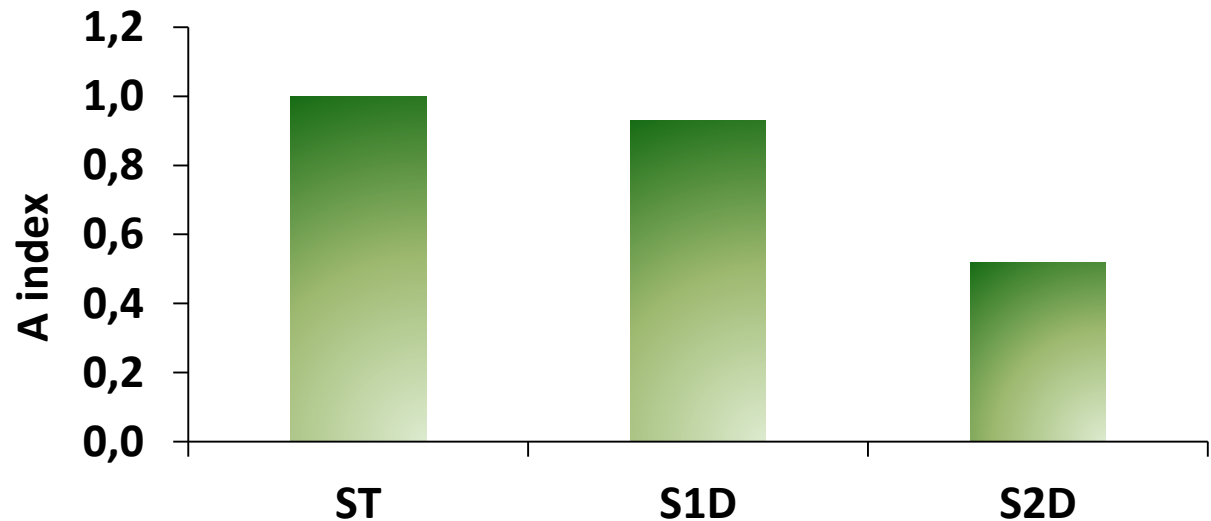
$$VE = \sum_i^3 (-\log \pi_i) \frac{\pi_i}{\log 3}$$



Vertical structure
decrease with thinnings

A Index (Pretzsch, 1998)

$$A = -\sum_{i=1}^S * \sum_{j=1}^Z p_{ij} * \ln p_{ij}$$



What about the target species?



Abies alba



Taxus baccata

Climate change effects?



Increased uprooting in coppice converted to even-aged forests



Climate change effects

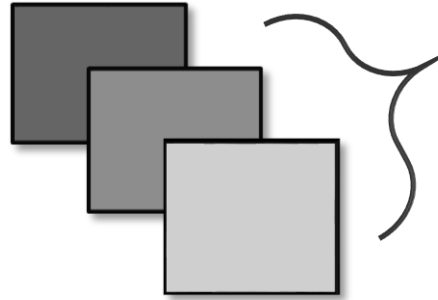
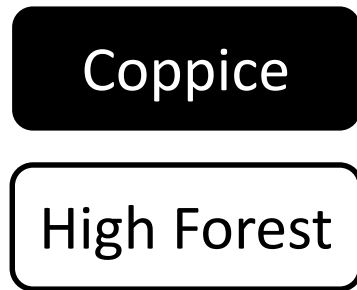
M. Acuto, versante Nord - 08-09-2011

September 2011



Conclusive remarks

■ Forest regulation and classification



- Scarce appreciation of forest structure diversity
- Lack of appropriate management rules and regulations

■ Simplified management - no clear targets



■ Natura 2000 measures - more restrictions than opportunities

Increasing structure standardization

The conversion syndrome





Thank you for attention



“ In tree species selection works mainly during regeneration events. Adaptation capacity depends therefore on the succesful regeneration”

(Kramer et al., 2008)