World Forum on Urban Forests
Mantova 2018

An old resource for new benefits – understanding the role of dead wood

Livia Zapponi[1,2] Franco Mason[1]

[1]Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" Carabinieri

[2]Unità entomologia agraria, Dipartimento Agroecosistemi sostenibili e biorisorse, Centro Ricerca e Innovazione, Fondazione Edmund Mach

Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana"

FONDAZIONE EDMUND MACH

World Forum on Urban Forests
Mantova 2018

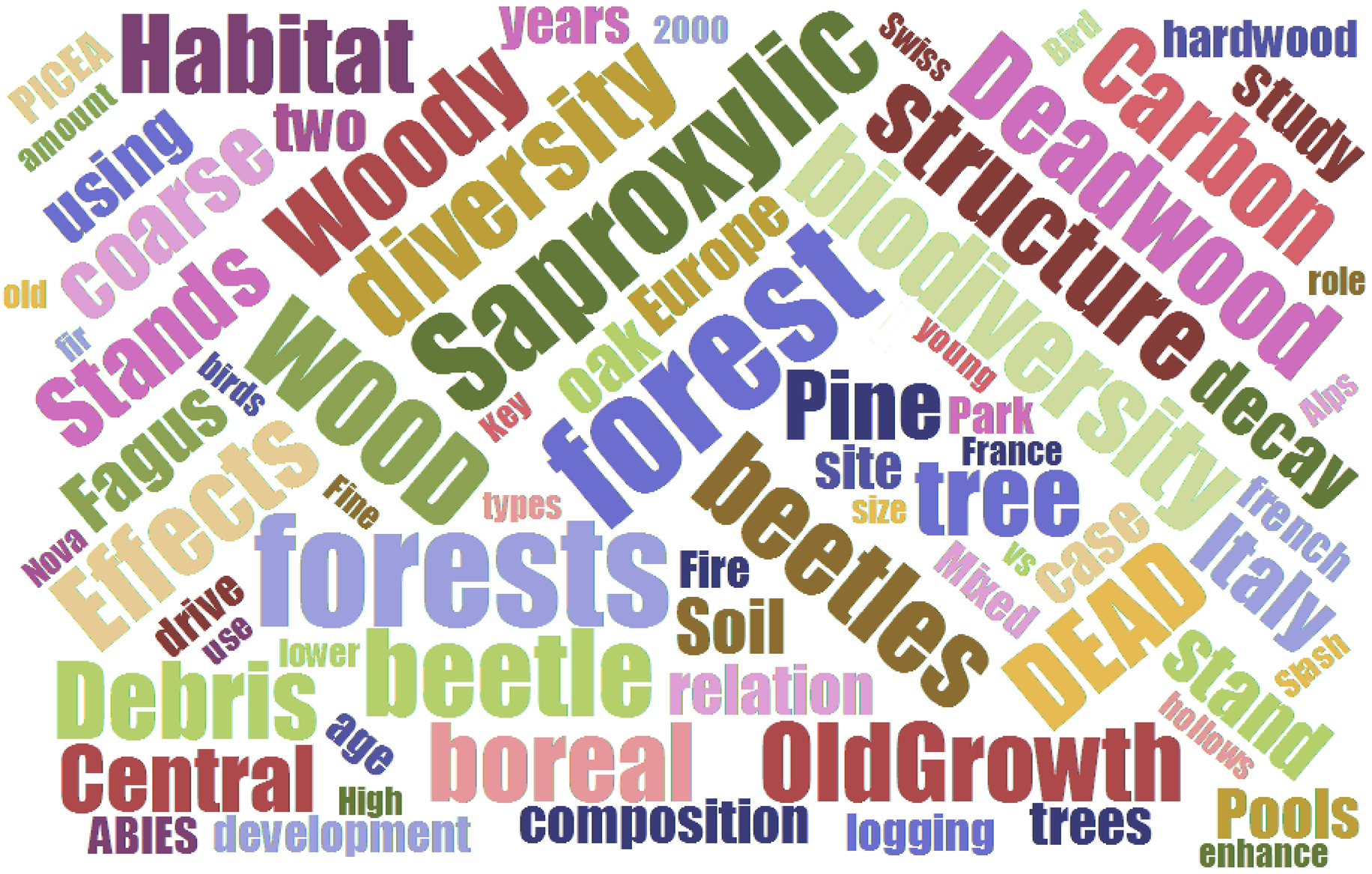
An old resource for new benefits – understanding the role of dead wood

Overview

- Why dead wood is a key resource for biodiversity conservation
- The multifaceted values of dead wood
- The historical and current management of dead wood
- Future perspectives

World Forum on Urban Forests
Mantova 2018

Why talk about dead wood?



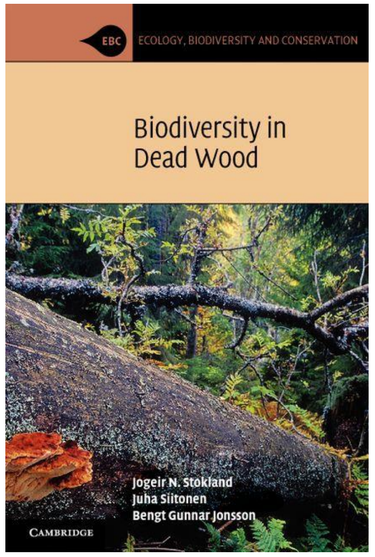
Web of Science search for: [Dead wood OR Deadwood]

→ 192 entries
→ Sum of the Times Cited 2,841

World Forum on Urban Forests
Mantova 2018

A key resource for biodiversity conservation

Saproxylic organisms: any species that depends, during at least a part of its life cycle, on dead wood material from living, weakened or dead trees.



Stokland et al 2012

«Structural decomposers»

FUNGI

«Bio-engineers»

BEETLES

«Top predators»

WOODPECKERS

«Predators»

BEETLES

«Fungivores»

BEETLES

«Parasitoids and hyper-parasitoids»

FLIES

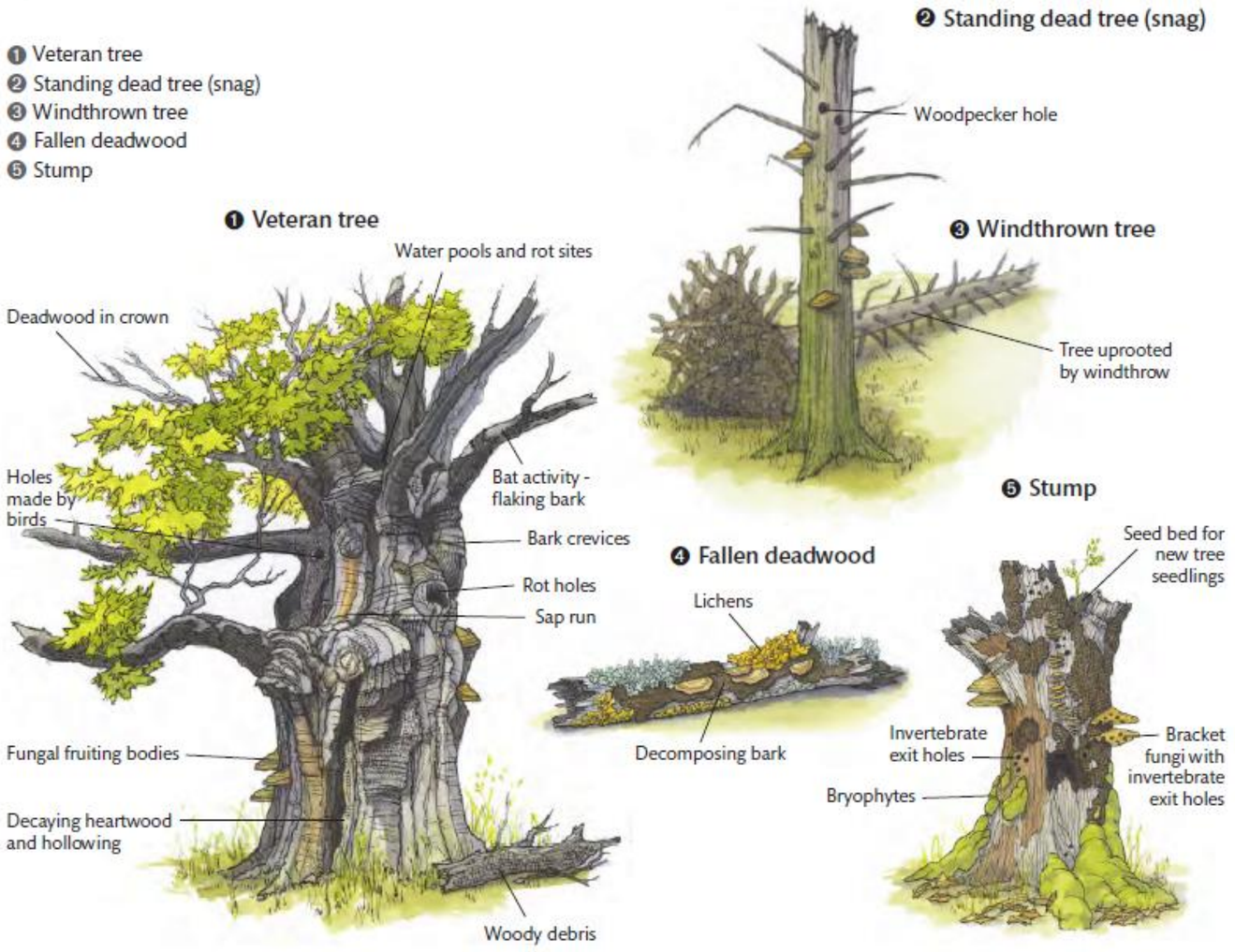
WASPS

«Scavengers»

BEETLES

World Forum on Urban Forests
Mantova 2018

A key resource for biodiversity conservation



Types of deadwood
– Humphrey and Bailey 2012, Forestry Commission

"Structural legacies":

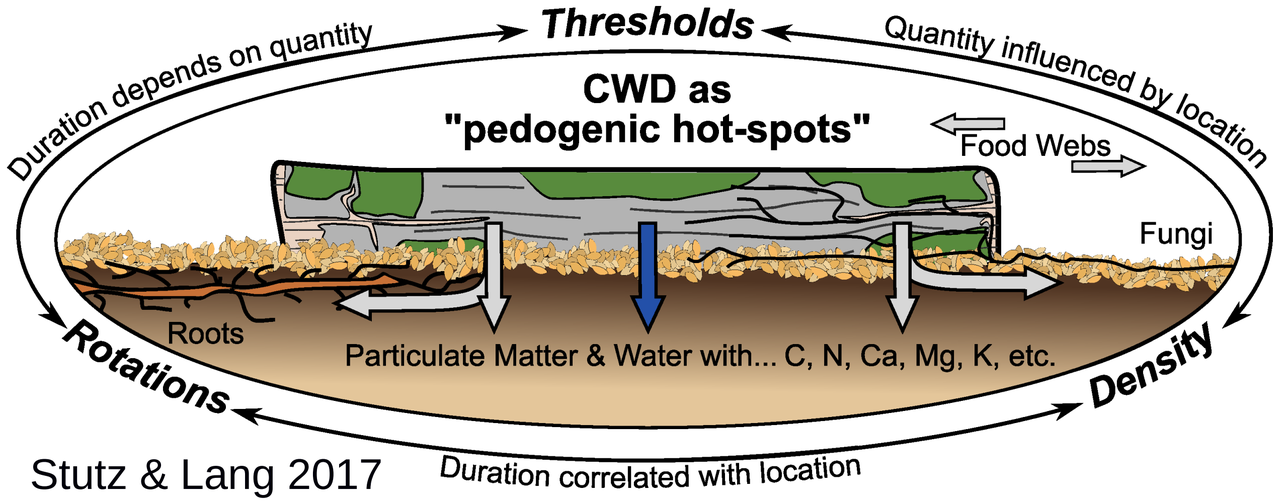
- Provide habitat, trophic resources, inrease post-disturbance complexity
- Promote survival and re-establishment of forest organisms – Franklin et al 2000, Cons Pract

Approximately one third of forest species are related to dead wood – Müller et al 2008, J Ins Cons

Sustain diverse and structured communities, more resistant disturbances (e.g. pathogen species)

World Forum on Urban Forests
Mantova 2018

Dead wood: a long-lasting carbon pool



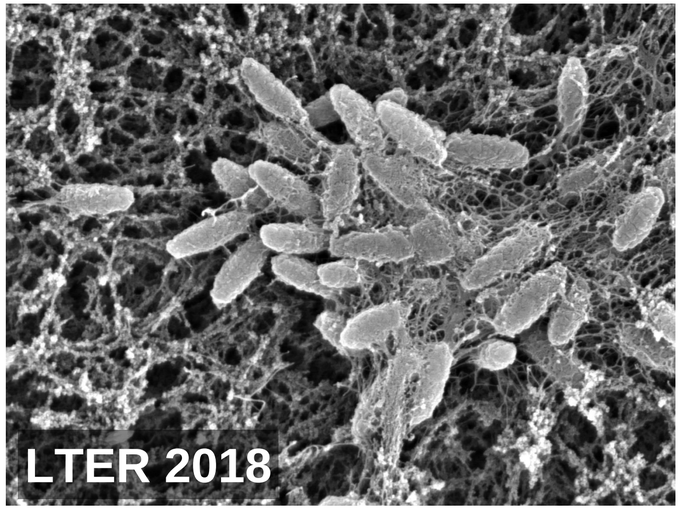
Stutz & Lang 2017

“Pedogenic hot-spots”

Dead wood is a large and long-lasting carbon pool, contributing to:

- nutrient cycling
- tree regeneration
- biogeochemical and physical processes that influence soil functioning

– Stutz & Lang 2017, Forests



Enhance the abundance and diversity of the microbial community:

- additional fluxes of carbon into the mineral soil

– Magnússon et al 2016, For Ecol Mng

World Forum on Urban Forests
Mantova 2018

Dead wood to increase water storage

Influences forest hydrology and geomorphology:

- Trap sediment
- Control water infiltration, stream channel development and hillslope processes

– Pypker et al 2011, Forest Hydrology and Biogeochemistry

The presence of dead wood makes forests more resilient against climate change induced drought situations

World Forum on Urban Forests
Mantova 2018

The management of dead wood

AVAILABILITY

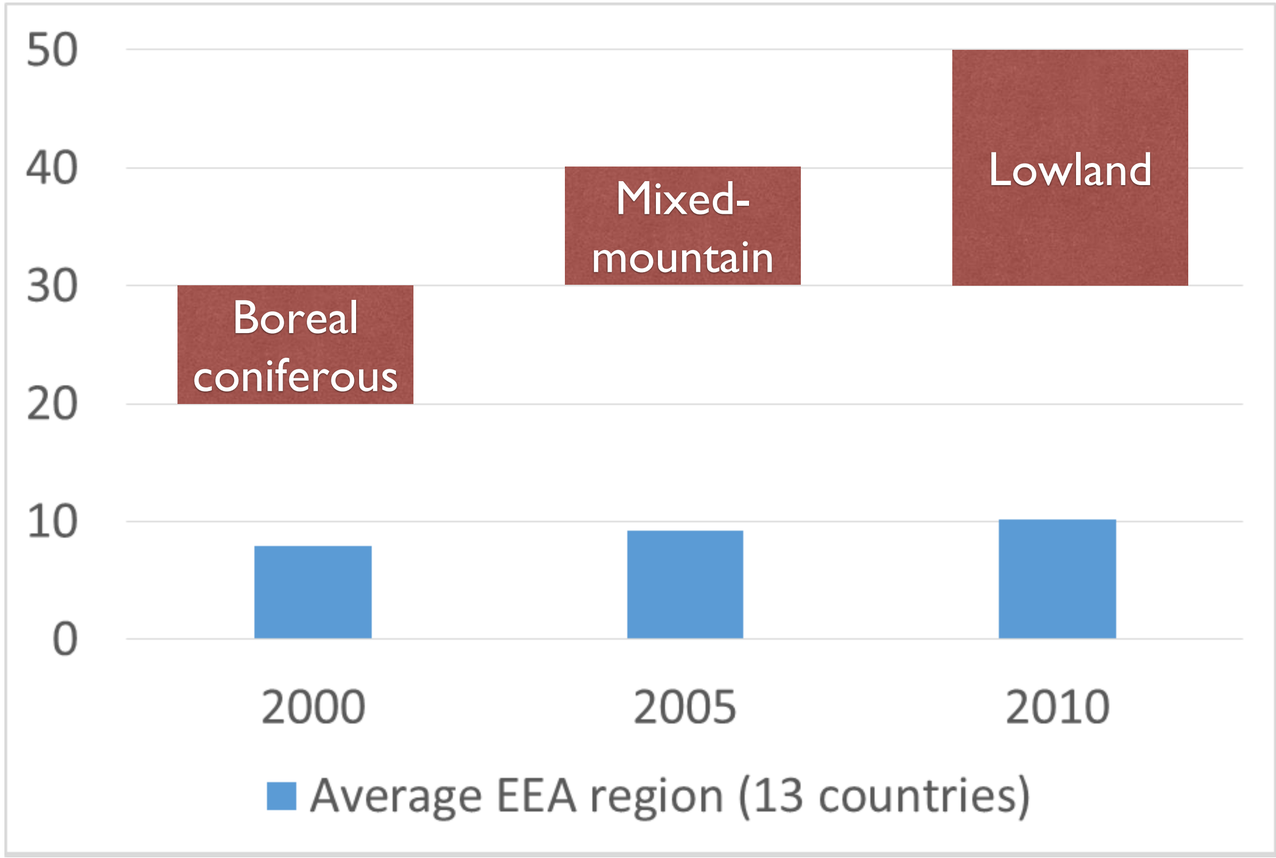
Disturbance

- Frequency
- Intensity

Management

- Harvest & removal
-Bioenergy

Dead wood volumes thresholds for the conservation of saproxylic biodiversity – Müller & Bütler 2010, Eur J For Res



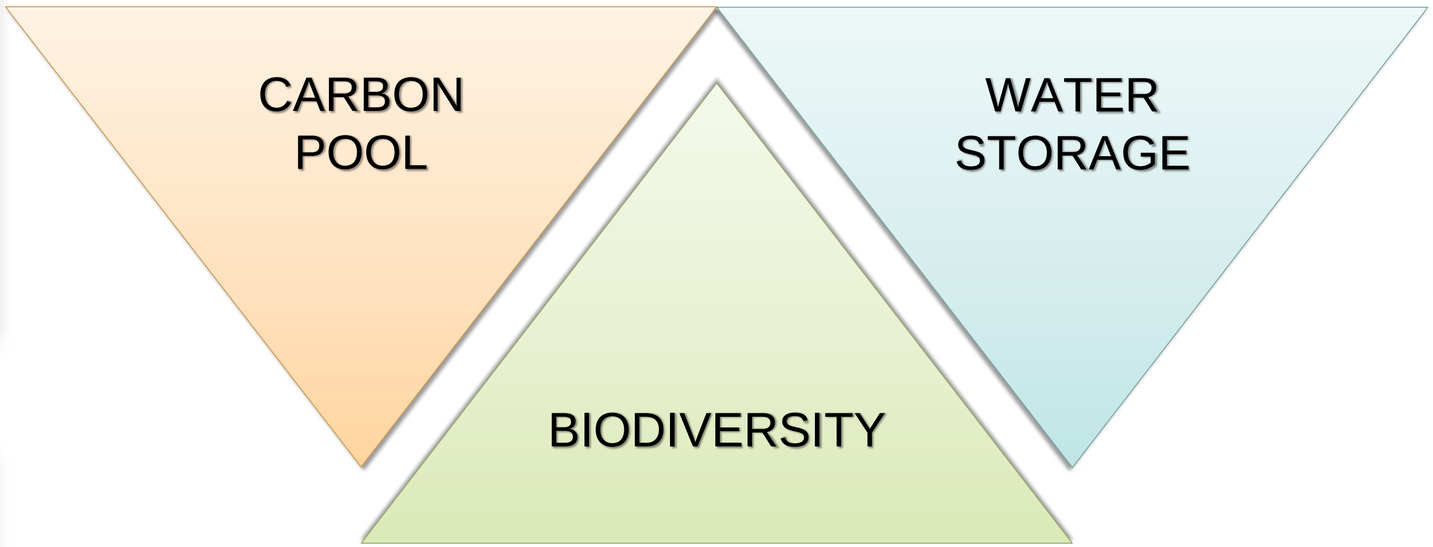
Average dead wood volume (m^3/ha) in forests in several EEA countries – European Environmental Agency

World Forum on Urban Forests
Mantova 2018

The multifaceted values of dead wood

Forest Europe growing life

Updated Pan-European indicators for sustainable forest management



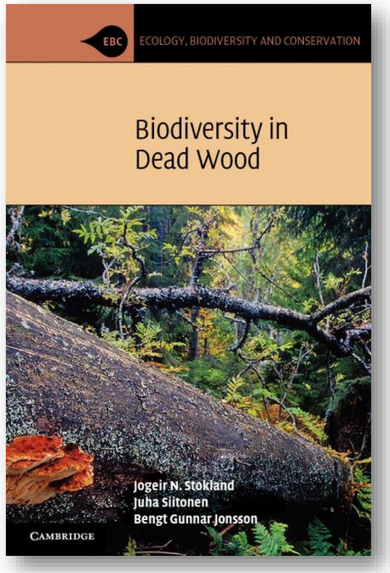
COUNCIL OF EUROPE
COMMITTEE OF MINISTERS

RECOMMENDATION No. R (88) 10

OF THE COMMITTEE OF MINISTERS TO MEMBER STATES

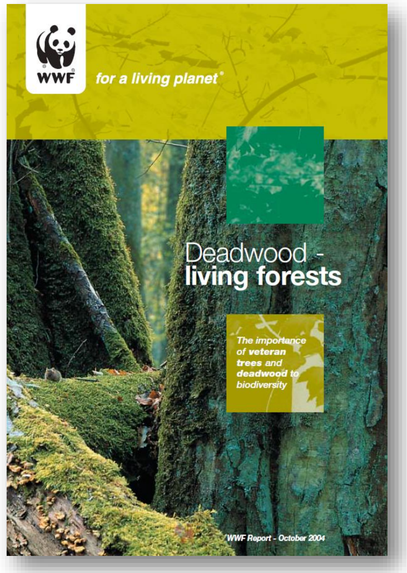
ON THE PROTECTION OF SAPROXYLIC ORGANISMS AND THEIR BIOTOPES

(Adopted by the Committee of Ministers on 13 June 1988 at the 418th meeting of the Ministers' Deputies)



Conflicts with timber production are still critical

Can a more complete consideration of the ecosystem services provided by dead wood ensure its conservation in the future?



World Forum on Urban Forests
Mantova 2018

The perception of dead wood

Is dead wood acceptable in urban forests?

Can it represent an aesthetic contribution?

YES!

Logs are actually perceived as natural features in urban forests

– Hauru et al 2014, Landscape Urban Plan

Increase awareness

World Forum on Urban Forests
Mantova 2018

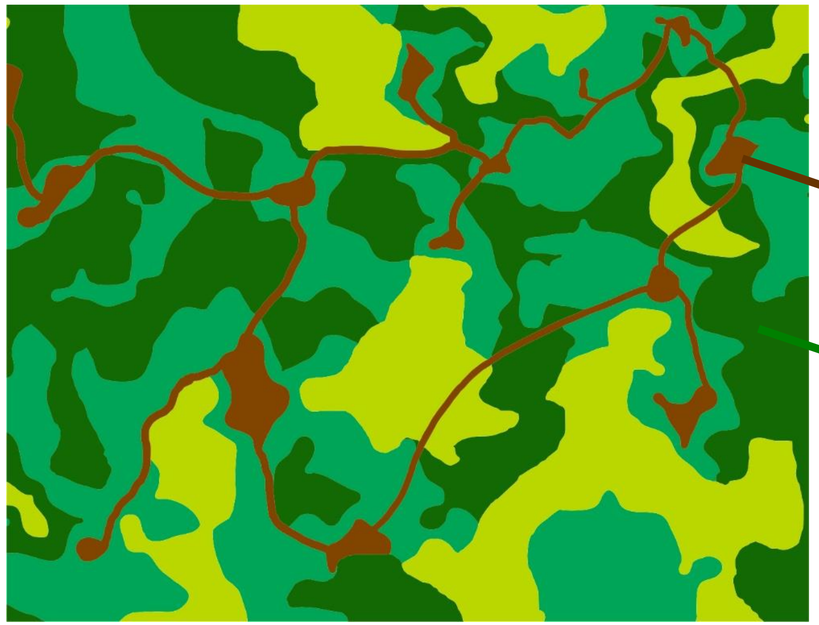
Future perspectives

Preserve forest diversity
Maximize the C pool:
- biomass
- forest soil

Increase water storage

SFM?

- Wood products
- Bioenergy



Integrative management approaches

Areas with high availability of dead wood

Forest matrix

- Create a network that would deliver dead wood functions to the forest matrix
- Zonation

– Mason & Zapponi 2016, iForest

World Forum on Urban Forests
Mantova 2018

As the pressure of biomass extraction for energy production increases, understanding the contribution of deadwood is crucial to support its sustainable management

Thank you for your time!