

Does uneven-aged silviculture better prepare forests to global change than even-aged silviculture?

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INTERNATIONAL WORKSHOP
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initiatives and new management practices
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A quick reminder

Eas

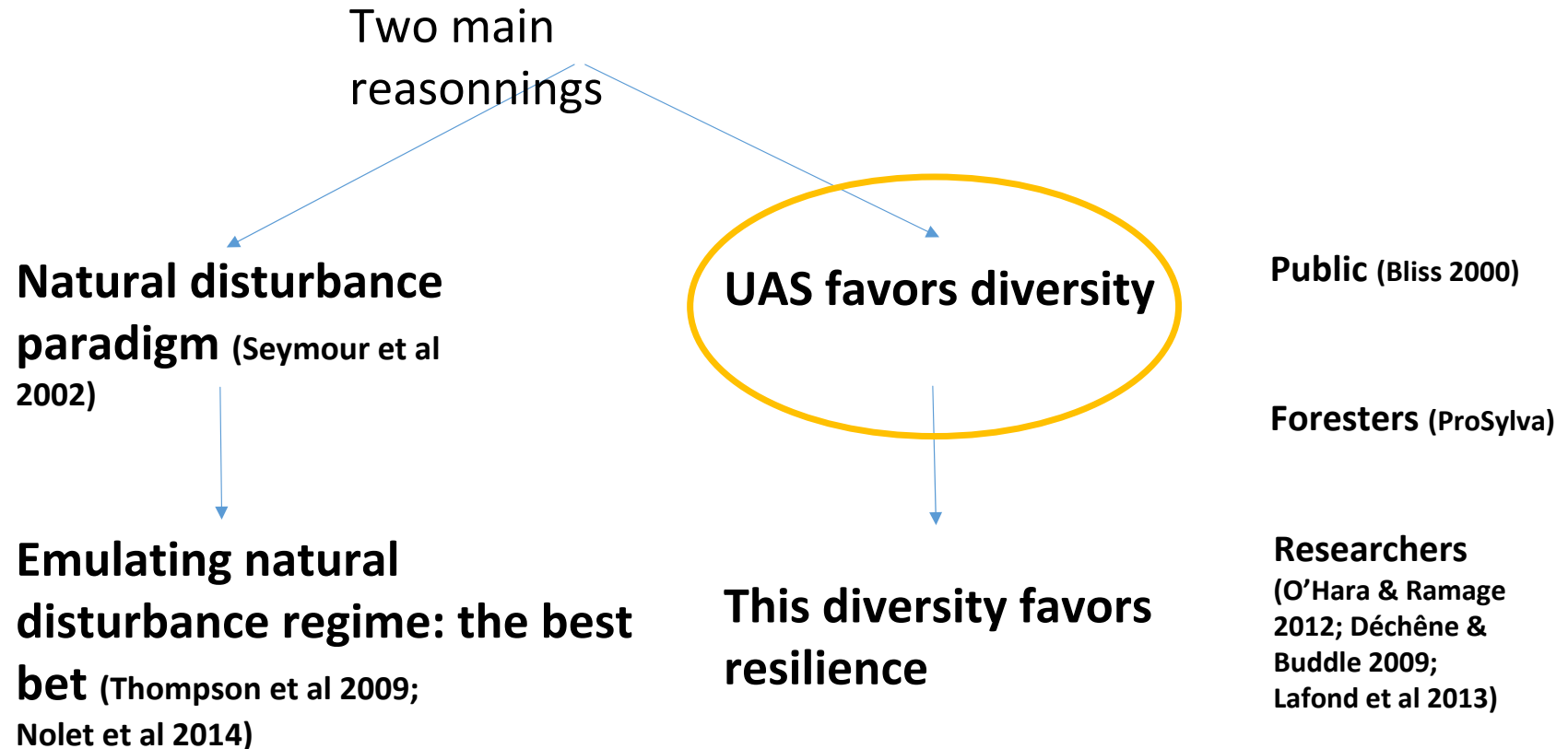


Uas



Introduction

Uneven-aged silviculture (UAS) leads to more resilient forests than even-aged silviculture (EAS) dominant thinking



Objective

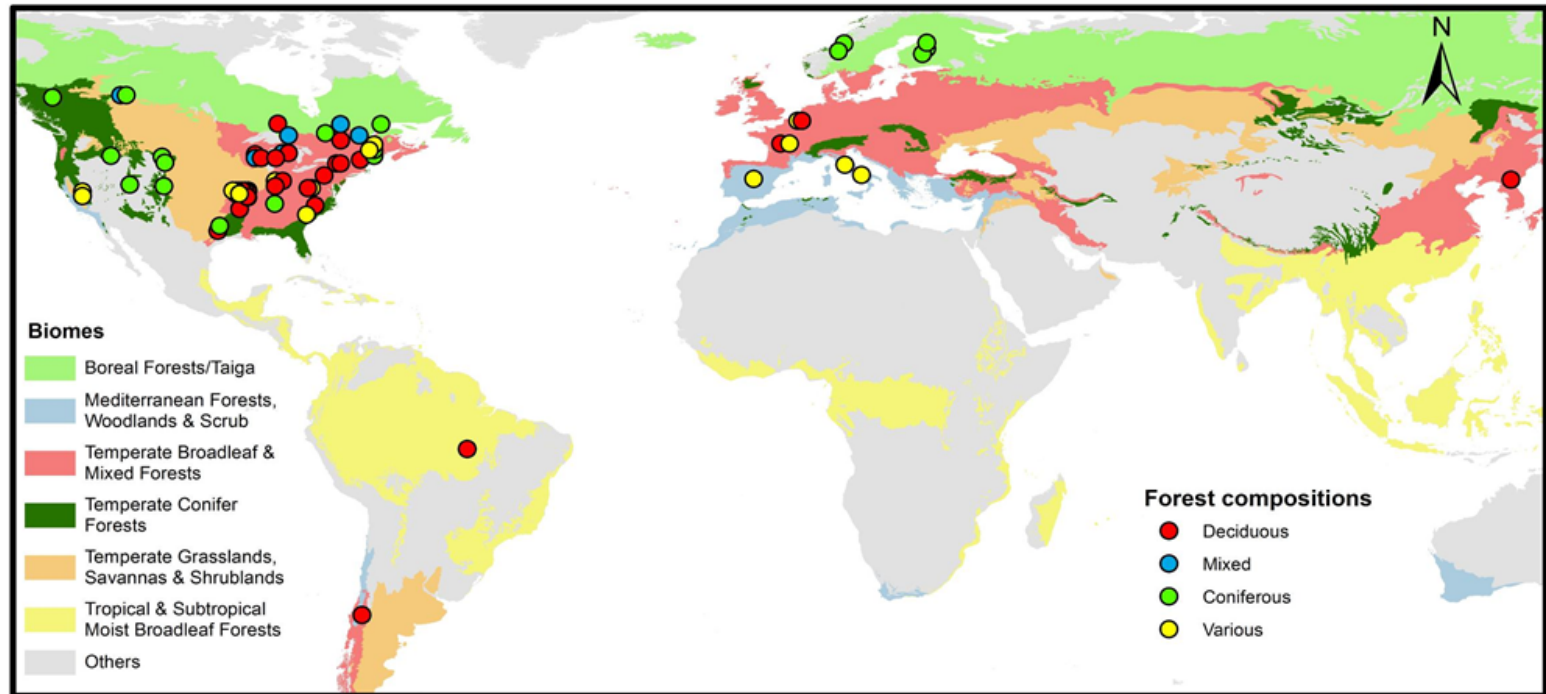
To evaluate, through a literature review, whether there is any scientific evidence to support that uneven-aged silviculture better maintains/promotes biodiversity and key ecological processes than even-aged silviculture.

Methodology

- Only scientific papers that compared EAS vs UAS on any ecological value;
- English papers only
- Worldwide;
- Scopus, Web of Science, Google Scholar.

Studies geographic distribution

~ 70 studies



Studies syntheses

Herpetofauna (partial example)

Properties or process studied	Metrics used	UAS preferable to EAS ?	Time/spatial scale consideration	Biome	Reference
Amphibians oviposition, larval, juvenile and adult stages	Abundance	No for oviposition and larval stages and yes for juvenile and adult stages	4 years after treatment/No	Temperate Evergreen Forests /Temperate Deciduous Forests	Semlitsch et al. (2009)
Red-backed salamander population	Abundance	Yes	6-7 years after treatment/No	Temperate Deciduous Forests	Hocking et al. (2013)
Salamanders populations	Abundance and reproductive efficiency	Yes	13 yrs after treatment/Yes	Temperate Deciduous Forests	Homyack & Haas (2009)
Amphibians and reptiles populations	Abundance	Yes for Amphibians and species-specific for reptiles	3-4 years after treatment/Yes	Temperate Deciduous Forests	Renken et al. (2004)
Amphibians specialist and generalist populations	Activity	Yes for specialist, species-specific for generalist	6 years after treatment/No	Temperate Deciduous Forests	Popescu et al. (2012),

Overall synthesis

Properties and process	Studies showing UAS preferable to EAS	Number of studies
Tree species diversity	1	7
Herb/shrub diversity and composition	0	11
Structural elements	3	7
Mycorrhizae, lichens, bryophytes, fungi and bacterias	3	5
Mammal communities	0	6
Bird communities	0	9
Herp communities	4	7
Invertebrate communities	0	10
Carbon-related processes	4	10
Soil-related properties	3	7
Total	18	79

Main findings

- There is no strong scientific evidence that UAS is preferable to EAS in ecological terms;

Two main caveats:

a) In most studies EAS was based on natural regeneration ;

b) Time and spatial scales were often not considered;

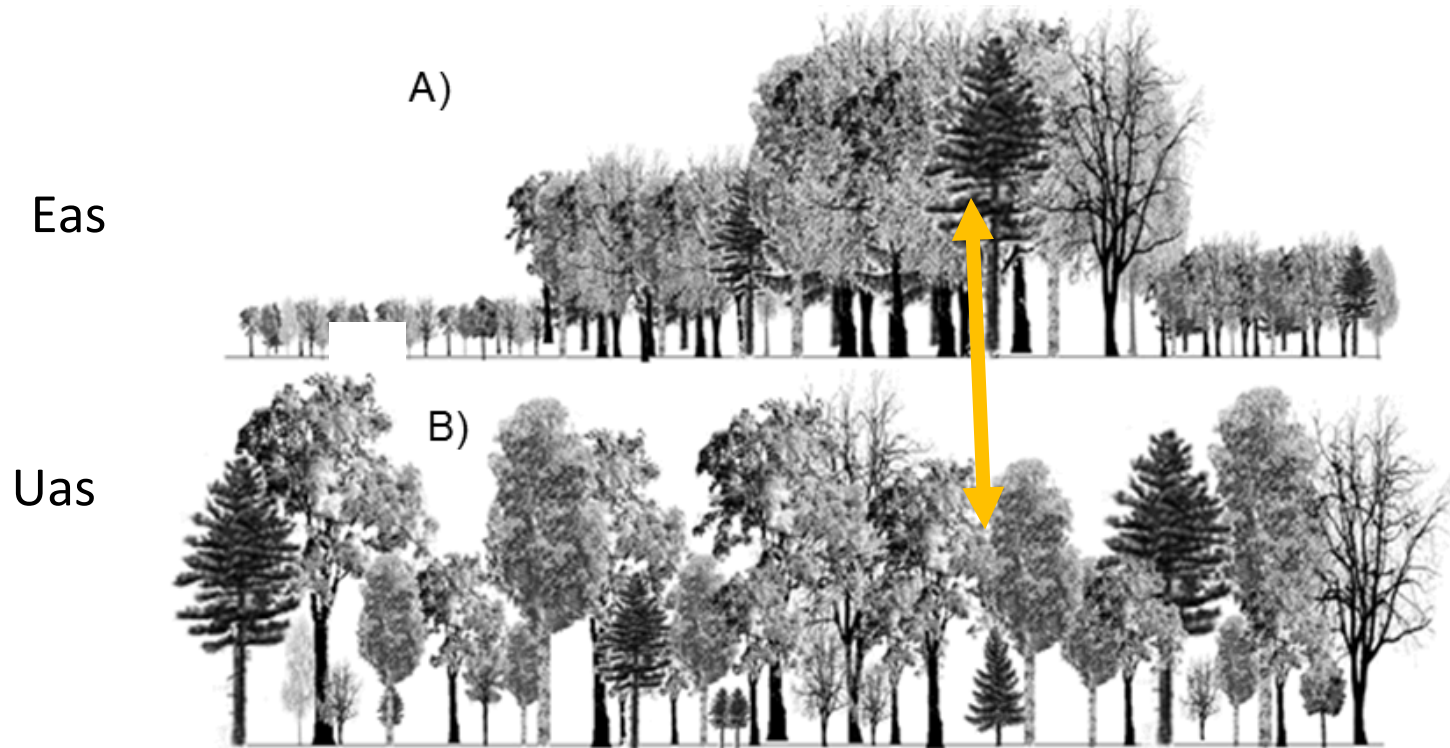
- Both EAS and UAS present advantages and limits;
- Some ecosystem properties and processes appear fragile to any type of forest management. Full conservation is still needed.

UAS not better than EAS ?

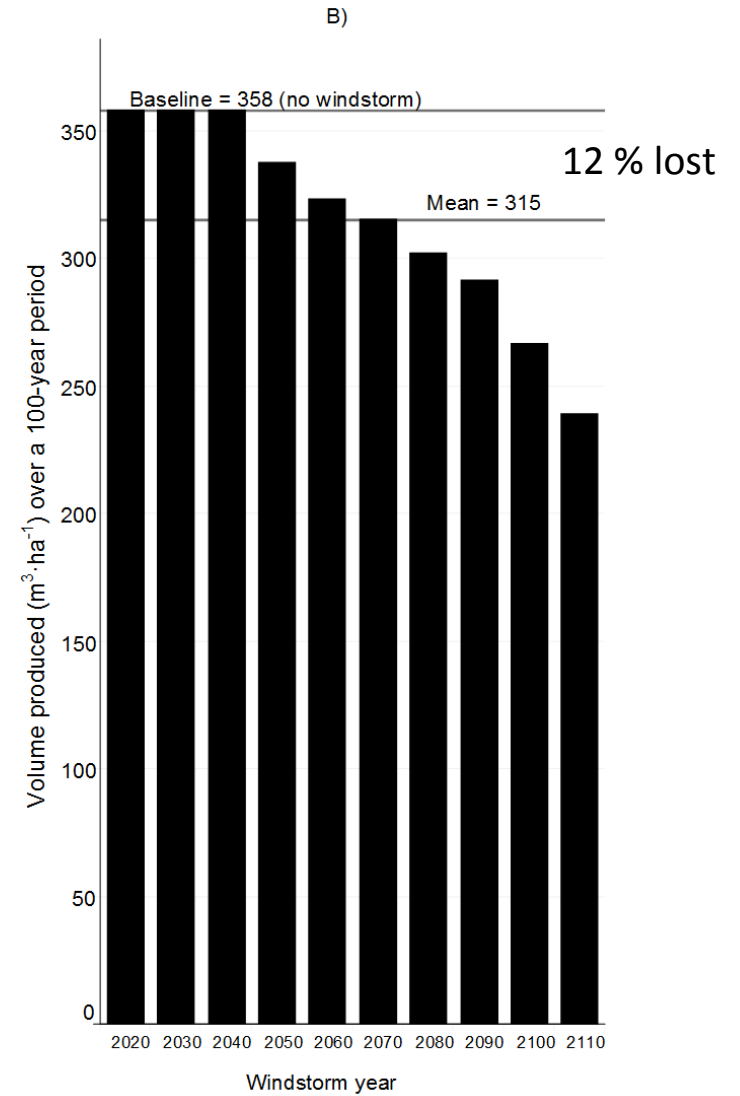
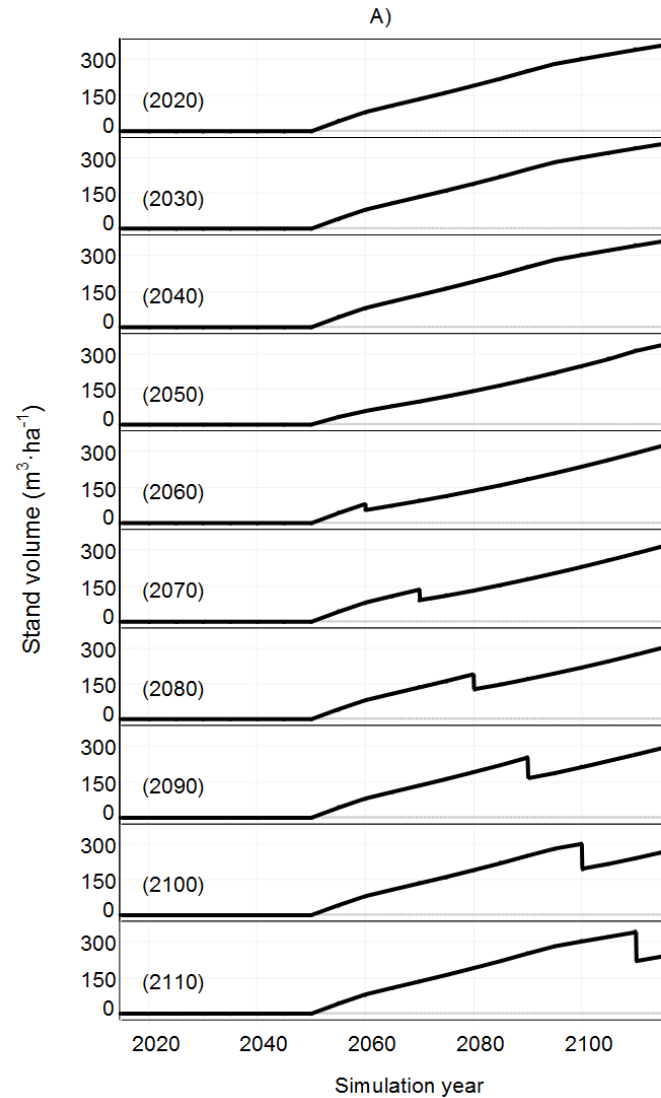
3 possible reasons to explain this result

- This is really it : UAS not better than EAS
- The low number of studies comparing EAS vs UAS
- The complexity of comparing EAS and UAS
 - Various sub-systems in both approaches
 - Variations in the management intensity in both approaches
 - The time and spatial scales effects

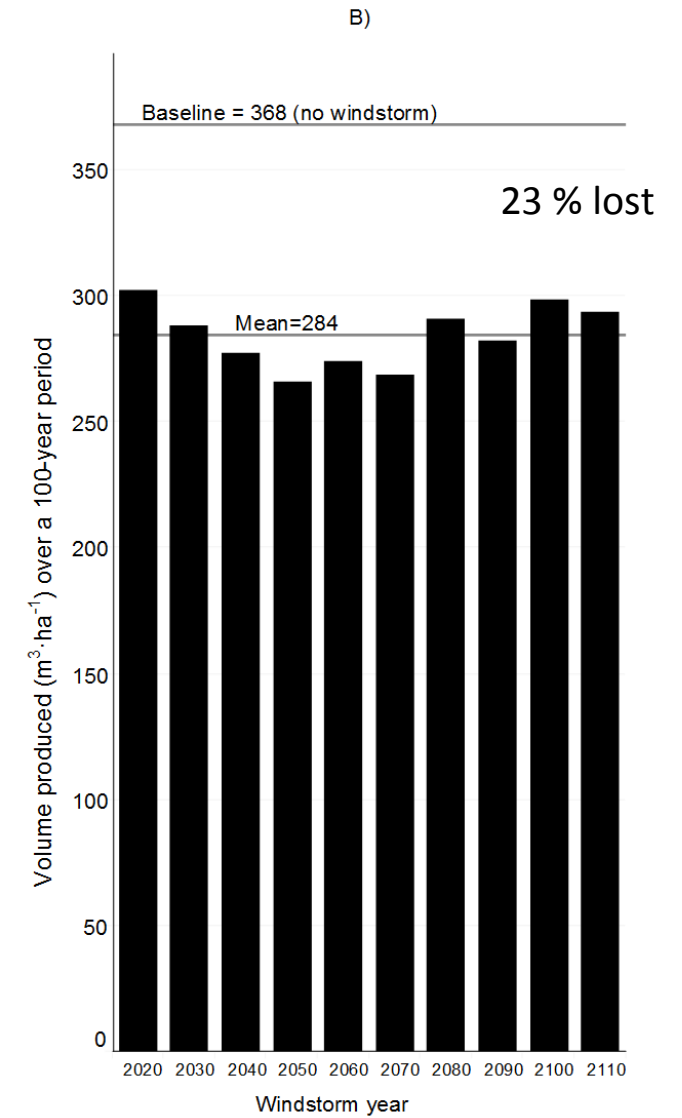
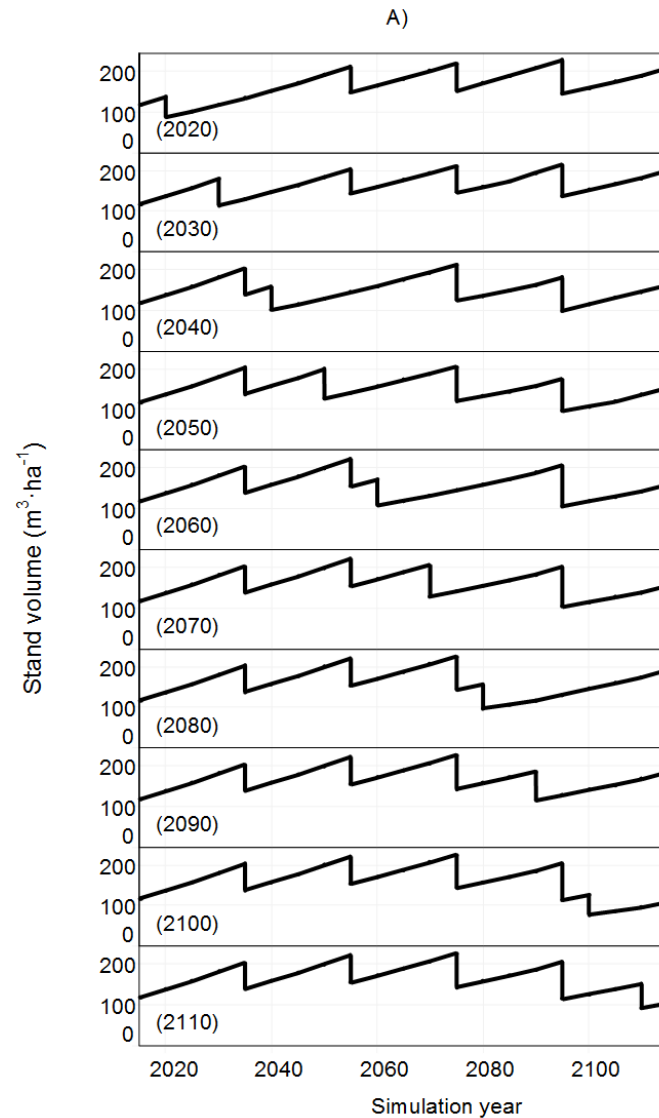
Time scale comparison problem: an example with windthrow susceptibility



Even-aged stand windthrow loss after partial windthrow



Uneven-aged stand windthrow loss after partial windthrow



Implications for silviculture of adaptation (SoA)

Any silvicultural treatment, new or not, that aims to prepare forests to global change

Reason 1:
UAS not
better than
EAS

Opens widely
the possibility of
using even-aged
silviculture in
SoA

Reason 2:
Not enough
studies

Requires
comparisons
of EAS and
UAS in SoA

Reason 3:
Complexity of
comparing EAS to
UAS

Requires that SoA
comparing EAS-UAS
be included in forest
management plans

Comparing EAS and UAS in forest management plans

Research and practice must work hand in hand: no more forest management plans without research

- In an **active adaptive** management framework

- Long time re-measurements

- At both stand and landscape scales

Conclusion

- UAS not obviously better than EAS to maintain diversity and processes;
- 3 reasons to explain this conclusion;
- EAS should be included in silviculture of adaptation.



Merci!

Message aux étudiants:
nous recrutons!!!