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How to link finance to forest biodiversity – what can science tell us?

Gert-Jan Nabuurs, Wageningen Environmental Research, WUR

With co-authors: Anna Begemann, Stefanie Linser, Yoan Paillet, Davide Pettenella, Sophus zu Ermgassen

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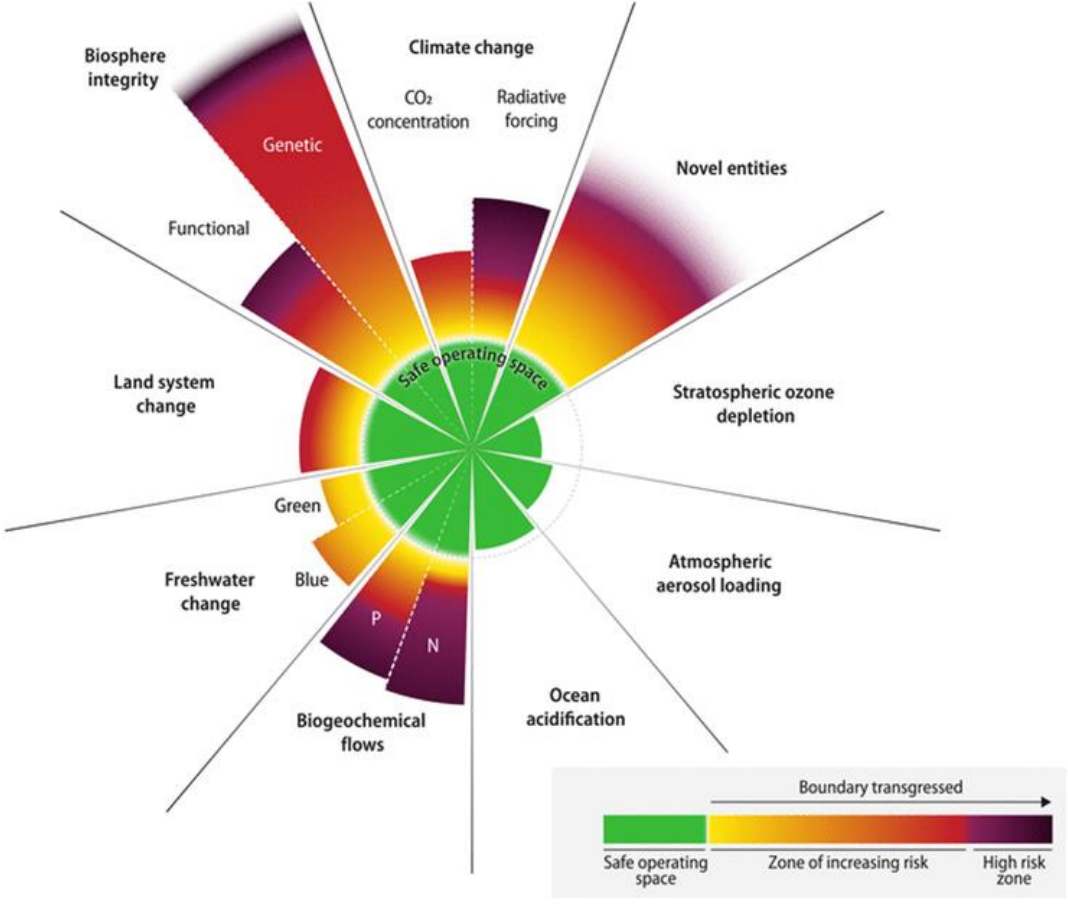
- Introduction: biodiversity, role of forestry
- Eu Taxonomy in brief

- Making Taxonomy operational
- Indicators and thresholds
- Examples and monitoring
- Conclusions

Photo GJNabuurs

Introduction



- No doubt we are over-using our earth resources
- Forestry practices do play a role in this
- Partly steered by investment decisions

- EU Sustainable finance initiative (for all sectors)

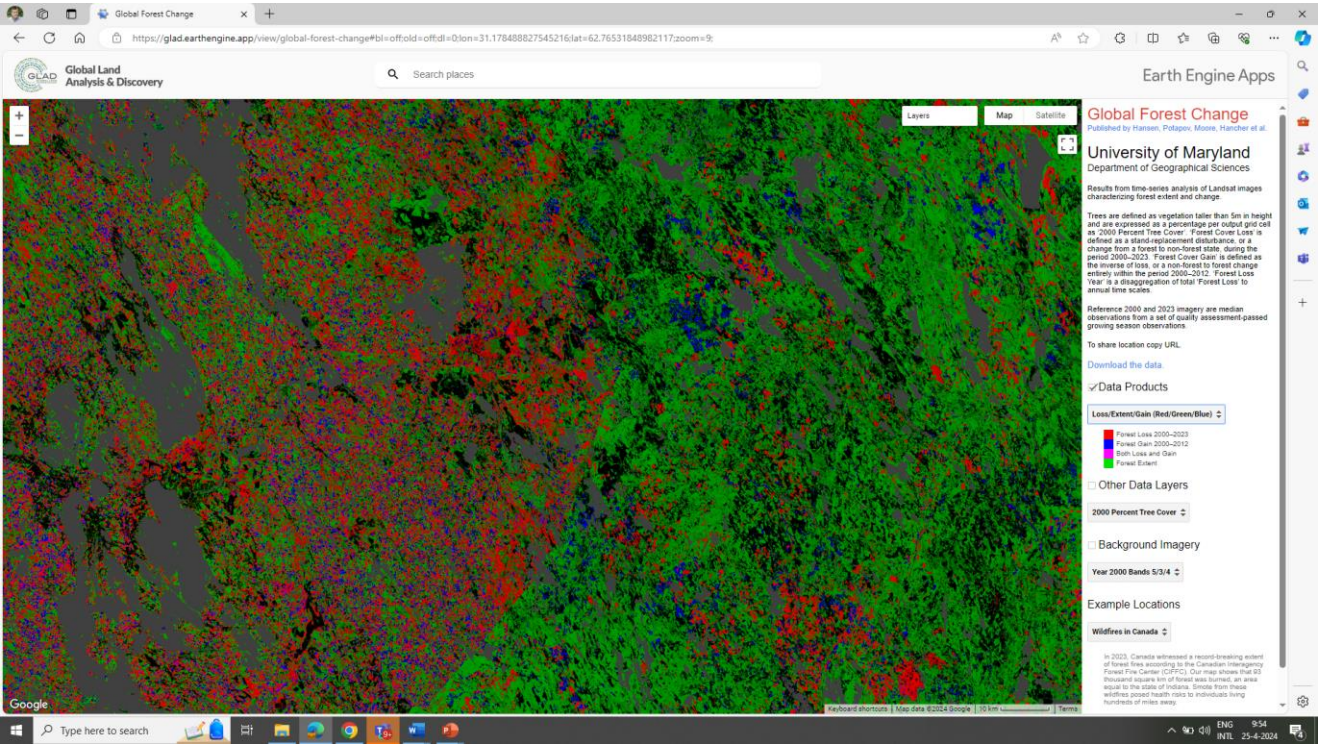
SCIENCE ADVANCES | RESEARCH ARTICLE

ENVIRONMENTAL STUDIES

Earth beyond six of nine planetary boundaries

Katherine Richardson[1]*, Will Steffen[2†], Wolfgang Lucht[3,4], Jørgen Bendtsen[1], Sarah E. Cornell[5], Jonathan F. Donges[3,5], Markus Drüke[3], Ingo Fetzer[5,6], Govindasamy Bala[7], Werner von Bloh[3], Georg Feulner[3], Stephanie Fiedler[8], Dieter Gerten[3,4], Tom Gleeson[9,10], Matthias Hofmann[3], Willem Huiskamp[3], Matti Kummu[11], Chinchu Mohan[8,12,13], David Nogués-Bravo[1], Stefan Petri[3], Miina Porkka[11], Stefan Rahmstorf[3,14], Sibyll Schaphoff[3], Kirsten Thonicke[3], Arne Tobian[3,5], Vili Virkki[11], Lan Wang-Erlandsson[3,5,6], Lisa Weber[8], Johan Rockström[3,5,15]

Forestry plays a role in the biodiversity crisis



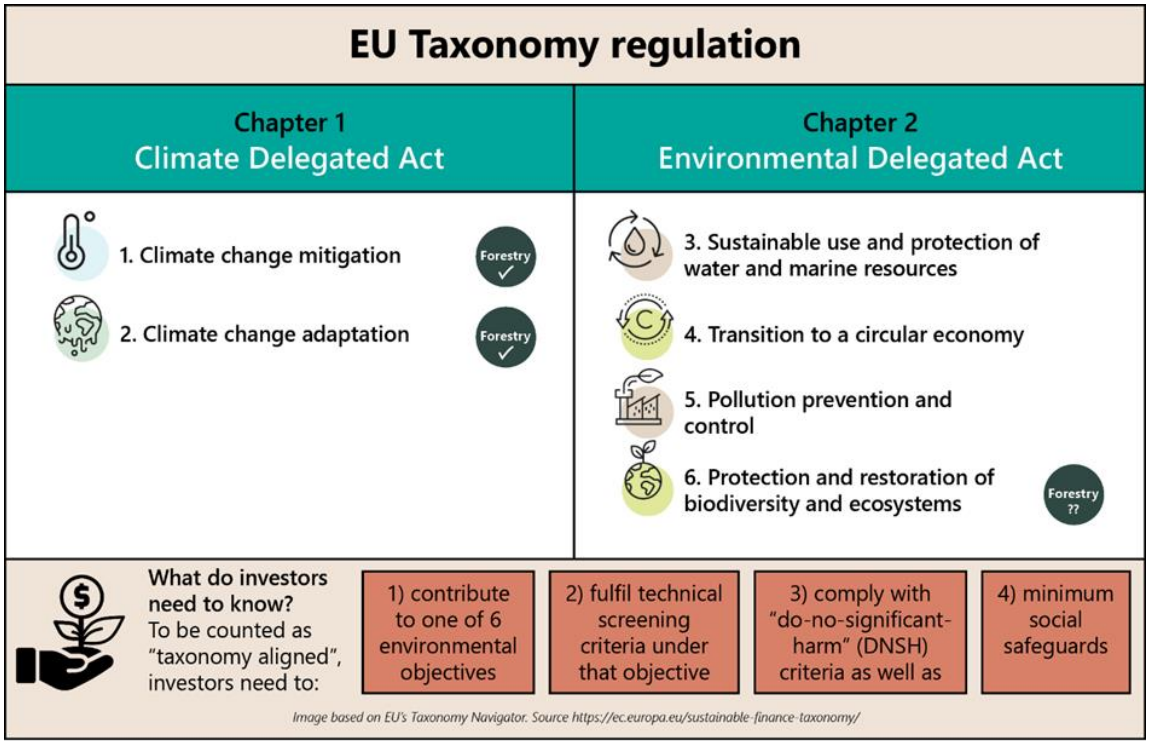
Cover losses and gains between 2000 and 2023.

Management has an influence
And thus also investments in forests

(Global Forest Watch)

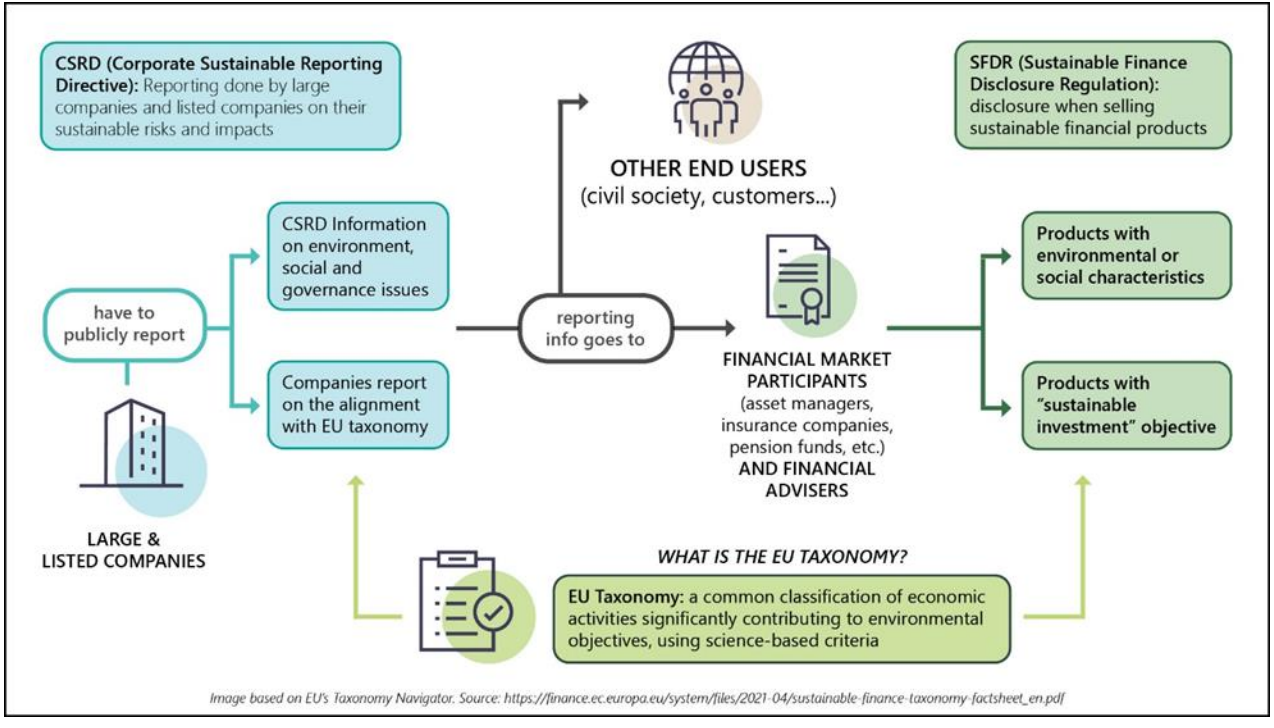
EU Taxonomy in brief

- aims to create a common set of criteria and indicators for investors, issuers, project promoters and policymakers to classify sustainable economic activities.
- establishes six environmental objectives (EU, 2020a)



EU Taxonomy in brief

- makes no obligations to invest sustainably …. mandatory EU disclosure rules.
- classify by indicators when an activity green, and when not so green



“Do no significant harm” criteria were already set climate delegated act (EU2021). E.g.

a) ensuring the good conservation status of habitat…;

b) excluding the use or release of invasive alien species;

c) ..

d) Ensuring…. quality of the soil;

e) …

f) excluding the conversion …;

g) ensuring the diversity of associated habitats ….;

h) ensuring the diversity of stand structures ….and dead wood.

Making Taxonomy operational

- An EU commissioned Technical Expert Group was formed in 2021 to set up forestry criteria

- This did not result in an agreed final product

Photo: GJnabuurs

Aim in current study

- Within frame of EU taxonomy, we provide

- guidance for biodiversity-oriented forest management

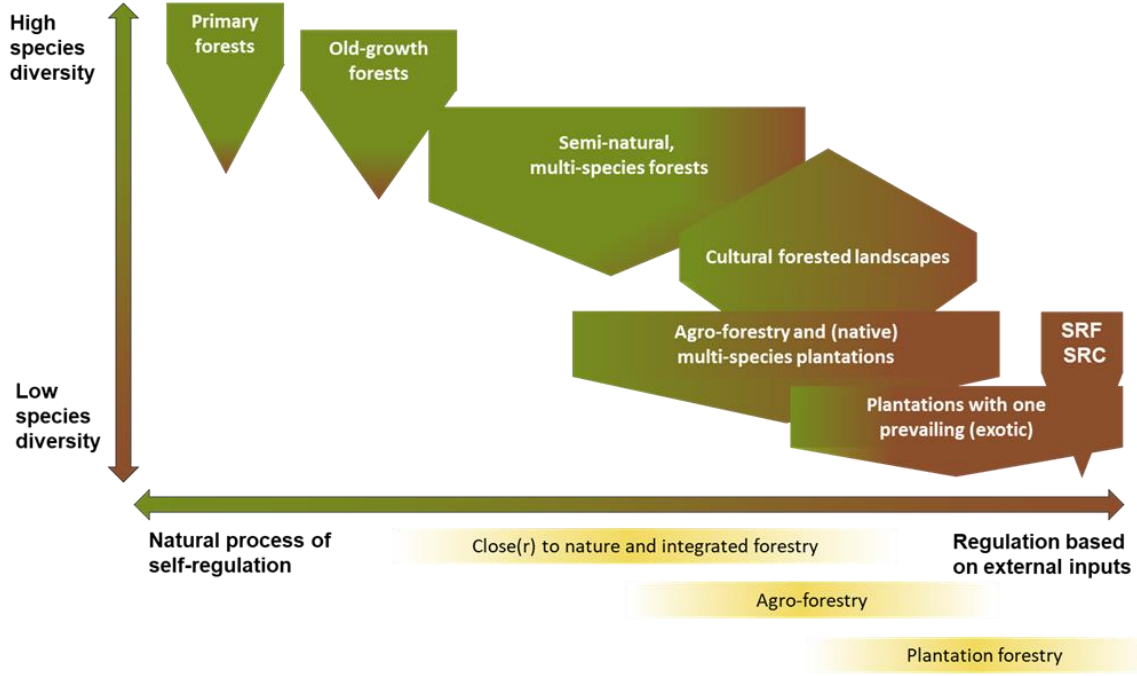
- propose a set of quantitative indicators and provide (ranges) of thresholds

- applicable under the EU Taxonomy standard

- monitoring and compliance options

Biodiversity in forests

- many aspects: landscape, habitat, species and gene level
- Forest management modifies this at different scales,
- varying over space and time. This makes designing indicators and thresholds difficult



Indicative levels of biodiversity

SRF-SRC: Short Rotation Forestry-Coppices; GMO: Genetically Modified Organism; NBT: New Breeding Techniques

Indicators and thresholds

What are good indicators (Linser 2002).

Quantifiable	Indicators should quantify information ……. The data should be available or obtainable….
Feasible	Indicators should be measurable at reasonable costs ….
Understandable / communicative	Indicators need to be easily understandable ….
Scale specific / representative for the chosen system	The choice of scale at which biodiversity is measured can significantly affect the interpretation of results ….
Include threshold degrees or targets	Indicators should enable an assessment of a current situation with respect to a reference situation. A threshold is a minimum value that shall be achieved.

Stag beetles are difficult to monitor, but instead amount of oak dead wood is a good indicator and easier to assess (photo GJ Nabuurs).

The indicators

Grouped by 4

- Afforestation
- Rehabilitation and restoration
- Forest management
- Biodiversity friendly measures

The indicators and directions (few mentioned).
A. Afforestation

Indicator & measurement units	Monitoring options	Biodiversity-friendly direction
Regeneration type (natural, seeded, planted,.. [%]	Management plan inventory.	Preference for natural regeneration but facing climate change, seeding and planting more site-adapted tree species is possible.
Diversity of regenerated tree species [%]	Management plan inventories, to some degree by remote sensing.	Maintain a high level of species diversity or increase species diversity to a higher level.

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The indicators and directions (few).
B. Rehabilitation and restoration

Indicator & measurement units	Monitoring options	Biodiversity-friendly direction	
Retention trees left on clearcuts [number/ha]	Management plan inventories, remote sensing.	Trees that are not harvested during timber harvesting operations but remain on the land favouring the tree species most valuable for biodiversity. Increasing / or higher than certain number/higher than in FSC	
Habitat trees (old, veteran) with tree-related microhabitats (e.g. cavities) [number/ha]	Management plan inventories.	Available / increasing	
Deadwood (lying, standing, decomposition stages) [m^3/ha]	Management plan inventories.	Significant amounts characteristic for forest type and depending on risk assessment (e.g. likelihood of forest fires)-.	
Clear-cutting forest management [ha]	Management plan inventories, remote sensing.	No clearcuts on steep slopes, no clearcuts in habitat type forest. Aim for small clearcuts. many EU countries maximum size clearcut is	

Habitat tree in managed Bialowieza. Photo GJNabuurs

The indicators and directions (few mentioned).
C. Forest management

Indicator & measurement units	Monitoring options	Biodiversity-friendly direction	
Riparian buffer zones alongside seas, lakes, rivers and creeks/ brooks, peat. [area (ha), length in m]	Management plan inventories, other biodiversity volunteer networks, remote sensing.	Maintained or increasing at certain widths along streams.	
Soil degradation [Physical or chemical degradation through various indicators, area (ha) affected/ degraded for a certain time]	Rutting (Management plan inventory or assessed by soil sampling and analysis/ Lidar	To be minimised e.g. no soil **rutting,** minimise nutrient loss, reduce human induced degradation.	
Dominant invasive tree species [area (ha), share of forest area (%)]	Management plan inventories.	Decreasing or eliminated.	
Forest fragmentation [Size of forest patches (ha), Length of forest edges (m), Edge-to-area ratios]	Management plan inventories, remote sensing.	No increase of fragmentation.	
Forest connectivity: activities to connect isolated forest patches [Size of isolated forest patches (ha), establishment of corridors (km) (afforestation) or game bridges (m)]	Management plan inventories, remote sensing.	Increasing (if necessary).	

The indicators and directions (few mentioned).
D. Biodiversity friendly measures

Indicator & measurement units	Monitoring options	Biodiversity-friendly direction	
Forest area undisturbed by man [ha, %]	Administrative documentation, part of management planning, remote sensing (lidar).	Stable or increase through active restoration towards old-growth, and set asides.	
Share of forest area under a protection regime (not available for wood supply) [% of forest area under MCPFE classes 1.1 and 1.2 or IUCN class I]	Administrative documentation one.g. set-asides , part of management planning.	Increasing up to a certain share of ecologically valuable forest area.	
Change in area of primary forests [ha, %]	Administrative documentation, part of management planning,	No decrease, and measures aimed at some increase in long term (old growth, set asides).	

Examples and few monitoring aspects

Cat D. Biodiversity friendly measures

Set aside

Strict reserve Galgenberg in the Netherlands.

Relatively young strict reserves do not always exhibit increased biodiversity values at short or medium term.

Photo: GJ Nabuurs

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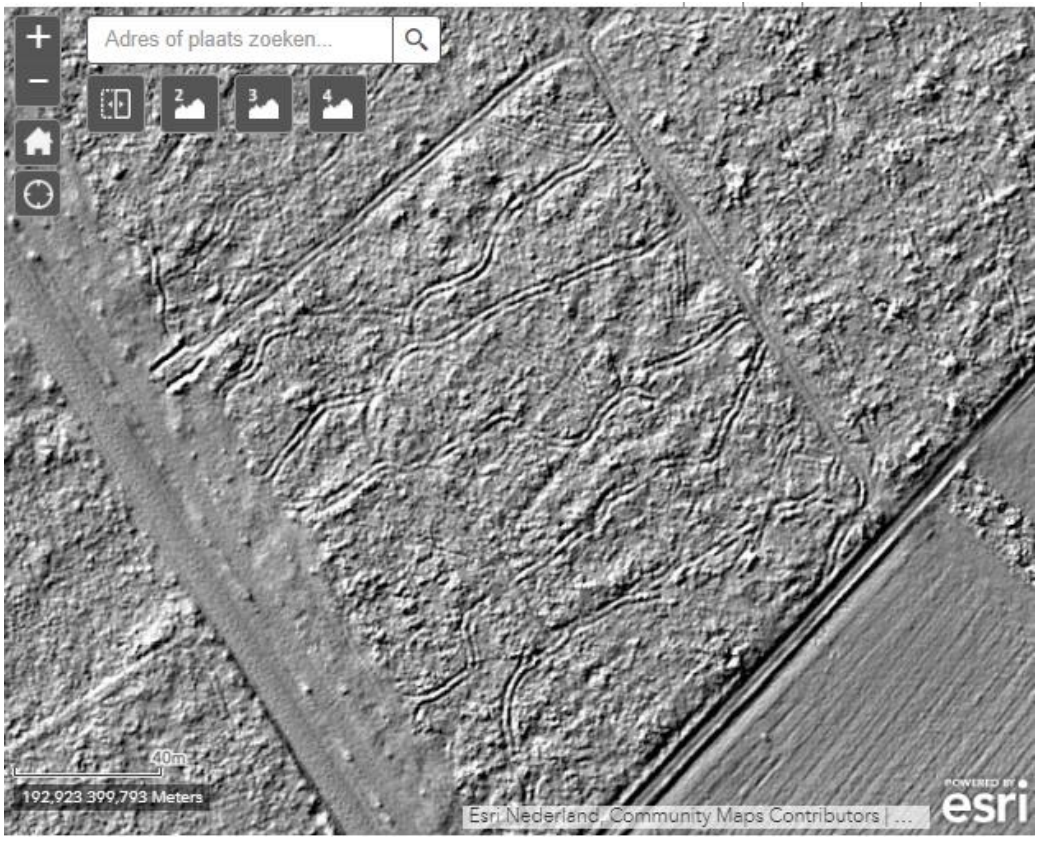
Clearcut management in 2nd rotation Douglas on Vancouver Island

Under a different (greener) management, costs would most likely increase and rate return decrease. Biodiversity credits may help

Novelties in monitoring

Tracks of a harvester leaving compaction on the thinning tracks.

compaction assessed through LIDAR for large areas (AHN4)



Example threshold: dead wood

- Müller and Butler (2010) metareview: peak values for species richness

- at 20-30m3/ha in boreal coniferous forests,
- 30-40m3/ha in mixed mountain forests and
- 30-50m3/ha in lowland oak-beech forests.

values could be used as thresholds (allowing some variation in space and time)

Photo: Yoan Paillet

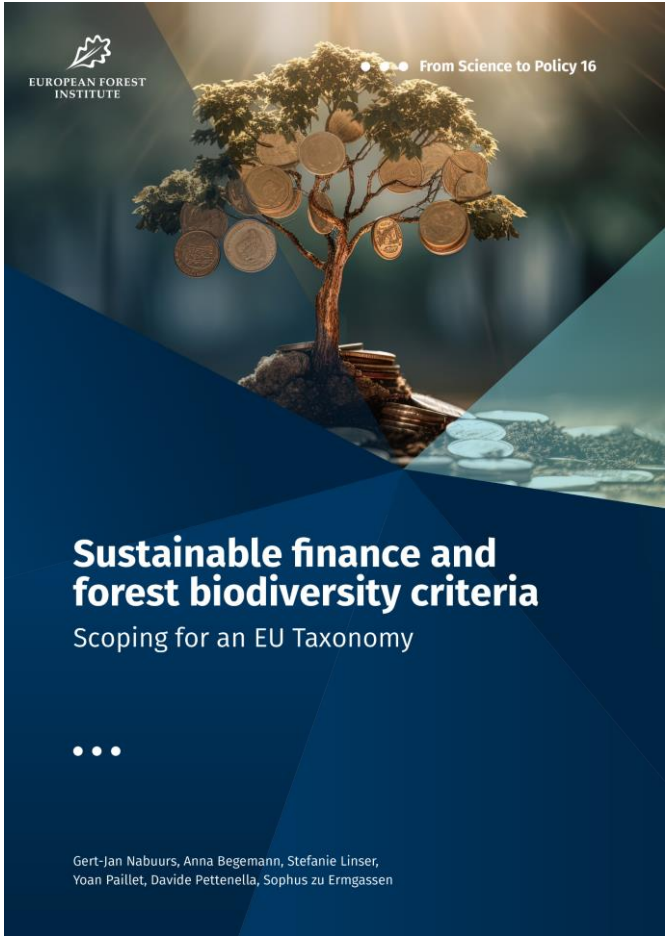
Conclusions (1)

- possible to find **consensus** on how sustainable finance, with regard to forest-related biodiversity, can be encouraged and verified.

- Use a **biogeographical-specific** approach for indicators
- science today provides a sufficiently solid basis to state **which measures** in forest management are favourable for biodiversity
- **it is possible to set indicators and thresholds that will lead to greener investments, and that are still attractive to finance sector**

Conclusions (2)

- diversity in forest types and management, and **variety** of biodiversity over space and time, will always make this a challenging sector for sustainable finance.
- **Thresholds** as presented here are first examples. Not gone through stakeholder process.
- It is a **challenging** sector in terms of monitoring, reporting and compliance, some ‘clever’ bookkeeping is always a risk.
- But many novel monitoring methods are available; no need to count every beetle.
- Sustainable finance initiative is only a disclosure regulation. **Other strong polices** will be needed as well.



Authors: Gert-Jan Nabuurs, Anna Begemann, Stefanie Linser, Yoan Paillet, Davide Pettenella, Sophus zu Ermgassen

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Further info:

European Forest Institute
www.efi.int

Gert-jan.nabuurs@wur.nl