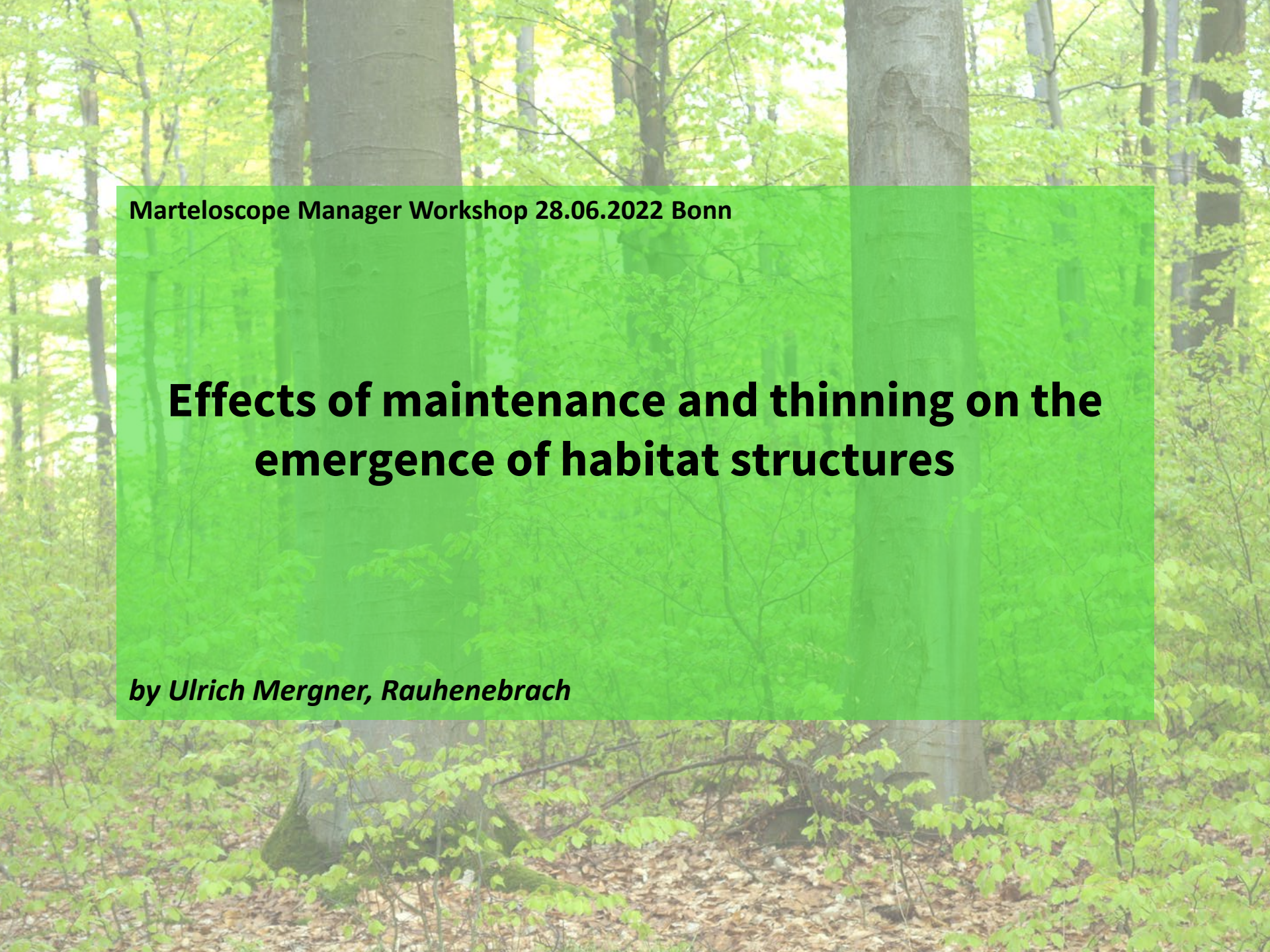
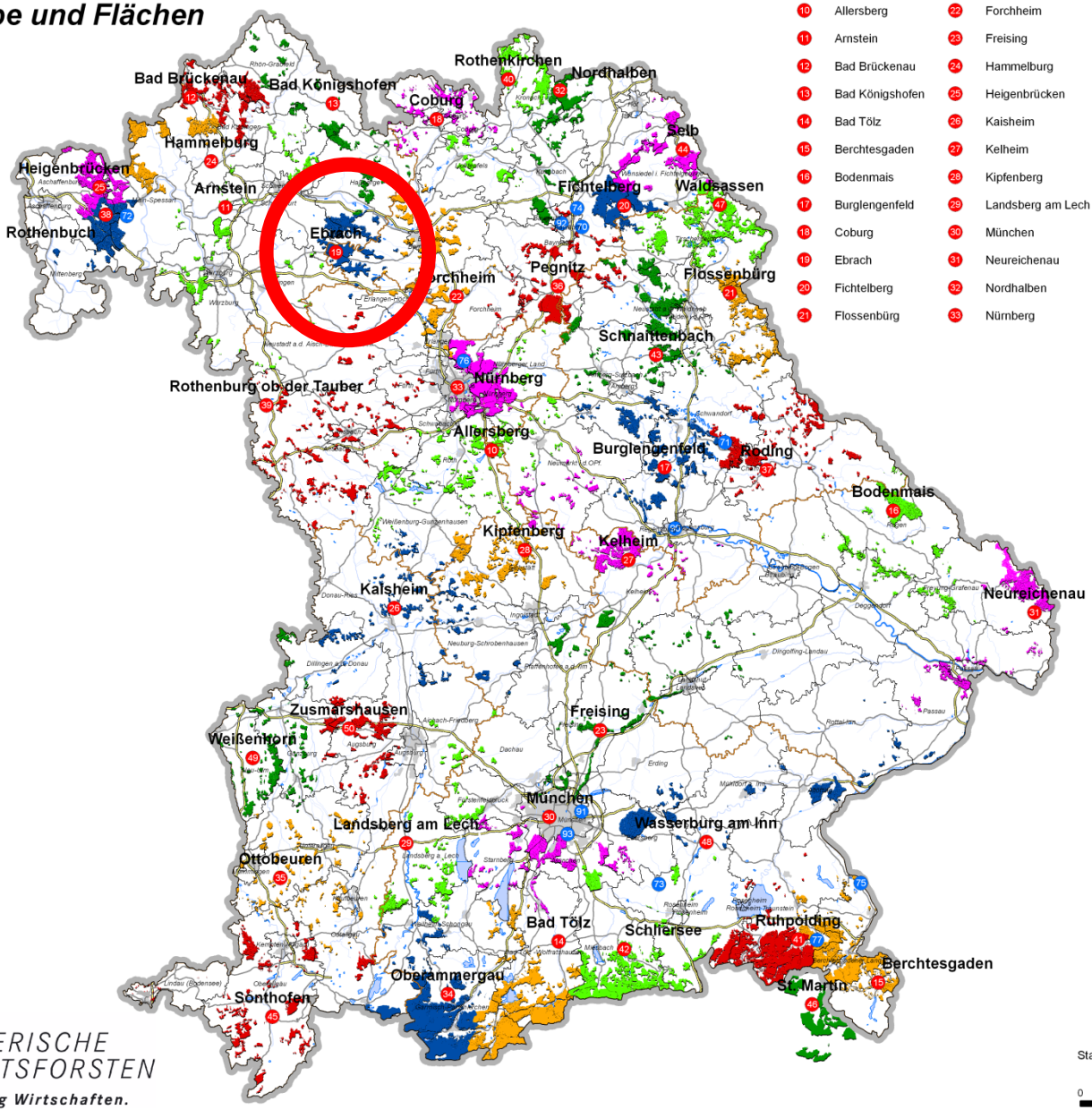


Marteloscope Manager Workshop 28.06.2022 Bonn

Effects of maintenance and thinning on the emergence of habitat structures

by Ulrich Mergner, Rauhenebrach

Forstbetriebe und Flächen



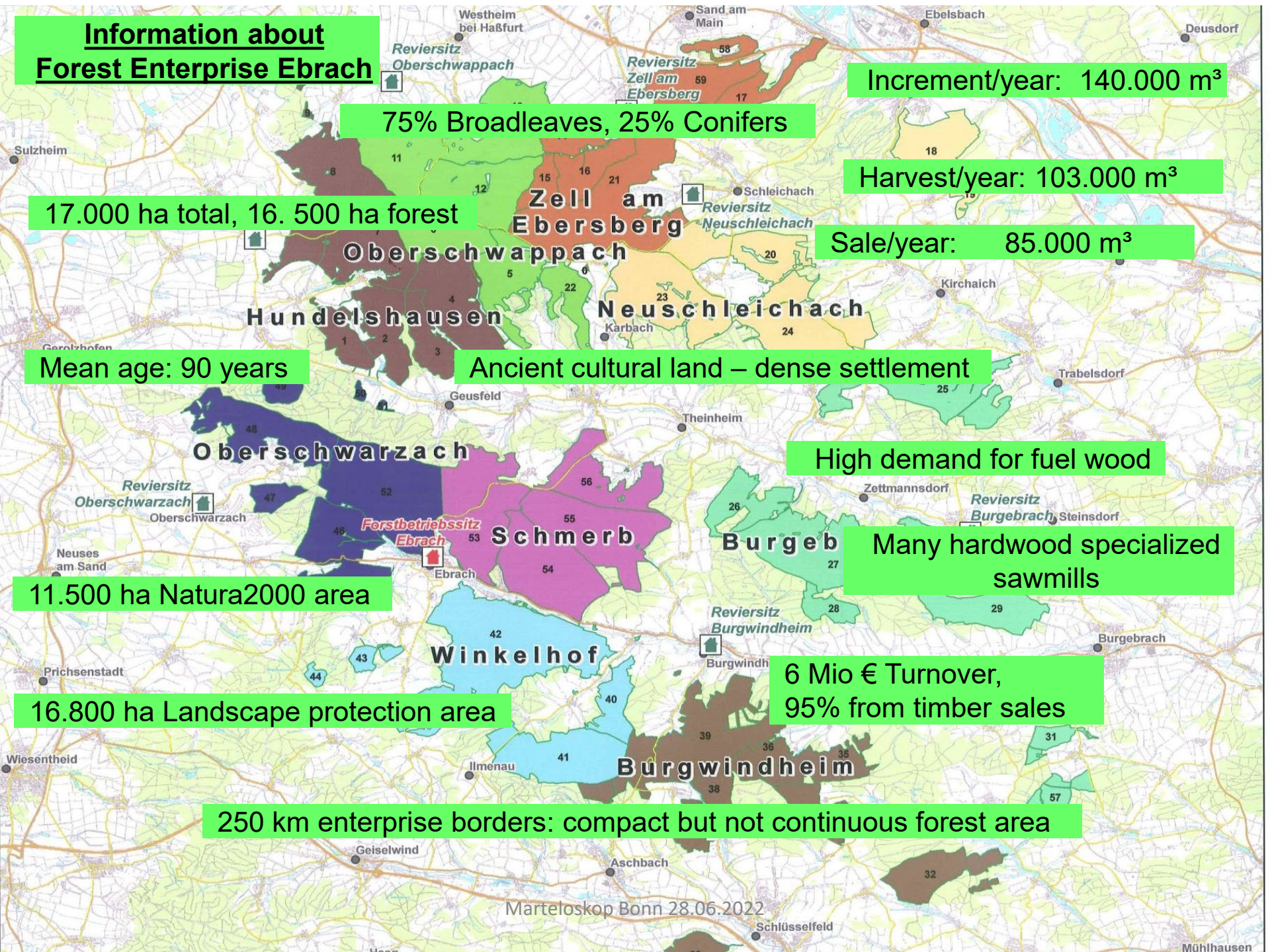
10	Allersberg	22	Forchheim	34	Oberammergau	46	St. Martin, Bayerische Saalforste
11	Arnstein	23	Freising	35	Ottobeuren	47	Waldsassen
12	Bad Brückenau	24	Hammelburg	36	Pegnitz	48	Wasserburg am Inn
13	Bad Königshofen	25	Heigenbrücken	37	Roding	49	Weißenhorn
14	Bad Tölz	26	Kaisheim	38	Rothenbuch	50	Zusmarshausen
15	Berchtesgaden	27	Kelheim	39	Rothenburg ob der Tauber		
16	Bodenmais	28	Kipfenberg	40	Rothenkirchen		
17	Burglengenfeld	29	Landsberg am Lech	41	Ruhpolding		
18	Coburg	30	München	42	Schliersee		
19	Ebrach	31	Neureichenau	43	Schnaittenbach		
20	Fichtelberg	32	Nordhalben	44	Selb		
21	Flossenbürg	33	Nürnberg	45	Sonthofen		

70	Maschinenbetrieb, Stützpunkt Bayreuth
71	Maschinenbetrieb, Stützpunkt Bodenwöhr
72	Maschinenbetrieb, Stützpunkt Rechtenbach
73	Maschinenbetrieb, Stützpunkt Schönau
74	Pflanzgarten, Stützpunkt Bindlach
75	Pflanzgarten, Stützpunkt Laufen
76	Forstliches Bildungszentrum, Stützpunkt Buchenbühl
77	Forstliches Bildungszentrum, Stützpunkt Laubau
90	Zentrale, Regensburg
91	Informations- und Kommunikationstechnik, München
92	Revision und Forsteinrichtung, Bayreuth
93	Forsteinrichtung, München

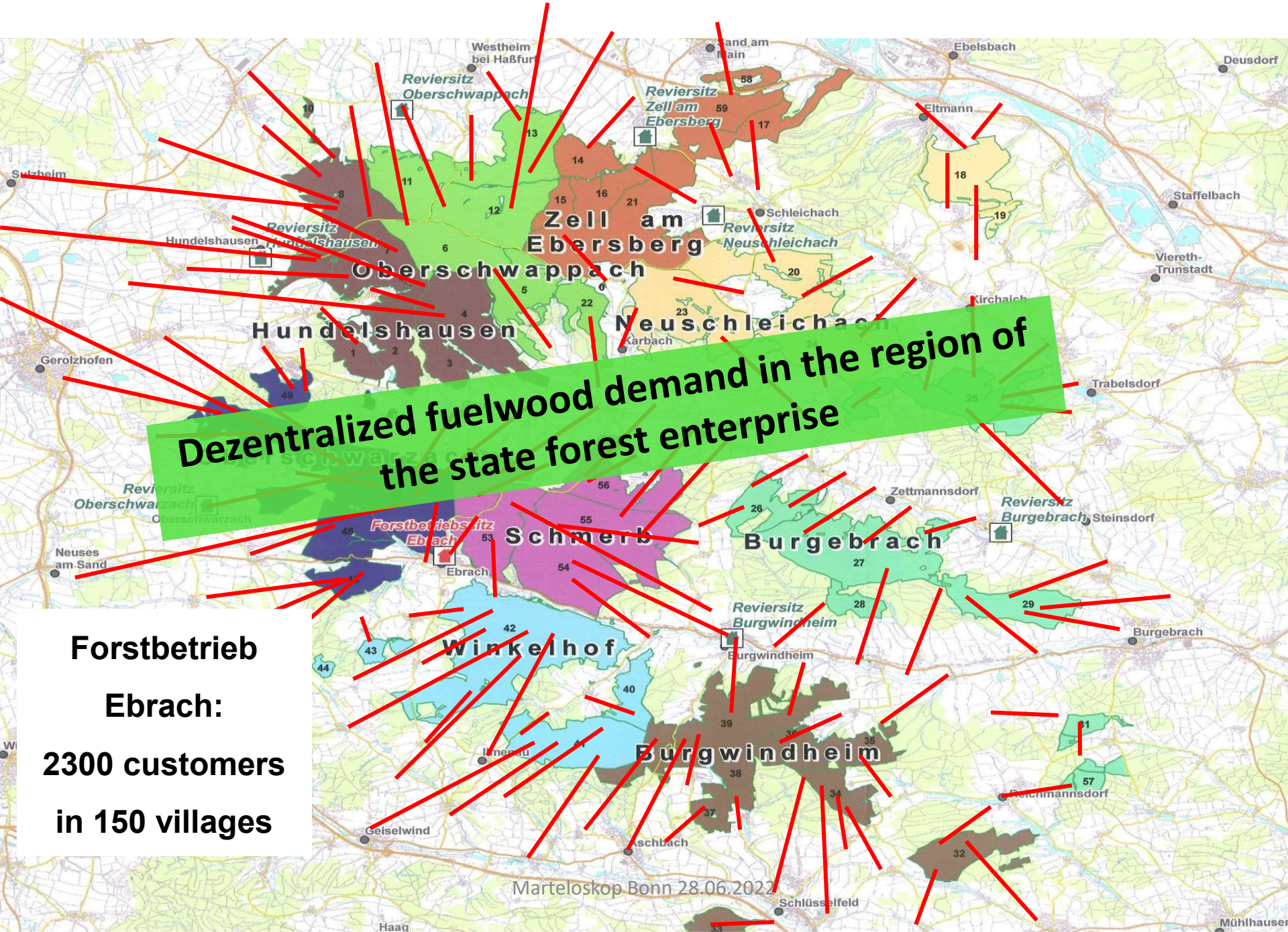
BAYERISCHE STAATSFORSTEN
Nachhaltig Wirtschaften.

Stand 01.07.2005

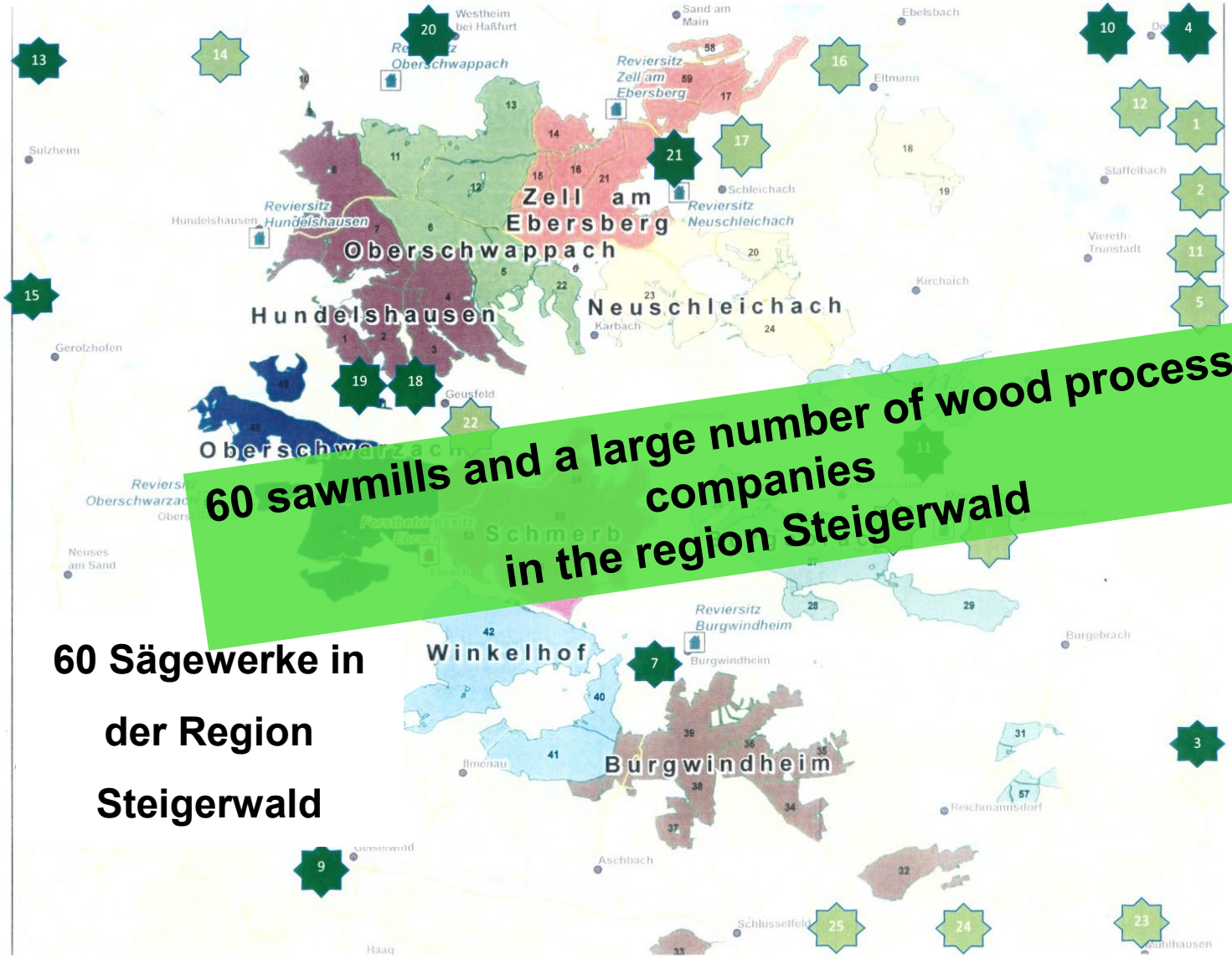
0 25 50 75 100 Kilometer


Information about
Forest Enterprise Ebrach
Increment/year: 140.000 m³
75% Broadleaves, 25% Conifers
Harvest/year: 103.000 m³
17.000 ha total, 16. 500 ha forest
Sale/year: 85.000 m³
Mean age: 90 years
Ancient cultural land – dense settlement
High demand for fuel wood
Many hardwood specialized sawmills
11.500 ha Natura2000 area
6 Mio € Turnover,
95% from timber sales
16.800 ha Landscape protection area
250 km enterprise borders: compact but not continuous forest area
Zell am Ebersberg
Oberschwappach
Hundelshausen
Neuschleichach
Oberschwarzach
Schmerb
Burgeb
Winkelhof
Burgwindheim
Reviersitz Oberschwappach
Reviersitz Zell am Ebersberg
Reviersitz Neuschleichach
Reviersitz Oberschwarzach
Forstbetriebssitz Ebrach
Reviersitz Burgebrach
Reviersitz Burgwindheim
Westheim bei Haßfurt
Sand am Main
Ebelsbach
Deusdorf
Sulzheim
Schleichach
Kirchaich
Karbach
Trabelsdorf
Geusfeld
Theinheim
Zettmannsdorf
Steinsdorf
Neuses am Sand
Ebrach
Burgebrach
Prichsenstadt
Wiesentheid
Ilmenau
Geiselwind
Aschbach
Schlüsselfeld
Mühlhausen


Marteloskop Bonn 28.06.2022


Dezentralized fuelwood demand in the region of the state forest enterprise
Forstbetrieb Ebrach:
2300 customers
in 150 villages
Zell am Ebersberg
Oberschwappach
Hundelshausen
Neuschleichach
Schmerb
Burgebrach
Winkelhof
Burgwindheim
Reviersitz Oberschwappach
Reviersitz Zell am Ebersberg
Reviersitz Hundelshausen
Reviersitz Neuschleichach
Forstbetriebssitz Ebrach
Reviersitz Burgebrach
Reviersitz Burgwindheim
Westheim bei Haßfurt
Ebelsbach
Deusdorf
Eltmann
Sulzheim
Staffelbach
Schleichach
Vierethtrunstadt
Gerolzhofen
Trabelsdorf
Zettmannsdorf
Steinsdorf
Neuses am Sand
Ebrach
Burgebrach
Burgwindheim
Geiselwind
Aschbach
Reichmannsdorf
Schlüsselfeld
Marteloskop Bonn 28.06.2022


MÖHRINGER
Systemlieferant
Turn-Key Supplier



60 sawmills and a large number of wood processing companies in the region Steigerwald

60 Sägewerke in der Region Steigerwald

Sägewerkskunden

des Forstbetriebs Ebrach in der Region Steigerwald

Landkreis Bamberg

1. Brehm, Richard – Kemmern
2. Eberlein – Stadelhofen
3. Gunreben – Strullendorf
4. Jacob, Erich – Grub am Forst
5. Kröner – Bischberg
6. Lechner – Burgebrach
7. Moser – Burgwindheim
8. Neser – Burgebrach
9. Reinlein – Geiselwind
10. Schonath – Scheßlitz
11. Schug – Schönbrunn
12. Ziegelhöfer – Breitengüßbach

Landkreis Schweinfurt

13. Alt – Schwebheim
14. Barthel – Donnersdorf
15. Gleitsmann – Wipfeld

Landkreis Haßberge

16. Bauerschmitt – Eltmann
17. Gehrig – Oberaurach
18. Jäger, Ludwig – Rauhenebrach
19. Jäger, Bernd – Rauhenebrach
20. Reitz – Wonfurt
21. Wirth – Oberschleichach
22. Zipfel – Rauhenebrach

Landkreis Erlangen-Höchstadt

23. Brehm, Wolfgang – Adelsdorf
24. Kugler – Vestenbergsgreuth

Landkreis Neustadt a. d. Aisch-Bad Windsheim

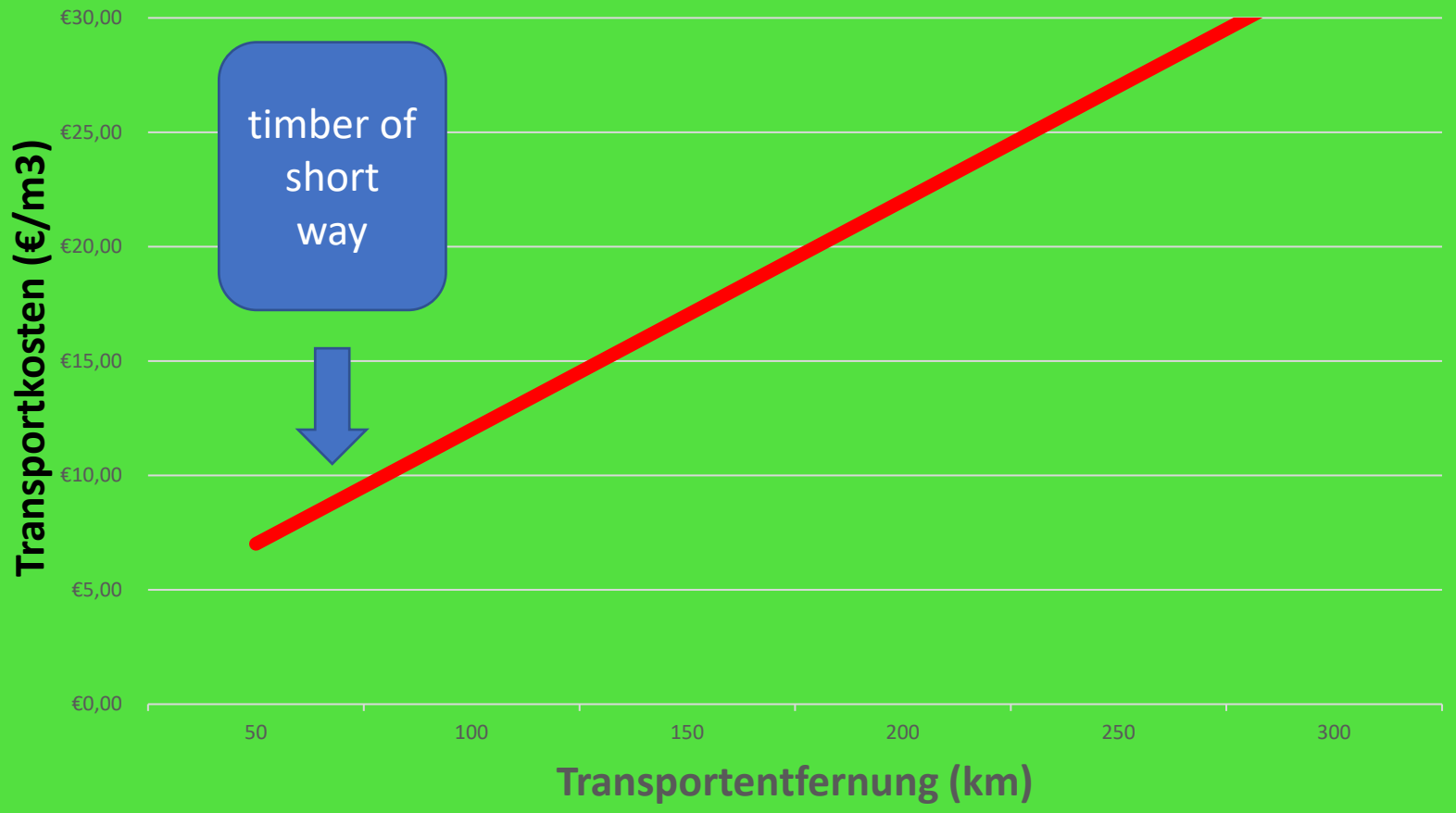
25. Nahrhaft – Markt Bibart

überwiegend Laubholz-Kunden

Nadel- und Laubholz-Kunden

8. Juli 2014

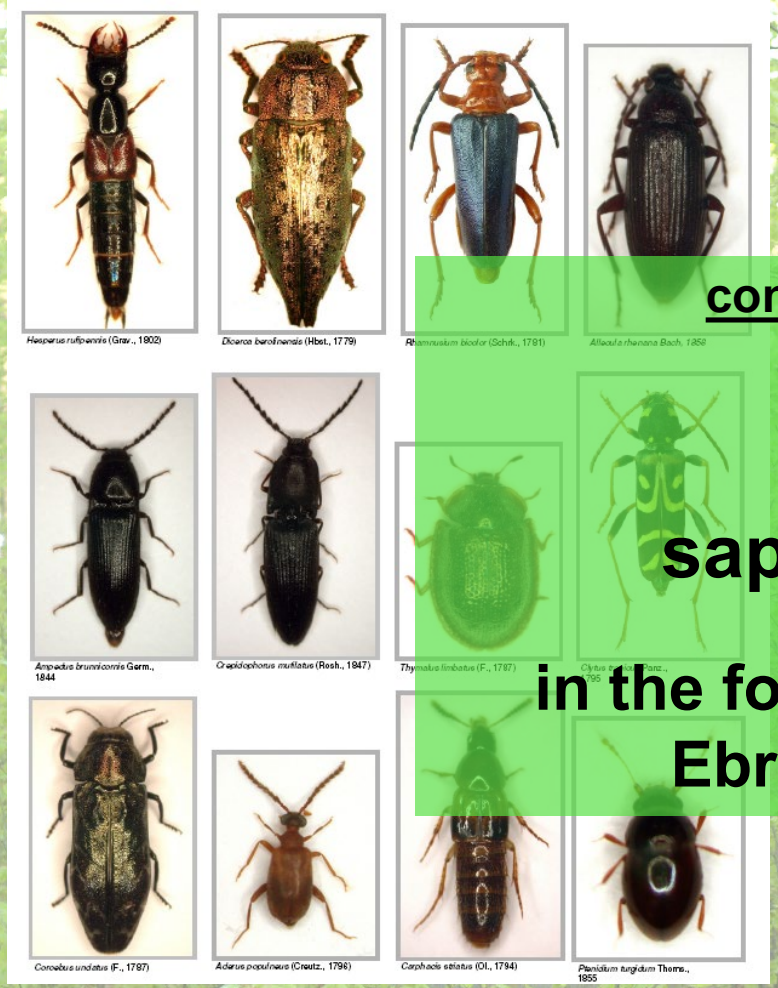
Fright charges of timber from forest to sawmill

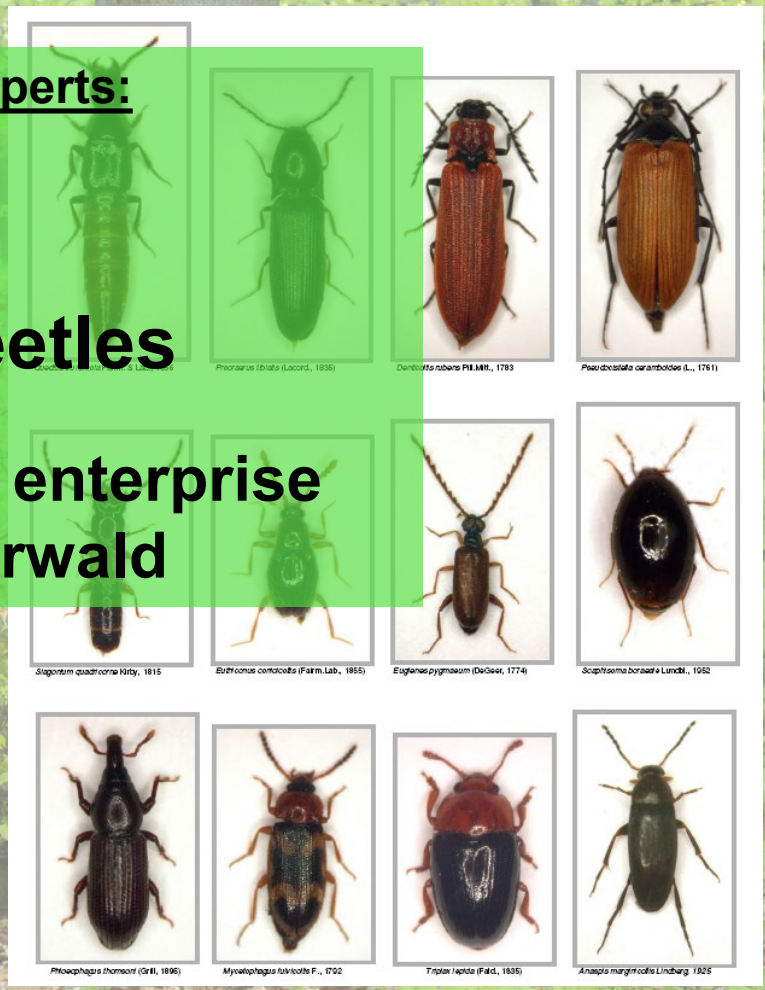


Dezentrilized timber demand needs wood production in the neighbourhood


Deciduous tree forests with a large amount of habitat-trees and deadwood …

… are the habitat of the biodiversity in forests





confirmation by experts:

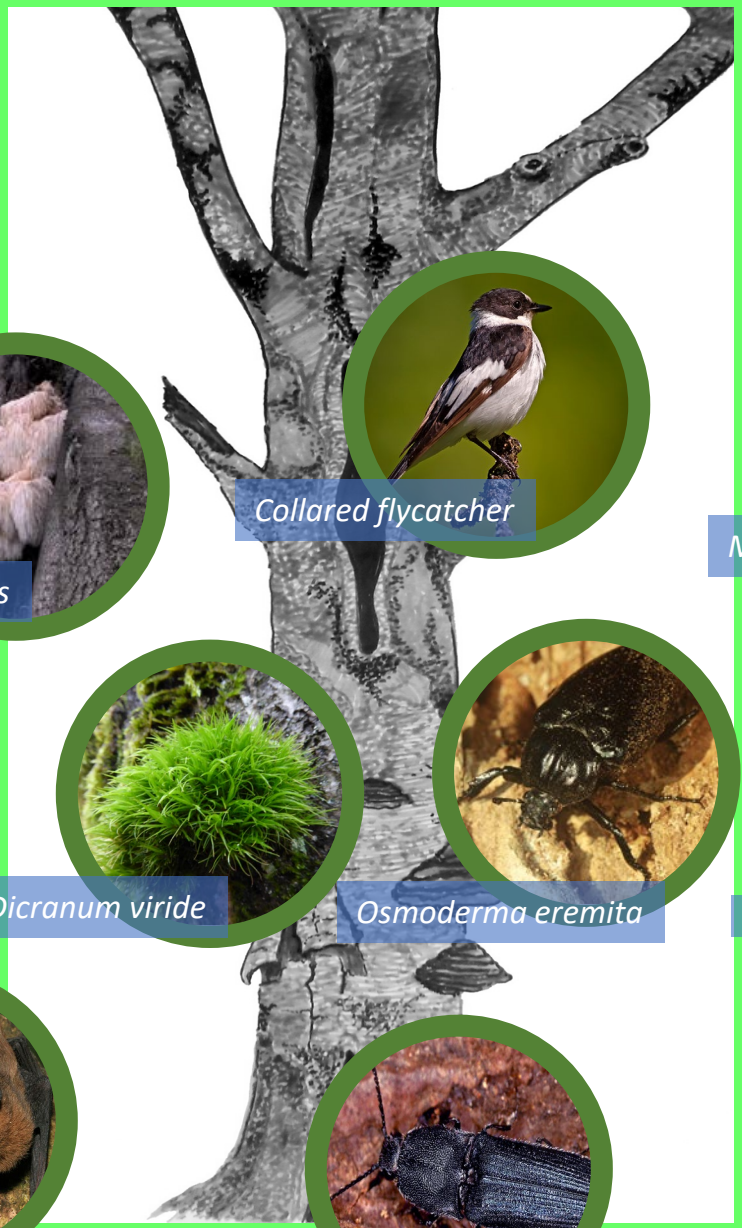
500

saproxylic beetles

in the forests of the enterprise Ebrach / Steigerwald


Habitat
trees – the
backbone
for species
diversity

Biodiversity – the associated species



Bechsteins bat

Hericium erinaceus

Collared flycatcher

Middle spotted woodpecker

Laetiporus sulphureus

Dicranum viride

Osmoderma eremita

Elater ferrugineus

Common pipistrelle

Limoniscus violaceus

Bolitophagus reticulatus

Microhabitats – key structures for biodiversity conservation

Woodpecker cavities

Conks

Cracks and scars

Nests

Branch cavities

Mould cavities

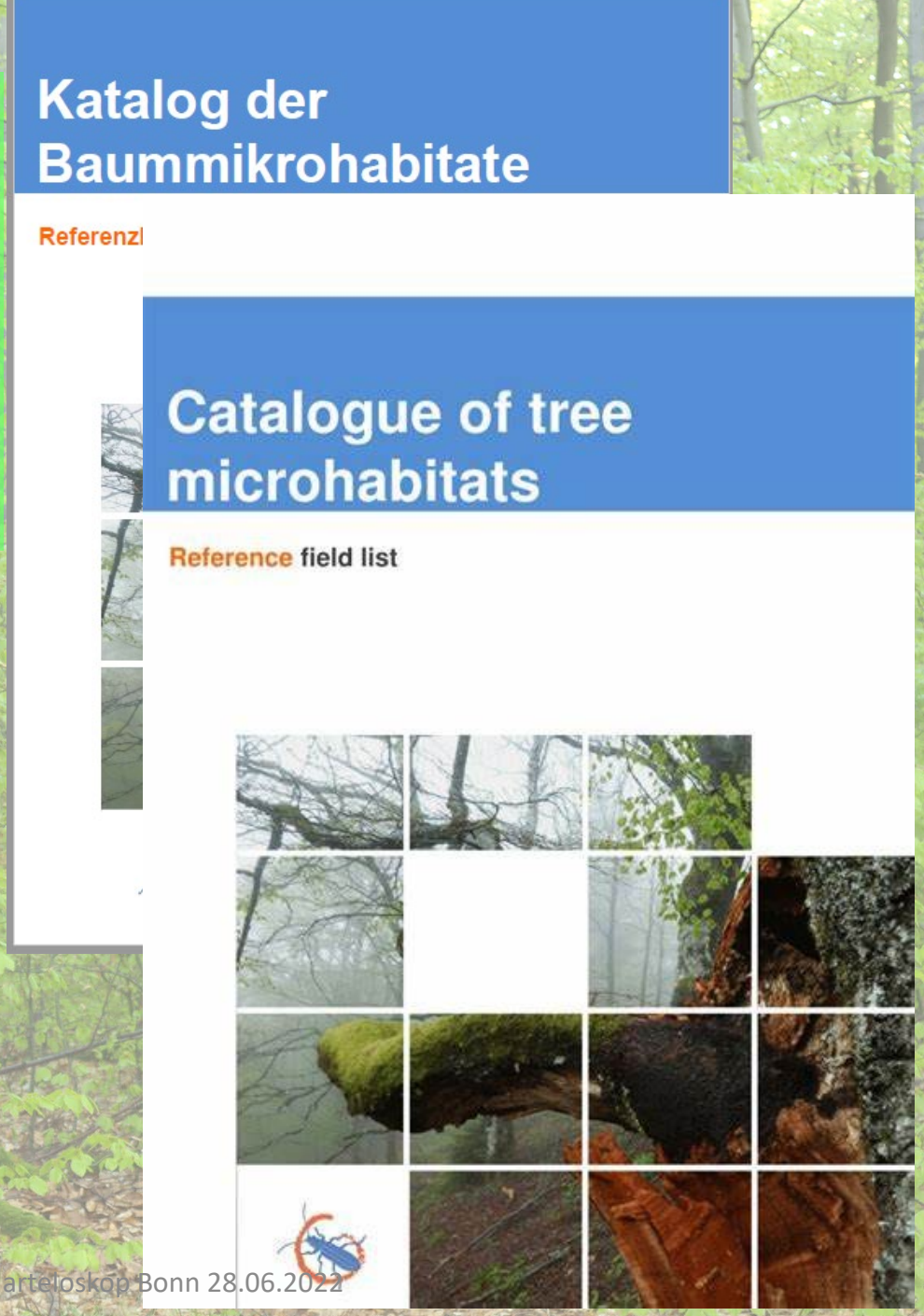
Dendrotelms

Epiphytes

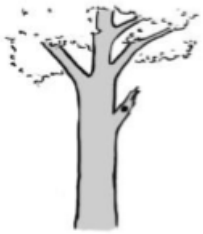
Bark pockets

The most important paper about the systematic of microhabitats comes from European Forest Institute:

Daniel Kraus et al, 2016



CV1

Illustrationen	Code	Typ	Beschreibung	Saproxylische Mikrohabitate
		Spechthöhlen		**Höhlen**
	CV11	ø = 4 cm	Höhleneingang mit einem ø von 4 cm und einem größeren Innenraum. Die Höhle von *Dendrocopos minor* befindet sich in Starkästen der Baumkrone.	
	CV12	ø = 5 - 6 cm	Höhleneingang mit einem ø von 5 - 6 cm und einem größeren Innenraum. *Picus viridis* baut seine Höhlen in den Stamm, wobei er vorwiegend Totastlöcher als Ansatzpunkt zum Höhlenbau nutzt. Der runde Höhleneingang folgt dem Habitus des Totastlochs. Die Höhlen z.B. von *Dendrocopos major* findet man an Faulstellen von Totastlöchern, toten Starkästen sowie in stehendem Totholz.	
				
	CV13	ø > 10 cm	Spechthöhlen am Stamm weisen auf *Dryocopus martius* als Bewohner hin. Der Höhleneingang ist > 10 cm im Durchmesser, wobei dieser im Höhleninneren größer ist. *Dryocopus martius* baut seine Höhlen am astfreien Stamm. Der Höhleneingang ist oval. Die meisten Höhlenbäume haben einen BHD von mehr als 40 cm,	

Stamm- und Mulmhöhlen

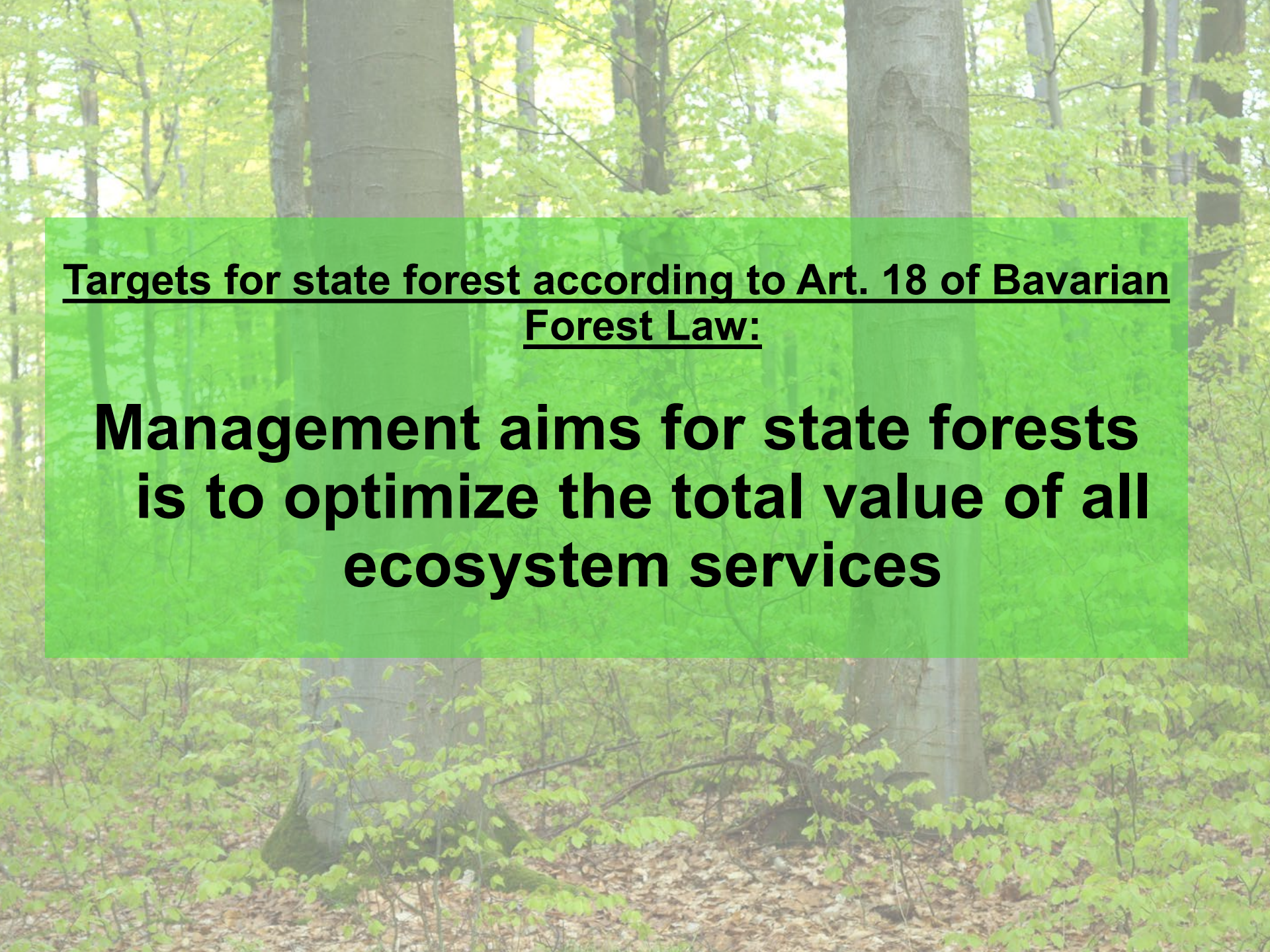
CV2

Höhlen

Baumhöhle mit Mulm und Bodenkontakt, was das Eindringen von Bodenfeuchte in den Hohlraum erlaubt. Der Eingang zur Höhle kann auch höher am Stamm liegen.	ø ≥ 10 cm (Bodenkontakt)	CV21
	ø ≥ 30 cm (Bodenkontakt)	CV22
Mit Mulm gefüllte Stammhöhle ohne Bodenkontakt.	ø ≥ 10 cm	CV23
	ø ≥ 30 cm	CV24
Halboffene Stammhöhle mit oder ohne Mulm; das Mikroklima des Hohlraumes ist teilweise den äußeren klimatischen Bedingungen ausgesetzt und Niederschlag kann eindringen. Der Eingang zur Höhle kann auch höher am Stamm liegen.	ø ≥ 30 cm / halboffen	CV25
Großer, kaminartiger Hohlraum im Stamm mit Öffnung nach oben, mit oder ohne Bodenkontakt.	ø ≥ 30 cm / hohler Stamm	CV26

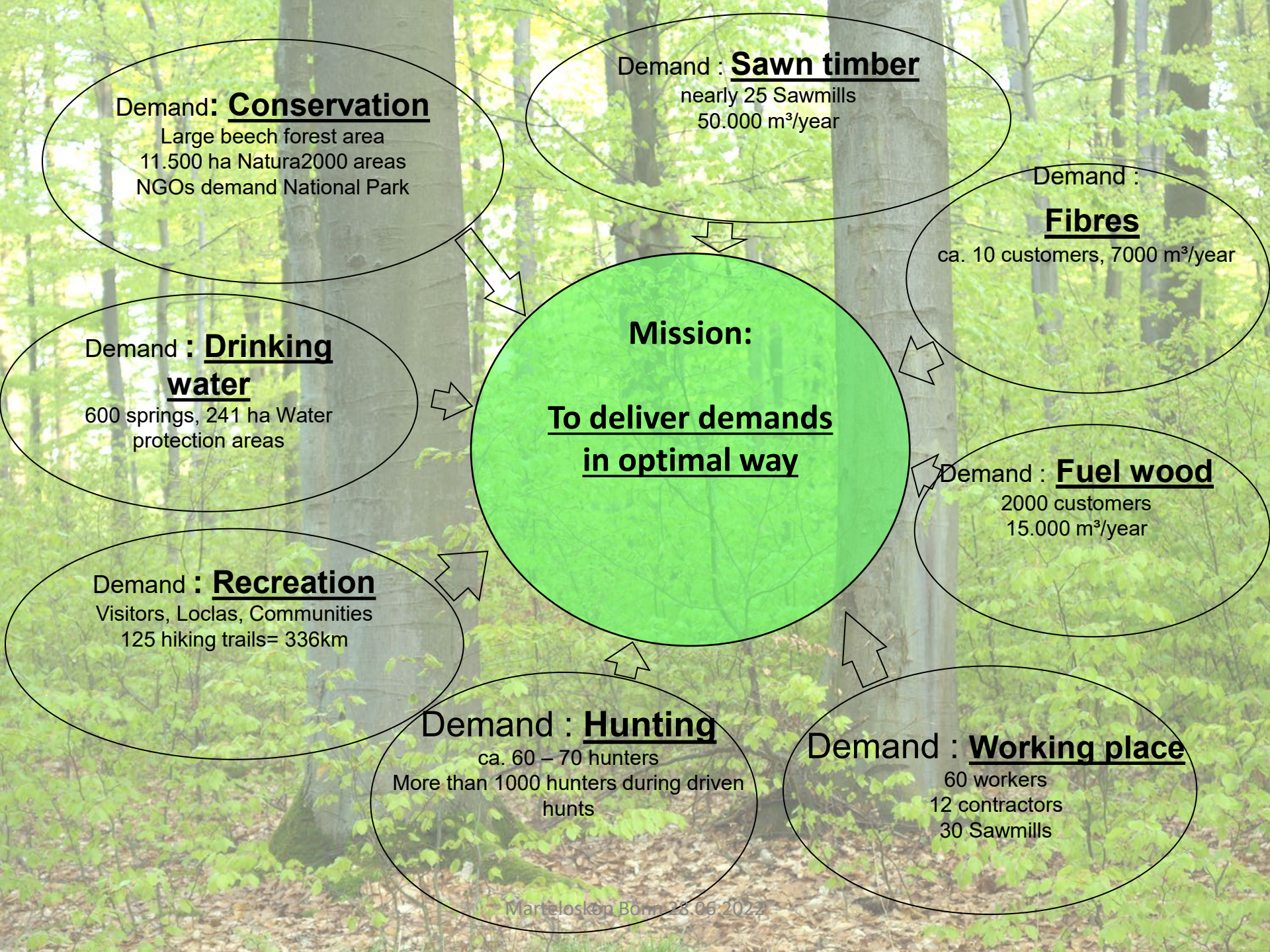
Knowledge of scientific researces in Naturwaldreservat Waldhaus (strictly protected area of 10 ha) in Steigerwald forests:

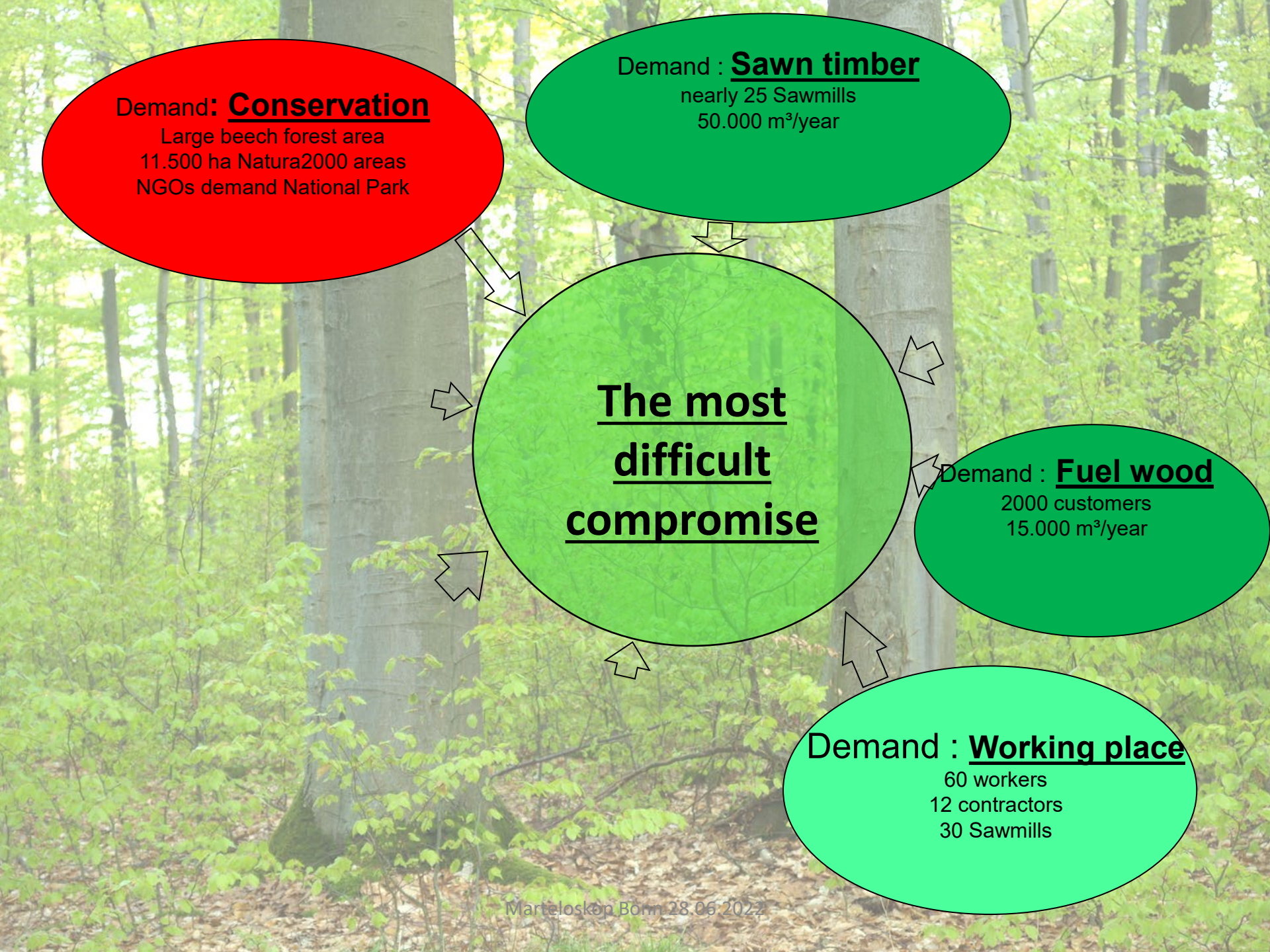
High amount of species on small areas



Targets for state forest according to Art. 18 of Bavarian Forest Law:

Management aims for state forests is to optimize the total value of all ecosystem services


Demand: Conservation
Large beech forest area
11.500 ha Natura2000 areas
NGOs demand National Park
Demand : Sawn timber
nearly 25 Sawmills
50.000 m³/year
Demand :
Fibres
ca. 10 customers, 7000 m³/year
Demand : Drinking water
600 springs, 241 ha Water protection areas
Mission:
To deliver demands in optimal way
Demand : Fuel wood
2000 customers
15.000 m³/year
Demand : Recreation
Visitors, Loclas, Communities
125 hiking trails= 336km
Demand : Hunting
ca. 60 – 70 hunters
More than 1000 hunters during driven hunts
Demand : Working place
60 workers
12 contractors
30 Sawmills


Demand: Conservation
Large beech forest area
11.500 ha Natura2000 areas
NGOs demand National Park
Demand : Sawn timber
nearly 25 Sawmills
50.000 m³/year
The most difficult compromise
Demand : Fuel wood
2000 customers
15.000 m³/year
Demand : Working place
60 workers
12 contractors
30 Sawmills

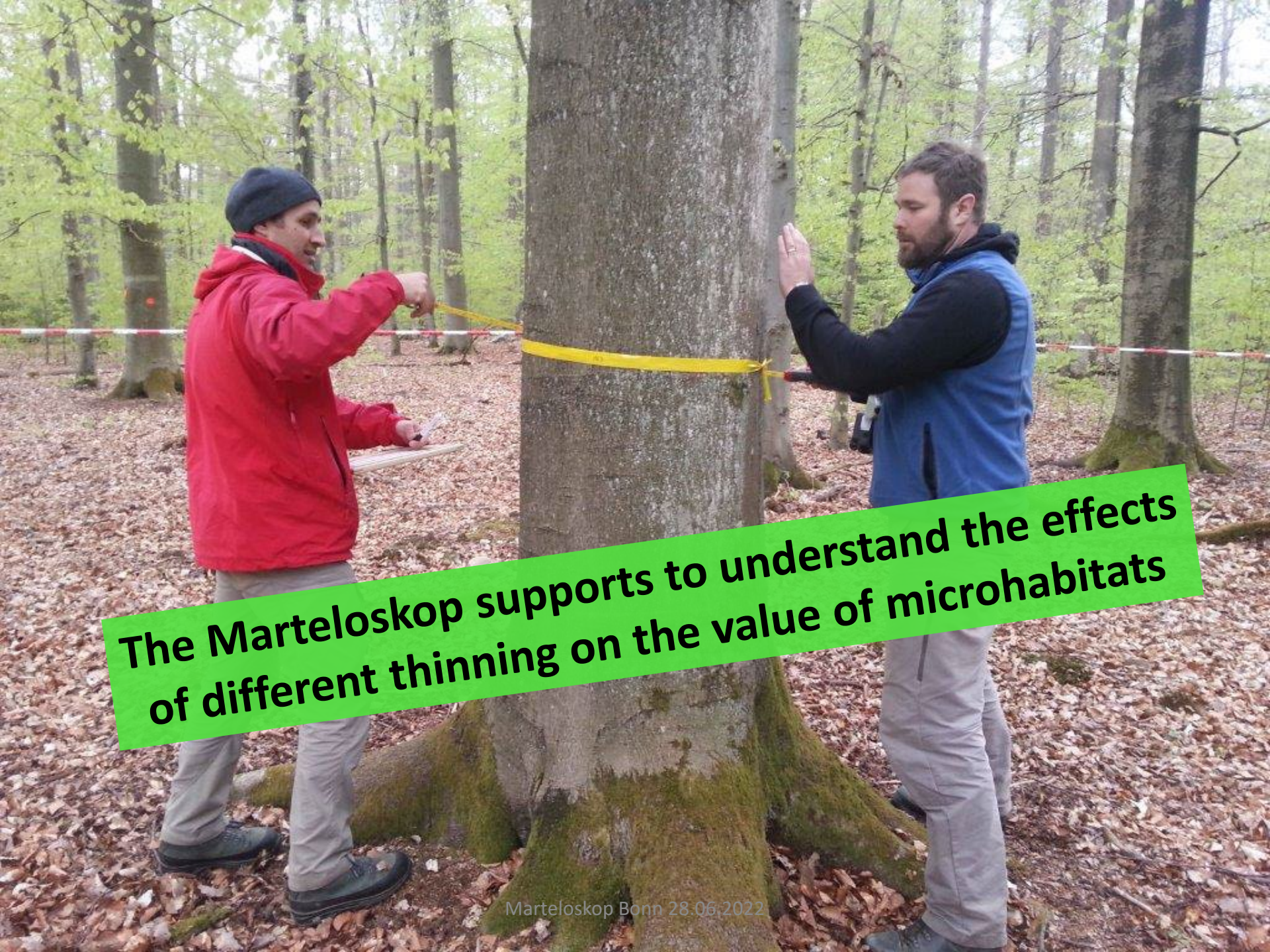
We urgently need examples for alternative concepts

Timber harvesting in accordance with nature in Ebrach/Bayerische Staatsforsten

Marteloskopes can help to find good solutions

Marteloskop Steinkreuz near Ebrach …

… an important place of learning


The Marteloskop supports to understand the effects of different thinning on the value of microhabitats

Marteloskop Steinkreuz / Forest Enterprice Ebrach

Description of two different thinning-scenarios

Scenario 1 (negativ-thinning):

- **Removal of 74 low economical value trees (analog former ANW (Pro-Silva)-management)**
- **Protection of a few recent and clearly habitat-trees**

=> Worth of removal-trees: 8,068.- €

Scenario 2 (positiv-thinning):

- **Promotion of 36 high economical value trees**
- **Removal 28 neigbour-trees**
- **Protection 24 habitat trees**

=> Worth of removal-trees: 4,488.- €

Marteloskop Steinkreuz / Forest Enterprice Ebrach

Ecologial value of the two thinning scenarios

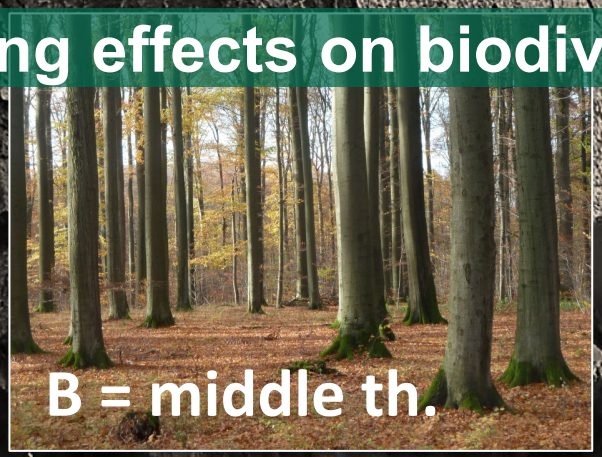
	Scenario 1	Scenario 2	
	(negativ thinning)	(positiv thinning)	difference
Points of microhabitats = ecological value			
- Directly after cut	**2753**	**3431**	**678**
- Estimation in 30 years	**3767**	**4765**	**998**

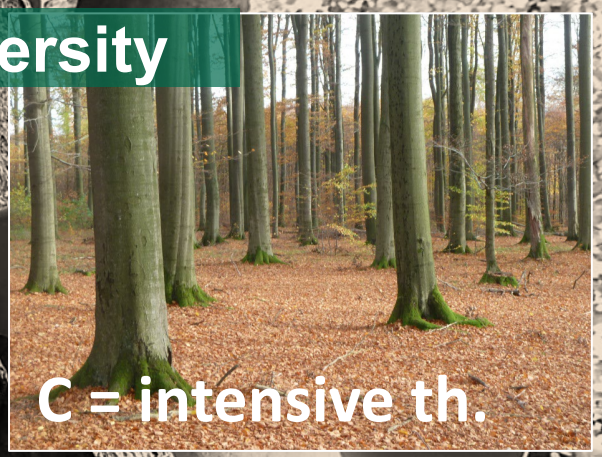
Marteloskop Steinkreuz / Forest Enterprice Ebrach

The result shows:

Negativ thinning
with the removal of low value trees
reduces
the later habitat trees

Thinning effects on biodiversity

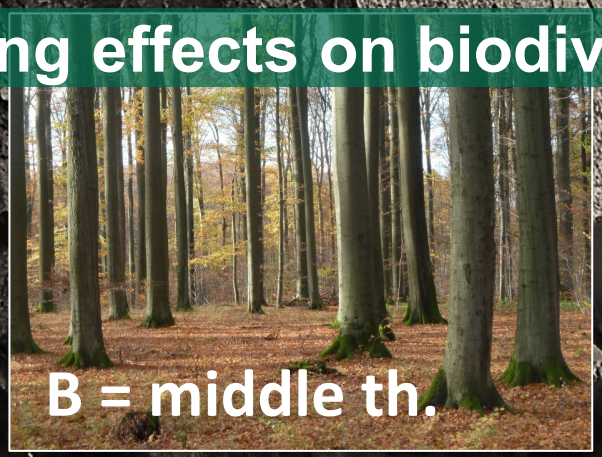


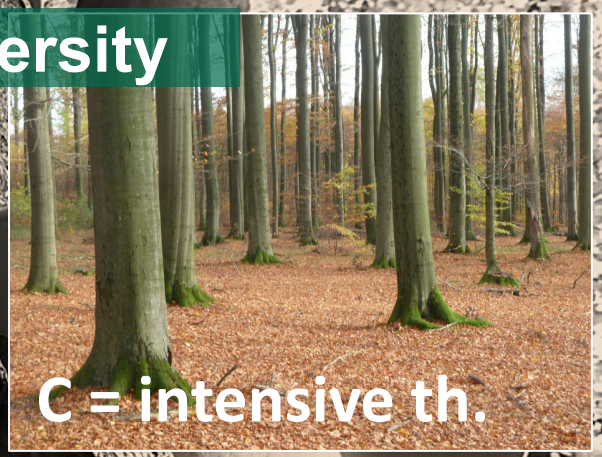


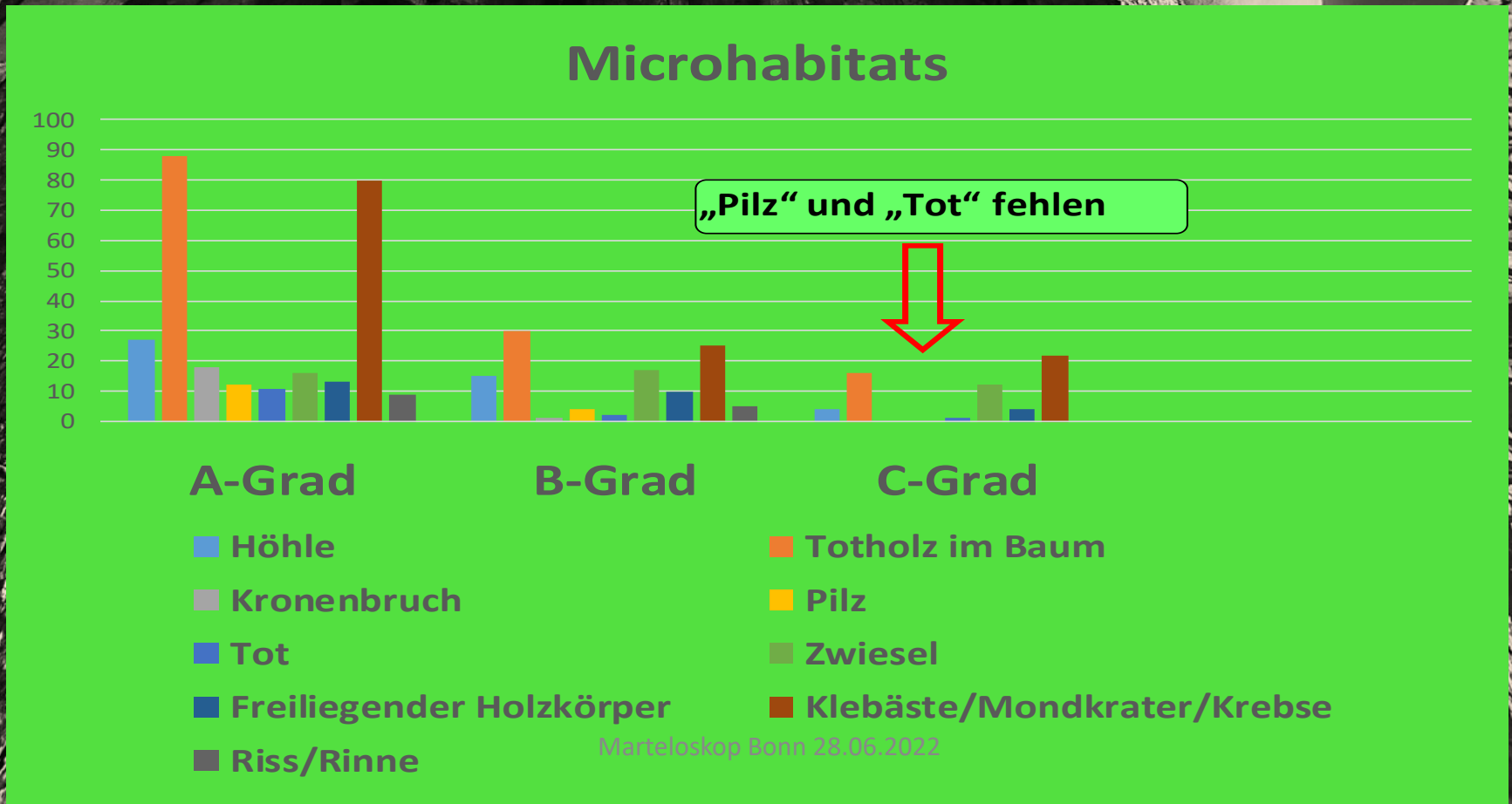
The world's oldest beech research area
ABC-Grad in the Abteilung Kapelle / Forest Fabrikschleichach
200 years old – 150 years research

The research shows
the effects of different thinning on microhabitat-structures

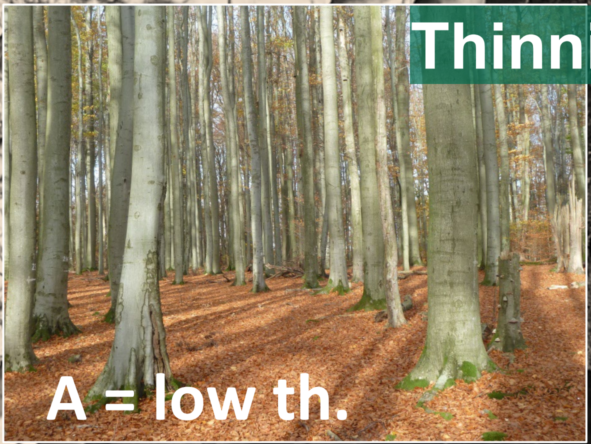
Thinning effects on biodiversity

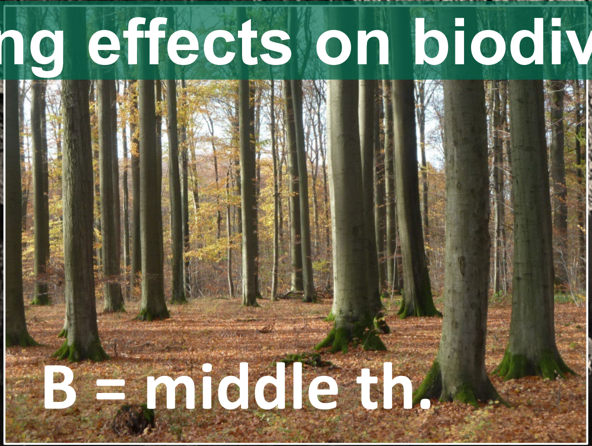


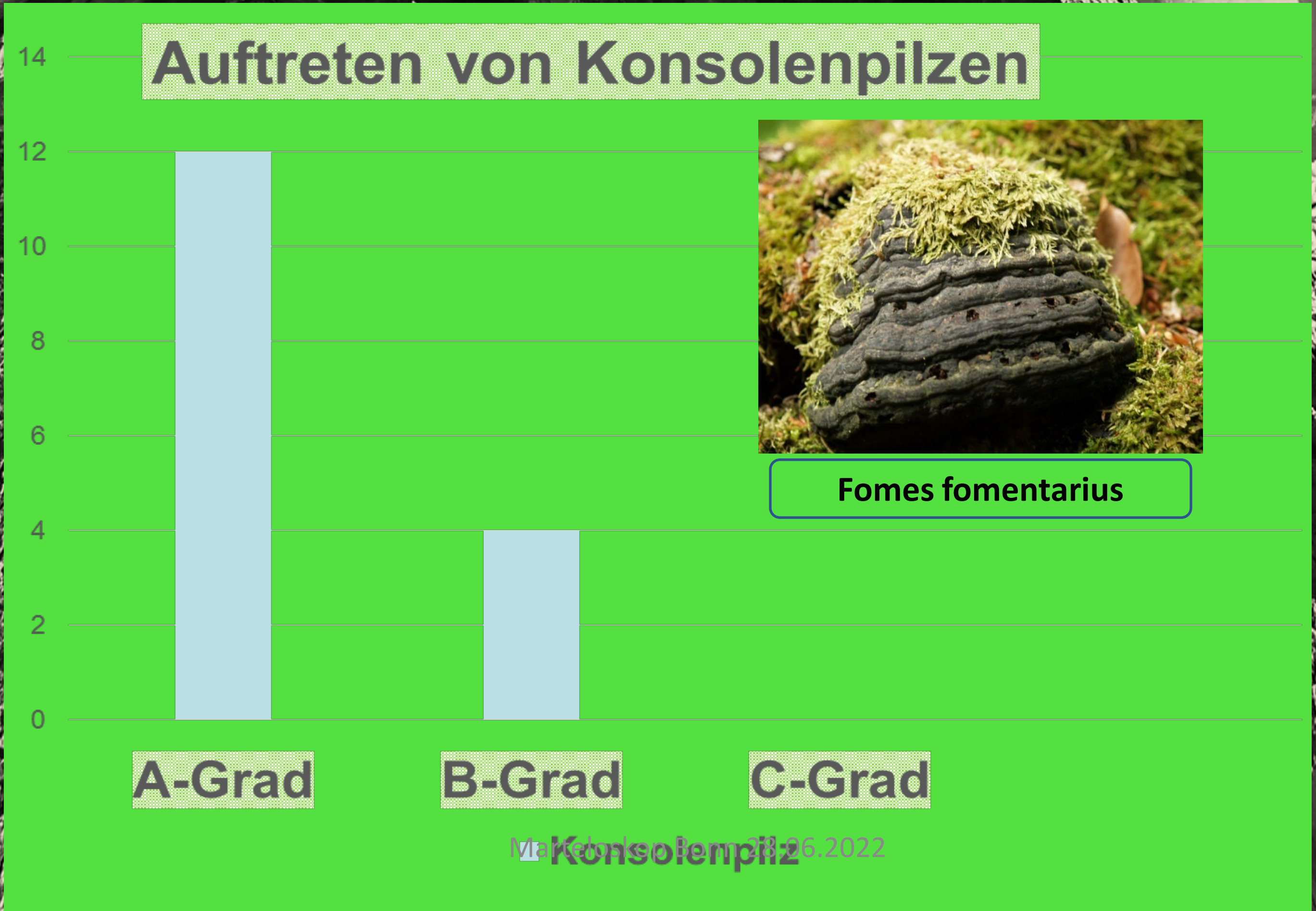




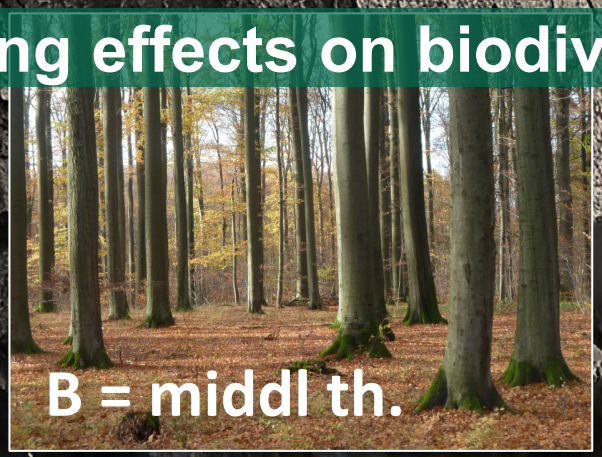
Thinning effects on biodiversity

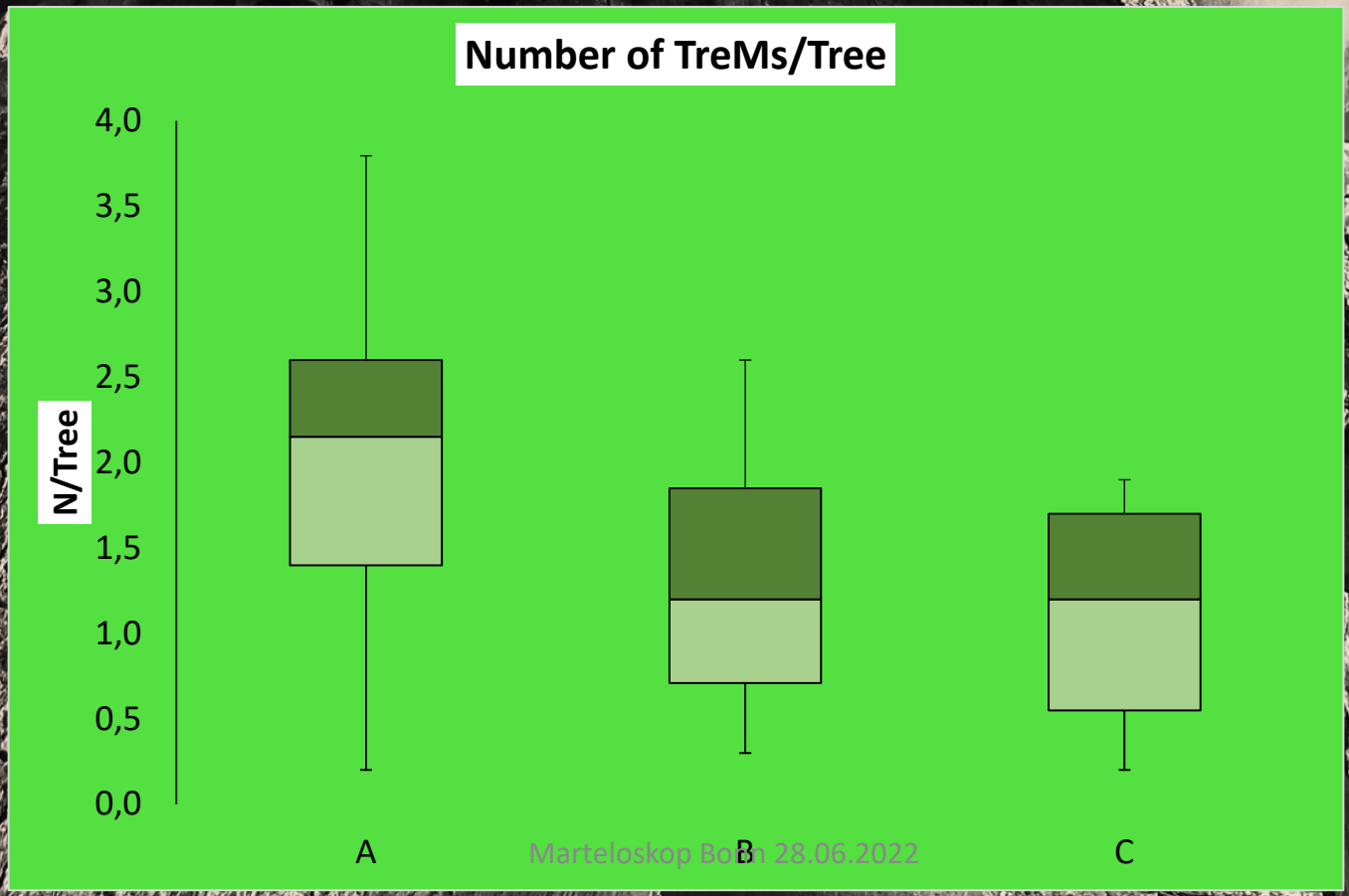




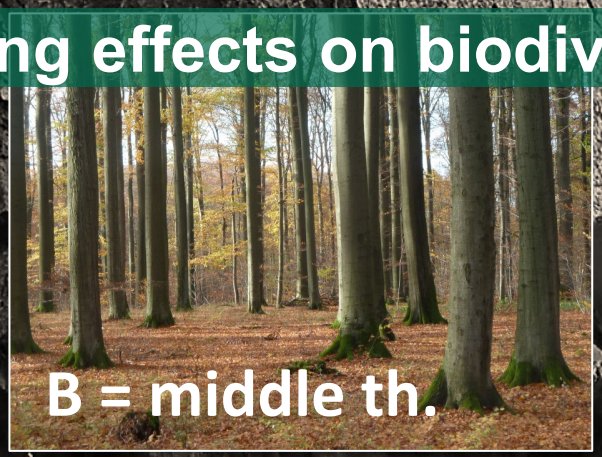


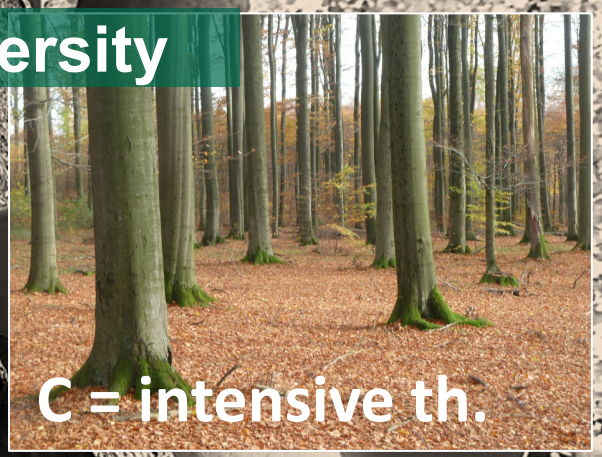
Thinning effects on biodiversity

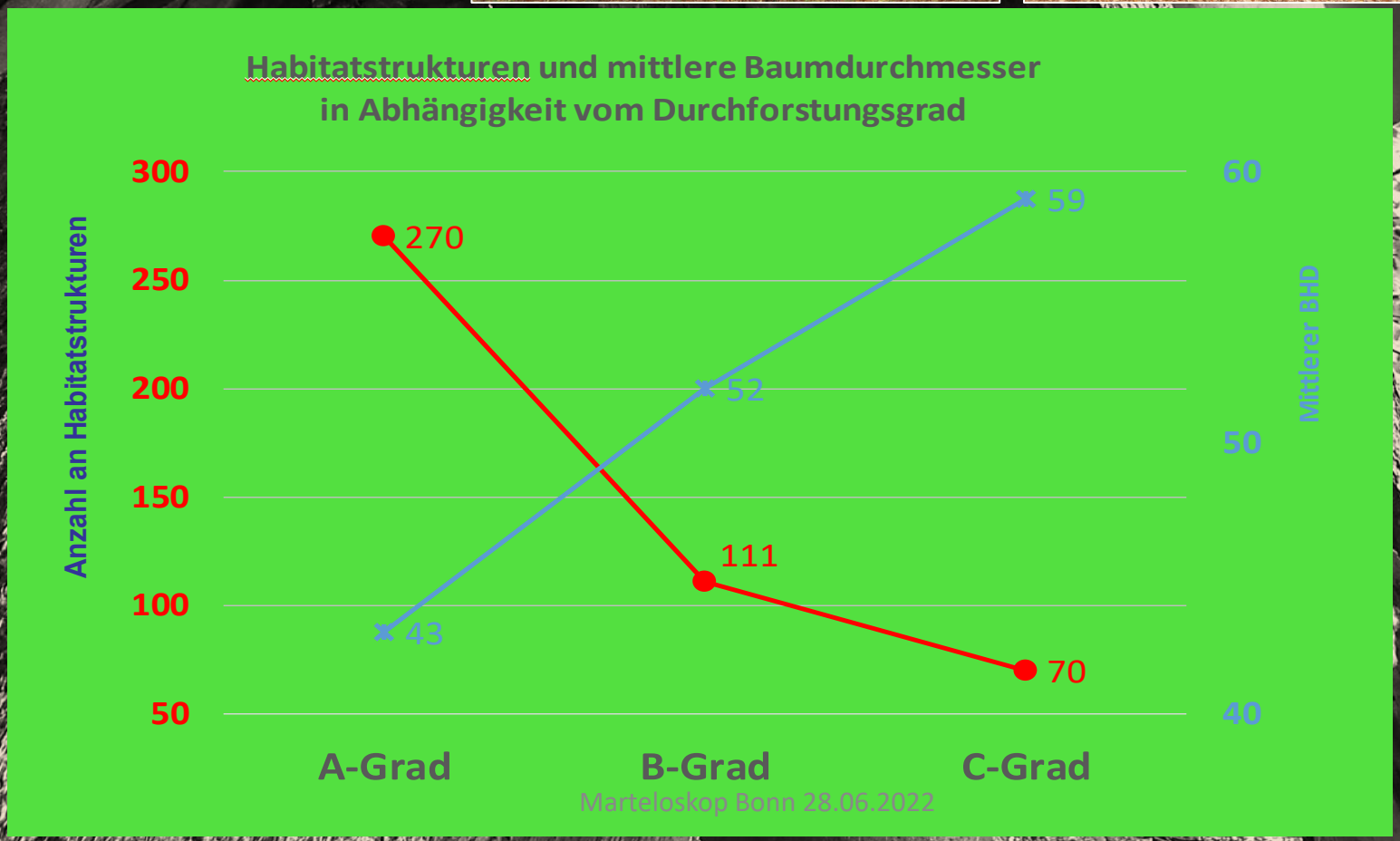


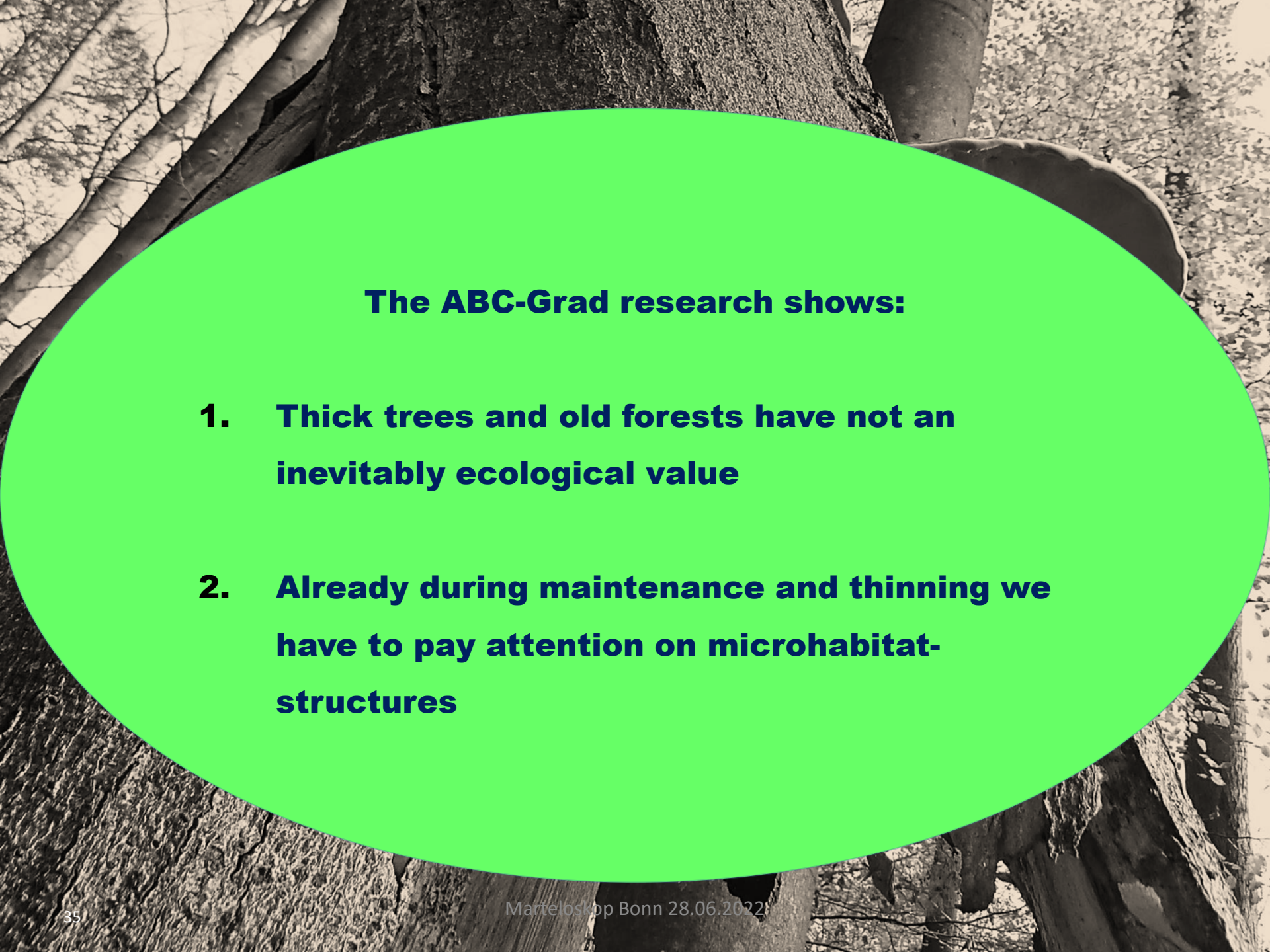


Thinning effects on biodiversity









The ABC-Grad research shows:

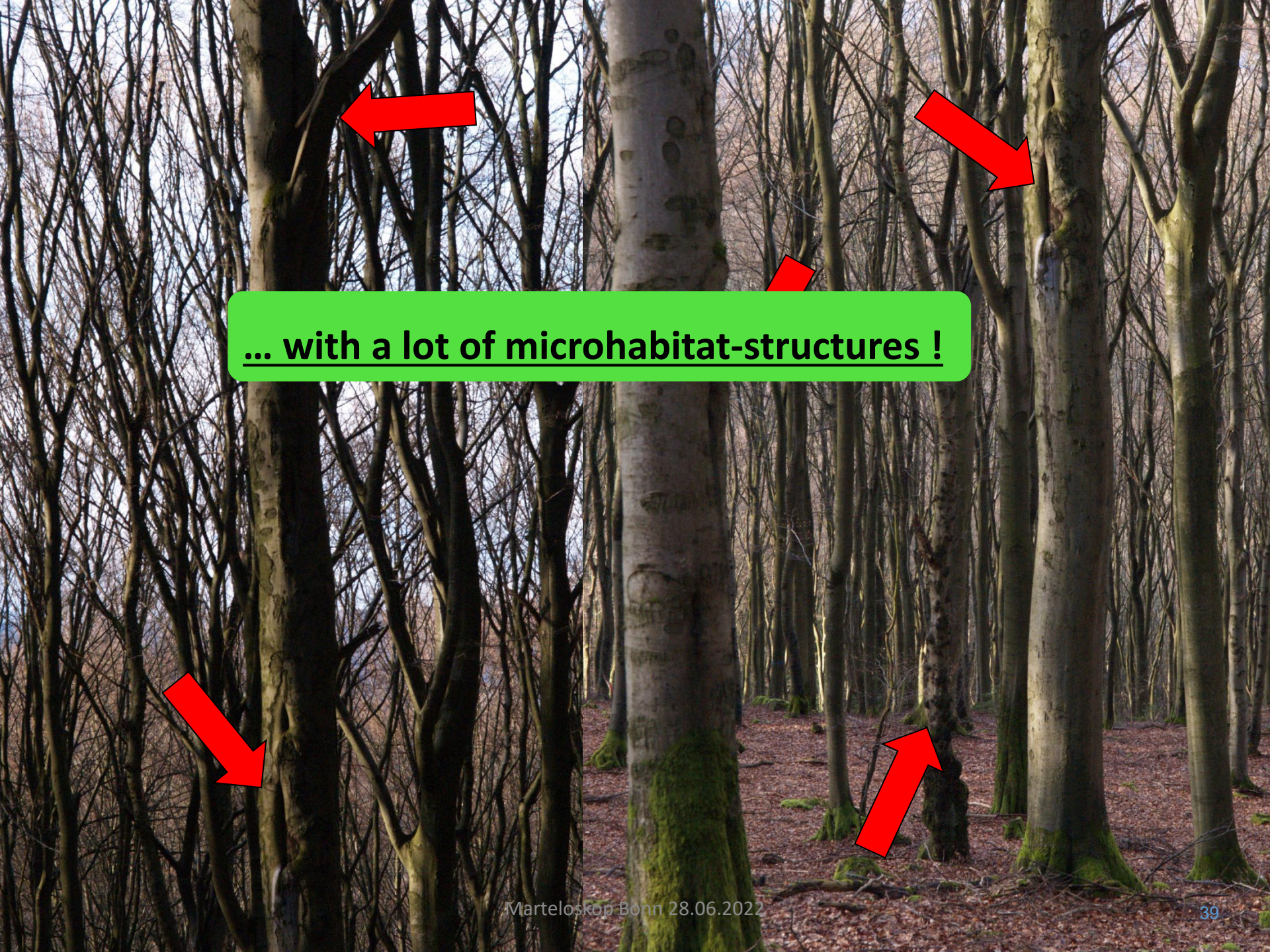
1. **Thick trees and old forests have not an inevitably ecological value**

2. **Already during maintenance and thinning we have to pay attention on microhabitat-structures**

Is this a nice forest …?


… after cutting the low value trees?


Or better this …?


… with a lot of microhabitat-structures !

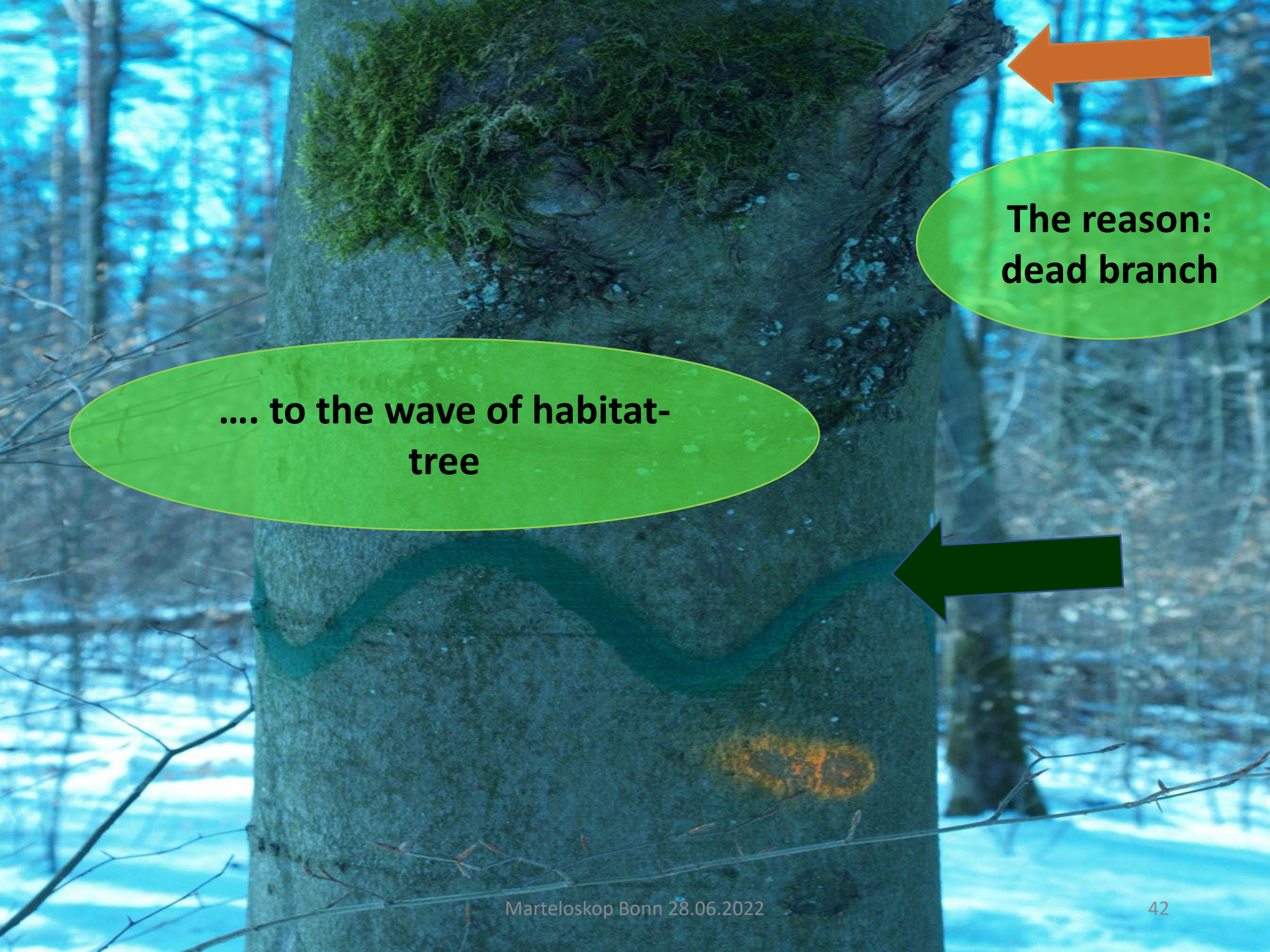
We forster have to change our optic

–

what is a beautiful tree?

Saproxylic beetle know what they need:
The trees on the right side !


We foresters have to
change: from sign to cut …..


The reason:
dead branch
…. to the wave of habitat-
tree

Naturschutzkonzept

für den

Forstbetrieb Ebrach

Stand: Dezember 2014

Protection despite use

Regional Concept for conservation of natur and wood-species

oskop Bonn

28.06.2022

Strategy for the safeguarding of biodiversity
Our local concept

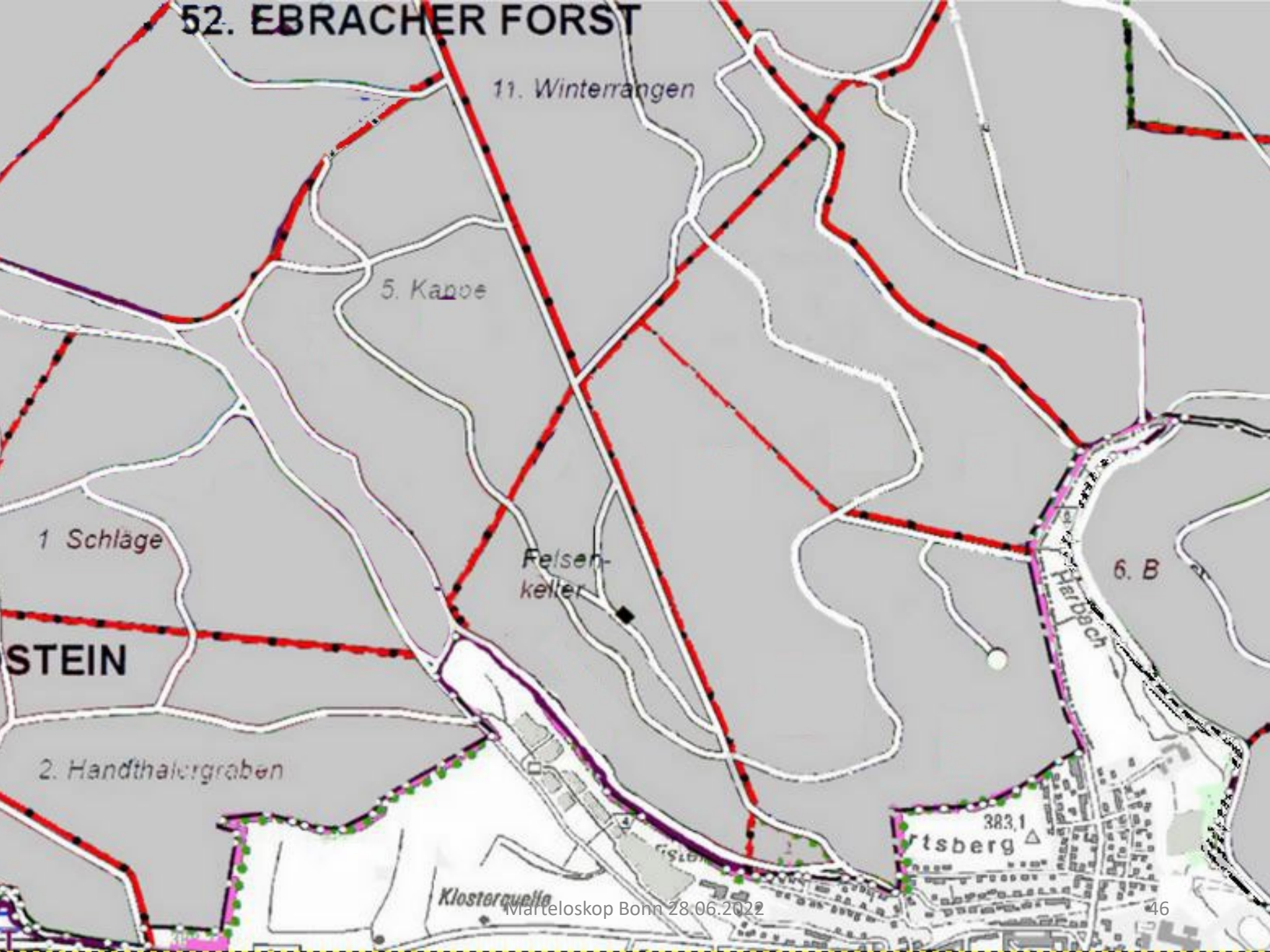
- Integrative model „Schützen und Nutzen“

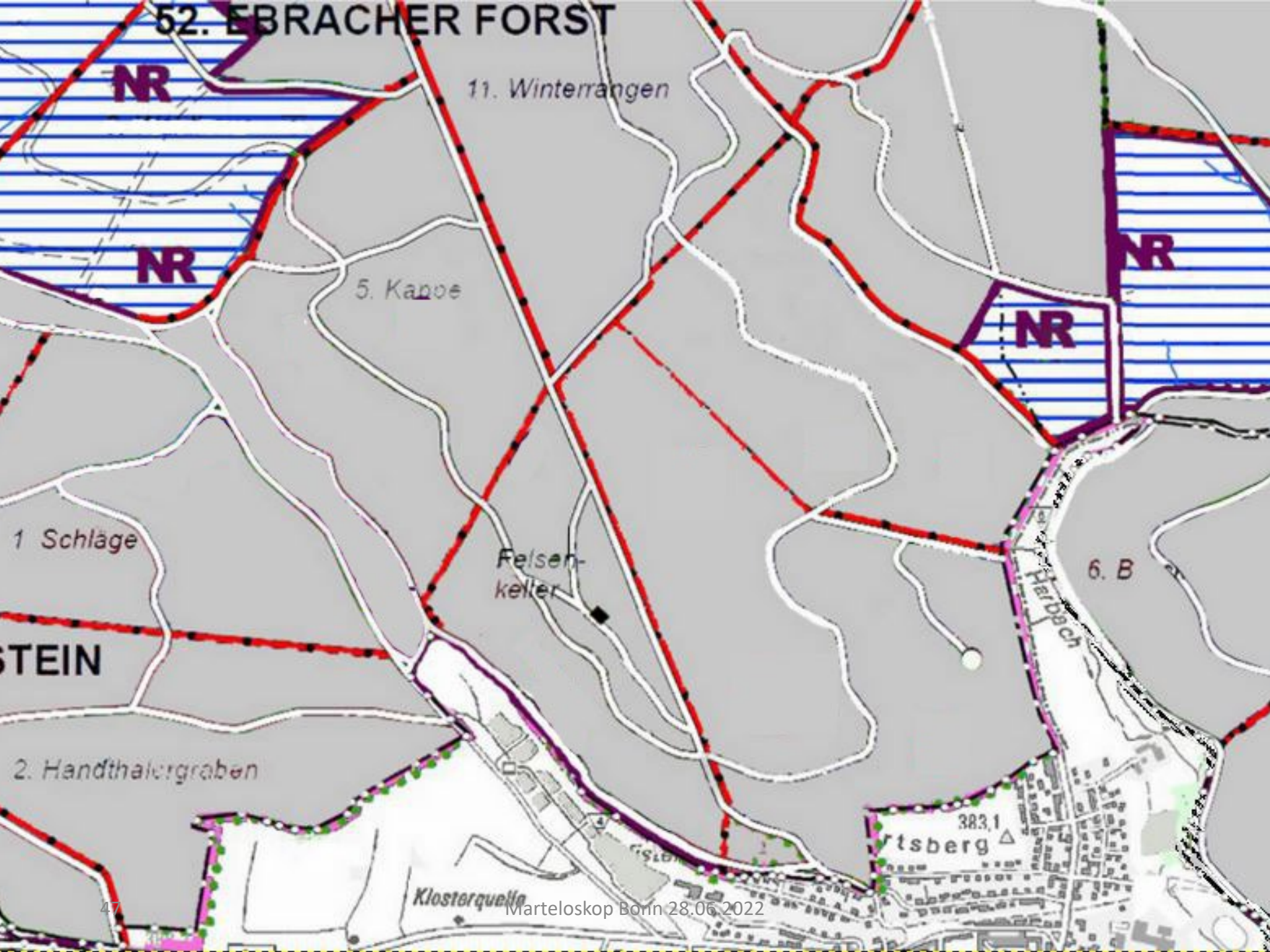
- 1.670 ha set-asides:
  6 strict reserves
  200 „Trittstein“ habitats, one 850 ha
  40 km edges

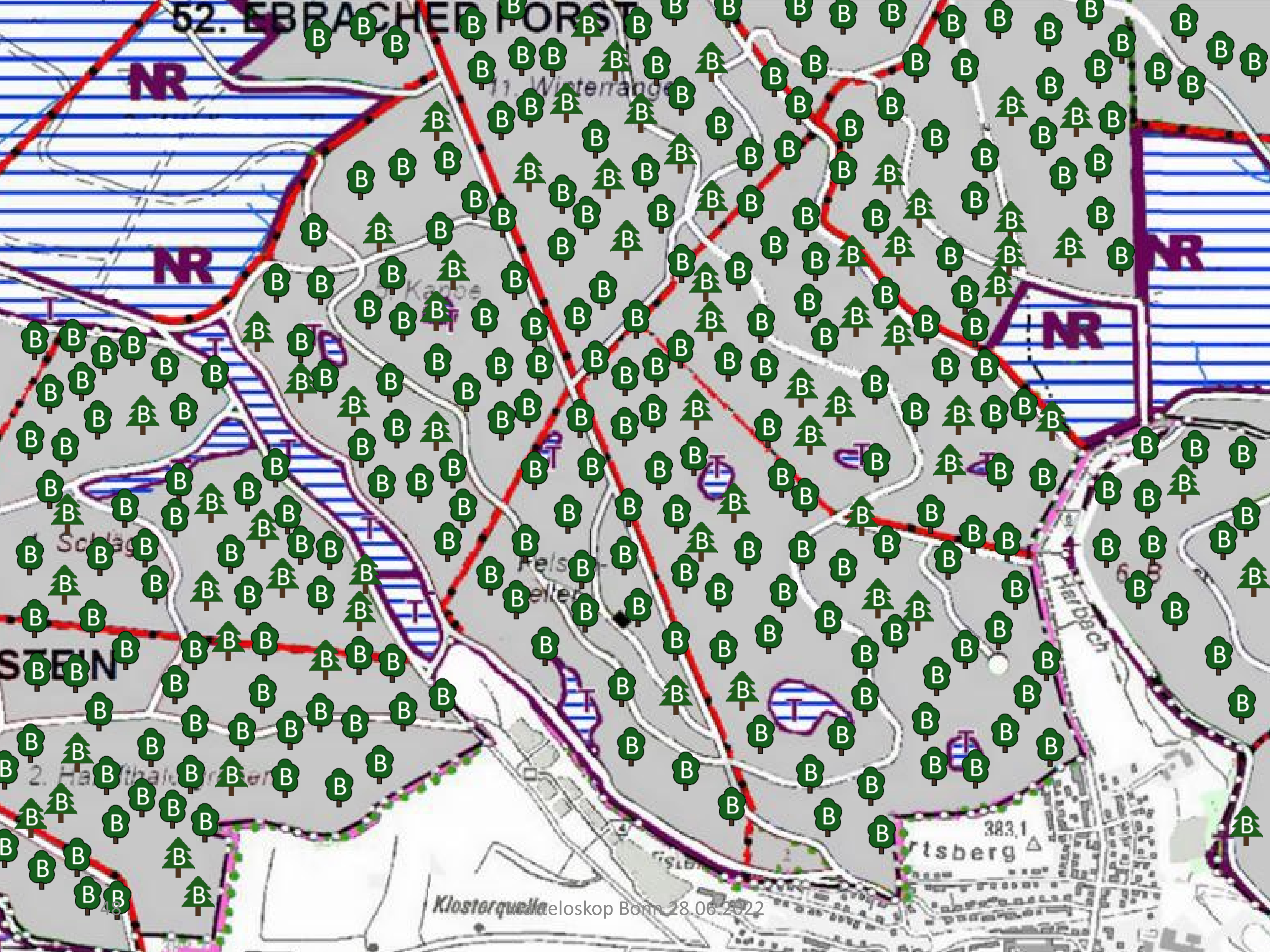
- 6.000 ha minimal impact in stands more than 100 y.

- Deadwood management:
  40 m³/ha from140 years
  20 m³/ha from100 years

- 10 habitat trees per ha


52. EBRACHER FORST
11. Winterrangen
5. Kappe
1 Schläge
Felsen-
keller
6. B
STEIN
2. Handthalergraben
Herbach
383,1
Klosterquelle


52. EBRACHER FORST
NR
NR
NR
NR
11. Winterrangen
5. Kappe
1 Schläge
Felsen-
keller
6. B
Harbach
STEIN
2. Handthalergraben
383,1
rtsberg
Klosterquelle


52. EBRACHER FORST
NR
NR
NR
NR
11. Winterrange
Klosterquelle
383,1
Herbach
STEIN

Rules for Protection despite Use

Tending

- **Conservation goal:**
  - **Retention of wolf trees (undesired overgrowth)**
  - **Retention of mature „achievers“ as habitat trees**
- **Silvicultural goal:**
  - **Diversification of mixed tree species**

- **Implementation:**
  - **No tending in mono-specific young stands**
  - **No negative selection**
  - **Spray-paint instead of chainsaw (Fuelwood harvest as priority)**

Rules for Protection despite Use

Early and late thinning phases

- **Conservation goal:**
  - **Retention of potential habitat trees**
- **Silvicultural goal:**
  - **Promotion of elite trees (tree groups)**

- **Implementation:**
  - **Limiting selected elite trees to ca 40 – 50 / ha**
  - **Positive selection and marking with coloured tape**
  - **Preservation of potential habitat trees**
  - **No negative selection, no clearing out of bad quality trees**
  - **Creating high stumps during harvester operations**

Rules for Protection despite Use

Regeneration phase (AD / VJN / LB)

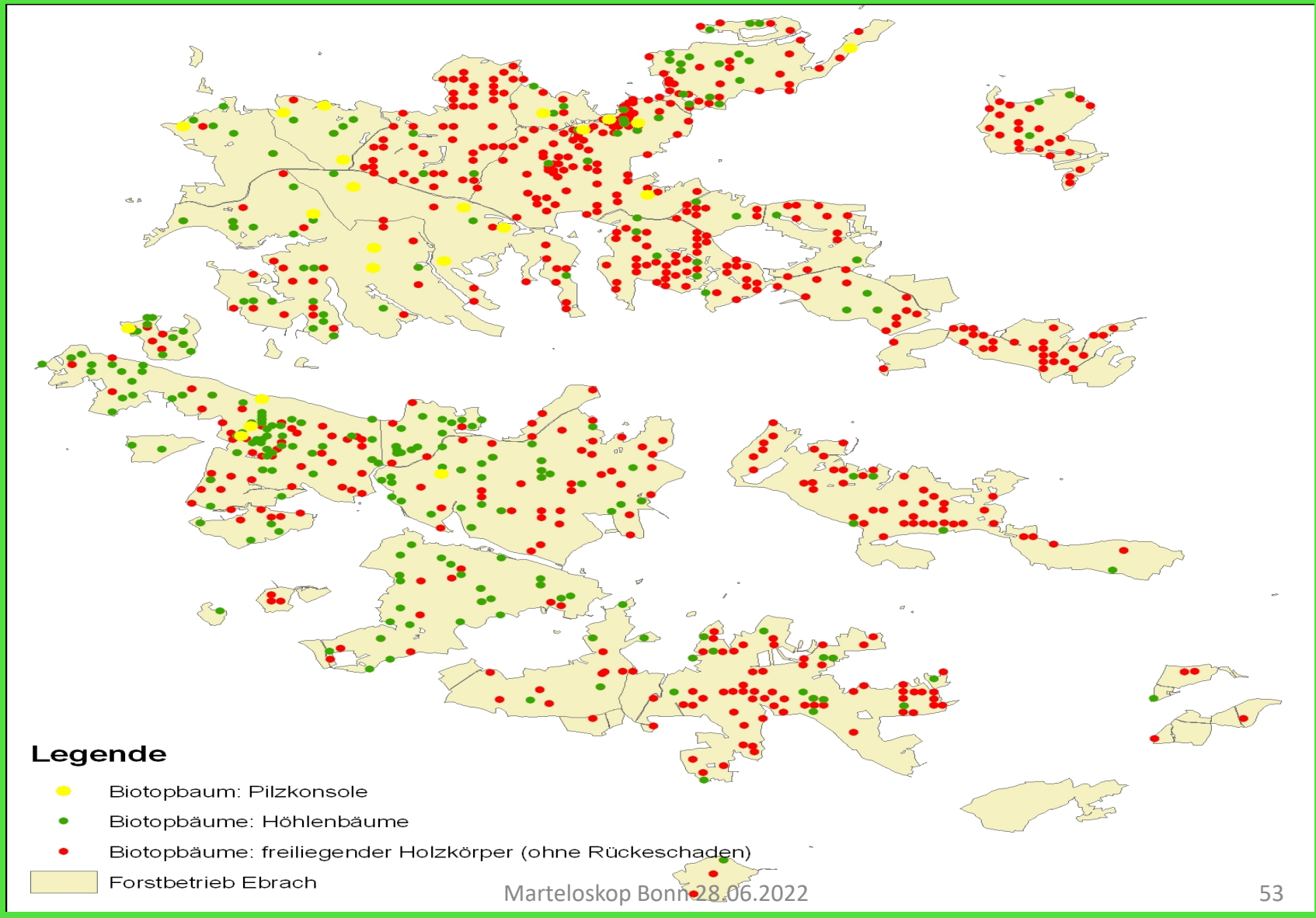
- **Conservation goal:**
  - **Accumulation of deadwood (20 m^3 / 40 m^3)**
  - **10 habitat trees/ha**
- **Silvicultural goal:**
  - **Target diameter harvest**
  - **Promotion of admixtures**
- **Implementation:**
  - **Separation of the harvested trunk from the crown at first strong branch**
  - **Limiting of the fuel-timber-using in this phase**

Rules for Protection despite Use

General rules

- No timber harvest during the period of breeding and rearing
- Early termination of harvesting in mature and old stands
- Permanent marking of habitat trees with „wave line“
- No felling of habitat trees accidentally marked for harvesting
- Trunk sections with cavities are left in the stand when a habitat tree was felled accidentally

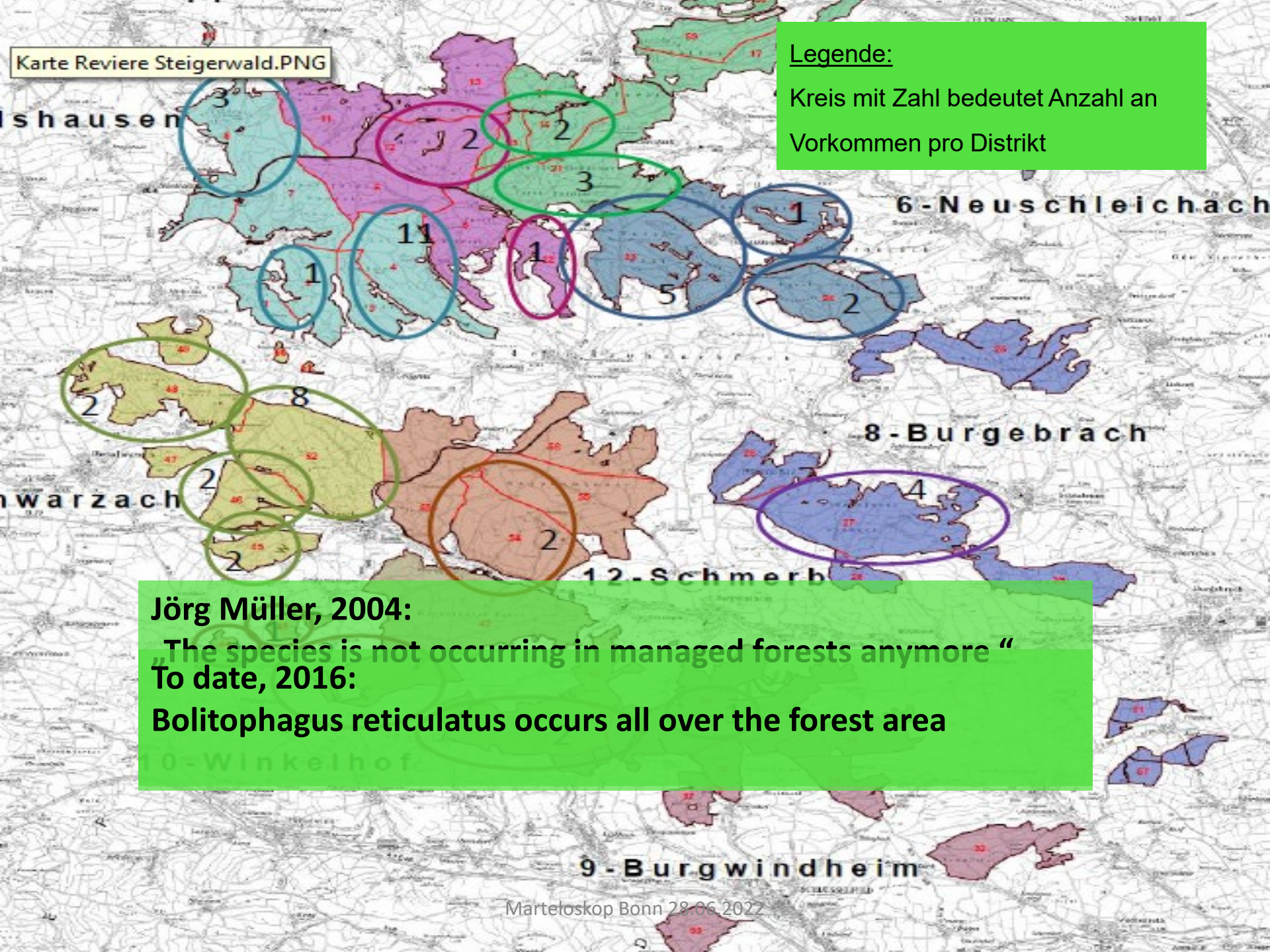
Inventory including habitat trees



The rules work

Example: Black beetle (Bolitophagus reticulatus)

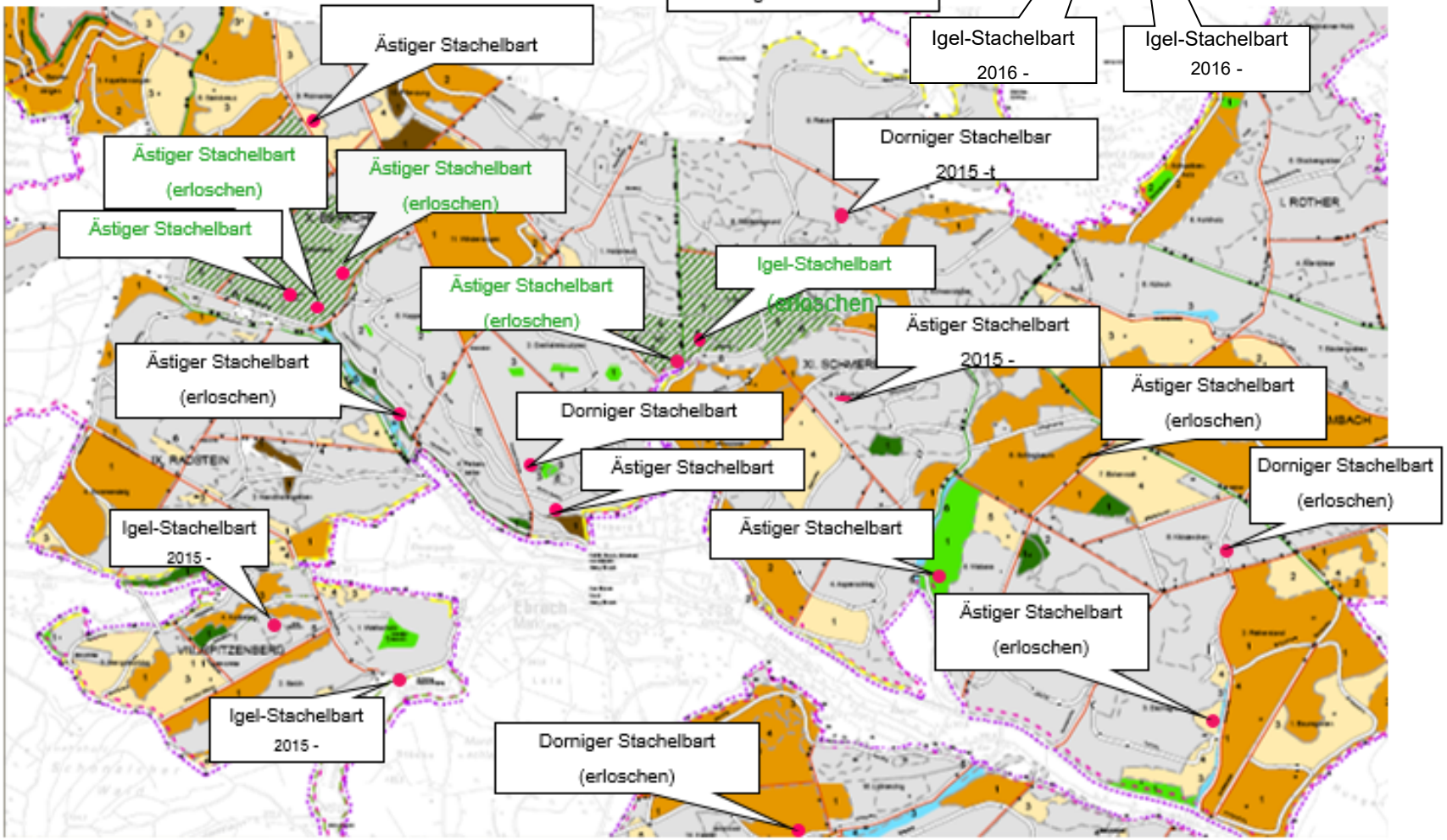

Marteloskop Bonn 28.06.2022


Karte Reviere Steigerwald.PNG
Legende:
Kreis mit Zahl bedeutet Anzahl an Vorkommen pro Distrikt
6-Neuschleichach
8-Burgebrach
12-Schmerb
9-Burgwindheim
10-Winkelhof
Jörg Müller, 2004:
„The species is not occurring in managed forests anymore “
To date, 2016:
Bolitophagus reticulatus occurs all over the forest area

The rules work

Example: Hericium spec. (H.Coralloides, H. erinaceus, H.cirrhatum)

Not a rarity anymore, also in the managed forest


Ästiger Stachelbart
Ästiger Stachelbart
Igel-Stachelbart
2016 -
Igel-Stachelbart
2016 -
Ästiger Stachelbart
(erloschen)
Ästiger Stachelbart
(erloschen)
Dorniger Stachelbar
2015 -t
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Igel-Stachelbart
(erloschen)
Ästiger Stachelbart
(erloschen)
Ästiger Stachelbart
2015 -
Ästiger Stachelbart
(erloschen)
Dorniger Stachelbart
Ästiger Stachelbart
Ästiger Stachelbart
(erloschen)
Dorniger Stachelbart
(erloschen)
Igel-Stachelbart
2015 -
Ästiger Stachelbart
Ästiger Stachelbart
(erloschen)
Igel-Stachelbart
2015 -
Dorniger Stachelbart
(erloschen)

The rules work

Example: <u>Collared flycatcher</u> (Ficedula albicollis)

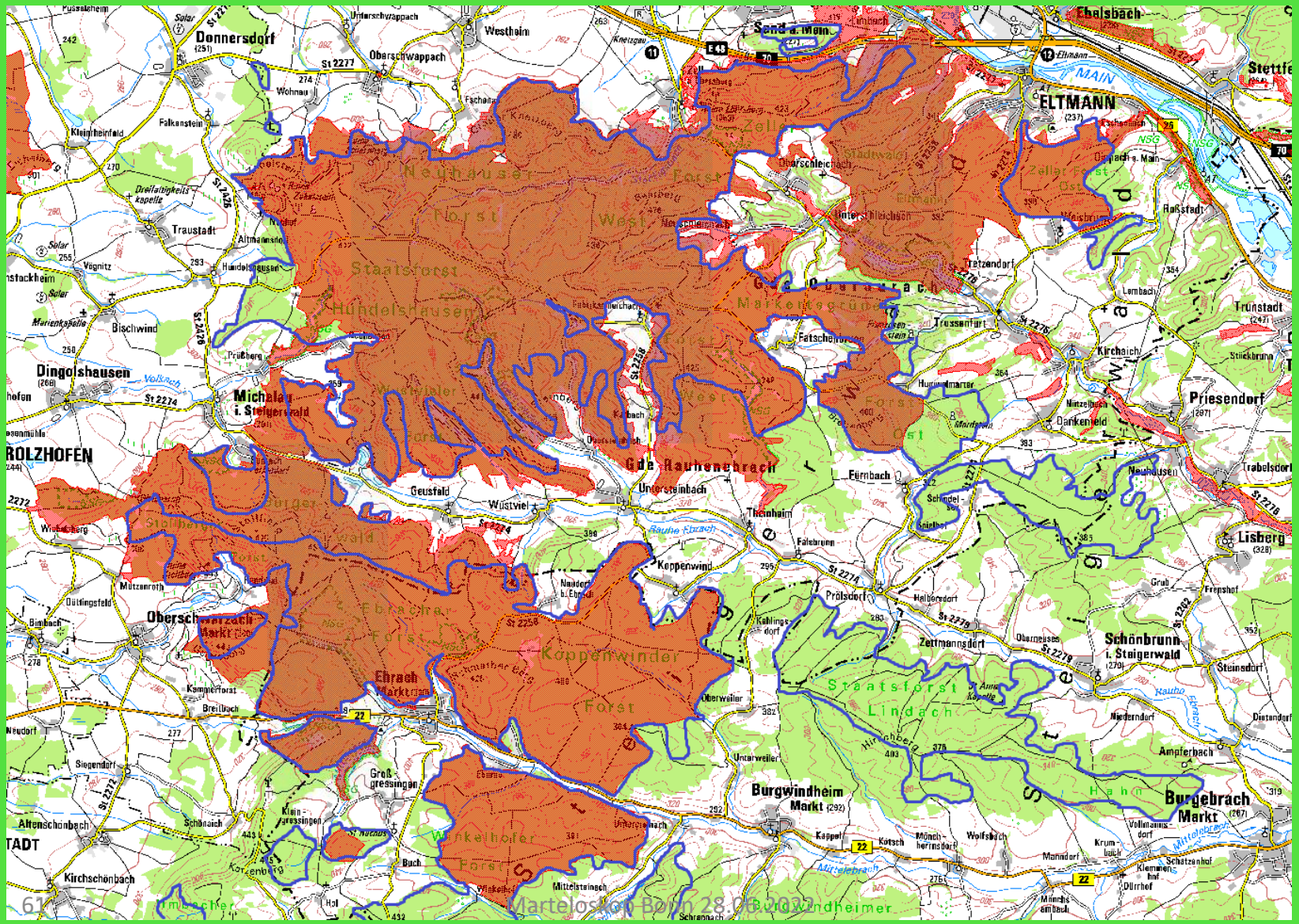
Occurs due to abundant small cavities all over the managed forest

The rules work

Example: Bone beetle (Trox perrisii)

2010 re-discovered in the managed forest

FFH and SPA – Area of the Forest Enterprise Ebrach



Seven FFH – umbrella – species

in Steigerwald

Lucanus cervus

Triturus cristatus

Bombina variegata

Dicranum viride

Myotis myotis

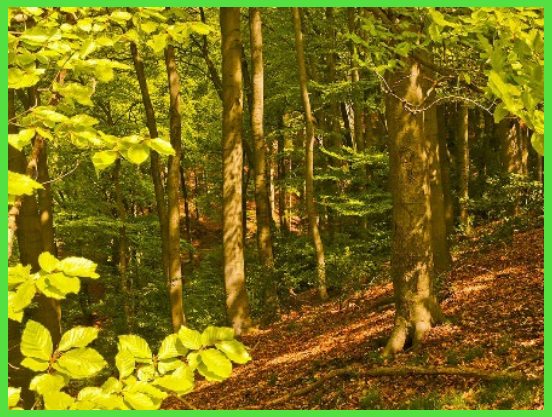
Myotis bechsteinii

Barbastella barbastellus

Bildquelle: Wikipedia

Seven FFH – umbrella - species in Steigerwald

	Evaluation			Conservation status
	Population	Habitat-Quality	Disturbance	
Lucanus cervus	C	C	B	**C**
Triturus cristatus	B	B	A	**B**
Bombina variegata	C	B	B	**B**
Babastella barbastellus	A	A	A	**A**
Myotis bechsteinii	B	B	B	**B**
Myotis myotis	B	B	A	**B**
Dicranum viride	B	B	B	**B**



LRT 9110 Luzulo-Fagetum

Five Natura2000 - Habitats

in Steigerwald

LRT 9130 Asperulo -Fagetum

LRT 9170 Galio-Carpinetum

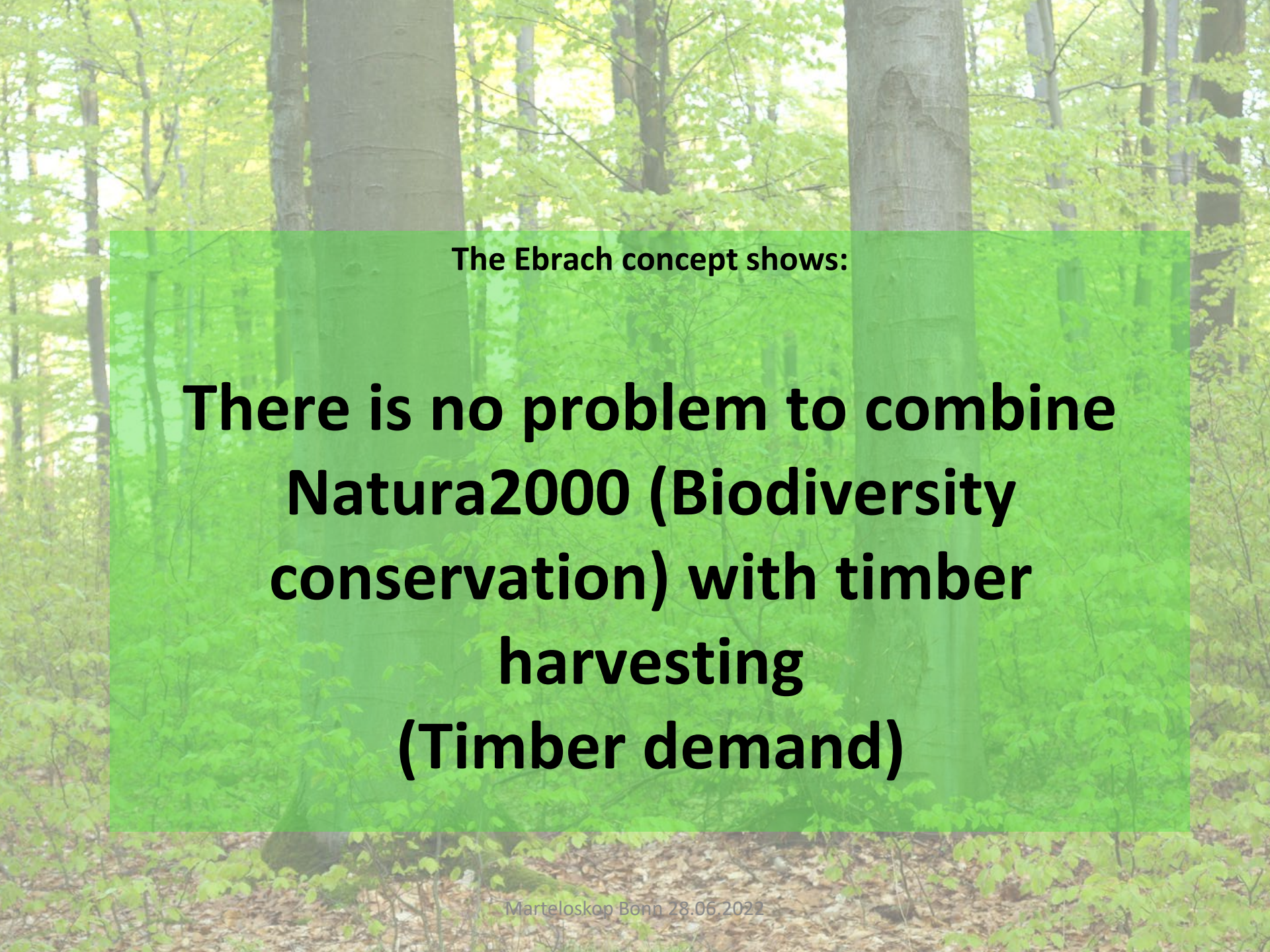
LRT 9180 Tilio-Acerion

LRT 91E0 Alno-Padion

Bildquelle: Wikipedia

Five Natura2000 - Habitats

	Luzulo Fagetum 9110	Asperulo Fagetum 9130	Tilio Acerion 9180	Alno-Padion 91E0	Galio-Carpinion 9170
Microhabitats	A-	A-	A-	A-	B+
Typical Species	A	A	A-	B+	B
Disturbances	A-	A-	A-	A-	B
Evaluation in total	A-	A-	A-	A-	B



The Ebrach concept shows:

There is no problem to combine Natura2000 (Biodiversity conservation) with timber harvesting (Timber demand)

Benefits of the Integrate-concept:

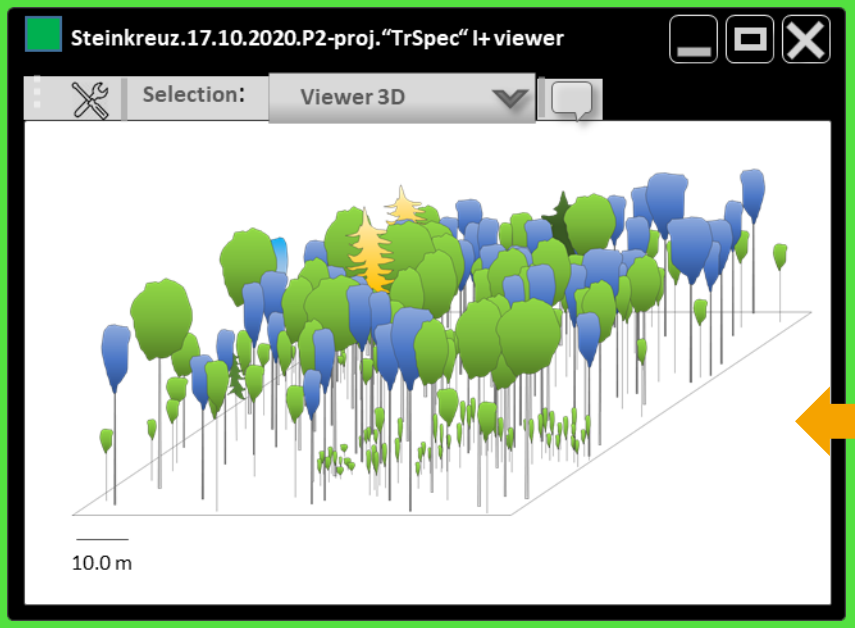
1. Compatibility of ecology and economy in the same forest
2. Short distance timber sales
3. Short distance wilderness experience
4. Distribution of (also rare) species over total forest area
5. Applicable in nearly all forest enterprises

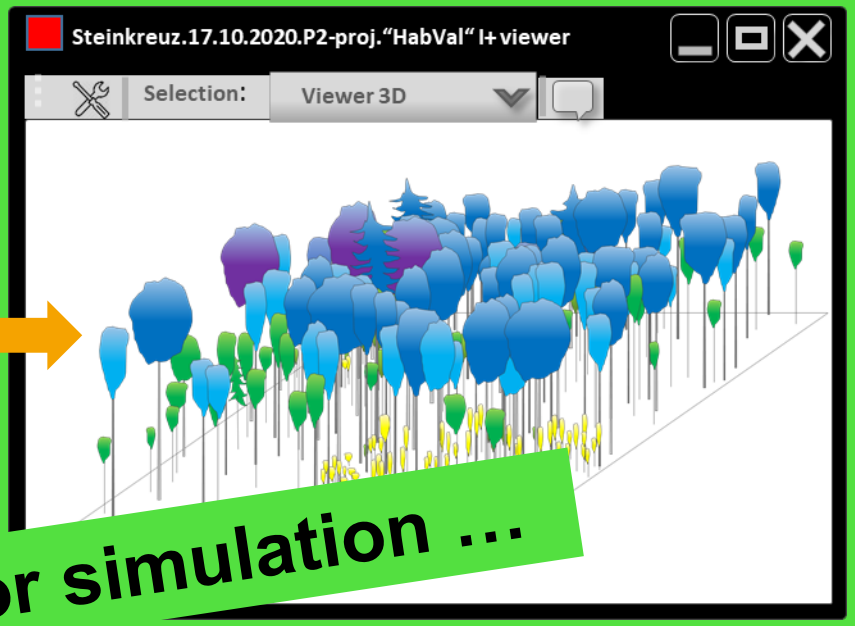
Preconditions:

1. Remnants of natural forest vegetation
2. Waiving of maximal income from timber sales
3. Acceptance of local people

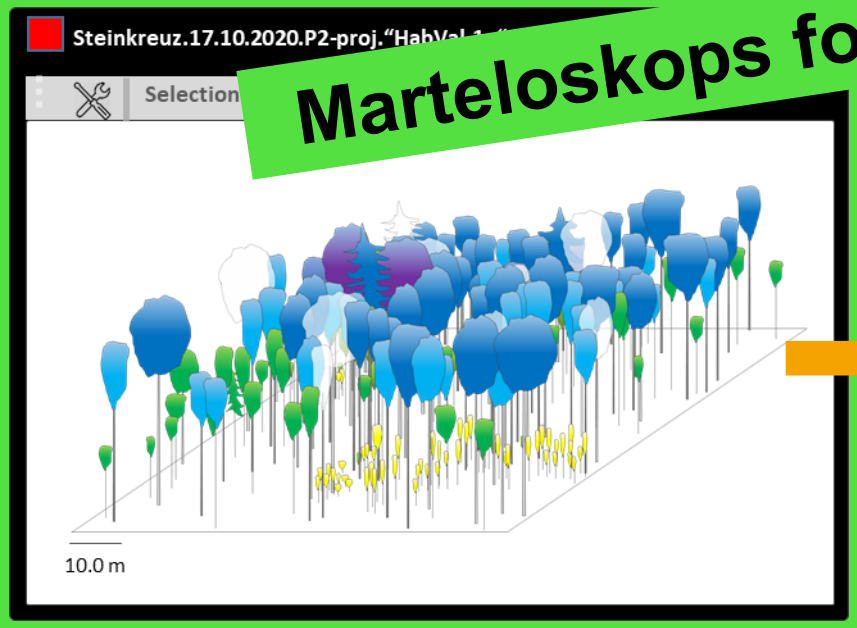

Timber for people

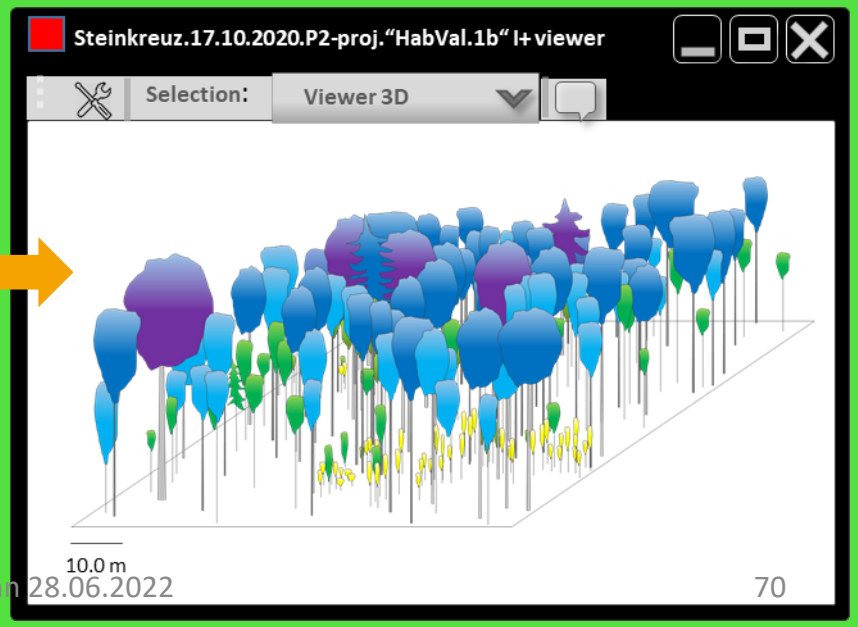
Habitat-trees and deadwood for biodiversity





Marteloskops for simulation …





International final-meeting of marteloskop-program
(2018 Ebrach – Steinkreuz)