



Status of the Forest Biodiversity in National Forest Inventory in Germany and Forest Management Planning System

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Biodiversity in Forest Management Planning



Biodiversity in National Forest Inventory

German national forest inventory



- Every 10 years (1986-1988 / 2001-2002 / 2011-2012 / 2021-2022)
- 2024: results of 2021-2022 recently published
- General procedure:
 - Implemented by federal and state agencies
 - Sample grid 4km x 4km (density in some federal states x2 or even x4)
 - 4 Sample plots per grid point (edges of a square of 150m):
 - Center: 5m, 10m and 25m radius (e.g. dead wood, herbs, habitat disturbances, smaller trees)
 - Center: angle gauge
 - 5m north of center: 1m and 2m: (e.g. regeneration)
- About 150 parameters



Photo: Reinbold

Biodiversity in National Forest Inventory

Biodiversity indicators



- No direct measurement of biodiversity, yet
 - Measurement of structures (potential niches)
 - Data analysis with view on biodiversity
- Measurement of
 - Tree species diversity (monocultures / mixed stands with min. 10 % per species)
 - Number of layers
 - Invasive species (e.g. *Fallopia japonica*, *Heracleum mantegazzianum*)
 - Habitat type (name and condition)
 - Dead wood
 - Naturalness (comparison of natural vegetation with actual vegetation)
 - Wood pecker caves
 - Bark pockets (loose bark, at least 10 cm²)

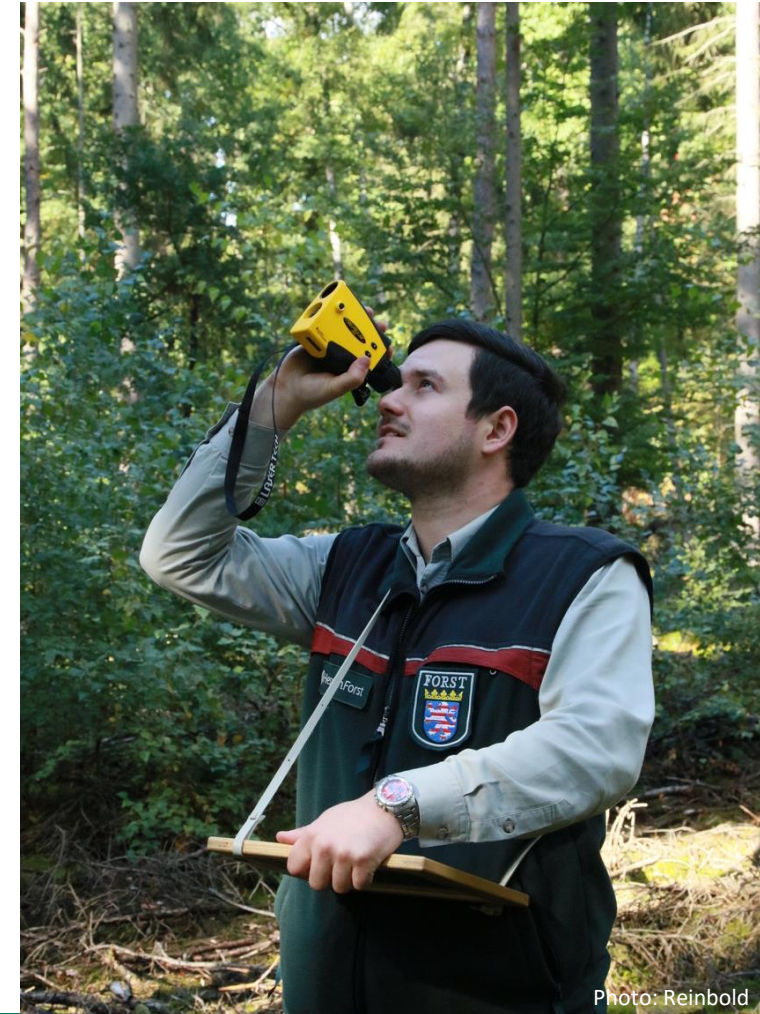


Photo: Reinbold

Biodiversity in National Forest Inventory

Outlook: EU-Regulations



- Nature Restoration Law, article 12: Member States shall achieve an increasing trend at national level
 - of the common forest bird index
 - of i.a. the following indicators for forest ecosystems:
 - standing deadwood
 - lying deadwood
 - share of forests with uneven-aged structure
 - tree species diversity
- “measured in the period from 18 August 2024 until 31 December 2030, and every six years thereafter, until the satisfactory levels as set in accordance with Article 14(5) are reached.”



Photo: Zettl

Biodiversity in National Forest Inventory

Outlook: EU-Regulations



- Forest Monitoring Law (Commission's proposal)
 - Data to be collected based on article 5, i.a.:
 - Deadwood
 - Location of forest habitats in Natura 2000 sites
 - Abundance of common forest birds
 - Location of primary and old-growth forests
 - Protected forest areas



Photo: Zettl

Biodiversity in National Forest Inventory

Outlook: EU-Regulations



- Forest Monitoring Law (Commission's proposal)
 - Data to be collected based on article 8 (annex III), i.a.:
 - Forest structure
 - Location of forest habitats outside Natura 2000 sites
 - Forest naturalness classes
 - Presence of invasive species
 - Diversity of non-tree vegetation
 - Threatened species

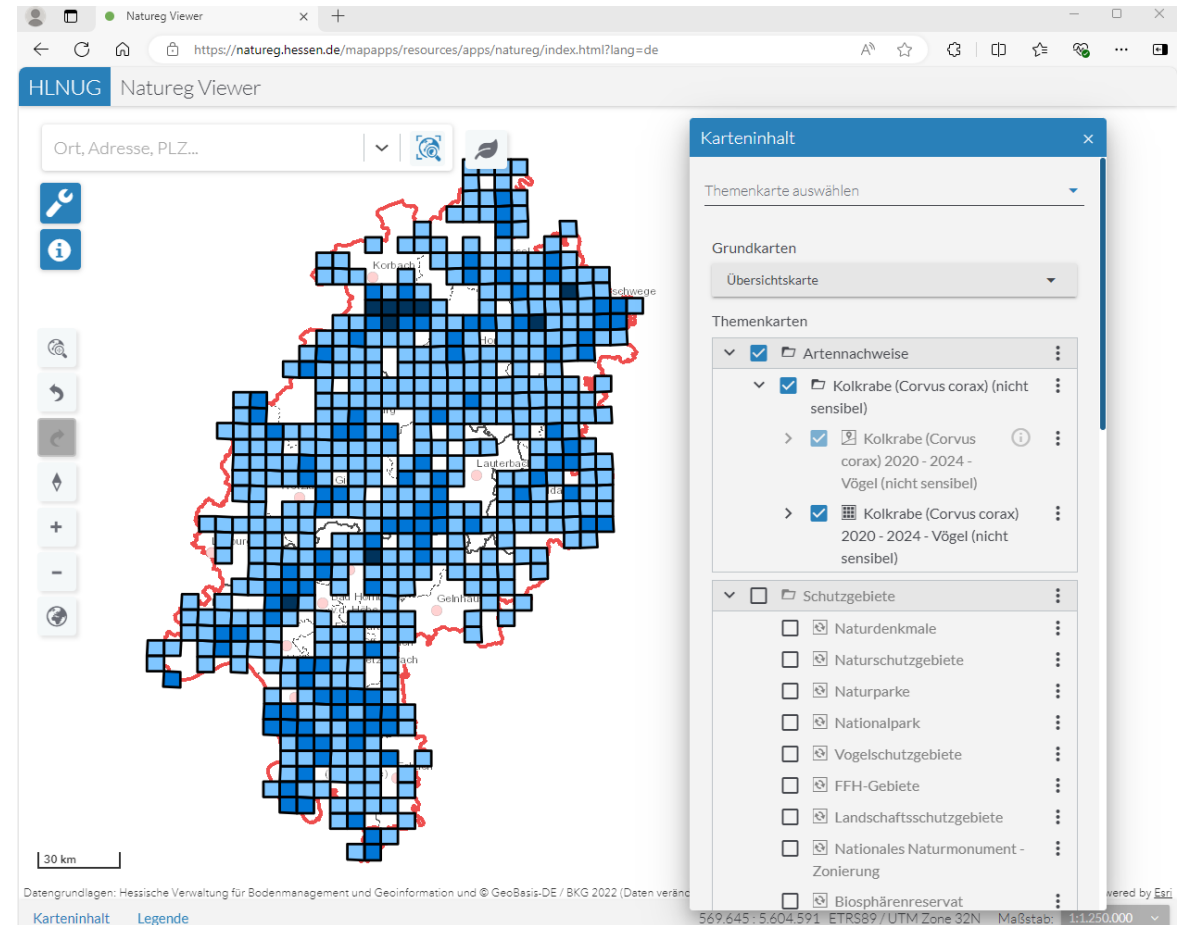


Biodiversity in National Forest Inventory

Nature protection administration



- Nature protection administration:
 - Data base of relevant nature information (endangered species, protected areas, habitats, etc.)
 - Data is open to public:
<https://natureg.hessen.de/>



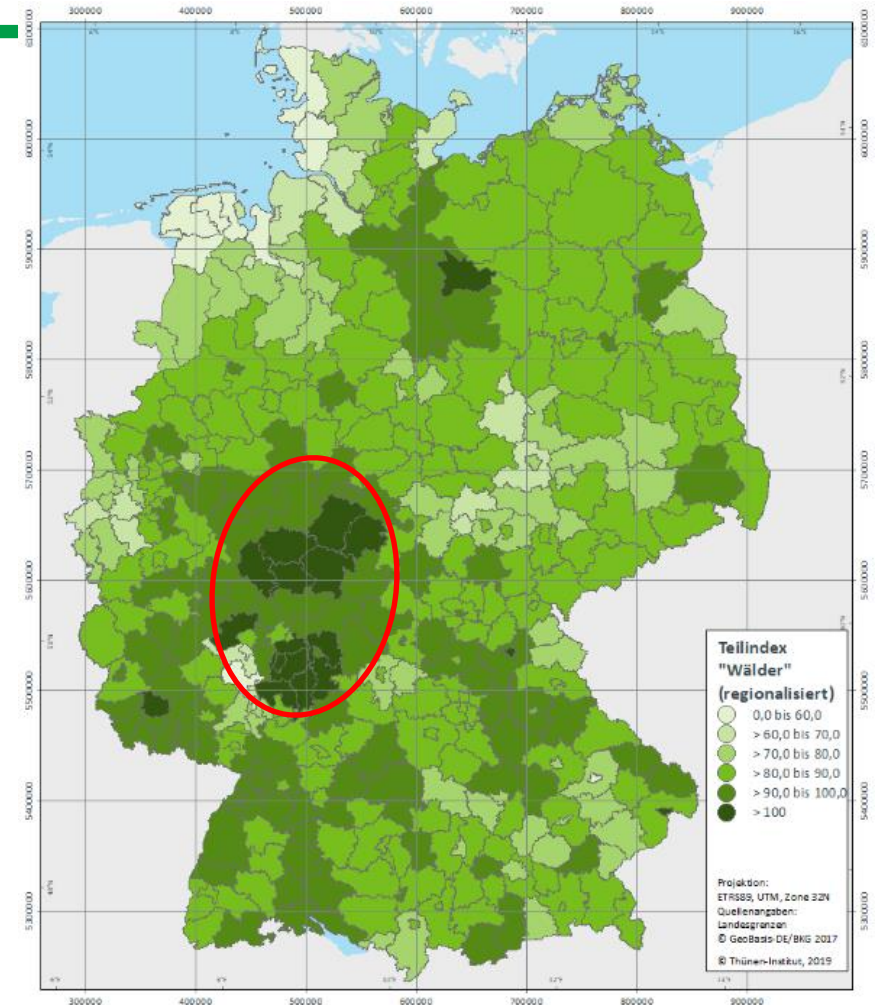
Biodiversity in National Forest Inventory

Quality of biodiversity and landscape



- Hesse is a **HOTSPOT OF BIODIVERSITY AND LANDSCAPE QUALITY**
- **GOAL:** Preserve protected goods, achieve additional effects, fulfill all forest functions

- ✓ **PROTECTION**
- ✓ **ECONOMY**
- ✓ **CLIMATE**
- ✓ **RECREATION**



Regional distribution of the indicator „Species diversity and landscape quality “ (Elsasser et al. 2020)

Biodiversity in Forest Management Planning

Hessian Forest Act



§ 3 Basic obligations

- Forest owners shall manage their forests for the benefit of the general public in accordance with forestry and land conservation principles
 - adequately
 - sustainably
 - **planful**
 - competently
- and thereby maintain the effects of utilization, protection, climate protection and recreation.

§ 4 Proper forest management, sustainability

- (1) Proper forest management is a method of management that uses, rejuvenates, maintains and protects the forest in accordance with established scientific knowledge and proven rules of practice and at the same time ensures the economic and ecological performance of the forest and thus the sustainability of its functions.



Biodiversity in Forest Management Planning

Guideline for the management of the state forest



Overall goal:

The Hessian state forest is to be preserved and developed as an ecosystem in order to ensure an optimal combination of its effects as the highest possible forestry contribution to environmental, economic and living conditions.



Biodiversity in Forest Management Planning

Guideline for the management of the state forest



Forestry and forest ecology objectives of the forest owner in the Hessian state forest.

Biodiversity



Climate and other protective goods



Production of raw materials



Recreation



Work



Benefits for the forest owner



- ✓ **Generally equal fulfillment** of all objectives through integrative management
 - ✓ **In case of conflict, priority of biodiversity goals and climate protection goals** (importance for the forest ecosystem)
- Implementation via the **nature conservation guideline**

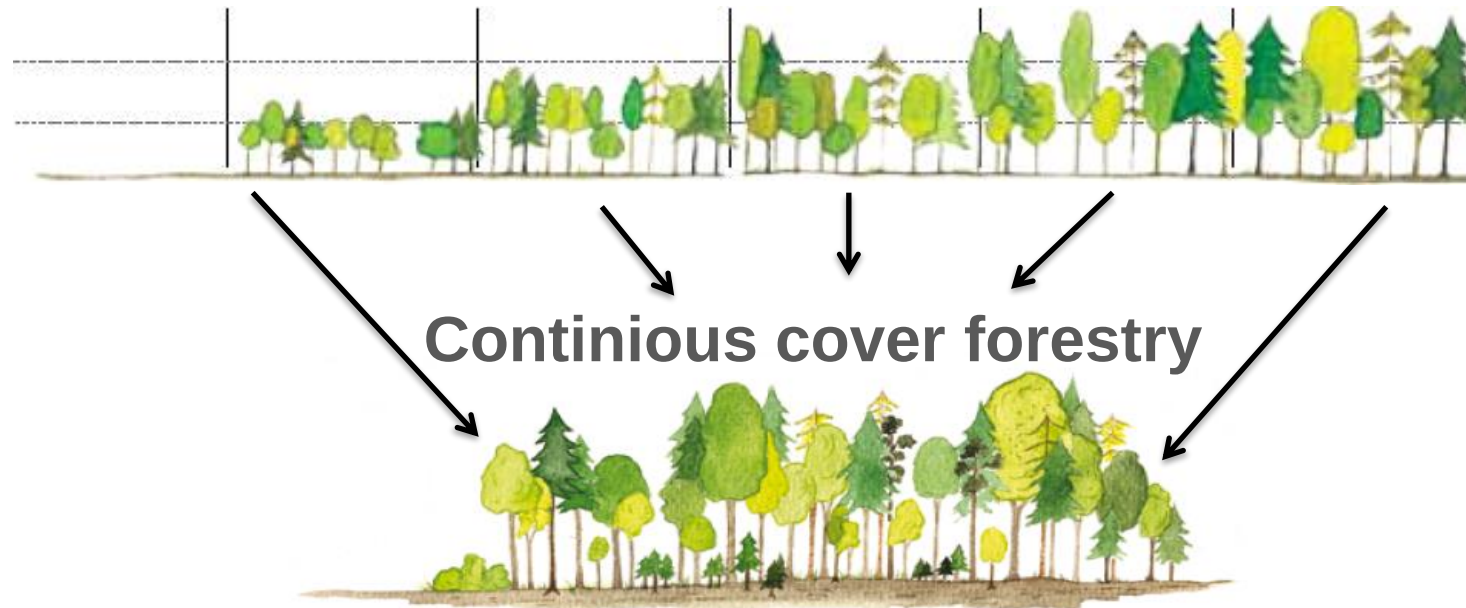
Biodiversity in Forest Management Planning

Guideline for the management of the state forest



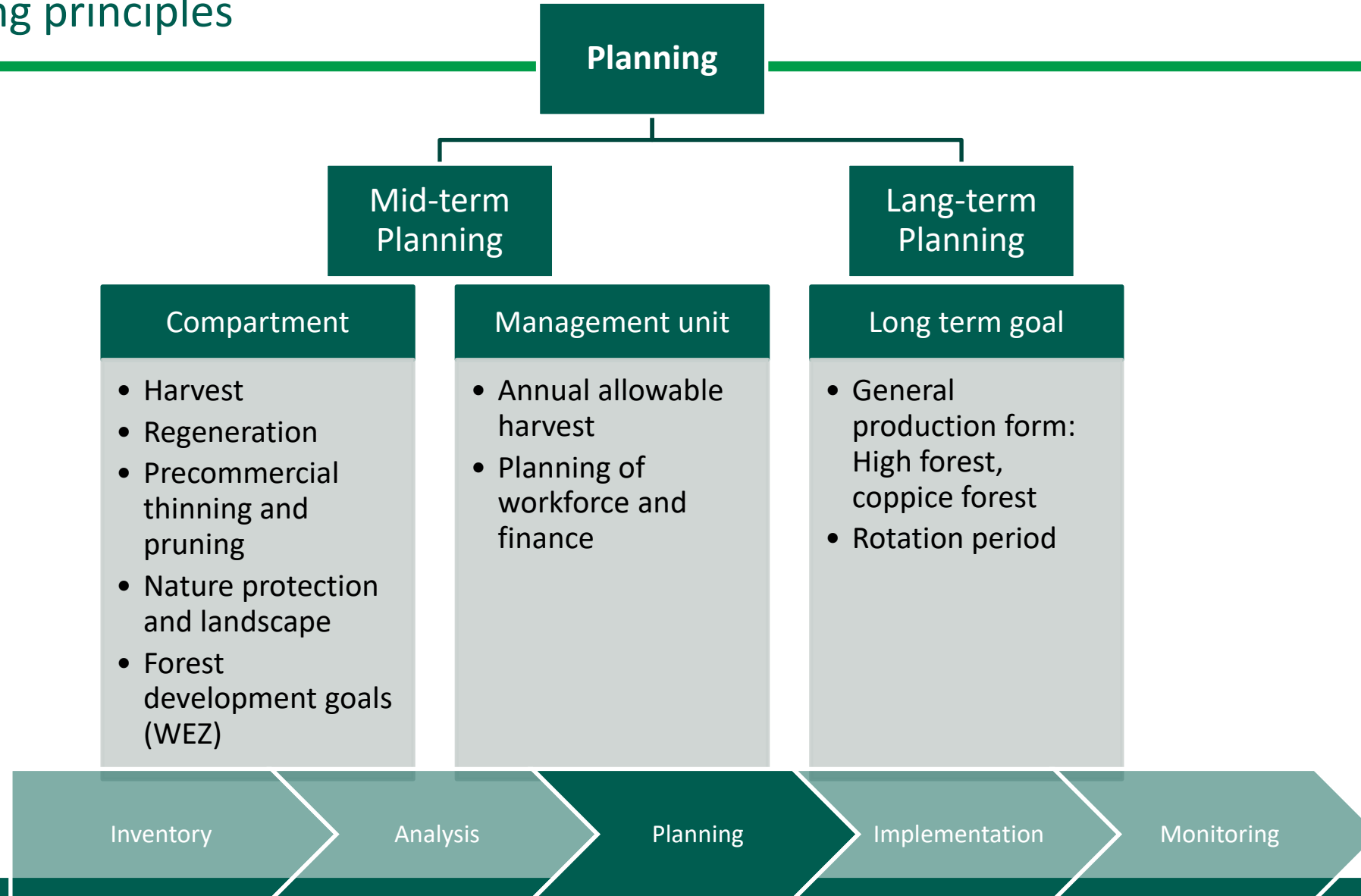
Semi-natural silviculture to achieve closed-cover-forestry

- Multilayer, mixed stands
- No clear cutting
- Single stem felling
- Selective logging
- Natural regeneration



Biodiversity in Forest Management Planning

Planning principles



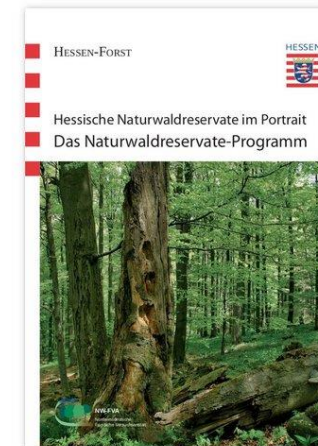
Biodiversity in Forest Management Planning

Protected areas in Hesse



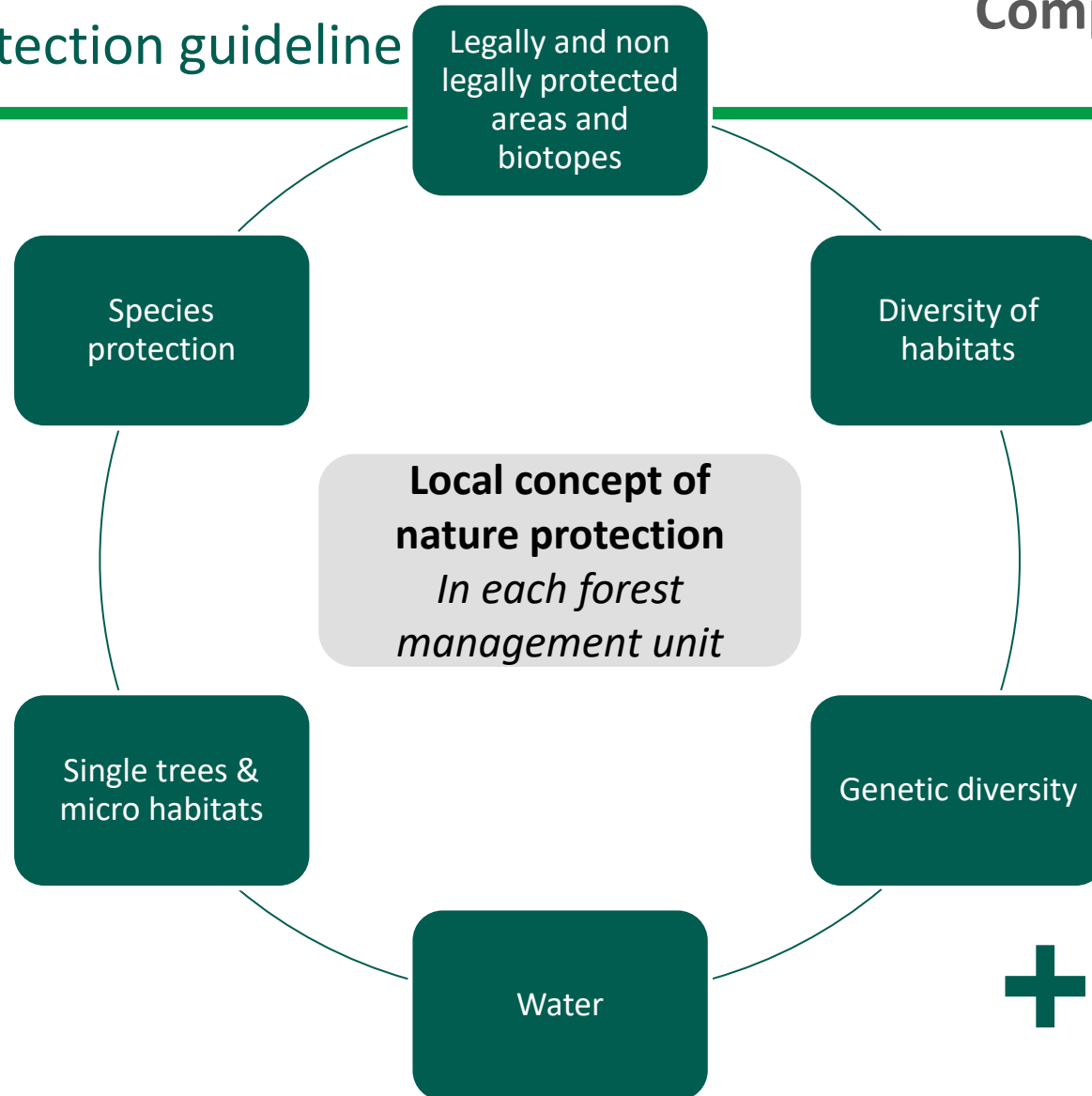
	Legally protected							
	State forest	N2000	FFH	VSG	NSG	LSG	NWR	NWE
[ha]	344.000	150.000	89.000	96.000	16.000	41.000	1.000	33.000
[%]	100	43	26	28	5	12	0	10

Analysis by FGeo
January 2023

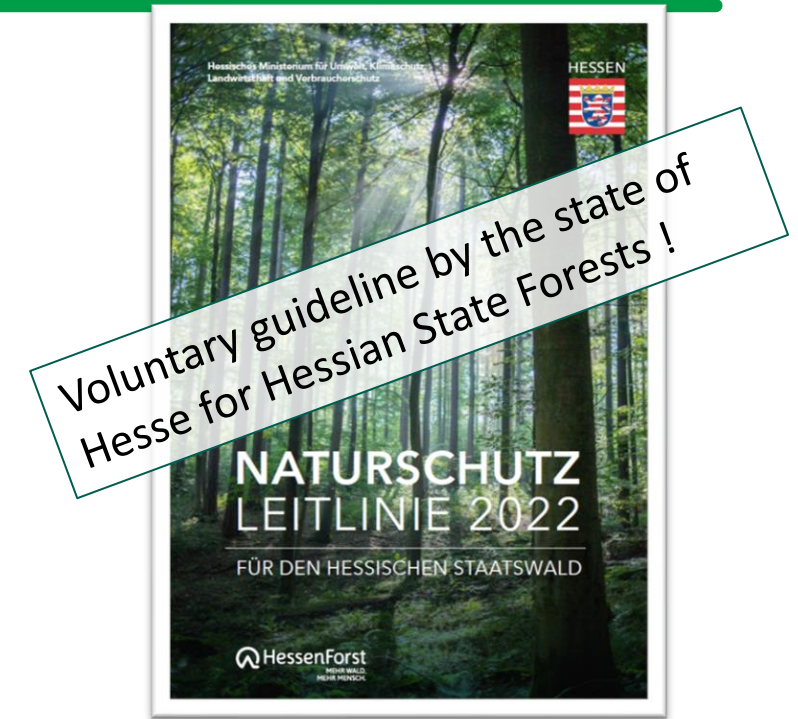


Biodiversity in Forest Management Planning

Nature protection guideline



Composition of NPG 2022

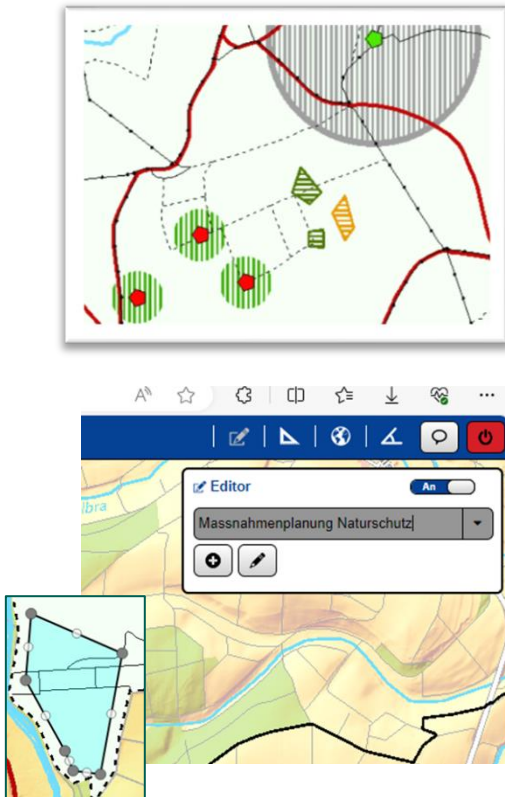


Biodiversity in Forest Management Planning

Nature protection guideline – local concepts of nature protection



Localized planning of protection measures



*Planning in each
forest
management unit*



*Basis for future
FMP*



Biodiversity in Forest Management Planning

Process

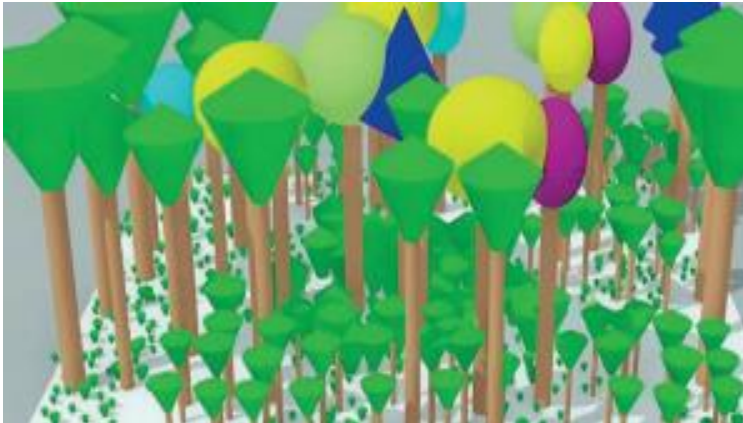


Natura2000 management plans

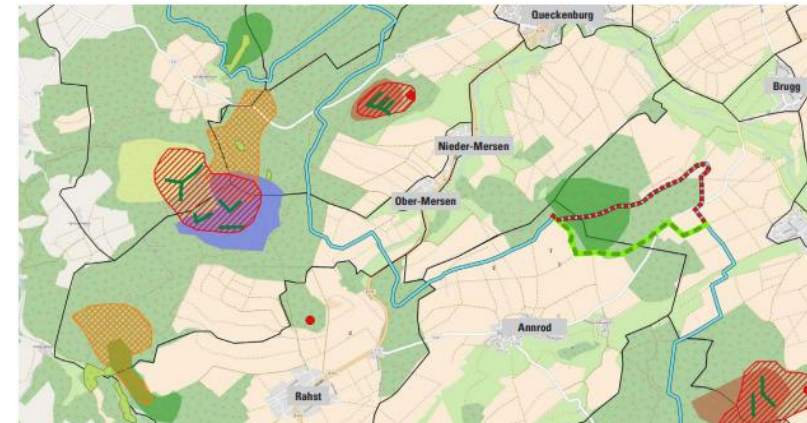
Local nature protection concept

Wildlife management

Wildlife needs to stay within the carrying capacity of the forest!



Problem:
Browsing leads to tree species reduction



Lokal concept for hunting:
Zoning of (low-) intensive hunting and non-hunting areas & times

Biodiversity in Forest Management Planning

Process

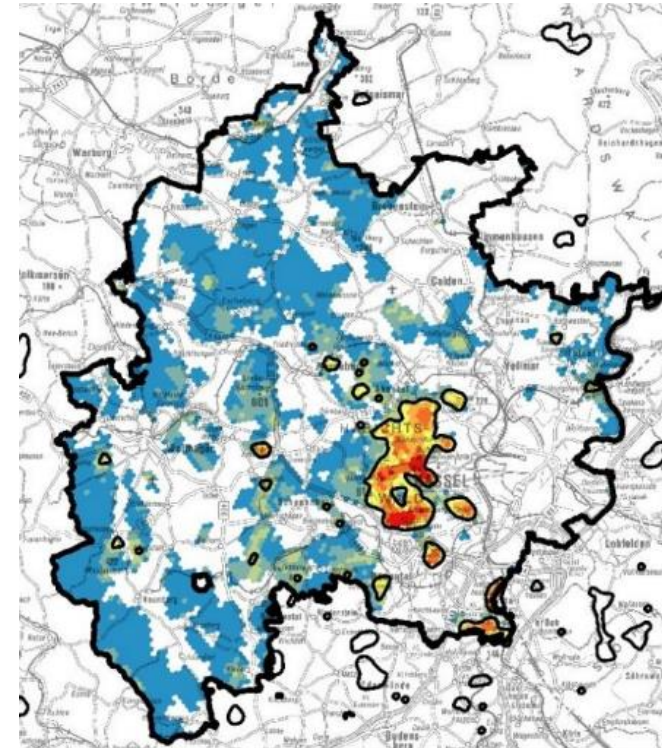


Natura2000 management plans

Local nature protection concept

Wildlife management

Focal areas of recreation



Biodiversity in Forest Management Planning

Process



Natura2000 management plans

Local nature protection concept

Wildlife management

Focal areas of recreation

Results of forest inventory



Photo: Reinbold

Biodiversity in Forest Management Planning

Process



Natura2000 management plans

Local nature protection concept

Wildlife management

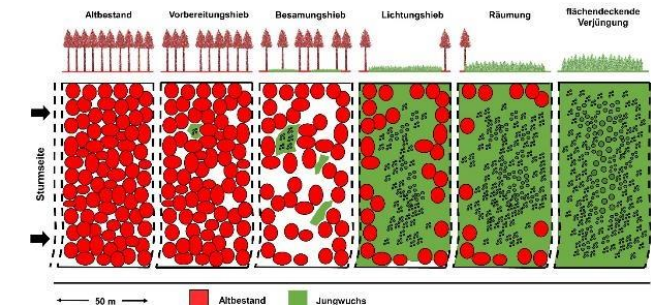
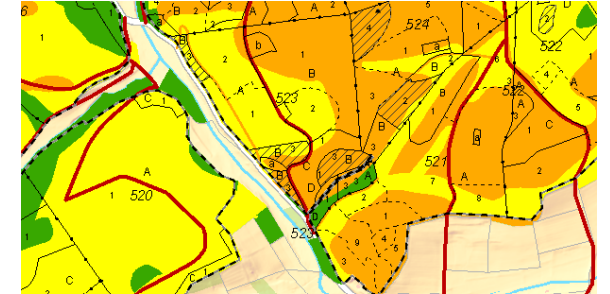
Focal areas of recreation

Results of forest inventory

- ✓ Climate change optimized species recommendations
- ✓ Production goals

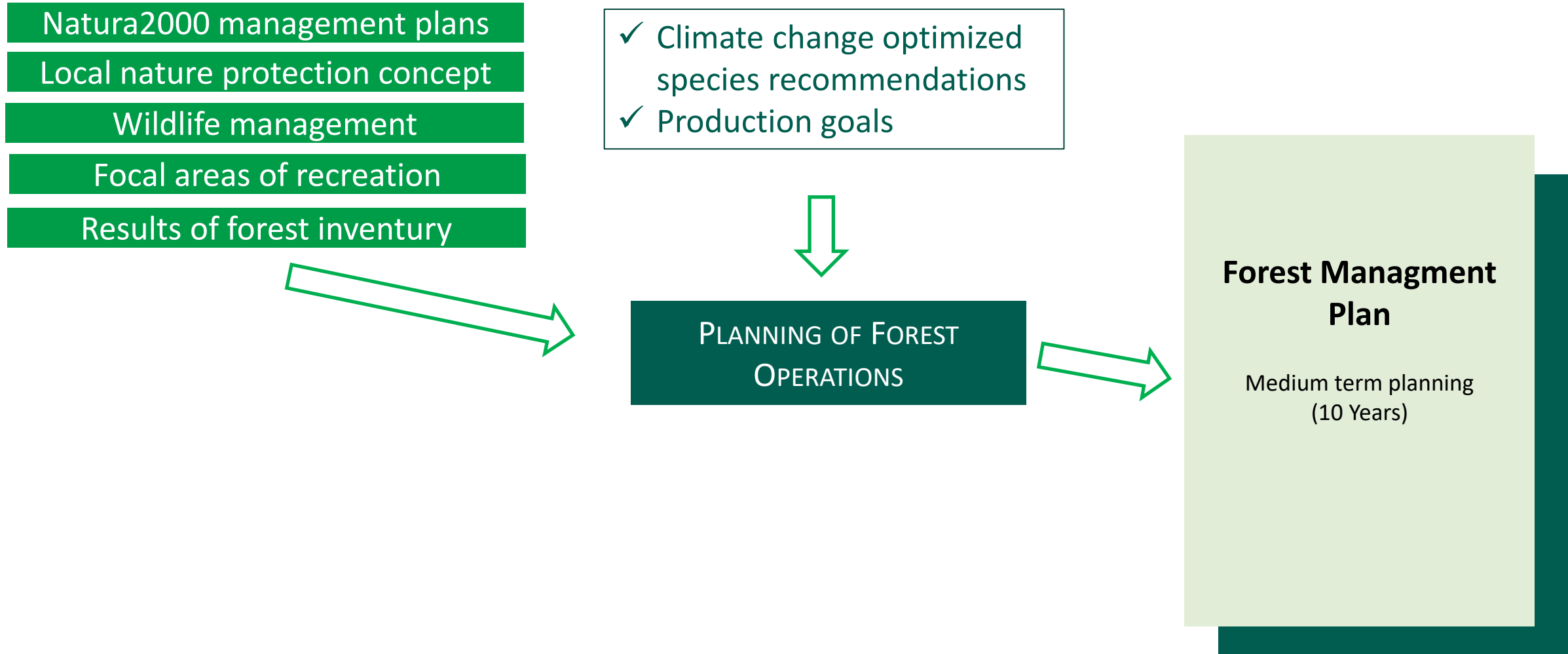


PLANNING OF FOREST
OPERATIONS



Biodiversity in Forest Management Planning

Process



Biodiversity in Forest Management Planning

Process



Forest Management Plan

Medium term planning
(10 Years)

Medium term planning as basis, but implementation gets more and more
DYNAMIC due to climate change

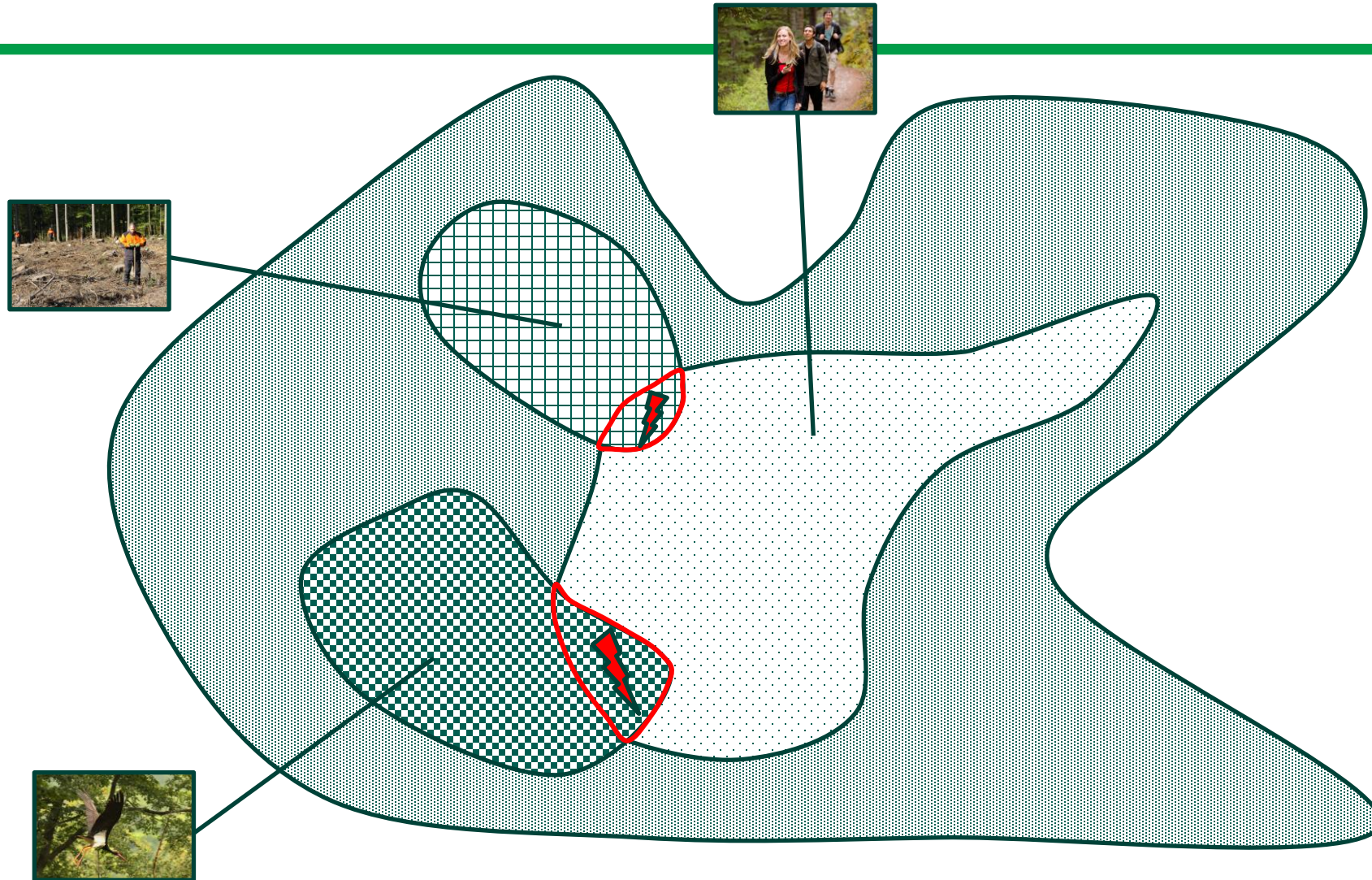
Biodiversity in Forest Management Planning

Process



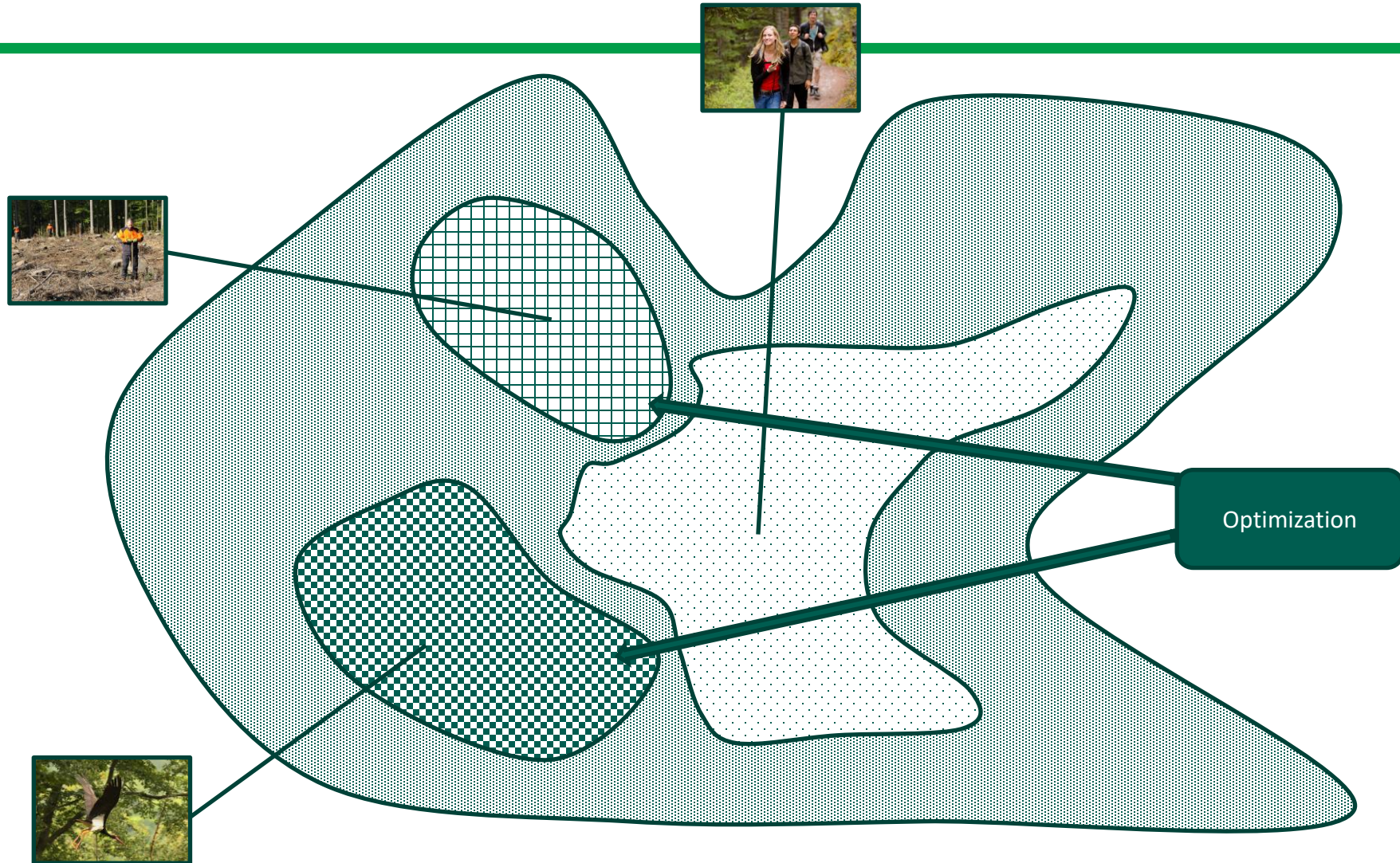
Biodiversity in Forest Management Planning

Process



Biodiversity in Forest Management Planning

Process



Biodiversity in Forest Management Planning

Protection in forest operations

- Forest Management Planning:
 - Site description
 - Inventory data
 - Planning data (forest operations)
 - Forest functions
 - Nature protection

Betriebsbuch

HessenForst



1129-1-130-168 Staatswald FA Groß-Gerau, Revier: Wiesental			2019
WirB	1,5 ha	Abteilung: 4 B 3	FE

Funktionen	Naturschutz
Wasserschutzbereich, wirtschaftsbeeinflussend, ausgewiesen 100%	Vogelschutzbereich, wirtschaftsbeeinflussend, ausgewiesen 100%
Überschwemmungsgebiet, wirtschaftsbestimmend, ausgewiesen 100%	Landschaftsschutzbereich, nachrichtlich, ausgewiesen 100%
Schutzwald, wirtschaftsbestimmend, ausgewiesen 100%	Biotop (HB), wirtschaftsbestimmend, faktisch 30%
Wald mit Klimaschutzfunktion, wirtschaftsbestimmend, faktisch 99%	
Wald mit Erholungsfunktion, wirtschaftsbeeinflussend, faktisch 99%	

Standort	ebenen (<= 3,5%)	Hess. Rheinebene	22
Höhe 100 m über NN		Zentrale Eichen-Mischwaldzone	1
Skelettarbeit: sehr schwach (bis 2%)		mäßig subkontinental	2
tiefliegend bis sehr tiefliegend		feucht	5
Hochflutlehm		mesotroph	2
sandiger Sand über lehmiger Lehm			

Bestand, Ziel und Maßnahmen		
EI, mittleres Baumholz bis schwaches Baumholz mit BU		
Ausreifestadium	locker bis geschlossen 1 bis 5 Vfm/ha Biotopholz	Vorgesehene Maßnahme Rückegassen markieren / offen halten
WEZ10 / EI mit BU, HBU		

Bestandesbeschreibung														
%	ha	BA	Alter (von - bis)	Bonität	Qualität Astung	Mischform	GW	TR	Vorrat Vfm	Zuw. Vfm	EG	Nutzung		
												Vfm	Efm	Efm/ha
Hauptschicht			B* 0,90	1,5 ha										
Durchforstung														
61	0,9	EI	114	I.0					311	60	1x	32	25	28
19	0,3	BU	110	II.5	-	trupp - einzeln			110	20	1x	9	7	25
15	0,2	HBU	105	III.0	--	trupp			71	20	1x	4	3	15
2	0,0	KI	110	I.0		einzeln - trupp			12	0	1x	1	0	28
2	0,0	BU	229	II.5	--	trupp - einzeln			15	0			0	0
erhalten														
1	0,0	EI	229	II.0	-	einzeln			5	0			0	0
erhalten														
gesamt									524	100		46	35	
je ha									350	67				23

Verjüngungsschicht B* 0,10 1,5 ha																	
100	1,5	BU	16	10-26	0,0				trupp			0	0		0	0	0
										gesamt			0	0		0	0
										je ha			0	0			0
Bestand										gesamt	524	100			46	35	
										je ha	349	67					23
										Einschlag % des Zuwachses: 44%							

Verjüngungsplan

Text
#SRM
Einzelne LI im W, FAH im O.

Schutzgebiete und Biotope	
Biotop (HB), Eichen-Hainbuchenwald nordwestlich Hesselrod, 6017 / 805, 1997	20%
Biotop (HB), Eichen-Hainbuchenwald südöstlich Falltorhaus, 6017 / 804, 1997	10%
Vogelschutzgebiet, Mönchbruch und Wälder bei Mörfelden-Walldorf und Groß-Gerau (6017-401), 0 / 45	100%

FE_RPT_000 - 3.0.0

28.01.2021

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Betriebsbuch



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Überschwemmungsgebiet, wirtschaftsbeeinflussend, ausgewiesen	100%		Landschaftsschutzgebiet, wirtschaftsbeeinflussend, ausgewiesen	100%	
Schutzwald, wirtschaftsbeeinflussend, ausgewiesen	100%		Biotop (HB), wirtschaftsbeeinflussend, faktisch	30%	
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Wald mit Erholungsfunktion, wirtschaftsbeeinflussend, faktisch	99%				

Standort			
Höhe 100 m über NN	eben (<= 3,5%)	Hess. Rheinebene	22
Skelettanteil: sehr schwach (bis 2%)		Zentrale Eichen-Mischwaldzone	1

Biodiversity in Forest Management Planning

Protection in forest operations



Art	Jan.	Feb.	März	Apr.	Mai	Juni	Juli	Aug.
Baum- und Stangenholzbrüter								
Kolkraus								
Grauer								
Habicht								
Mäuse								
Wald								
Schwa								
Rot- u. Milan								
Turmf								
Baum								
Wespe								
Stangenholzbrüter								
Sperb								
*Arten, die regelmäßig Stangenholzbrüter sind								
Hinweis: Besonders empfindlich reagieren die Arten zu Beginn der Brutperiode								

Tabelle 3:

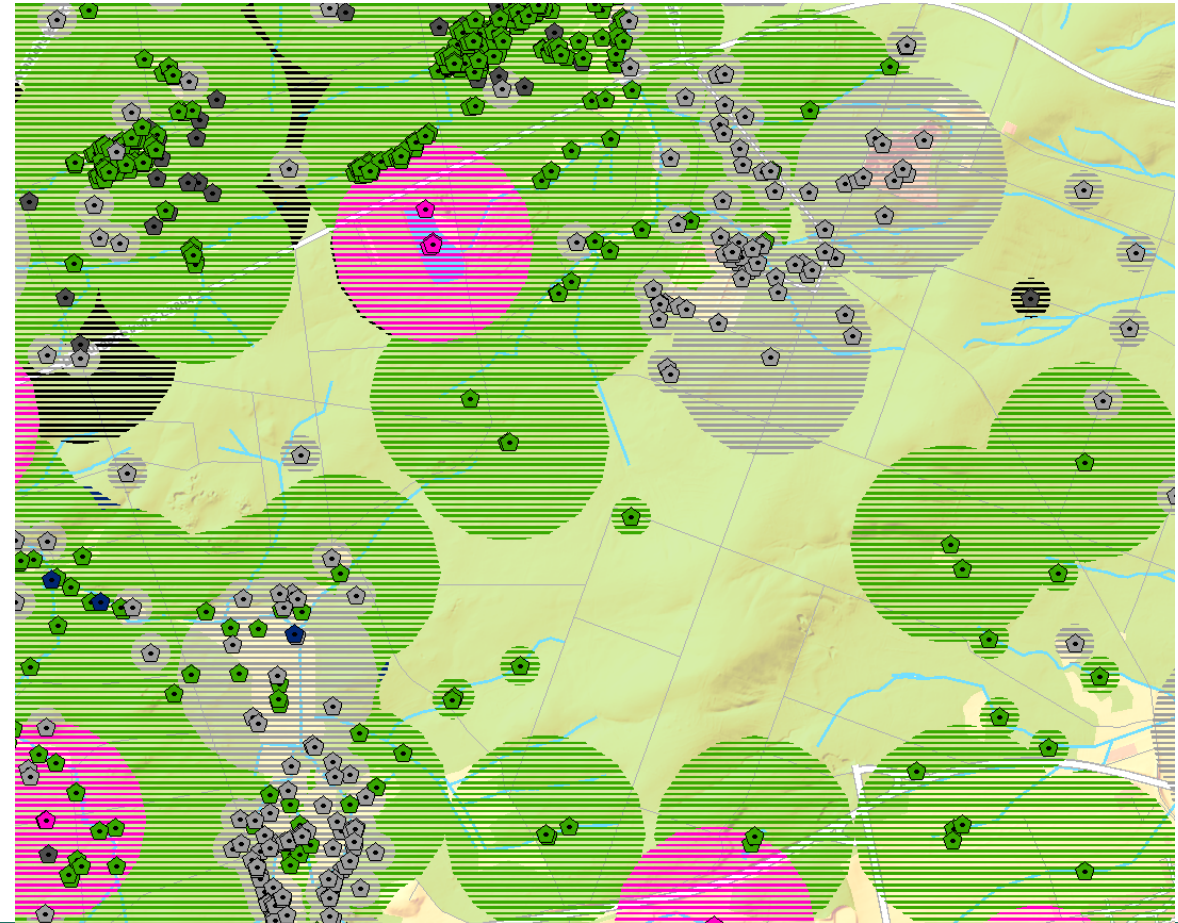
Schonfristen um den Horstbaum (verändert nach Waldbaufibel Hessen-Forst 2021); Arten mit besonderem Schutzstatus (Anhangs I oder wandernde Arten nach Art.4(2) der Vogelschutzrichtlinie) sind farbig unterlegt

Biodiversity in Forest Management Planning

Protection in forest operations



- Species maps for foresters:
 - Species maps in GIS-system
 - Integration of natureg data
 - Occurrences of: birds, insects, mammals, plants, etc.
 - Areas of sensitivity







MEHR WALD.
MEHR MENSCH.