Pro Silva **Jahrestagung 2018**

Exkursion - Eibenstock
22.6.2018

Schlosspark Belvedere

Naturschutzleistungen des Waldes am Beispiel des Thüringer Forstamtes Bad Berka

Weißtannen-Etablierung am Beispiel des sächsischen Forstbezirks Eibenstock

Goethe-Schiller-Denkmal auf dem Platz vor dem Deutschen Nationaltheater in Weimar

Wald-Wild-Problematik am Beispiel BioWild-Projekt Beichlingen

Arbeitsgemeinschaft Naturgemäße Waldwirtschaft

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Mit freundlicher Unterstützung der **Klassik-Stiftung Weimar**

STAATSBETRIEB SACHSENFORST | Freistaat SACHSEN

ANW

Reintroduction of silver fir into the mixed mountain forests of the Erzgebirge (Ore Mountains)

Guide for PRO SILVA EUROPE excursion on June 22nd, 2018, in the forest district of Eibenstock

I. Forest district Eibenstock – a brief description

Location: West-Erzgebirge / Vogtland
Counties: Aue - Schwarzenberg and Vogtlandkreis

Altitude: 324 - 1,019 m a.s.l.

Growth zone: Erzgebirge (Ore Mountains)

Growth district: Western upper Erzgebirge and northwestern slope of the Erzgebirge

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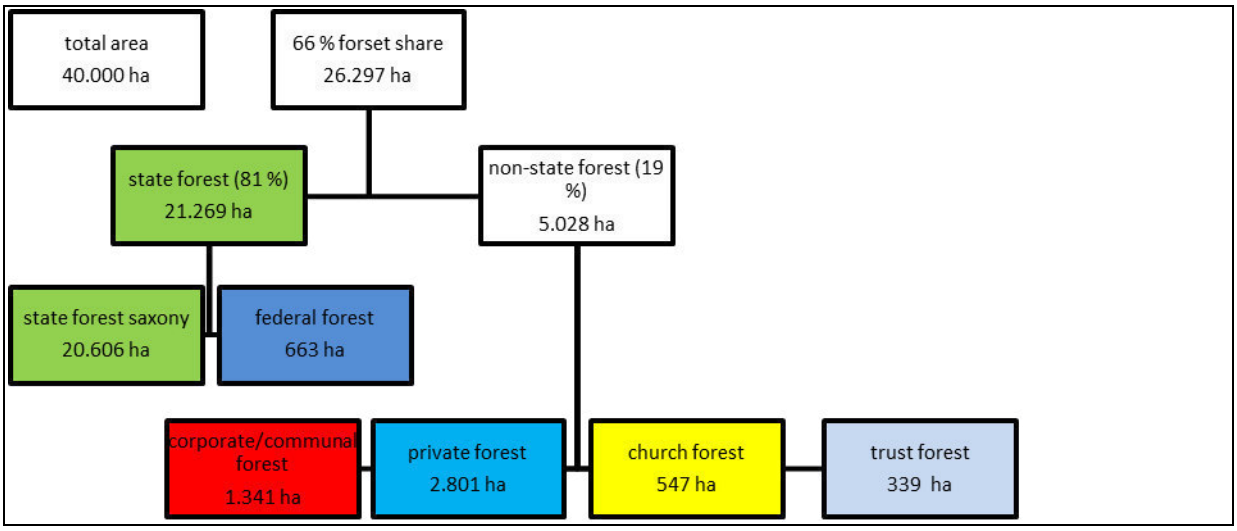
Forest area: 26,215 ha total area, of which 20,997 ha forest land, state forest

Forest ownership:

Types of ownership in the forest district of Eibenstock



Organisation: 13 Provincial forest districts (Ø 1,585 ha per forest district)
2 monitored private/corporate forest districts (Ø 2,347 ha per forest district)
1 forest hostel for school classes, 12 apprentices
55 forest workers, 34 employees and civil servants

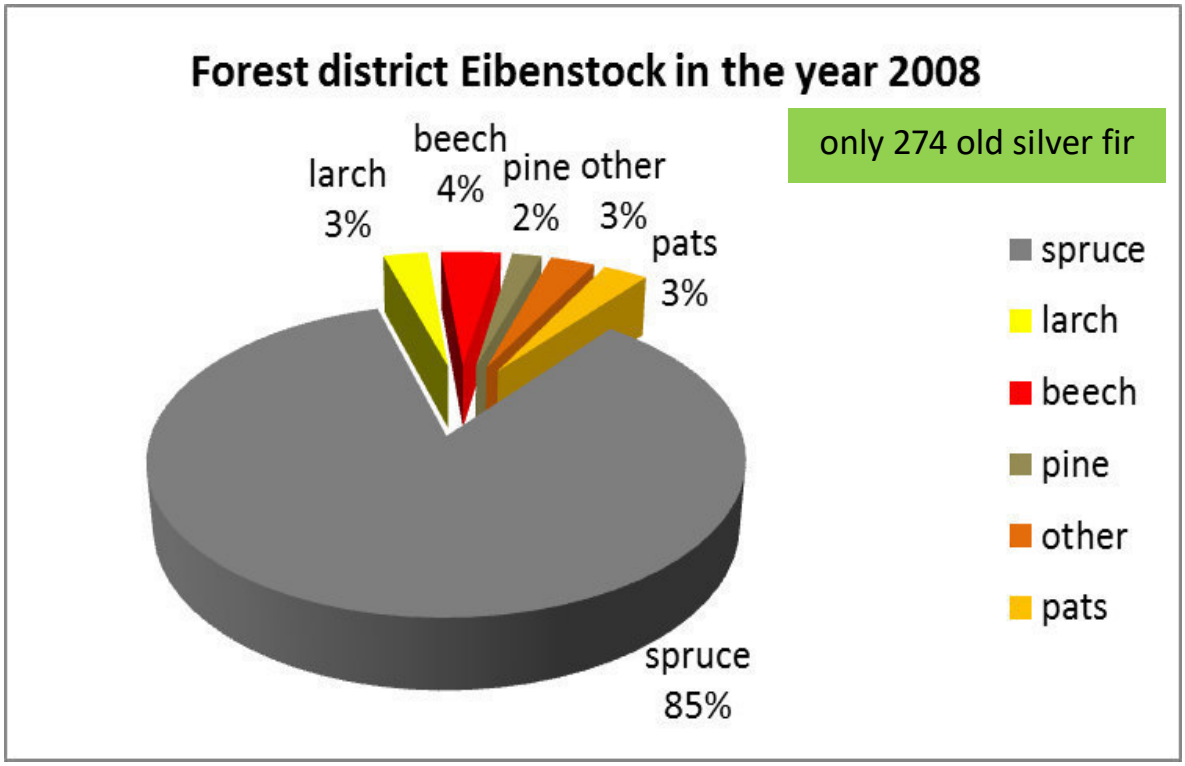
Natural forest communities: Calamogrostio villosae-Piceetum
Calamogrostio villosae-Piceetum/Fagetum
Luzulo-(Abietum-Piceetum-)Fagetum (wood-rush beech forest with silver fir or spruce)
Luzulo-Querco-Fagetum (wood-rush beech forest with oak)

Bedrock: 80% Eibenstock granite, 20% phyllite

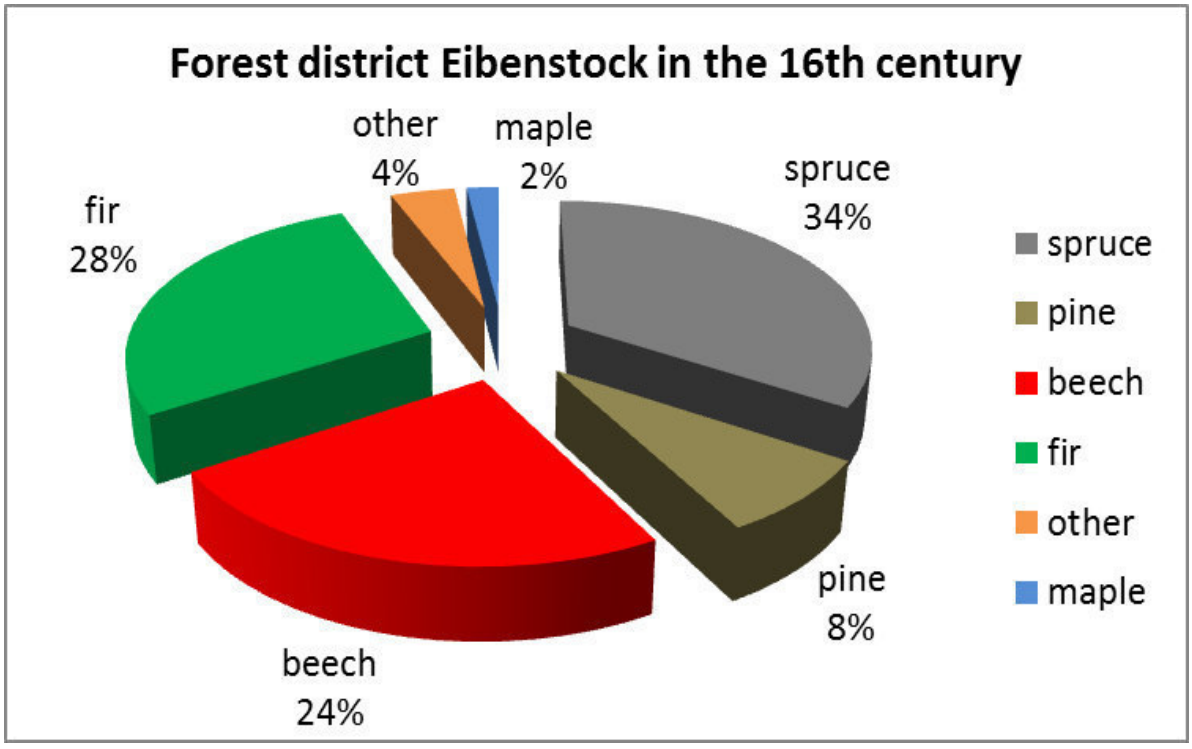
Soils: Podsol, brown podsol, humic gleysol, upland mire, brown (forest) soil (Cambisol)

Precipitation: 800 - 1200 mm/a
Temperature: 5 - 6 °C (41 – 42° F)

Tree species distribution in the cape (Forest management 2008):



Tree species distribution in the 16th century:



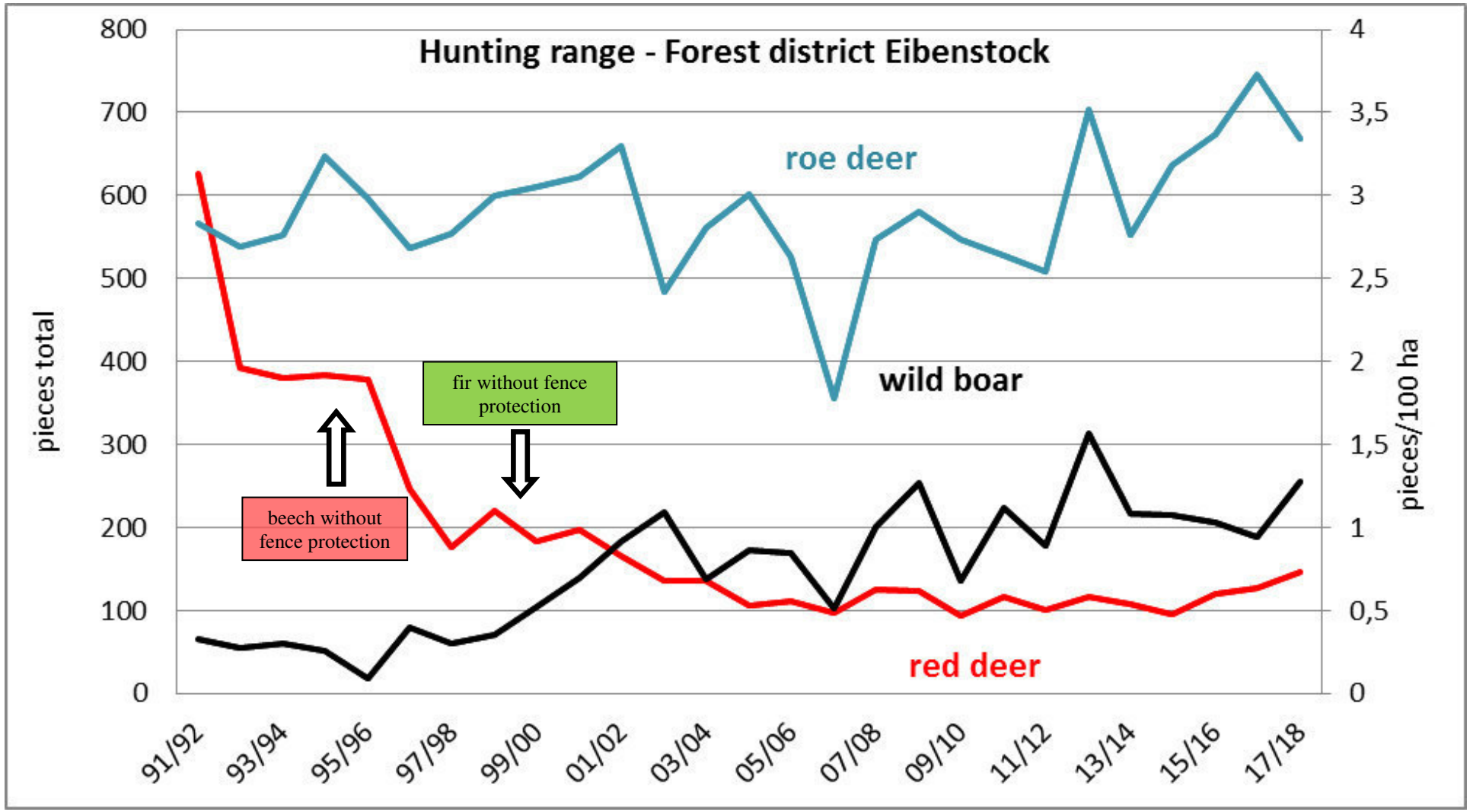
Forest management plan:	New management plan on January 1st. 2008
Stock:	approx. 400 m³/ha (solid m³ over bark), *Source: BWI 3 (National Forest Inventory - NFI)*
Current annual increment:	approx. 11,4 m³/a*ha (solid m³ over bark)
Prescribed yield:	9,0 m³/a*ha (m³ of timber harvested) 180.000 m³/a*ha (plan for 2018: 10 m³/a*ha)
Landscape conservation:	Nature Park „Westerzgebirge-Vogtland“ (82 % of the forest area)
Nature conservation:	11 nature reserves 43 natural monument areas
Water protection:	60 % of the forest area is located within a drinking water protection area
Biotopes (§ 26) in forests:	730 units (1,051 ha)
FFHD areas:	13 units (3,372 ha)
Regeneration area:	approx. 160 ha/a (net area)

Calamities:

2005 Summer storm	160 000 m³
2006 Ice breakage	100 000 m³
2007 Cyclone Kyrill	375 000 m³
2008 Storm Emma	43 000 m³
2008 Bark beetle	23 000 m³
2009 Ice break/Insects	26 000 m³
2010 Bark beetle	5 000 m³
2011 Snow breakage	22 000 m³
2015 Storm	30 000 m³
2017 Hurricane Herwart	35 000 m³
2018 Storm Friederike	15 000 m³
Sum 2005 – 2018:	**834 000 m³**

Ratio of salvage wood in felling: 55 %

II. Hunting statistics



Hunting in the forest district of Eibenstock

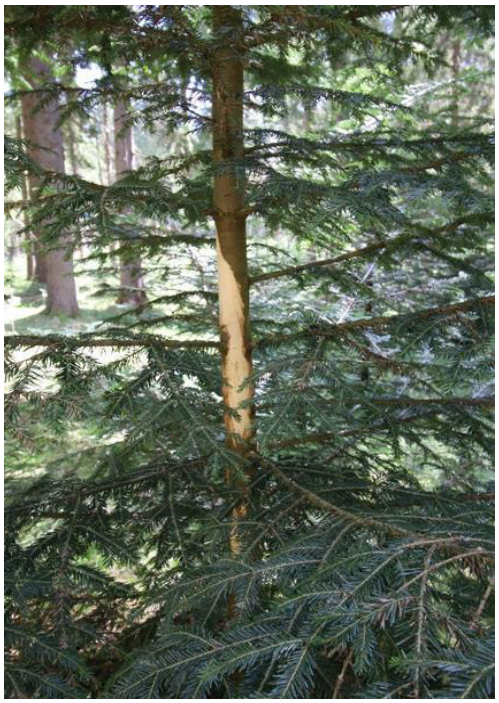
Forest conversion to continuous cover forests and sustainable protection of all forest functions is not possible without consistent reduction of ungulates!!

- annual yield losses due to old bark stripping damage from before 1990 in the Forest District: approx. 2 million €/year; Provincial Forest of Saxony approx. 10 million €/year
- new peeling percentage as per survey 2015 < 1; browsing percentage < 5
- Hunting revenues less expenses: -50,000 €/a ; negative
- Cost for forest protection against game: 400.000 €/a (individual protection silver fir; but only 5 ha of fence for 150 ha of regeneration per year = 3% of regeneration area)
- Savings are possible step by step through better hunting, resulting in cost reduction in forest protection measures (fencing etc.). Savings from non-necessary fencing: 600.000 € /year
- Required density of red deer: < 1,0 deer/100 ha

Hunting is a service for silviculture - not a business field
Hunting is a job-related duty for our employees and has priority in operations

- Inclusion of all employees up to the forest ranger; no guest hunting
- Elimination of all restrictions (equal clearances for all actors)
- Promotion of dogs (purchase of protective vests, GPS devices; application premiums, veterinary costs, acquisition costs)
- Ongoing further training (Drive hunt seminars, shooting cinema)
- Generous releases; reimbursement of hunting fees in case of success

Consistent enforcement of forest-friendly hunting objectives is key to success.



III. Excursion sites in the forest district of Eibenstock

Excursion site 1

Topics: ***Presentation of forest district –forest conversion – Hunting strategy***

Forest site: District of Eibenstock Compartment 138 b^3

Size: 8,4 ha

Terrain: slope, exposition northwest, moderately sloping
720 to 770 m a.s.l.

Site type: Mf - TZ 2 6,9 ha, Mf – TZ 1 1,7 ha
Eibenstock granite brown podsol (EbGt-4/-5)

Forest development type: mixed beech-spruce forest

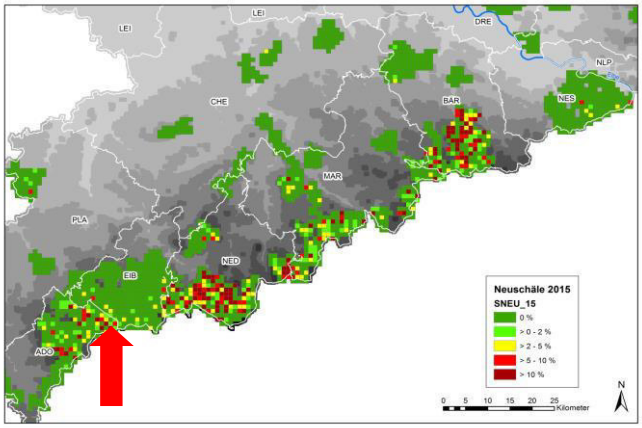
Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey	8,4					
Spruce	7,8 (93%)	56	25	38,5	500	14
Understorey Silver Fir	2,0	5				

Last measures:
1994 / 1999: Liming for soil protection
2005 / 2011: Thinning with 80 m^3/ha
2012: Advance regeneration of silver fir
2018: Processing of windthrown timber

Objectives:
- Conversion to continuous cover forest

Discussion:
- Forest conversion with silver fir
- succession of tree species over time – structure / conversion
- economic and ecological aspects
- Hunting strategy now and in the past; damage caused by game



new red deer bark damage 2015

Excursion site 2

Topic: ***Conversion to continuous cover forest***

Forest site: Forest district Eibenstock department 139 a[3]

Size: 15,0 ha

Terrain: Slope and brook bottom, exposition north to southeast, moderately to strongly inclined

Site type: Mf - TZ 1 4,4 ha, Mf – TZ 2 1,9 ha
Eibenstock granite brown podsol (EbGt-4/-5)

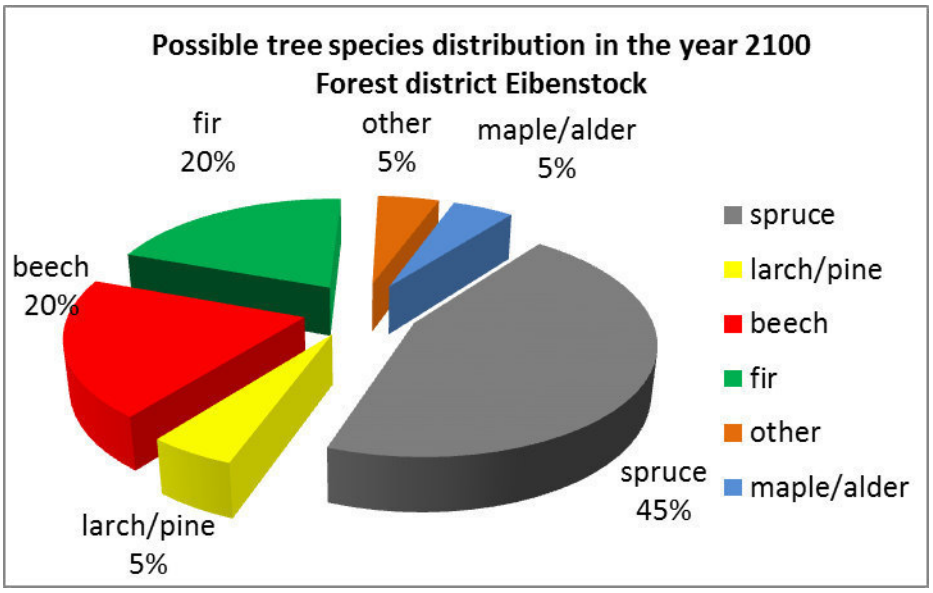
Forest development type: mixed beech-spruce forest

Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey	6,3					
Spruce	3,7	119	33	51	387	11
Spruce	2,6	49/33	20/11	28/16	200	14/13
Understorey	1,6				30	
Silver Fir Spruce Beech Sycamore	0,3 0,7 0,5 0,1	16 49 16 14				11 10 7 5

Last measures: 2008 / 2013:Harvesting with 60 m³/ha

Discussion:
- Climate change
- long-term development of continuous cover forest structures
- Consistency and balance
- Extent of forest conversion in the forest district



Excursion site 3

Topic: ***Objectives for continuous-cover forest structures in the Erzgebirge***

Forest site: Forest district Eibenstock department 137 b[3]

Size: 2,0 ha

Terrain: Exposition north to northwest, moderately to strongly inclined

720 to 770 m a.s.l.

Site type: Mf - TZ 1
Eibenstock granite brown podsol (EbGt-4)

Forest development type: mixed spruce-beech forest

Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey	2,0					
Spruce	1,0 (50 %)	173	36	61	242	12
Beech	0,8 (40 %)	173	31	63	228	6
Silver Fir	0,2 (10 %)	173	37,5	74	110	15
total					**580**	
Understorey	2,0					
Spruce	1,2 (60 %)	60	16	22		11
Beech	0,6 (30 %)	55	14	20		9
Silver Fir	0,2 (10 %)	22-55 (39)	3			9
total					**150**	

Last measures: 1994 +1999: Liming for soil protection
2009: Seed harvesting, fence dismantling

2011 + 2018: Selective felling / Harvesting / tending + pruning

Objectives:
- Demonstration site for the study of structures and natural processes in continuous cover forests - a model for continuity and balance

Discussion:
- Biodiversity - holistic approach to forest management
- Internal forest climate, water protection functions
- Management of forest nature reserves
- Optimum stock in continuous cover forests, dynamics

Excursion site 4

Topic: ***Sowing in situ with silver fir***

Forest site: Forest district Eibenstock department 209 b[1]

Size: 13 ha

Terrain: Slope, exposition northwest, moderately inclined, navigable 800 m a.s.l.

Site type: Hf - TM 2 (10,4 ha), Hf – TZ 1 (2,6 ha)
Steinbach shale brown soil (St.Sf-5)
Special site: tin placer deposit (So-z)

Forest development type: mixed spruce-beech forest

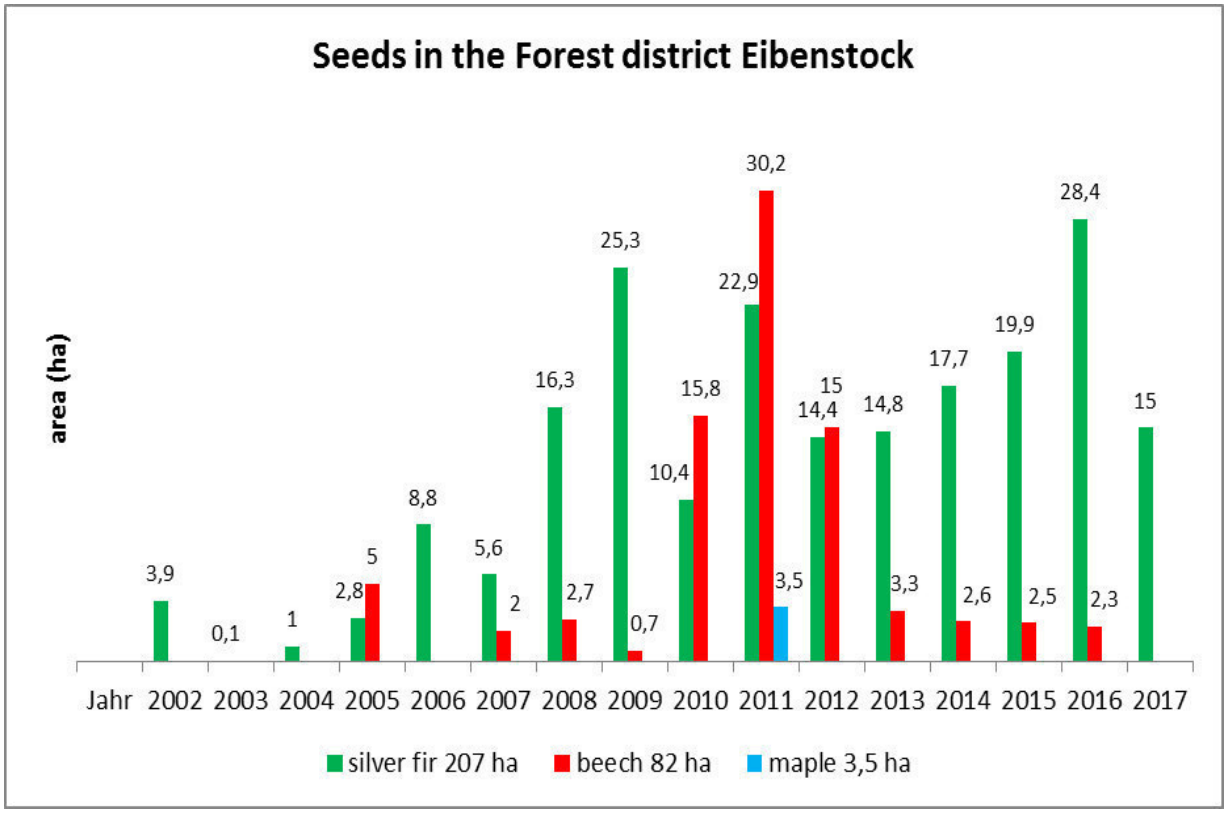
Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey						
Spruce	12,8	58	26	33	507	15
Spruce	0,2	35	13	14	110	14
Understorey						
SFir Seed	1,8	9				
SFir Va	1,0	6 - 9				
Beech Va	0,1	3				

Last measures: 2009 / 2016: Thinning / group selection cutting method
2018: Processing of windthrown timber

Objectives:
- undisturbed root development, stability in climate change

Discussion:
- Seeding operations, soil preparation, advantages of seed
- Genetics, seed procurement, premium methods
- Conversion to continuous cover forest, succession of tree species over time
- Change of forest management procedures - permanent sample plots


Seeds in the Forest district Eibenstock
area (ha)
3,9
0,1
1
2,8
5
8,8
5,6
2
16,3
2,7
25,3
0,7
10,4
15,8
22,9
30,2
3,5
14,4
15
14,8
3,3
17,7
2,6
19,9
2,5
28,4
2,3
15
Jahr 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017
silver fir 207 ha
beech 82 ha
maple 3,5 ha

Excursion site 5

Topic: ***Natural regeneration of spruce – „Femel“ group structures –***

Forest site: Forest district Eibenstock department 211 a^2 stand 1

Size: 7,7 ha

Terrain: Upper slope, exposition north, slightly inclined, accessible 820 bis 900 m a.s.l.

Site type: Hf - TM 2; Hf – TZ 3, Steinbach shale brown soil (St.Sf-5); Wildenthal shale brown podsol (Wi Sf 6)

Forest development type: mixed spruce-beech forest

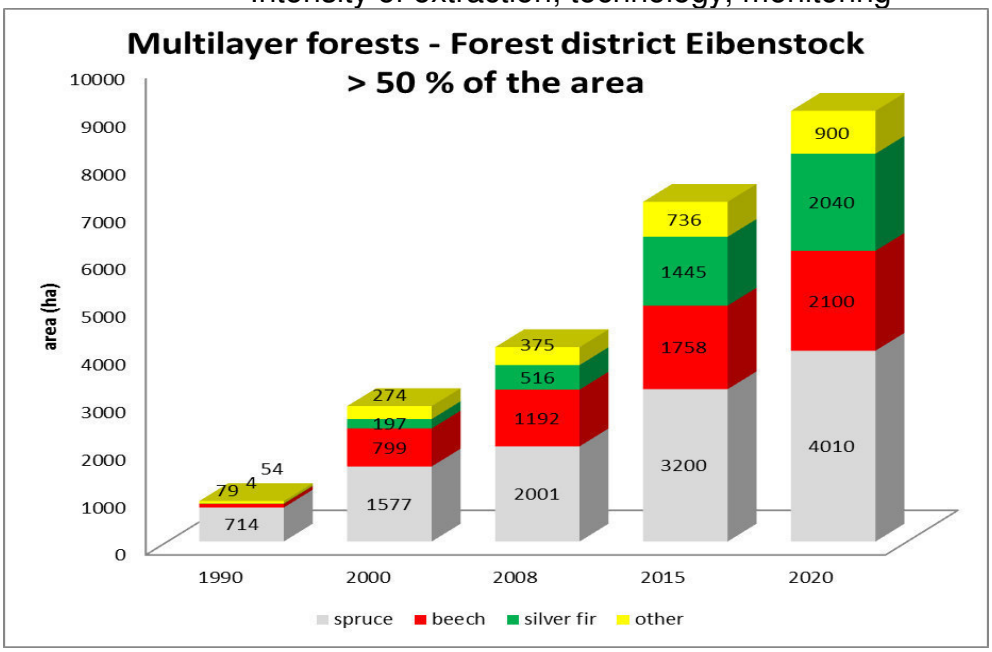
Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey	7,7					
Spruce	7,7	105	27	41	279	9
Understorey	6,9					
Beech	2,3	25	2			7
Spruce	4,2	28	3			12
Silver Fir	0,4/0,2	12/3				11
total					**279**	

Last measures: 2005 and 2015: Advance regeneration of silver fir

Objectives: - Structural diversity, dynamic equilibrium, sustained level of stock volume

Discussion: - Group structures - rationalisation of stand tending
- Species composition, conversion to continuous cover forest
- Intensity of extraction, technology, monitoring



Excursion site 6

Topic: ***Structural diversity after disturbances***

Forest site: Forest district Eibenstock department 208 a^2 stand 1

Size: 8,1 ha

Terrain: Slope, exposition north, slightly to moderately inclined
700 bis 750 m a.s.l.

Site type: Mf - TZ 2 1,4 ha, Mf - NZ 1z 2,3 ha, Mf - TM2 5,6 ha
Schönheide granite anmoor stagno gleysol (Sh.GG 3 z)
Eibenstock granite brown podsol (EbGt-5)
Steinbach shale brown soil (St.Sf-5)

Forest development type: mixed spruce-beech and spruce-fir stand

Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Main stand						
Upper storey	8,1					
Spruce	7,7	61 - 71	27	50	273	13
Eur. Larch	0,4	71	25	51	39	7
Beech	-	71	27	40	20	6
Red Alder	-	26	20	20	13	-
total					**345**	
Understorey	7,9					
Beech	2,4	26				7
Sycamore	0,7	26				6
Silver Fir	3,6	26				10
Spruce	1,2	19-25				13

Last measures: 2007:- group selection cutting on 1,8 ha with 60 m^3/ha
2008/2009/2012/2018: pruning

Objectives: - Production of quality timber, stability by means of diversity

Discussion: - Upbringing in half-shade - quality
- pruning – quality timber
- differentiated tree species growth dynamics
- Stability through tree species and structures which are well-adapted to the site
- technological aspects

Size: 8,9 ha

Terrain: Brook bottom and slope, southwest exposed slope, strongly inclined, machine accessible
690 to 750 m a.s.l.

Site type: Mf - TM 1 (2,9 ha), MF - TM 2 (4,8 ha), Mf – TM 3 (1,9 ha)
Steinbach shale brown soil (St. Sf 4-6),

Forest development type: mixed beech-spruce forest

Inventory data:

Tree species	Share in ha	Age in a	h_{100} in m	d_{100} in cm	Stock in m^3/ha	mai_{100} in $m^3/a*ha$
Upper storey	**8,9**					
Spruce	8,9	96 - 134	31	51	492	10
Understorey	**5,4**					
Beech	2,2	8 - 25	4			7
Sycamore	0,3	8 - 24	8			6
Silver Fir	1,3	8 -17	0-1			9
Spruce	1,8	19 - 26	2			9
total					**492**	

Last measures: 2009: advance regeneration of silver fir on 1,2 ha
2014: group selection cutting (Femel)

Objectives:
- high planting standards
- Stability by means of species composition and structural diversity

Discussion:
- Forest restoration strategy - size of regeneration units
- Importance of Silver Fir, Sycamore and Beech in continuous cover forests
- plant procurement, planting methods and plant quality
- Documentation and quality management
- Scope of the advance regeneration in the forest district
- long-term development into a continuous cover forest – continuity

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Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz

Aufgrund eines Beschlusses des Deutschen Bundestages