The Manětínská vrchovina Marteloscope

Field guide

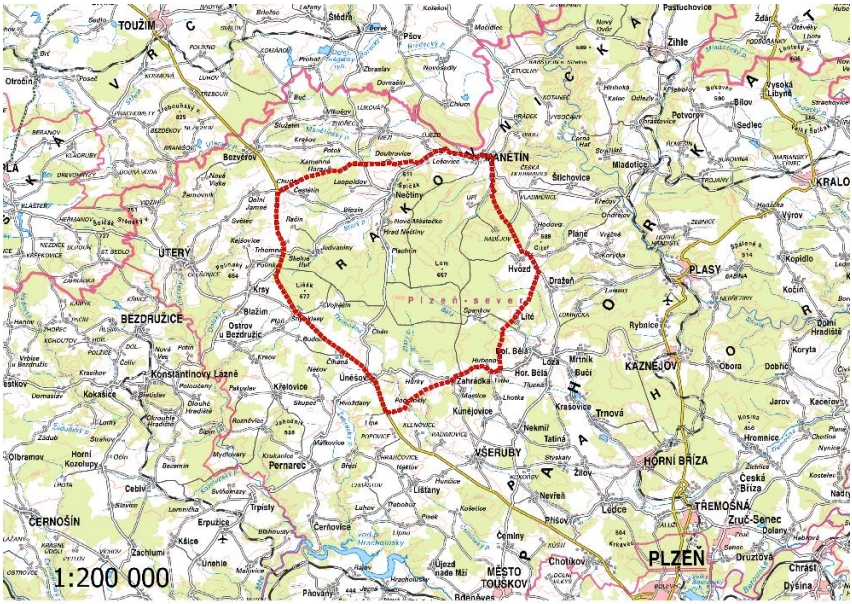
The Manětínská vrchovina Forest Complex

The forest of '*Manětínská vrchovina Upland'* is situated about 25 km north of Pilsen near the town of Manětín and includes the '*Manětínská vrchovina'* Demonstration Object. The total forest area in this territory is 7248 ha.

Forest management bases on close to nature principles ensuring a good balance of wood production and nature conservation. Management intensity results from estimating the potential value for producing quality timber and the forests' ecological function and value while ensuring economic return.

'Manětínská vrchovina' is frequently subject to spring drought spells. The natural lack of soil nutrients can considerably affect the growth of regeneration and that of young stands.

The impact of wildlife on the stands is severe. In particular Sika deer (*Cervus nippon*) exceeds environmental carrying capacity and thus strongly restricts forest management. It was introduced during the 19th and 20th century to western Bohemia. It was kept in game fences but by the 1940s gradually spread throughout the area. Excessive browsing and bark stripping has notably limited both artificial and natural regeneration. Forest stands, repeatedly damaged by deer, exhibit wood quality loss and are more prone to breakage caused by wind storms, and high snow loads. Thus the costs resulting from wildlife protection are quite substantive.



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7,248 ha

Total forest area

6.8 m³/ha

Annual increment

230 m³/ha

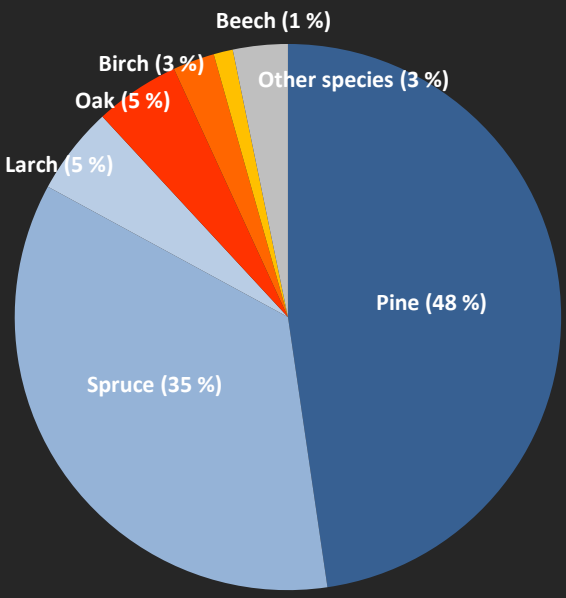
Actual average stock

11 %

Broadleaves

89 %

Conifers



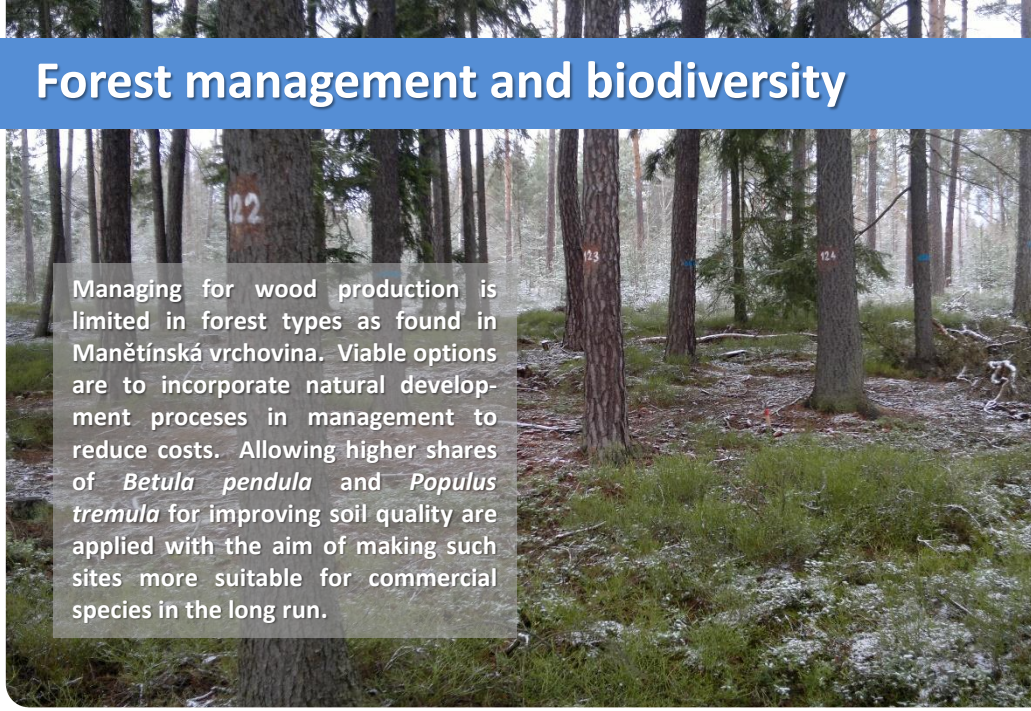
48,980 m³

is the annual increment measured over the total forest area

5.9 m³/ha

is the annual cutting-rate

Forest management and biodiversity



Managing for wood production is limited in forest types as found in Manětínská vrchovina. Viable options are to incorporate natural development proceses in management to reduce costs. Allowing higher shares of *Betula pendula* and *Populus tremula* for improving soil quality are applied with the aim of making such sites more suitable for commercial species in the long run.

Historic development

Forest composition in the '*Manětínská vrchovina Upland*' experienced marked changes throughout history. In the 1870s, forests were spruce dominated (65 %) with broadleaves only at 1 %. At present pine is the main tree species (48 %), while the share of spruce has decreased to 35 %. The proportion of broadleaved species increased considerably (11 %). European larch was planted in the 19th century now covering 5 % of the forest area. The introduction of Sika deer to western Bohemia during the 19th and 20th century has resulted in serious implications for forest management.

Manětínská vrchovina Demonstration Object

The forests of the '*Manětínská vrchovina Upland*' feature a rather non-traditional demonstration object as it lacks so called model management areas. Instead it presents options on how to reduce management costs in commercial forests on nutrient-poor sites by allowing natural development processes to take place to a large degree. Measures include the use of local soil-improving tree species (e.g. birch and European aspen), simplified tending methods, applying different regeneration methods and allowing spontaneous natural development. The whole '*Manětínská vrchovina Upland*' is part of the '*Manětínská Nature Park*'. The nature park, however, implies no restrictions to forest management.

Hůrky nature reserve

The region incorporates the nearly 27 ha large '*Hůrky Nature Reserve*'. It is enlisted as a *Site of Community Interest* and composed of a mosaic of representative, well-preserved peat bog types, fenlands and wetland alder woods. Many threatened plant species occur, including *Drosera rotundifolia*, *Eriophorum vaginatum* or *Pinguicula vulgaris*. Main tree species are *Pinus sylvestris*, *Betula pendula* and in drier parts *Juniperus communis*.

9,064 ha

are designated as 'Nature Park Manětínská'(including non-forest area)

about 27 ha

are designated as the 'Hůrky Nature Reserve'

nearly 250,000 ha

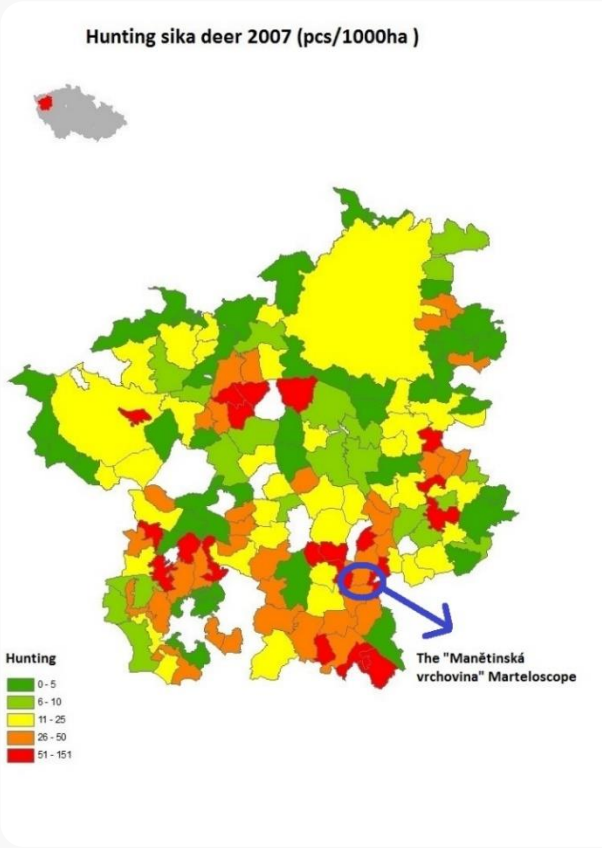
are the current range of Sika deer in western Bohemia

Sika deer

considerably affects natural regeneration

6700 pieces

of Sika deer are hunted annually

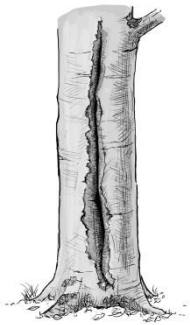


Habitat structures

Large quantities of deadwood and a high density of old microhabitat-bearing trees are characteristic elements of natural forests, especially of the old-growth phases. These phases are often absent or rare in managed forests, even in forests under close-to-nature management. Also in selective harvests and thinnings, 'defective' trees referring to these old-growth phases (hollow, dead and languishing trees) are often removed. Yet, an important share of forest biodiversity is strictly or primarily dependent on these elements for their survival, especially 'saproxylic' species, that is species depending on deadwood.

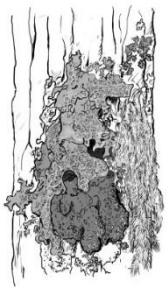
Most species dependent of old-growth-elements and phases have become threatened. Conservation of biodiversity in commercial forest stands is mainly a question of conservation of adequate amounts of deadwood and retention of such microhabitat structures

Crown deadwood



Cracks and scars

Bark Loss

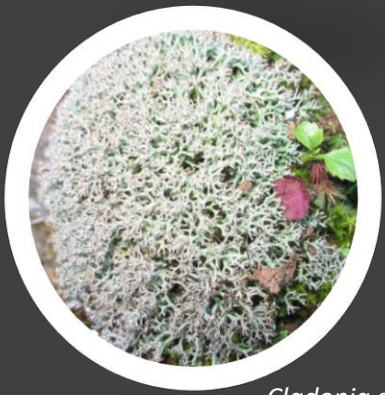


Epiphytic foliose and fruticose lichens

….and biodiversity

Dryocopus martius

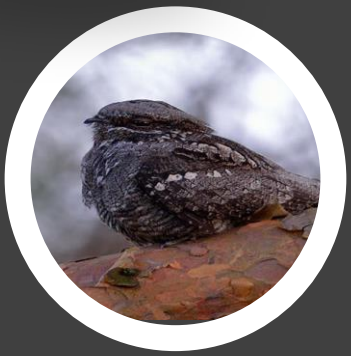
Ena montana



Cladonia stelaris

Myotis myotis

Phellinus pini



Caprimulgus europaea

Site conditions

Altitude:	**550 -600 m.a.s.l.**
Forest ecological region:	**6 – Západočeská pahorkatina**
Soil:	**Haplic Podzols**
Site description:	**Carbonate sandstones**
Mean annual temperature:	**7.0 °C**
Annual precipitation:	**500 - 550 mm**
Natural forest community:	***Pinetum quercino -abietum***

The forest of Manětínská vrchovina features plateaus and flat mild slopes. Soils are deep, sandy to loamy-sand, with very low supply of nutrients. They are strongly acidic and drought-prone with retarded humification. Soil types are Arenic Podzols, at some places extreme Arenic Podzols with Ortstein. The macroclimate is characterised as mildly warm. The dominating species is Pinus sylvestris with a varying admixture of oak. Also found are Abies alba, Betula pendula and Picea abies.

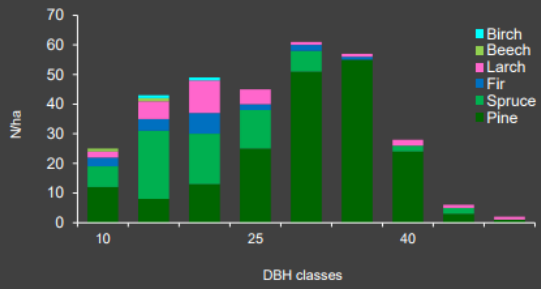
The undergrowth synusia is poor in species. It includes e.g. Vaccinium myrtillus, Vaccinium vitis idaea, Caluna vulgaris, acidophilous mosses and lichens (Cetraria islandica, Leucobryum glaucum and cladonias).

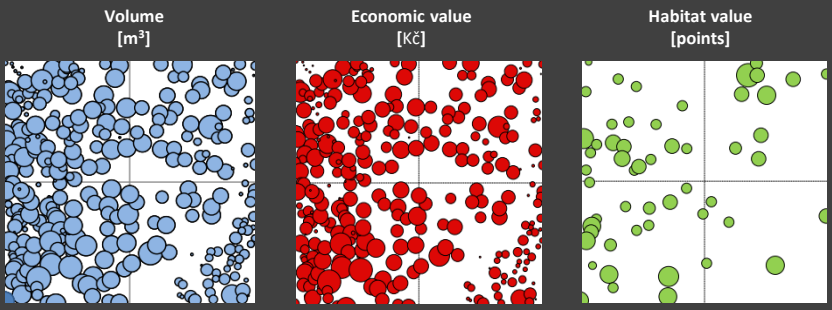
Stand characteristics

The **Manětínská vrchovina** Marteloscope is located in a pine – spruce dominated forest.

Stand data

N [stems/ha]	316
BA [m²/ha]	19.3
Volume [m³/ha]	156.6
Habitat value [points]	926
Economic value [Kč]	229,314.-

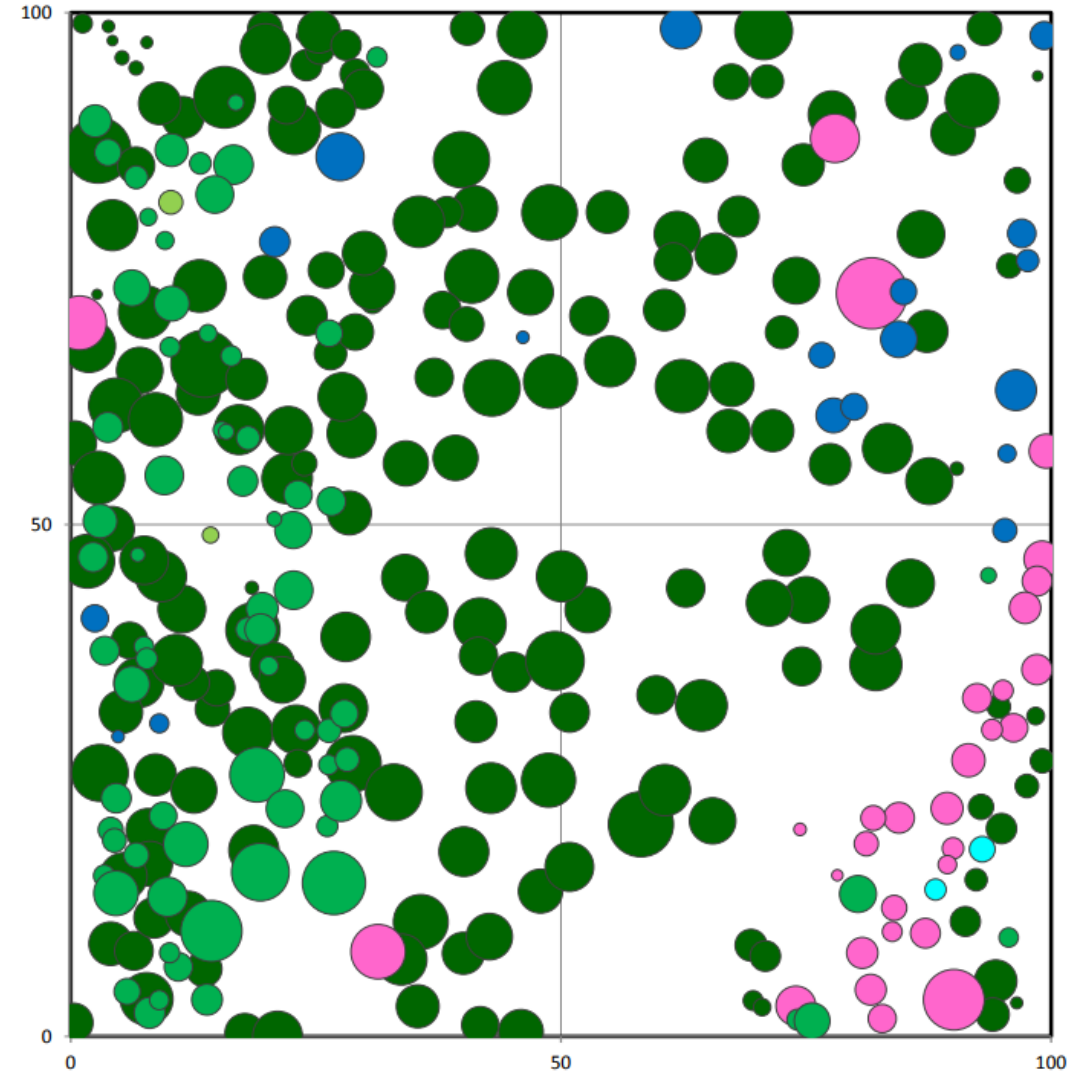




The **economic value (in [Kč)** is estimated for each tree based on volume, stem quality and corresponding local timber price lists.

The **habitat value (in points)** is assessed for each tree based on tree microhabitats, taking into account rarity of each habitat and duration for it to develop.

The evaluation of the habitat value is based on a comprehensive catalogue of tree microhabitats. It comprises 23 saproxylic and epixylic features such as cavities, large dead branches, cracks and loose bark, epiphytes, sap runs, or trunk rot characteristics. Tree microhabitats are of prime importance for specialized and often endangered forest species of flora and fauna.



Tree species

- Birch
- Beech
- Larch
- Fir
- Spruce
- Pine

DBH (cm)

7,5 - 15,0	65,1 - 75,0
15,1 - 25,0	75,1 - 85,0
25,1 - 35,0	85,1 - 95,0
35,1 - 45,0	95,1 - 105,0
45,1 - 55,0	
55,1 - 65,0	105,1 - 115,0

N

Notes

Integrate+ is a demonstration project funded by the German Federal Ministry of Food and Agriculture (BMEL) to establish a European network of demonstration sites for the integration of biodiversity conservation into forest management.

The Integrate+ project runs from December 2013 to December 2016 and builds on a partner network from research and practice with a focus on implementation of integrative management and enhancing transnational exchange of experiences.

Lenka Lehnerová, Andreas Schuck and Daniel Kraus, 2017. The Manětínská vrchovina Marteloscope field guide. Integrate+ Technical Paper No. 16. 12 p.

European Forest Institute, 2017

www.integrateplus.org