



City forest of **Göttingen** Demo sites

Field guide

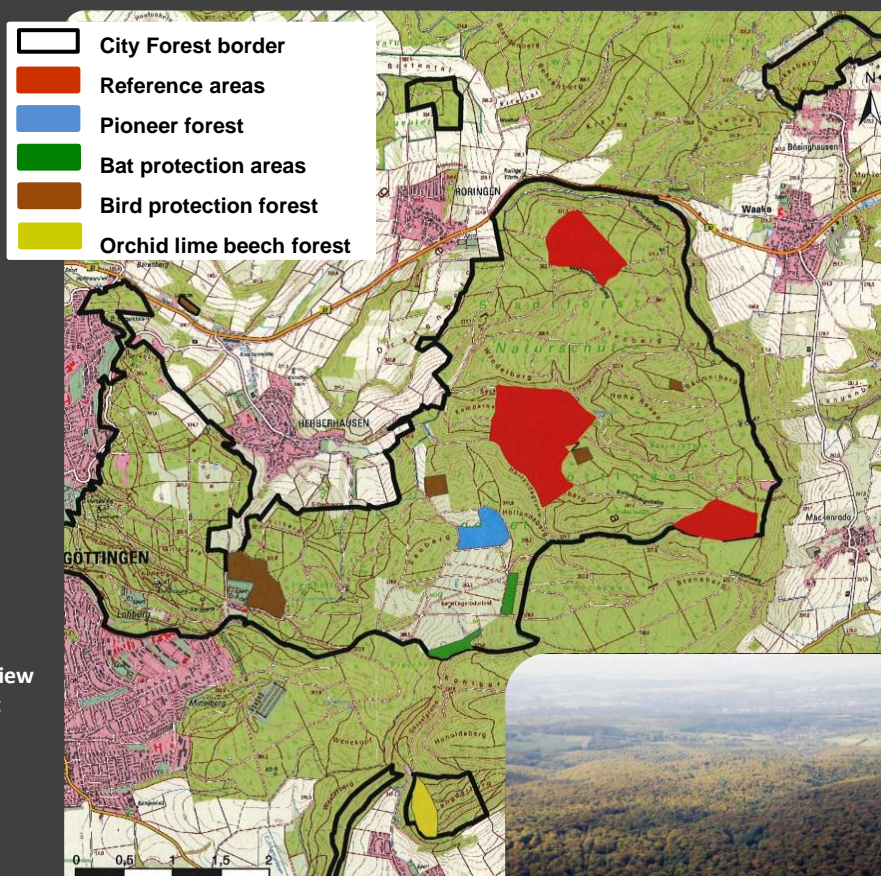


City forest of Göttingen

During its long history, the City Forest of Göttingen has been shaped by the great responsibility the city has shown towards its own forest since the middle of the last millennium. In 1860, one of Europe's first forests reserved for recreation was established on 300 hectare. As early as in the 1920s, an astoundingly modern close-to-nature forest management was introduced.

The forest concept which is now set in place for about 20 years can serve as a good practice example for integrative forest management. It complies with the principles which have been elaborated by major nature NGOs and the forest certifier Naturland in 1994. It also complies with societal demands towards recreation, nature and climate protection which are often of minor importance when it comes to financial outputs.

Beech forests form the main tree species with a share of nearly 60 %. This is due to the long lasting close-to-nature forest management and beech forests representing the potential natural vegetation type. Ash (18 %) and maple (10 %) are also well represented. The average timber stock is 420 m³ / ha.



Map and aerial view
of the City Forest
of Göttingen

.... in figures

1,780 ha

Total forest area

8 m³/ha

Annual increment

420 m³/ha

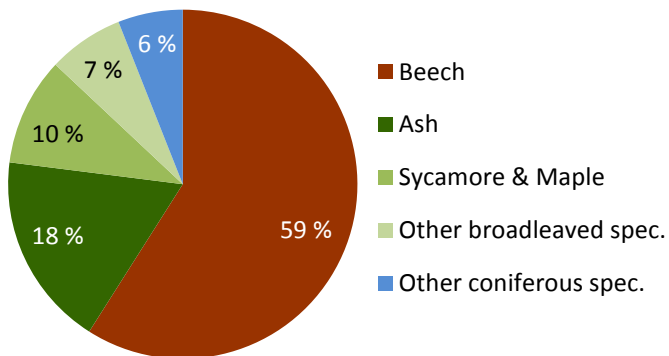
Actual average stock

5,000 m³

is the total annual
cutting-rate

3.5 m³/ha

is the annual cutting rate



80 €/m³

Average timber price

94 %

Broadleaves

160 t /ha

CO² sequestration in the forest

6 %

Conifers

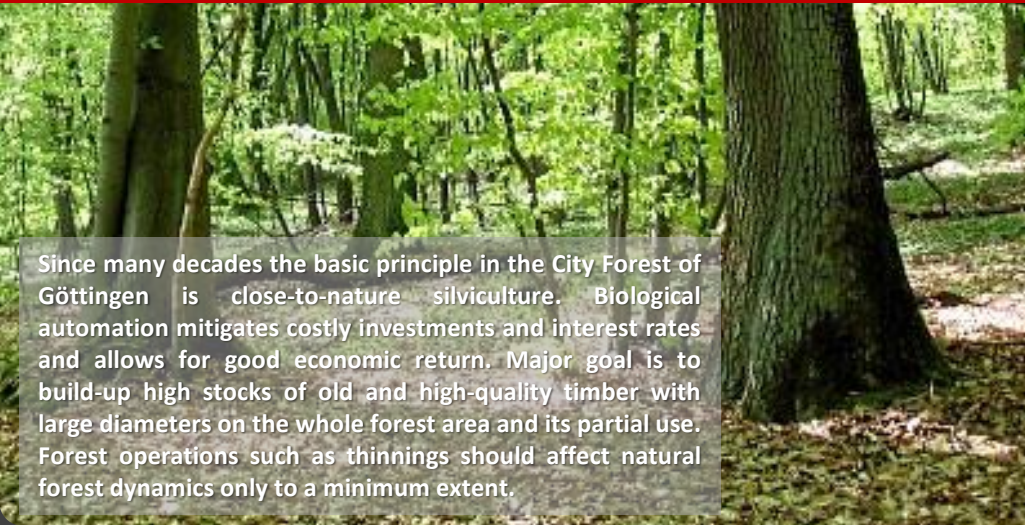
More than **300**

fungus species, including one first find
in Lower Saxony

342

saproxylic beetles, including several
relic species of primeval forests

Biodiversity concept



Since many decades the basic principle in the City Forest of Göttingen is close-to-nature silviculture. Biological automation mitigates costly investments and interest rates and allows for good economic return. Major goal is to build-up high stocks of old and high-quality timber with large diameters on the whole forest area and its partial use. Forest operations such as thinnings should affect natural forest dynamics only to a minimum extent.

Since 1995 the enterprise pursues the goal to develop a forest landscape that corresponds in its appearance and biodiversity with the naturally occurring forest of the region. Such forests are seen as the most resistant, resilient, productive and appealing in the long run. Forest management follows the objective that optimal ecological interaction within the forest biocoenosis coupled with minimal forest operations will guarantee the highest possible economic net return. Basic requirements for ecologic and economic performance are the continuous occurrence of mature forest stands and old trees. Therefore, a considerable part of the old stands, accompanying dead wood and habitat trees are subject to protection.

Since 1995, reference areas which were excluded of management are used for learning and comparison.

They also serve as a central tool for defining goals for management of commercially used forest stands. In these managed forests, timber stock, tree species composition and the amount of deadwood should develop in a similar way than in comparative reference areas.

For educational purposes, additional 54 hectares (3.5 % of the City Forest area) have been designated as strictly protected forest areas. They are dedicated specifically for nature and species conservation. These areas include a Medio-European limestone beech forest where management was stopped about 60 years ago as well as a highly mature stand which displays large numbers of tree cavities and a great abundance of bat populations. Several so-called bird protection forests and a pioneer forest in the core area of the Kerstlingeröderfeld conservation area (see map page 2) are also part of it.

104 ha

Total size of the 3 reference areas

54 ha

Total size of strict protection sites

1.107 ha

Total size of Natura 2000 areas

1.183 ha

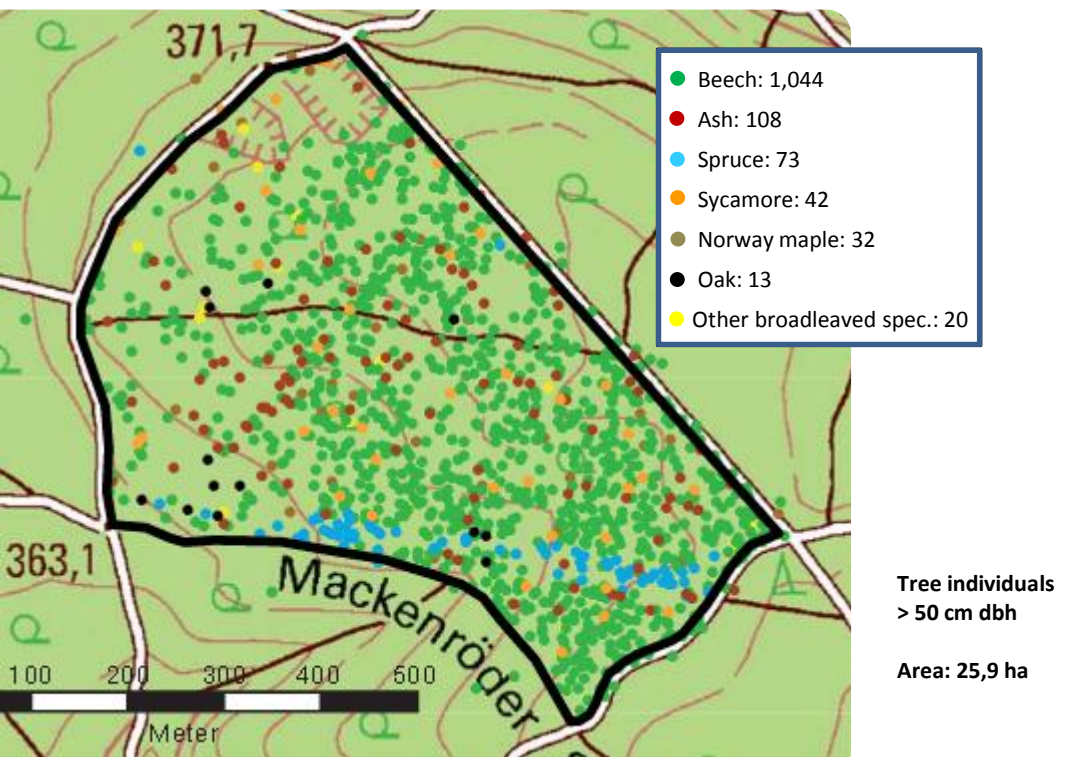
Total size of conservation areas and
National natural heritage sites

200 ha

Total size of inner-city park and
recreational forest areas

About **600 m³/ha**
is the targeted average timber stock

At least **10 %**
of the crown wood has to stay inside the
forest as dead wood



Protection of natural processes

Minimizing stand thinning and target diameter harvest

The City Forest of Göttingen applies close-to-nature management principles making best use of natural development processes. Forest operations such as thinnings are conducted only when necessary allowing to reduce costs considerably. Maximum two to three early thinnings are conducted, as well as a systematic target diameter harvest regime. As general rule, no planting and tending of young stands is foreseen.



Biological automation

Usually, about 400,000 tree saplings per hectare are found in regenerating forest stands in Göttingen. Of those, only the most vital trees survive the high selection pressure in their early years. Therefore, trees best adapted to the given site conditions will form the next stand generation. Allowing natural selection will also provide advantages concerning climate change.

Minimal tending

Only the 40-80 most vital and high-quality trees per hectare are favored in case neighboring trees show the same competitive strength. These thinning operations are conducted when trees have reached a diameter of 25 to 40 cm at breast height (dbh). Experience has shown that there is almost no increased diameter growth above 40 cm dbh if competitors are then removed. This approach reduces costs and prevents damages to the remaining stand. Avoiding the felling of so-called 'wolf trees' of very bad quality and the generally high timber volumes have a positive impact on the development of future habitat trees.

Partnership instead of competition

As early as 1935, the formerly responsible City forest master (called Fruchtenicht) realised that the knowledge acquired at forestry schools partly didn't apply to local circumstances. In mixed forests, trees behave differently than in pure stands from which until today all significant forest yield data is derived. As example, ash and maple can reach considerably larger heights in mixture with beech.



....and integrative management

Large diameter trees

Central goal in the City Forest of Göttingen is to build up and preserve a considerable amount of large dimension trees, and to target maximum net production by harvesting such big trees of high timber quality. Timber increment of large diameter trees (of about 120 years and older) is more valuable than of young trees. This is because timber value usually increases with higher log dimensions while harvesting costs only rise slightly. Thus, high-quality trees of large diameters form the backbone of the forest enterprise's operational result, their share is supposed to continuously rise. Equally important is the goal ecosystem integrity and nature conservation. Old wood bears in general a much higher ecological value for nature conservation than young trees and have mostly disappeared from many of our commercial forests.



Quality before quantity

Valuable timber assortments are carefully classified for best possible utilization and based on customers' requests. Continuous observation of timber market developments, enterprise-visits of customers, tailored service, reliability and addressing niche markets allow the City Forest of Göttingen a high economic return. In general roundwood timber is sold directly to local wood processing companies or end customers.

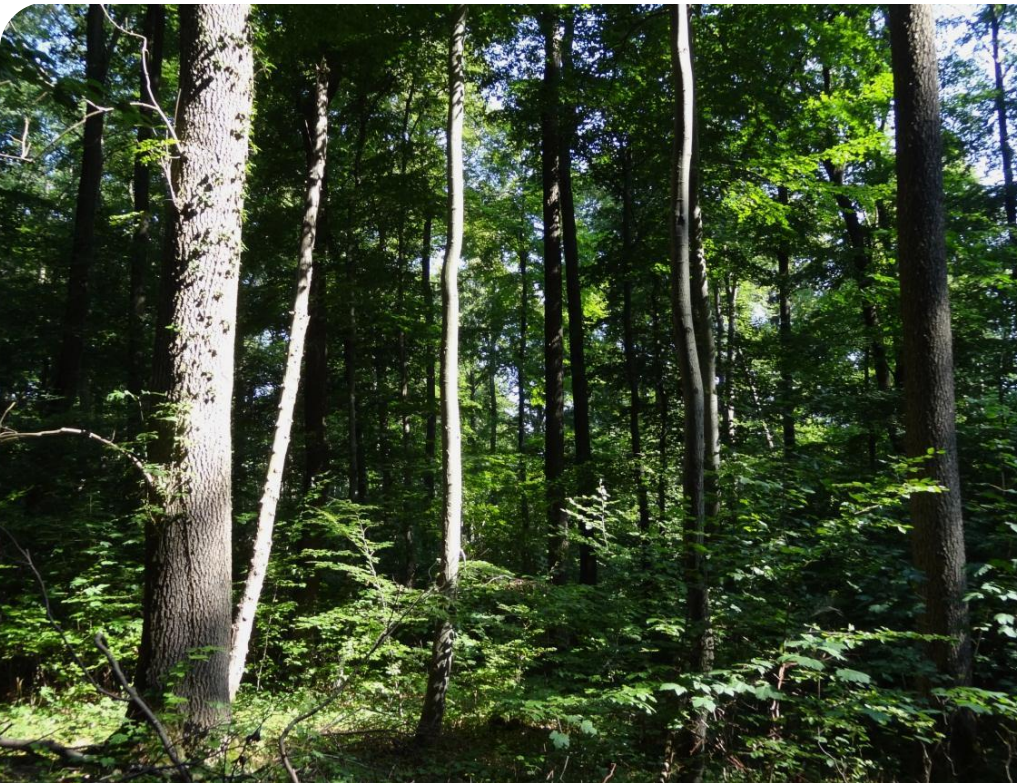
Ensuring productive capacity

The enterprise precludes frequent thinnings and the use of harvesters. All work is performed by own staff who are well trained and usually identify themselves more with their forest than contractors. Minimum distance between skid-trails is 40 meters. This approach guarantees that damages are reduced especially on economically valuable trees and forest soils (e.g. mycorrhiza networks). Preventing such damages is a prerequisite for continuous production of high-quality timber.



Site 1: Waaksches Ufer

This beech stand of about 150 years is located in the northwest of the City Forest. It is characterized by high timber stocks of around 600 m³/ha, very high increment rates and good timber quality. The share of valuable broadleaved species in the main and mid layer is 20 %. In natural regeneration they even account to more than 70 %. Originally, this forest was managed as a coppice with standards, a traditional form of forestry for the production of construction and fuel wood. This management has foreseen clear-cuts of the top and mid layer as well as stump extraction. The main layer of primary beech was removed about 145 years ago. Along with this shelterwood felling the stand was transformed into an even-aged forest. Today it consists of 70 to 80 % beech and other hardwoods. Over time, beech displayed its competitive strength and dominance especially in the non-managed stands on limestone sites. Until now, an average of 29 m³/ha have been utilized in this stand since the last forest plan was made in 2011. Targeted total cutting rate for the decade 2011 to 2021 is about 100 m³/ha. Removals so far yielded a share of about 25 % of highly valuable broadleaved tree species.



Site 2: Lukasberg

This stand is located near the village of Bösinghausen and considered a demo stand of a close-to-nature forest structure according to Pro Silva principles.

Bedrock is formed by the geological formation of the Upper Red Sandstone, the Röt, which ensures one of the most fertile sites in the City forest.

The forest stand with a stock volume of 576 m³/ha consists of both medium-sized and uneven-aged mature timber. The main layer comprises mainly of beech (45 %) and oak (31 %). A considerable amount of the regeneration is composed of valuable broadleaved tree species (60 %). The stand has reached an age of 140 years and is now entering the target diameter phase. Since the last forest management plan elaborated in 2011, about 30 m³/ha have been harvested as target diameter cuttings. Of those, 7 m³/ha were formerly planted larch and spruce. The planned cutting rate until 2021 in this stand amounts to a total of 56 m³/ha.



Site 3: Pferdeköpfe

This approximately 140-year-old demo stand is an excellent example for close-to-nature forest structure. It is comprised in its main layer of 75 % beech and 25 % valuable broadleaved trees. Next to the more dominant sycamore and ash also 2 % Norway maple and lime occur. In the understorey, the share of valuable broadleaves is 40 %. In the regeneration (age about 30 years) the share of beech is only 22 %.

In the year 2013 an inventory of all mature trees (all data of trees >50 cm dbh) was conducted by Greenpeace. Using the data, it was evaluated in how far the ambitious goals of the forest concept implemented in Göttingen are reached.

The forest structure is two-layered with a closed crown layer including gaps. Within two target diameter cuttings about 16 m³/ha have been harvested to date. The planned cutting rate for the 10-year period is 80 m³/ha (main layer 50 m³/ha). Major objective according to the management plan is to preserve the general structural diversity and to continue target diameter harvesting on the whole area. Further it is targeted to conserve and improve the quality of 20 – 30 % of the admixed share of valuable broadleaved tree species in the stand.



Site 4: Wallmannsort

In the context of the inventory of natural forests in Lower Saxony a 1 ha large area was fenced within the reference area Wallmannsort (no timber removal since 1997). This fenced area is now also one of the Marteloscope sites being established in the City Forest of Göttingen.

The stand originated from a former coppice with standards and shelterwood felling. The stand is roughly 125 years old with a timber stock volume of about 440 m³/ha.

81 % of the main tree layer is formed by beech while valuable broadleaved species contribute 14 %. 5 % are younger, artificially planted spruce which will most likely not be able to cope with the strong competition of broadleaves. The forest structure is two-layered, dense but with gaps.

In the center of the Wallmannsort forest unit a historic monument can be found in honour of the forester Carl Wallmann. He was instrumental in setting up the first modern forest inventory for the City Forest of Göttingen, giving the demo site and Marteloscope its name.



Integrate+ is a demonstration project funded by the German Federal Ministry for Food and Agriculture (BMEL) to establish an 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.



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