Gorjanci Forest
Demo sites

Field guide

Univerza v Ljubljani
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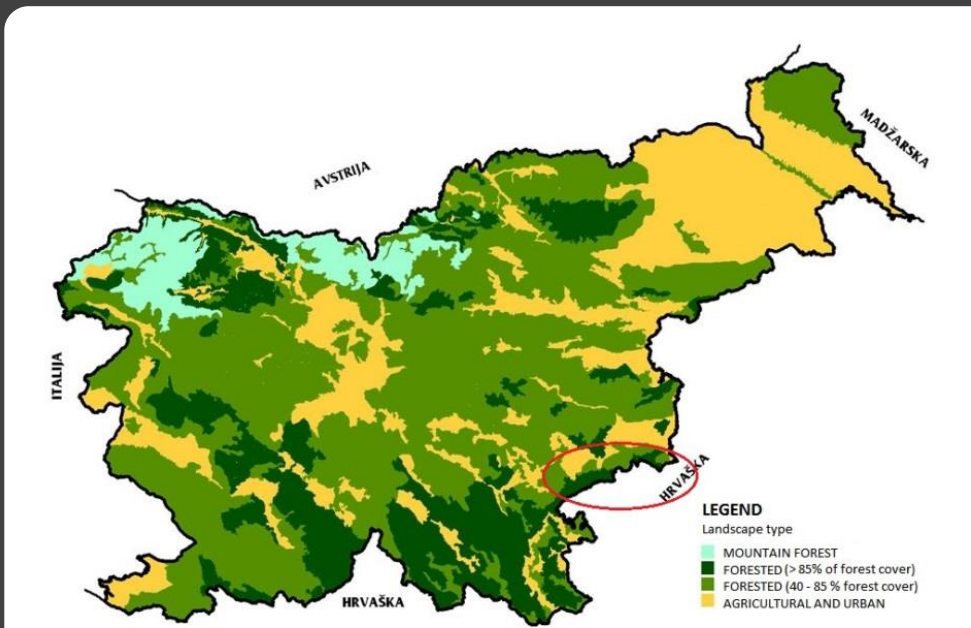
Gorjanci mountains

The **Gorjanci** mountain range is located in south eastern Slovenia and covers an area of 212 km^2. The range extends far into Croatia where it is protected as 'Žumberak-Samobor Hills' Natural Park. There are plans in Slovenia to designate this diverse and hilly landscape as a so called Regional Park. The Gorjanci range is characterized by an exceptional mixture of pannonian and karst landscape features and incorporates two large regional forest areas, Novo mesto and Brežice. The forests are administered by the Slovenia Forest Service. The Gorjanci range is vastly covered by forests and public access to the region can be limited due to an extensive mosaic of mountain ranges, hills and valleys. In the lowlands, oak and hornbeam dominate, while in the hilly regions beech-oak forests are present. In the higher altitudes mountain beech forests are most prominent. The forests of Gorjanci include two designated strict forest reserves which display virgin forest remnants. Those remnants are some of the rare examples still existing in Central Europe where undisturbed beech forests can be observed.

Despite the long history of close-to-nature forestry in Slovenia, implications of intensive forest management are still visible. This accounts especially for parts of the lower Gorjanci region. Large-scale commercial exploitation began in 1838 with the aim to supply the glass producing industry. It further intensified after the First World War with a sawmill accessible via a forest railway. Grazing also contributed to forest exploitation and degradation. Still some coppice stands can be found close to farms as well as monocultures mainly consisting of coniferous tree species.



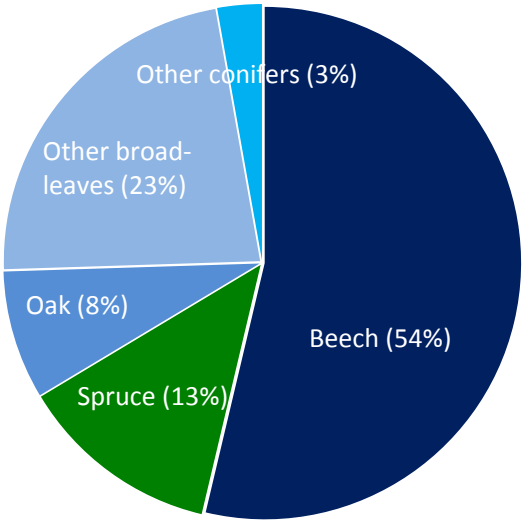
...in figures

15148 ha
total forest area

9.1 m^3/ha
annual increment

308 m^3/ha
actual average stock

44,435 m^3
is the total annual cutting-rate



3.7 m^3/ha
is the annual cutting rate per year

6.6 %
protective forest

85 %
Broadleaves

15 %
Conifers

20.8 €/m^3
average income from timber

Around **72**
Bird species (including *Pernis apivorus* and *Dendrocopos leucotos*)

Forest management

The majority of forests belongs to private owners. Those include landowners such as the Cartusian Monastery owning considerable amounts of forest. A long tradition of close-to-nature forest management in Slovenia ensures that the production of high-quality wood is combined with biodiversity conservation, protective functions, recreation and education.

Forest management is focused on both increasing the wood quality and the overall growing stock. The average felling rate is estimated slightly above 70 % of the annual increment. All forest operations are implemented to ensure minimal impact to the forest ecosystem. Wood harvesting is done manually while tractors with cable winches are used for skidding. On steep slopes cable logging is applied.

The preservation of deadwood is given special attention. Snags and lying dead-wood are not removed but left in the stands. Trees displaying highly valuable microhabitat structures, so called habitats trees, are identified and designated not to be removed.

Natural development is guaranteed for forest stands that are situated on steep and inaccessible slopes (‘ecocells’).

277 ha of the forest area are excluded from management. They are protected as strict forest reserves and left to develop naturally.

Such set-aside areas have been and will continue to be affected over time by small but also larger scale natural disturbances. All features inherent to natural forests make set-asides valuable reference areas and learning objects for managed forests. Their importance is considerable for research, as is their role as showcases and training sites for forest managers. They are further considered important biodiversity hotspots within larger areas of managed forests.

Most of the forest in the Gorjanci mountain range is part of the Gorjanci – Radoha Natura 2000 area. Especially the continuous forest cover acts as a corridor for many species and streches from the Dinaric mountains into Austria.

...and biodiversity

11,607 ha

are designated as Natura 2000

1.8 %

of the total forest area set-asides

277 ha

Total area of 4 strictly protected set-asides

16 m³/ha

is the average amount of deadwood

80 %

Natural tree species composition

Reference areas

Virgin forest remnant 'Ravna gora'

The 16 ha large virgin forest remnant is part of a once more extensive undisturbed beech forest. It is located in the heart of Gorjanci forest. Evidence points towards the fact that it has never been managed, most likely due to poor accessibility. The forest is located on limestone and dolomite with an average growing stock of 832 m^3/ha. The forest is dominated by beech with individual trees reaching heights of up to 40 meters and a dbh exceeding 130 cm. Two permanent research plots have been established in 'Ravna gora'.

Natural disturbances

Natural disturbances can have considerable impacts on (re)shaping stand structure. Being able to observe forest development without human intervention following a major disturbance event is rarely found, especially within strictly protected forest areas. 'Ravna gora' was hit by strong winds in 1983 creating a large gap of about 6.3 ha. Stand structure has since then changed visibly in terms of development patterns and tree species composition. Regeneration in open areas has favoured light demanding species. Large amounts of sun exposed deadwood with up to 500 m^3/ha are present. 'Ravna gora' represents an illustrative example of natural forest dynamics, from which much can be learned for managed forests.

Forest Reserve 'Kobile'

'Kobile' forest reserve is with 231 ha one of the largest in Slovenia. It is located in a valley composed of several gorges and canyons. The creeks are often subject to torrential flooding. Forest stands are highly diverse in structure and tree species composition. Many rare plants and animals have been recorded. On steep slopes (up to 45°) beech forests grow under extreme conditions while other more open areas display a variety of light demanding tree species. Some mostly inaccessible valleys are natural habitats of yew and holly. All forests are characterized by large numbers of snags (36/ha) and one of the highest densities of Dendrocopos leucotos in Slovenia (5–7 pairs inside the reserve).

….and managed forest

'*Section 03054a*' is part of the regional unit Kostanjevica na Krki and extends across 18 ha. It is located between the two strict forest reserves (approximately 300 m distance to 'Kobile' and 750 m to 'Ravna gora'). It had been in the ownership of the state before being returned in the course of forest restitution measures to its original owner, the Carthusian Monastery Pleterje. This montane and sub-montane beech forest (Savensi-Fagetum) has an average growing stock of 400 m^3/ha and is around 80 years. It is logged in intervals of ten years with the last removals (1143 m^3) conducted during 2010.

'*Section 03054a*' is located on a hillside with an average slope of 7°. Close-to-nature forest management principles are applied giving particular attention to nature conservation. The number of snags is rather high averaging around 6/ha. Based on a recent inventory a wide variety of tree microhabitats (463/ha) were identified. They include 49 branch holes/ha, 17 trunk and mould cavities/ha, 10 trees with conks/ha and 9 dendrotelms/ha.

Within the next 10 years main focus in management will be given to moderate thinning operations and maintaining forest edges. It is planned to remove about 18 % of the average growing stock, which accounts for approximately 1250 m^3.

30 years from now regeneration of the stand will be initiated by final harvest of selected old trees in order to stimulate forest regeneration.

Integrate+ is a demonstration project funded by the German Federal Ministry for 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.

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