

Austrian Forest Report 2023

We Take Care Of The Forest



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Preface

With a forest cover of around 48 percent of its total territory – equivalent to 4 million hectares – Austria is one of the most densely forested countries in Europe. The Austrian forests are truly multifunctional entities, affecting our lives in numerous ways. They protect us from natural hazards, offer recreation opportunities, and secure jobs. They also provide the renewable resource wood, thereby contributing significantly to climate protection and the energy transition.

As climate protectors, forests absorb CO₂ from the atmosphere and store it in the renewable resource wood, which is used in long-lived wood products. This unique raw material and its processing secure revenues and jobs in our regions and provide the foundation for a profitable value chain. Forests are complex ecosystems with a multi-functional character and host rich biological diversity: Among all the land-based habitat types, they possess the greatest biodiversity – the largest “variety of life”. Experts estimate that around two-thirds of all domestic species occur in forests.

The effects of climate change are unfortunately noticeable in our forests as well: Extended periods of drought, strong winds, and heat waves distress them, making it easy for pests like bark beetles to multiply and cause damage. We are faced with the difficult challenge of making our forests fit for the climate of the future. Through measures financed by the Austrian Forest Fund (Waldfonds), the federal government has created methods to support climate adaptation in the forest industry.

The Austrian Forest Report 2023 provides an overview of Austria’s forests and describes their current status, their development, and their future along with necessary steps to maintain them for coming generations. It also casts a glance at completed projects and successful measures as well as examining the effects of forests with regard to humans and society.

Mag. Norbert Totschnig, MSc

Federal Minister for Agriculture, Forestry, Regions and Water Management



Federal Minister
Mag. Norbert Totschnig, MSc

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Austria's Forest in Numbers

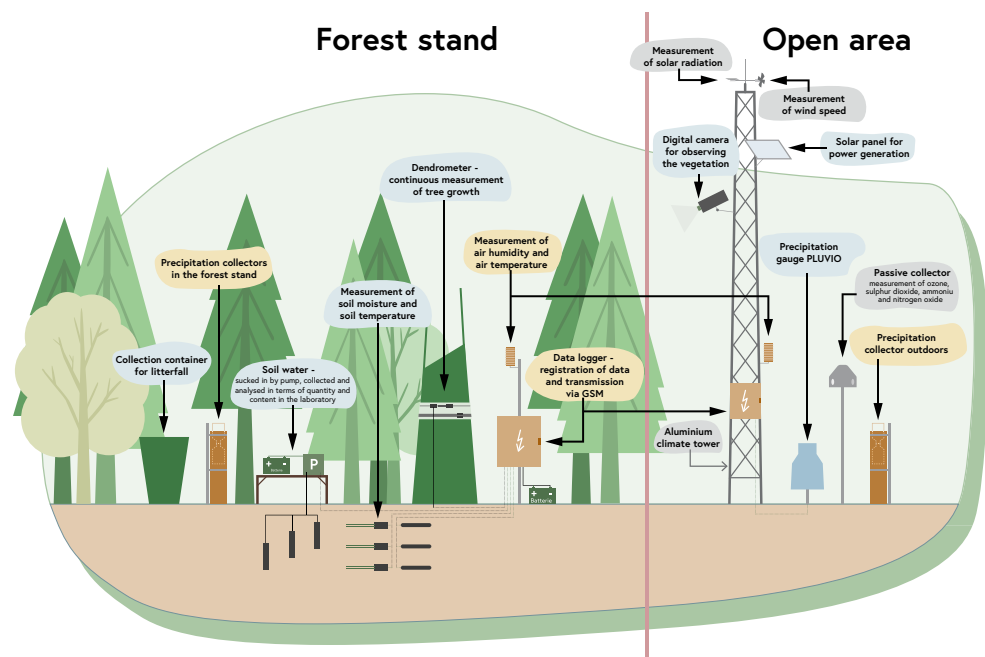
Forests secure revenues and create green jobs, protect against natural hazards, provide energy, contribute to climate protection, and offer habitats for animals and plants as well as recreational value for humans. Ensuring these functions are maintained requires efforts across all areas of our society.

Regarding climate change and its effects especially on forests the most important point of leverage is the reduction of greenhouse gas emissions. Without this our forests will be unable to sustain their positive influence in the fight against climate change indefinitely. Climate change with extreme weather events and pests is putting increasing pressure on forest managers. A number of forest policy measures are therefore being implemented to support them. Read more on this in the interview on page 60.

The Austrian Forest Inventory as a yardstick

The results of the Austrian Forest Inventory 2016/21 performed by the Austrian Research Centre for Forests (Bundesforschungszentrum für Wald, BFW) clearly show a sustained trend towards more deciduous wood, thereby increasing biodiversity and improving climate fitness. The share of deadwood and the associated biodiversity have further improved. The stock of wood is growing, meaning we are using less than is growing back. However, damage caused by wild animals currently influences sustainable forest development in protection forests. Analysis of the inventory period 2016–2021 is complete, and the results can be accessed at www.waldinventur.at.

Forest science in Austria has numerous experimental plots. Many findings about the forest ecosystem are based on these long-term facilities.





In total, the Austrian Forest Inventory sampling network comprises around 11,000 sample plots in the forest. Around 200 forest and environmentally relevant parameters are recorded on each sample plot.

Around 48% of the Austrian territory is covered by forests

The wooded area of Austria continues to grow; it currently covers more than 4 million hectares (precisely: 4,015,000 hectares; 1 hectare equals 10,000 square metres); this represents 47.9% of the federal territory. Over the past ten years, the forested area has statistically increased by six hectares per day – roughly the equivalent of nine football pitches. But when do we actually speak of a forest? The Austrian Forest Act provides the following definition: A forest is an area of land stocked with silvicultural plants, provided the stock covers an area of at least 1,000 square metres and has an average width of 10 metres.

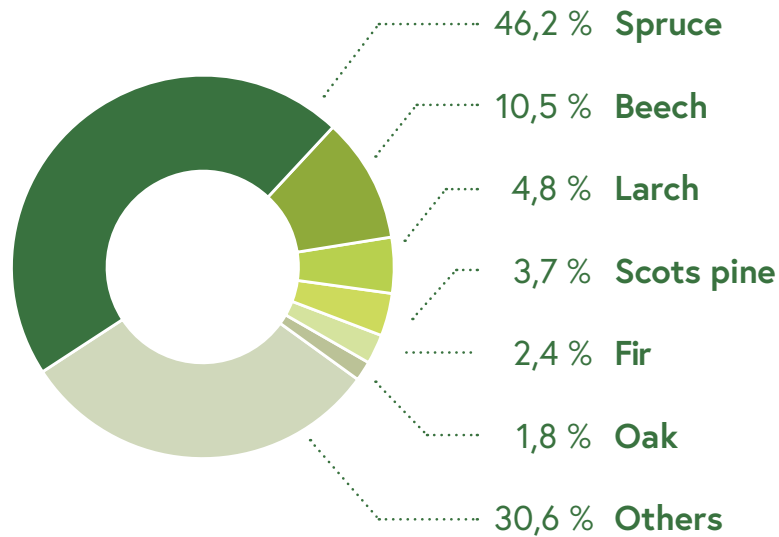
The forest area is growing particularly within the alpine regions in western Austria, with the increase resulting from reforestation and natural regeneration. The most densely forested province is Styria with a forest cover of 62%, followed by Carinthia with 61%, Salzburg with 52%, and Upper Austria with 42%.



Deciduous tree species on the rise

The trend towards hardwood is increasing markedly, which enhances biodiversity and makes forests more climate-fit. In order to prepare our forests for future climate conditions, it is important to rely more and more on mixed stands. Doing so means stands can be maintained even if individual species should be lost to changing conditions. In the last decade pure conifer stands have decreased by 6% and mixed hardwood stands have increased by the same percentage. Due to climate change, spruce has lost parts of its distribution at low altitudes between 600 and 800 metres above sea level. This development will continue in the future.

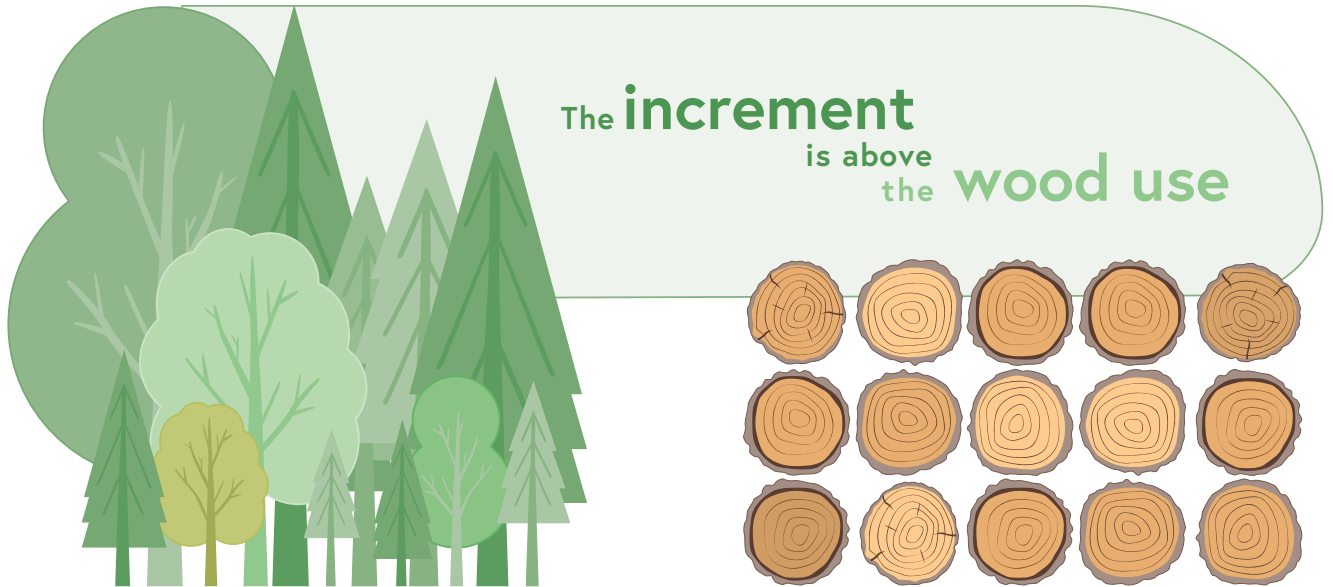
Tree species in Austria's forests



Spruce is still Austria's main tree species

Wood is growing back faster than it is being used

Our stock of wood continues to grow and has reached a new high mark: 1.18 billion solid cubic metres. Almost half of the living wood stock is in trees with trunk diameters of more than 40 centimeters. This reserve in particular has increased over the past few decades. One of the principles of sustainable forestry is not to remove more wood from a forest than it can regrow in the same period. Currently, about 89% of ongoing growth is being harvested in Austrian forests. To maintain this status, sustainable forest management is codified in the Austrian Forest Act. Three aspects are decisive for guaranteeing continued availability of the sustainable resource wood and optimal sequestration of CO₂: Forests must be managed, wood used and the regeneration of our forests ensured. Younger forests between 40 and 60 years of age bind the most CO₂. Using wood can also reduce our dependency on fossil and other non-renewable resources and materials. Read more on this in the chapter "Forest and Climate" on page 13.



Game puts pressure on our forests

Damage from the browsing of young plants has increased. Hoofed game like roe deer and red deer are part of the forest ecosystem, but the hoofed game population has been steadily rising for many decades. It is already too large to allow sustainable development in terms of forest rejuvenation. Wherever it is needed, rejuvenation must be possible without special protection measures and with species adapted to climate change. This is cur-



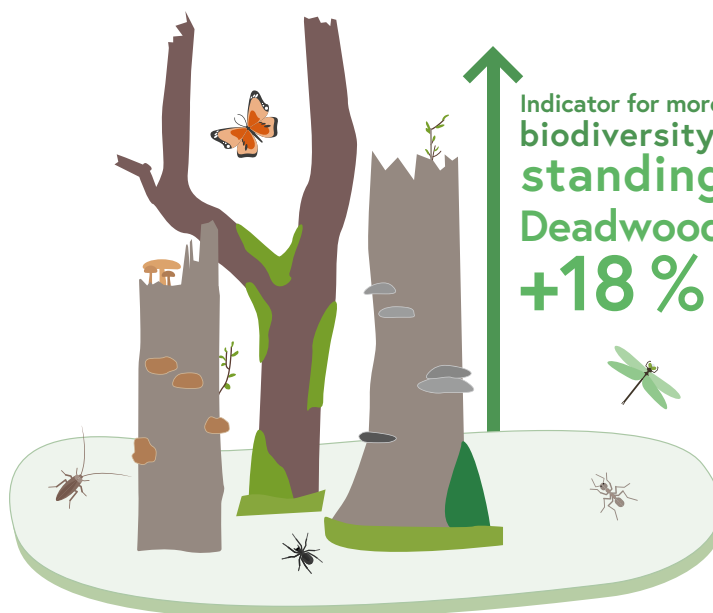
Regeneration should be able to emerge wherever it is required, even without protective measures and with species adapted to climate change.

rently not the case on 800,000 hectares of forest, and the rejuvenation deficit is a major problem particularly in protective forests. In addition, the existing regeneration on an area of 420,000 hectares is damaged by browsing. In order to begin reversing this trend, the affected areas will need to be reduced by half over the course of the coming years.

Bark-stripping damage remains at a high level. It has increased significantly in protective forests (by 11% compared to the Forest Inventory 2007/09) and impedes their protective function. It is therefore crucial to prevent further increase in stripping damage to protective forests in the future. This will require holistic approaches targeting the total game population and its fluctuation throughout the seasons as decisive factors.

More deadwood in forests

The habitat availability for animals and organisms in forests has improved, and biodiversity has further increased as a result. An indicator for this is standing deadwood, which has increased by 18% (compared to the Forest Inventory 2007/09) to 32.7 million solid cubic metres. Deadwood is a key factor for forest biodiversity. Around one third of Austria's forested area is protected according to international and European criteria. More on the efforts to maintain and improve biodiversity on page 26.



The Forest Fund, a support package for the future of our forests

The Austrian forests are under pressure from the effects of climate change: Extreme weather events, drought, and pest infestations lead to high amounts of damaged wood. The federal government has therefore established the Austrian Forest Fund to invest into sustainable and futureproof forestry. The ten measures supported by the Austrian Forest Fund (see page 11) are designed to promote climate-ready forests, increase biodiversity in our forests, and employ the resource wood as an active contribution to climate protection.

Where the Austrian Forest Fund works



The Austrian Forest Fund Facts

The Forest Fund aims to support managers of agricultural and silvicultural businesses, research institutions, and other funding applicants like agricultural associations, administrative bodies, etc.

1. Reforestation and care measures following damage events
2. Development of climate-fit forests
3. Compensation for value loss caused by bark beetle infestations
4. Establishment of wet and dry storage locations for damaged timber
5. Mechanical debarking and other preventive and protective measures
6. Forest fire prevention
7. Research activities on the topic of "Wood gas and biofuels"
8. Research focus "Climate-fit forests"
9. Increased usage of the resource wood
10. Preservation and promotion of biodiversity in forests

350 million euros investment volume

10 application areas

6 years duration until 2027

www.waldfonds.at

Our contribution to the UN Sustainable Development Goals

Austria has pledged to work towards implementing the 17 “Sustainable Development Goals” or SDGs defined by the United Nations by the year 2030. Our forests can contribute to almost all of these goals. Sustainable forest management is explicitly called for in Goal 15. The concept of sustainable forestry has a long tradition in Austria; is prescribed by the Forest Act and secured by corresponding governance instruments, such as subsidies and a well-functioning interaction of institutions and participation processes. In this context, the Austrian Forest Dialogue (Walddialog) is essential. It offers all stakeholders the opportunity to participate actively in shaping domestic forestry policy. More information can be found in chapters 4 and 5.

The 17 Sustainable Development Goals (SDGs) are political targets set by the United Nations (UN) to ensure sustainable development at the economic, social and environmental levels worldwide.

SUSTAINABLE DEVELOPMENT GOALS



Explore

Austrian Forest Inventory: www.waldinventur.at

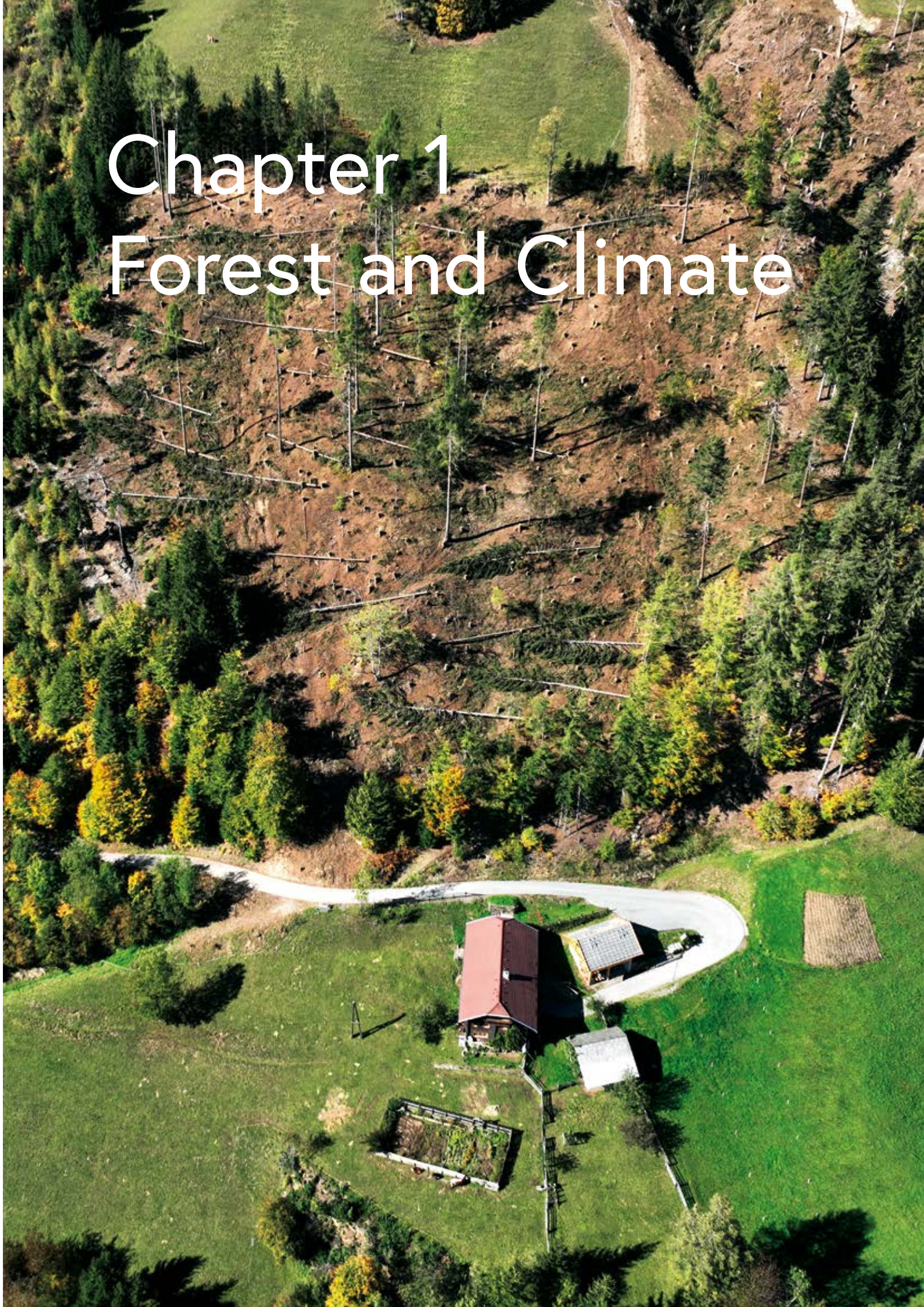
Austrian Forest Dialogue: www.walddialog.at

Austria's forests and the global sustainability goals:

<https://info.bml.gv.at/themen/wald/eu-international/Wald-und-SDGs.html>

Chapter 1

Forest and Climate



1.1 Effects of climate change on forests

Not all consequences of climate change are detrimental to our forests. But even the positive effects can have secondary negative ramifications. Over the past 50 years, the vegetation period in Central Europe has been extended by an average of ten days – in other words, trees have more time to grow. In addition, the increased concentration of CO₂ in the atmosphere has led to higher photosynthesis rates, meaning that trees are also better nourished. These effects of climate change result in more growth and higher productivity in plants, which is generally a positive development. But faster-growing trees also form wider growth rings, which in turn changes the characteristics of their wood. In addition, the faster growth caused by climate change causes trees to reach lower average ages and die earlier. Warmer springs also shift the time of budding further forward, increasing the incidence of damage from late frosts. Habitat expansion into higher mountain regions and the associated increase in wooded area is a double-edged sword as well, as it can result in displacement or loss of species living above the tree line.

Ecosystem services for society

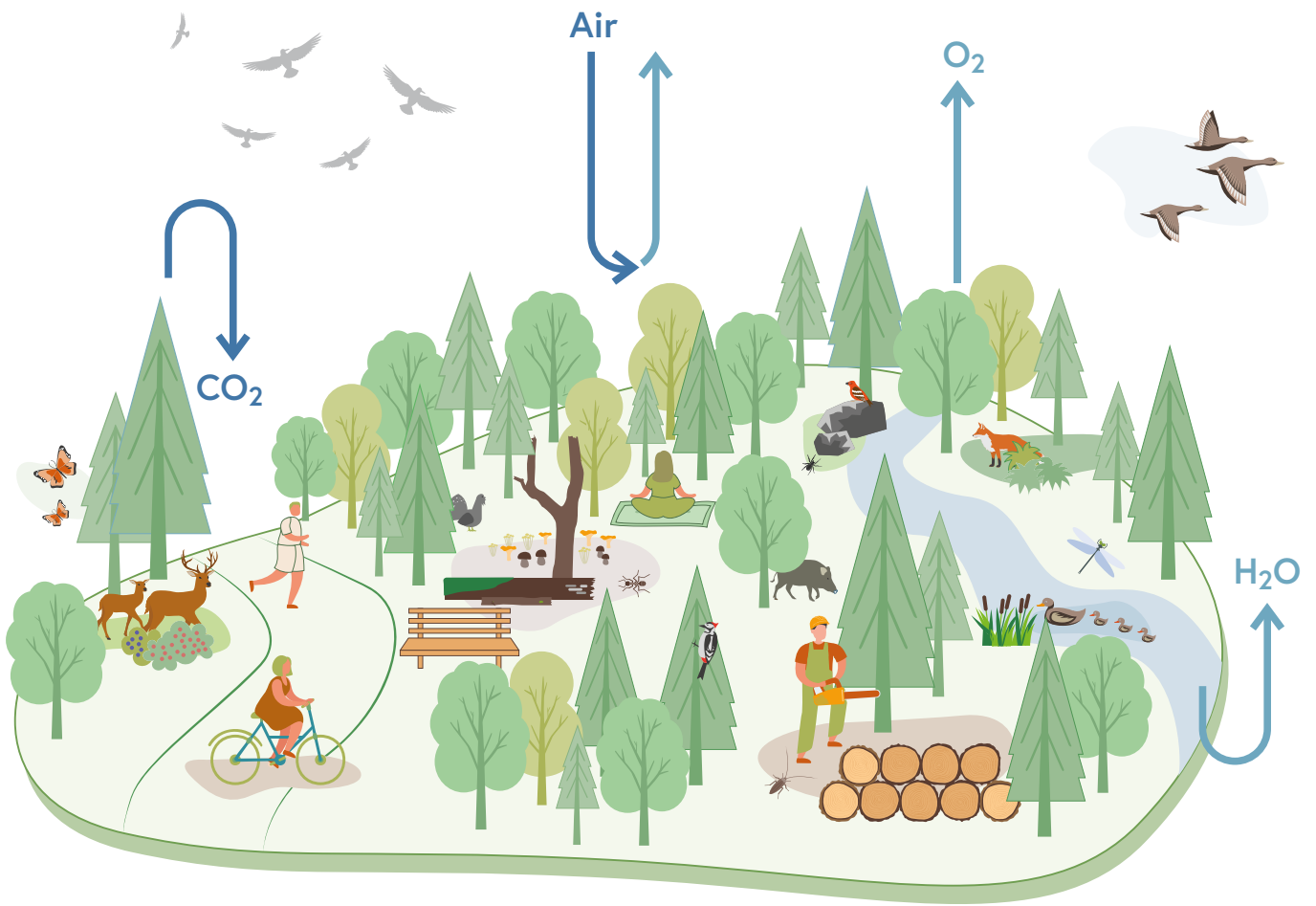
Naturally, individual and specific interests always affect whether changes are viewed as positive or negative. From the perspective of a spruce bark beetle, rising temperatures are a good thing: On the one hand, the aridity accompanying the heat weakens its food source, reducing the amount of sap with which healthy spruces defend against the beetle. On the other hand, the insects' transformation from larvae to mature beetles occurs more quickly in warmer temperatures, allowing up to four generations to develop each year. From the point of view of the people relying on forests for resources, however, these tendencies are tragic – for forests are not only important for their respective owners but provide valuable services for our entire society. However, only a healthy and stable forest is capable of optimally providing these ecosystem services. Therefore, humans are faced with the challenge of supporting the forest as best as possible in adapting to the changes.

Invisible adaptation in the forest soil

The warming of forest floors increases microbial activity, thus releasing more CO₂ from the soil into the atmosphere. A study including a long-term warming experiment near Achenkirch/Tyrol shows that trees in warmer soil form more fine roots to ensure their nutrient supply. Furthermore, the composition of soil microorganisms changes as well. Although this tends to introduce more CO₂ into the soil, it can be assumed that Austria's forest soil will lose CO₂ to the atmosphere in the long term as a result of climate change.

Online monitoring of bark beetle development

Massive proliferation of bark beetles, in particular the European spruce bark beetle, is facilitated when site conditions and weather patterns increase the susceptibility of spruces to infestation. The beetle's development is largely governed by temperature. The so-called PHENIPS model uses temperature threshold values and required heat summation to pret-



dict the development of bark beetles according to current weather data. The onset of swarming and infestation in spring, the development of broods, generational succession, and the pests' ability to survive winters are shown temporally and spatially in online maps. The Department of Forest Protection at the BFW maintains a website on bark beetles (www.borkenkaefer.at) that provides information on the beetle types and the current infestation status as well as explaining the symptoms and threats of infestation, the parameters affecting the beetles' development, and measures for timely detection and control of infestations.

Only a healthy and stable forest can optimally provide ecosystem services for society. These include purification of water and air, storage of CO₂, provision of the raw material wood, recreational value and the importance as habitat for animals and plants.

1.2 Shaping the forest of the future

The forest can exist without humans, but we cannot exist without it. Austria is a country of forests, with nearly half the nation's territory covered by trees that provide valuable ecosystem services for humans, animals, and other plants alike.

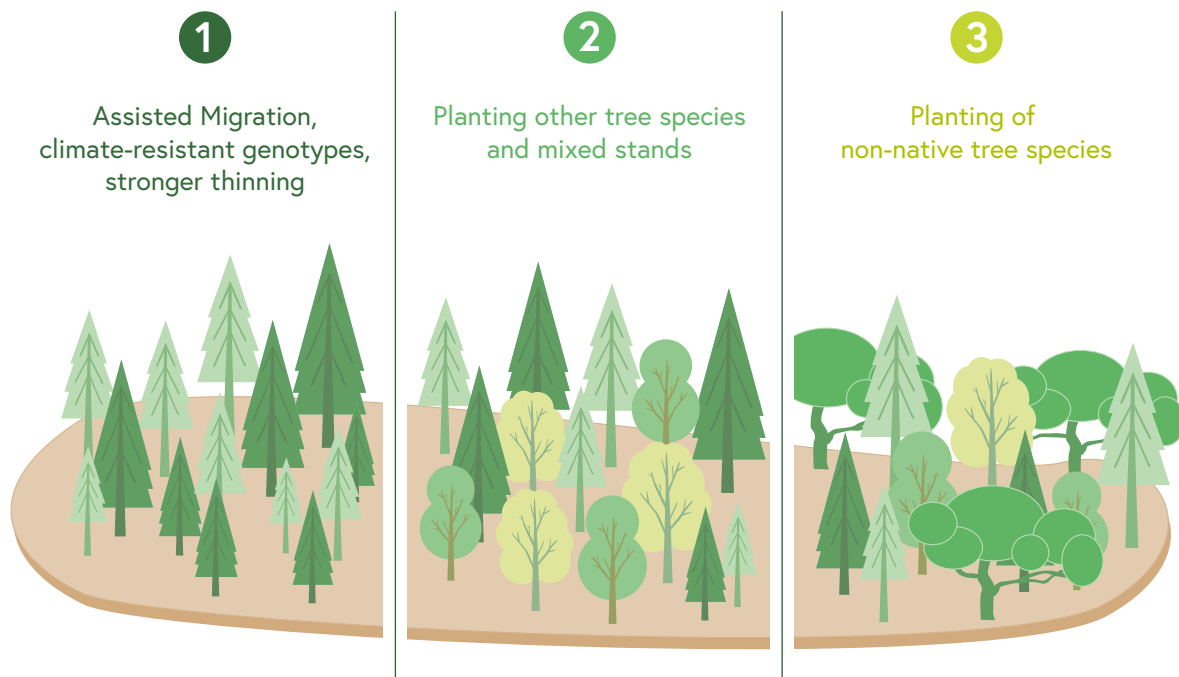
We want our future forests to continue protecting us from natural hazards, supply raw materials, offer habitats for a multitude of animal and plant species, function as CO₂ sinks, clean our air and drinking water, and relieve stress as areas of recreation. The healthier and more stable our forests, the better they can provide these ecosystem services. But climate change is weakening many tree species. Without human intervention, forests would eventually adapt to these changes, but the process of adaptation would require a very long time. With sustainable and site-specific forest management measures, we can facilitate the necessary developments while simultaneously influencing the direction of change.

Three strategies for adaptation

The composition of tree species will change in the future, with or without human intervention. Over time, various tree species will disappear while new ones appear and spread. Since we depend on the ecosystem services provided by forests, we must try to influence this development in order to maintain their health and productivity in future. Three potential strategies can be plotted for this purpose. The first of them aims to maintain and vitalise the current forest communities. For example, timely management measures and more thinning can contribute to making individual trees more stable and less likely to be thrown by storms or broken by snow. In addition, assisted migration should be employed as well. This involves using seed provenances from other regions, like the Balkans which already have similar climate conditions to the ones expected for Austria in the future. As climate change occurs much too quickly for trees to migrate or adapt naturally to the new conditions a process which can take thousands of years forests will need to be supported by afforestation and supplementary planting.

A healthy forest of tree species adapted to the location is the best precaution against the negative effects of global warming. In general, an increase of hardwoods is expected.





The second strategy sees forest adaptation facilitated by planting other domestic tree species in locations altered by climate change. For example, fir and pine instead of spruce, and the far more drought-resistant species oak and service tree as replacements for beech. A mix of species is important in this regard: on the one hand, to reduce the risk of one species failing and, on the other hand, to ensure the desired ecological services of the forest. In some areas of Austria, however – especially in the warmer regions of eastern Austria – many native tree species are already reaching their limits. This is where the third strategy of using non-native trees better adapted to future climate conditions can be useful. When applying this strategy, however, the requirements of the Austrian Forest Act must still be observed.

The three strategies to protect forest functions from climate change. Assisted migration uses seed origins from other regions, such as the Balkans.

Forest management is climate protection

Active and sustainable forest management is the most effective lever for protecting the climate and our forest habitats. Forest owners can apply for federal and regional funding programs to support their adaptation measures. Detailed information can be obtained from the responsible Provincial Forest Service.

1.3 The Forest protects our climate

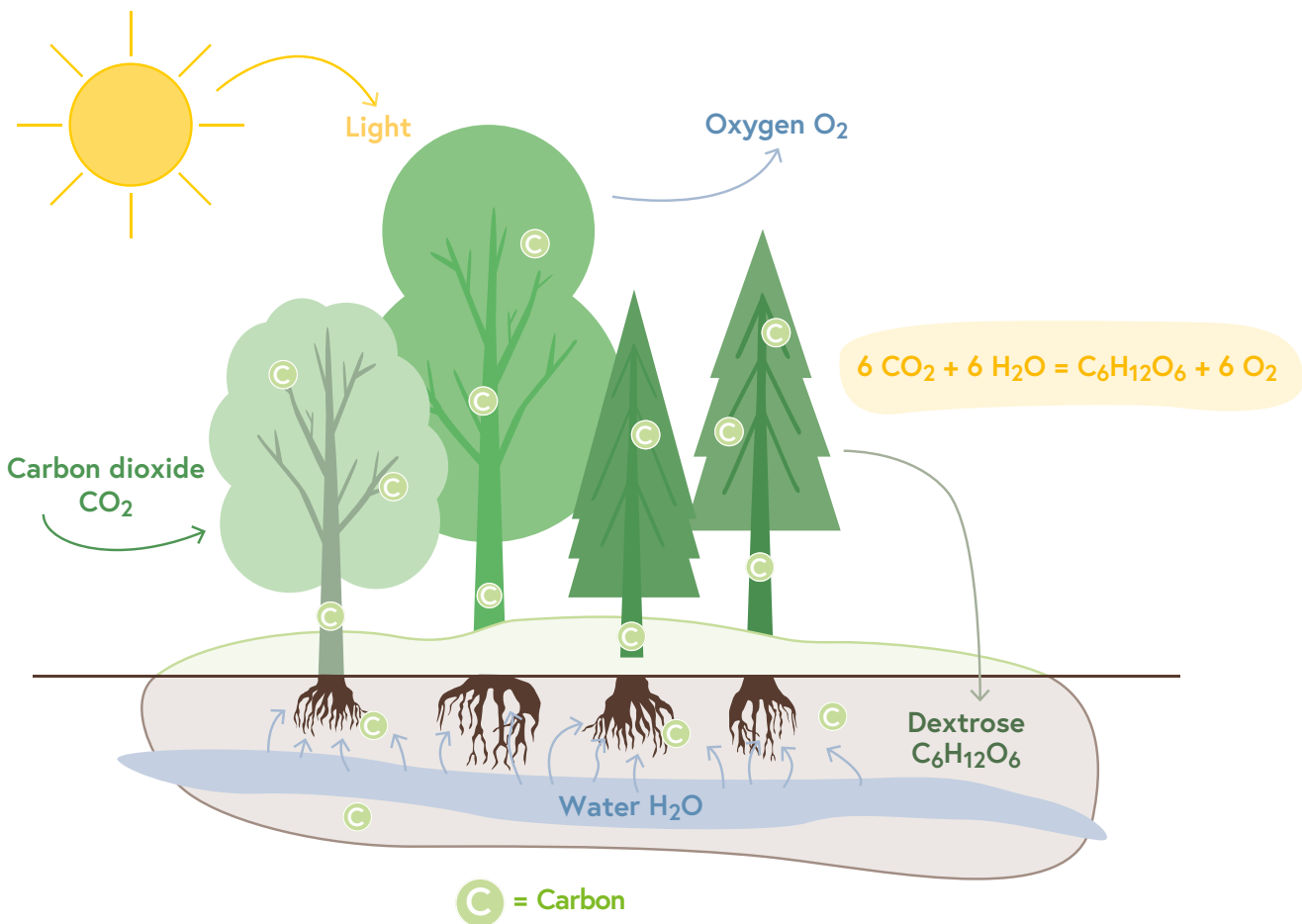
Trees help us to reduce the CO₂ concentration in the atmosphere. Does this mean we can just plant more trees and everything will be fine? Unfortunately, the solution is not that simple, for forests cannot simply be viewed as mere CO₂ storage units.

Their ability to absorb CO₂ from the air and store it in biomass as well as in the soil make forests valuable helpers with regard to climate protection. At present, 59% of the carbon stock of Austria's woodlands are bound in their soils. But the consequences of climate change also affect this storage capacity. Higher temperatures can cause more CO₂ to be released from the soil.

Climate-smart forest management is needed

There is also a risk of deteriorating growing conditions for forest trees due to more frequent heat waves and dry periods. As a consequence, trees become more susceptible to damage and some stands have to be used prematurely. Sooner or later, forests can go from being CO₂ sinks to being CO₂ sources, as illustrated by a 2021 study for the project CareForParis organised by the BFW, the Environment Agency Austria, and the University

During photosynthesis, the carbon atom C is taken out of carbon dioxide (CO₂) and stored in the form of (C₆H₁₂O₆) in the biomass and in the soil. The two oxygen atoms (O₂) are released back into the atmosphere.



of Natural Resources and Life Sciences Vienna (BOKU). The study shows that climate-smart and sustainable forest management is imperative in the long term in order to support the adaptation of forests to the ongoing changes. Even if no more trees are felled, they will eventually die on their own, rot and release the carbon they have absorbed.

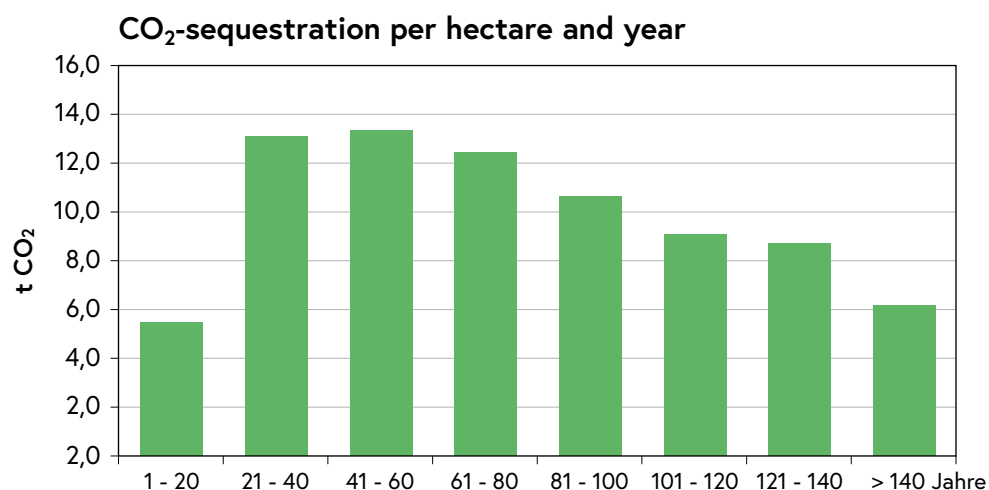
Forests as part of the solution

In order to make full use of the potential of forests and wood for reducing greenhouse gases, the results of the CareForParis study suggest two strategies:

- Replacing energy-intensive raw materials and fossil fuels with long-lasting wood products as an effective lever, to bind carbon in wood as long as the products made from it exist.
- Active forest management under the aspects of sustainability and climate fitness to ensure healthy and stable forests that are better able to cope with change.

Forests are not a cure-all for climate protection

Depending on the management scenario and even as a „primeval forest“, every forest will sooner or later become a source of CO₂. The forest is therefore not the universal remedy, but an important part of an overall societal concept in which lower energy consumption and the use of other climate-friendly technologies can help to achieve the goals of the Paris Climate Agreement by 2100.



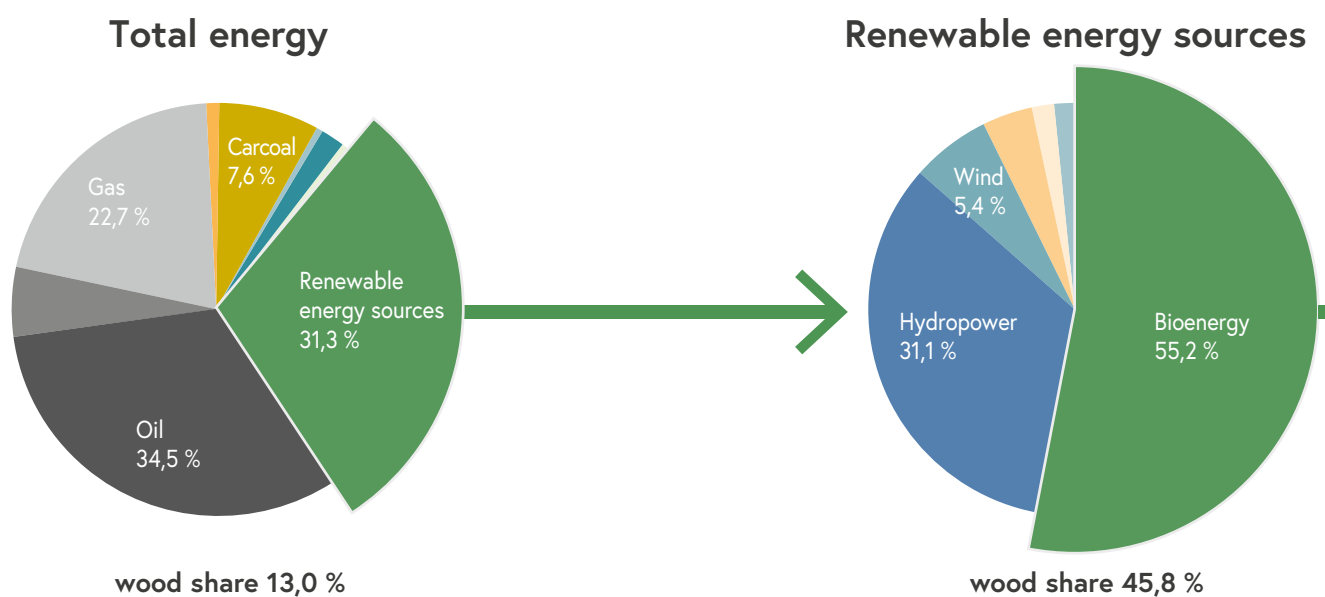
1.4 Energy from wood

The burning of coal, oil, and natural gas is doubtless the strongest driver of the climate crisis. Producing energy from wood is considered a climate-neutral alternative, even though CO₂ is released in the process. Is there even a way out of the fossil fuel one-way street? Trees absorb CO₂ from the air to grow and incorporate it into their leaf matter, their wood, and the forest soil in the shape of carbon. One cubic metre of wood stores around 750 kilograms of carbon. When a tree dies and rots on the forest floor, the stored carbon is released into the atmosphere again, where it exists as the greenhouse gas CO₂ until it is once again absorbed by an organism. When wood is burned, the same amount of carbon is released as if the wood had rotted.

Climate-neutral cycle

In this visualisation, all of the carbon existing on the planet is part of a cycle, namely as carbon dioxide in the atmosphere and in bonded form on the earth's surface. When viewed this way, burning wood is climate-neutral. Our massive problems are created by the fact that we are also releasing carbon bound in fossil fuels, which had previously been “bunkered” deep underground for millions of years. In order to fully replace oil and other fossil energy sources in our fight against the climate crisis, new technologies must be made more efficient.

Climate-neutral wood plays an important role by bridging the gap between the climate-damaging fossil fuels of the past and present and even more climate-friendly new

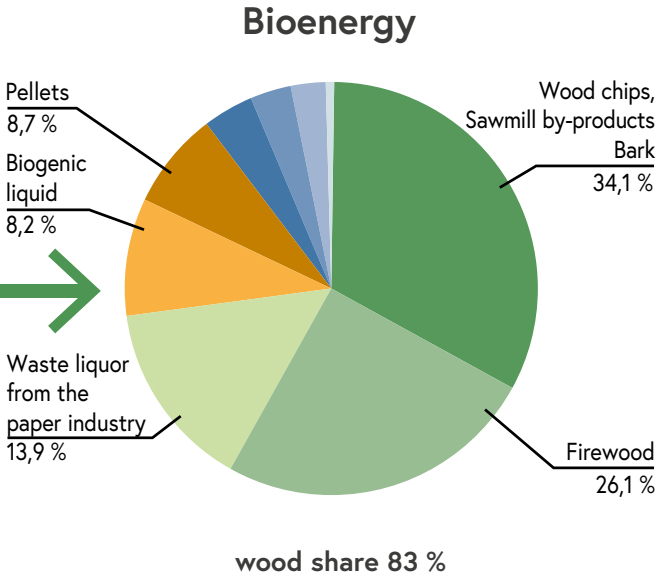


technologies of the future. Sustainable and climate-smart management of our forests optimises the absorption and sequestration of carbon. Trees felled during harvest or as part of forest management measures are utilised in the best possible way, with some being turned into long-lasting wood products in which the carbon remains bound. The by-products of forest management and wood processing are used for energy production and replace fossil oil, gas, and coal.

Generating value within the region

The fear of large quantities of fine dust resulting from wood burning is unwarranted when modern heating systems are used. It is mostly generated in older multi-fuel furnaces that are not optimised for burning wood. Modern wood-burning systems with properly regulated firing chambers produce only minimal fine dust emissions.

Wood fuels represent the largest share of biomass used for energy production (bioenergy) at around 83%. Biomass in turn is used to produce more than half of all renewable energy. However, the share of renewables in Austria’s overall energy consumption is only around 31%. If we wish to stop using the fossil energy sources oil, gas, and coal by 2040, a fundamental transformation of our energy system is required in which all renewable energy technologies are optimally developed. At the same time, our total energy consumption must be reduced. This gives us a chance to use our energy system to generate regional value.



Source: Statistics Austria, Energy balance 2021

1.5 Forests protect: Many challenges, strong solutions

Healthy protective forests are especially important in Austria. Sadly, reality often does not reflect this importance, as there is frequently a lack of rejuvenation. What measures are needed to ensure our forests can still protect us from natural hazards despite climate change? In a mountainous country like Austria, large parts of our territory would be uninhabitable without functioning protective forests. Of the entire forested area, 42% or 1.6 million hectares are classified as protective forests. Protection against natural hazards is an ecosystem service that forests can best provide if they are healthy and stable. However, the results of the Austrian Forest Inventory show that the protective forests in many regions are not in good condition.

Rejuvenation needed in many areas

A primary reason is the lack of young trees in around half the protective forest area in need of constant rejuvenation. Deer and chamois are moving to areas less accessible to humans so as to avoid pressure from hunting and disturbances from recreational activities. Only around 30% of the protected forest sites where rejuvenation is required and present are not damaged by game browsing. The risks associated with climate change, like intense forest fires and severe storms, pose additional problems – and as mentioned above, pests benefit from the higher temperatures as well.



Steep terrain, shorter growing season and poor soils the conditions in the mountains are a challenge for tree growth.

Forests protect others and themselves

- Object protection forests protect people, settlements, cultivated land or infrastructure from hazards such as avalanches, rockfall or landslides and allow rainwater to seep away quickly.
- Site protection forests preserve their own site if it is at risk due to the erosive forces of wind, water or gravity.

Action programme for protective forests

The steep slopes and lack of roads and other infrastructure in many protective forests make forest care and management in these sites difficult and expensive, and necessary measures are therefore often not taken. These measures are needed to ensure the longterm health of our protective forests and help them adapt optimally to the effects of climate change, however. To meet the challenges of the future, the federal administration has developed the action programme “Wald schützt uns!” (Forest protects us!) together with various partners to ensure climate-ready, sustainable, effective, and resilient protective forests in Austria. It comprises investments and funding programmes, protective forest research, a push for digitalisation, and the awareness building for the benefits provided by green protective infrastructure. One successfully implemented goal is the establishment of the Protective Forest Centre at WALDCAMPUS Austria in Traunkirchen, a cooperation between the Forest Engineering Service for Torrent and Avalanche Control (WLV) of the Federal Ministry of Agriculture, Forestry, Regions and Water Management (BML), the Austrian Federal Forests (ÖBf), the BFW and the University of Natural Resources and Life Sciences Vienna (BOKU). The institution’s purpose is to jointly initiate and implement long-term projects contributing to the improvement of protective forests. Among its tasks are knowledge transfer and awareness building, education, and the establishment and management of a model torrent drainage area for teaching and research.

Protective Forests in Austria

- Almost every fourth Austrian benefits from the protective effect of the Austrian forest.
- Around 16% (or 615,000 hectares) are forests with object protection function.
- There are more than 600 protective forest communities with a share of more than 50% protective function against natural hazards in the local area.
- The federal government invests 15 million euros annually in area management projects with a focus on forests with object protection function.

Forestry & Hunting Dialogue

In many areas, game influence causes problems for the forest and thus for its effects. Browsing by game affects regeneration and the healthy, climate-friendly development of the forest. The BFW's game impact monitoring also proves this.

The Forestry & Hunting Dialogue (Forst & Jagd Dialog) was launched in 2012 and, with the Mariazell Declaration, has set itself the goal of promoting balanced forest and wild-life ecology conditions nationwide. In order to achieve this goal, the Forestry & Hunting Dialogue relies on awareness raising, communication and motivation for joint solution strategies of forest owners and game managers.

The expert panel of the Forestry & Hunting Dialogue consists of representatives of hunting associations, forestry and science and is supported in its mission by renowned organisations, associations and companies as well as by the Federal Ministry of Agriculture, Forestry, Regions and Water Management.

The annual reports of the Forestry & Hunting Dialogue provide an overview of new measures and activities. For example, recommendations for wintering concepts for red deer were issued in 2022, a certificate course in forestry & hunting education was established and professional hunting training was modernised.

Explore

www.schutzwald.at

www.forstjagddialog.at

www.klimafitterwald.at

Tree species recommendations: www.klimafitterwald.at/baumartenampel

Information portal bark beetle: www.borkenkaefer.at

Information on subsidies: <https://info.bml.gv.at/service/foerderungen.html>

Bark beetle risk analysis:

iff-server.boku.ac.at/wordpress/index.php/language/de/startseite/phenips-online

Project: „CareForParis – der Wald als Kohlenstoffspeicher” under www.bfw.gv.at

www.biomasseverband.at

www.energyagency.at

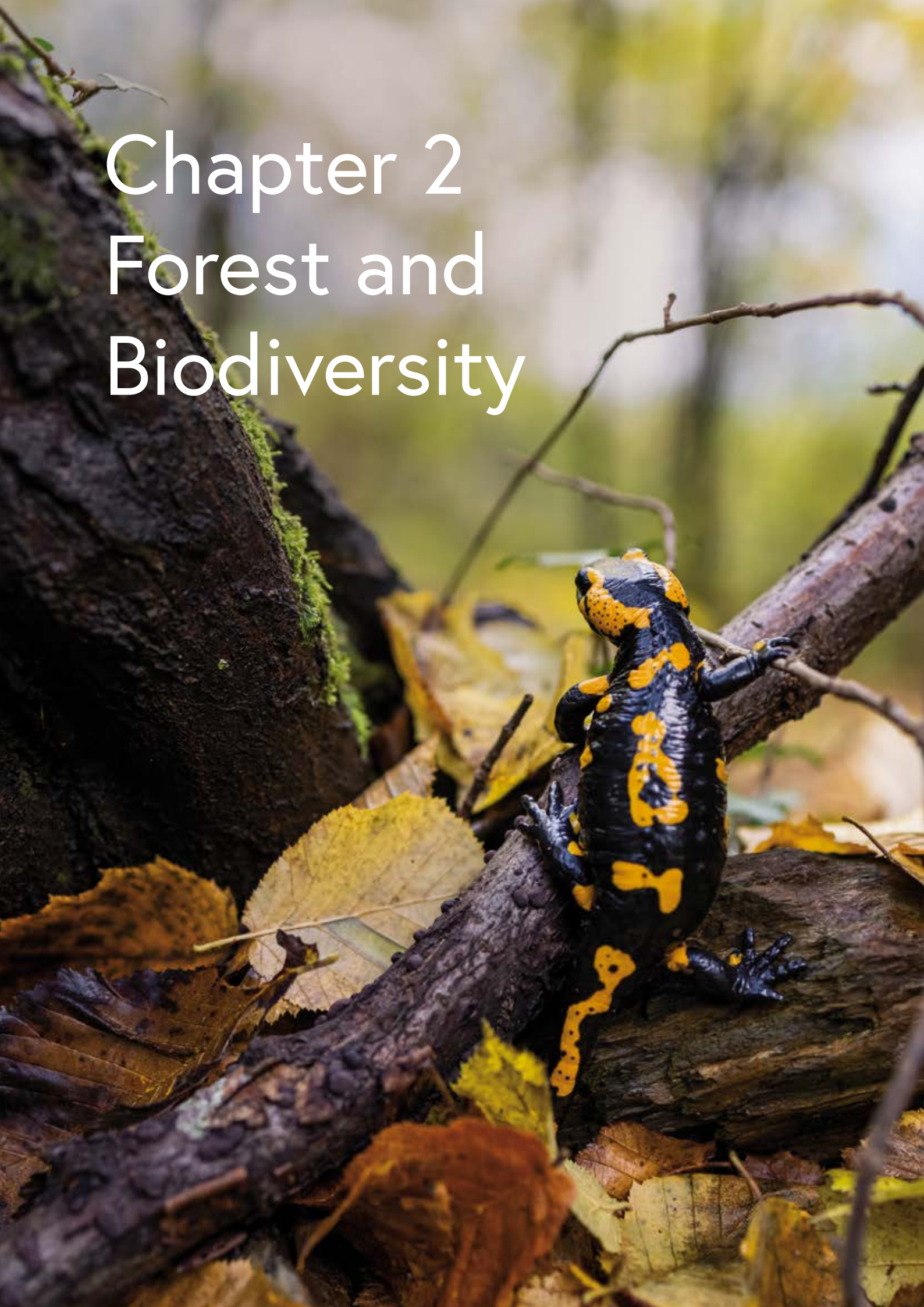
www.waldcampus.at

www.statistik.at

www.wildeinflussmonitoring.at

Chapter 2

Forest and Biodiversity



2.1 The state of biodiversity in our forests

Besides climate change, loss of biodiversity is one of the greatest global challenges faced by humanity. By international comparison, Austria is in a relatively good position in this regard, but not everything is ideal in our forests.

The “Land of Mountains” is one of the species-richest countries in Central Europe. Its area of about 8.4 million hectares is home to around 68,000 different species. Roughly 45,000 of these are animals, of which about 40,000 are insects. There are 65 native tree species, but of course forests are not made up exclusively of trees. It is estimated that two thirds of all native animal and plant species live in forests or require forests to survive.

The term „biodiversity“ is composed of three aspects. First, it encompasses the genetic diversity within a species, which means a diversity of varieties or breeds. The second area is species diversity itself, i.e. the number of animal, plant and fungal species. And the third is the diversity of ecosystems, i.e. the coexistence of different habitats such as wetlands, forest types or dry grasslands. The worldwide loss of this diversity is, along with global warming, the greatest challenge facing humanity.

Monitoring and managing biodiversity

Austria’s forests have been used and managed by humans for centuries. Forest pastures and litter use shaped the state of our forests until well into the twentieth century, and the emergence of industry meant firewood was also used for the production of salt and iron. The natural development of forests occurs in phases: In managed forests, the primary focus is usually on the development and optimal phases (spanning the period from 10 to 100 years), while the decomposition and rejuvenation phases of forest stand are kept as short as possible or skipped completely. This results in a frequent lack of old trees and deadwood.

Supporting the richness of species and structures

Appropriate management can allow the biodiversity of forests to be maintained and promoted. These measures include allowing old and thick trees with microhabitats to remain standing, preserving humid and dry biotopes, and leaving piles of branches, log heaps and stone walls untouched. The more habitat trees and microhabitats are present in a forest stand, the more the species richness associated with them is promoted. Nevertheless, managed forests will likely always have to strike a compromise between wood production and preserving biodiversity. Unfortunately, tree microhabitats do not develop overnight, and measures to promote and maintain the variety of species and structures in our forests should therefore be taken today. Besides forest type, the stand age,



the intensity of management, and the potential existence of rare, specialised species are important factors in this regard.

Biodiversity comprises the three levels of genetic diversity, species diversity and ecosystem diversity.

The Biodiversity Index shows development

There are many ways to measure forest biodiversity, since it encompasses far more than the mere number of species in a forest. It also includes the gene pool as well as the richness of structures and functional processes required to deliver the many services provided by forest ecosystems. Almost ten years ago, the Forest Biodiversity Index was developed at the BFW to visualise the development of biodiversity within Austria. The index calculated for the entire national territory indicates a relatively high level of biodiversity in our forests.

Over the past decades, biodiversity has continually improved in Austria – not least due to the strict requirements of the Forest Act. This is immensely important especially for rare species like the 581 animal and 167 plant species occurring exclusively in Austria. Our great species richness is unparalleled in Central Europe.

Influence of global warming

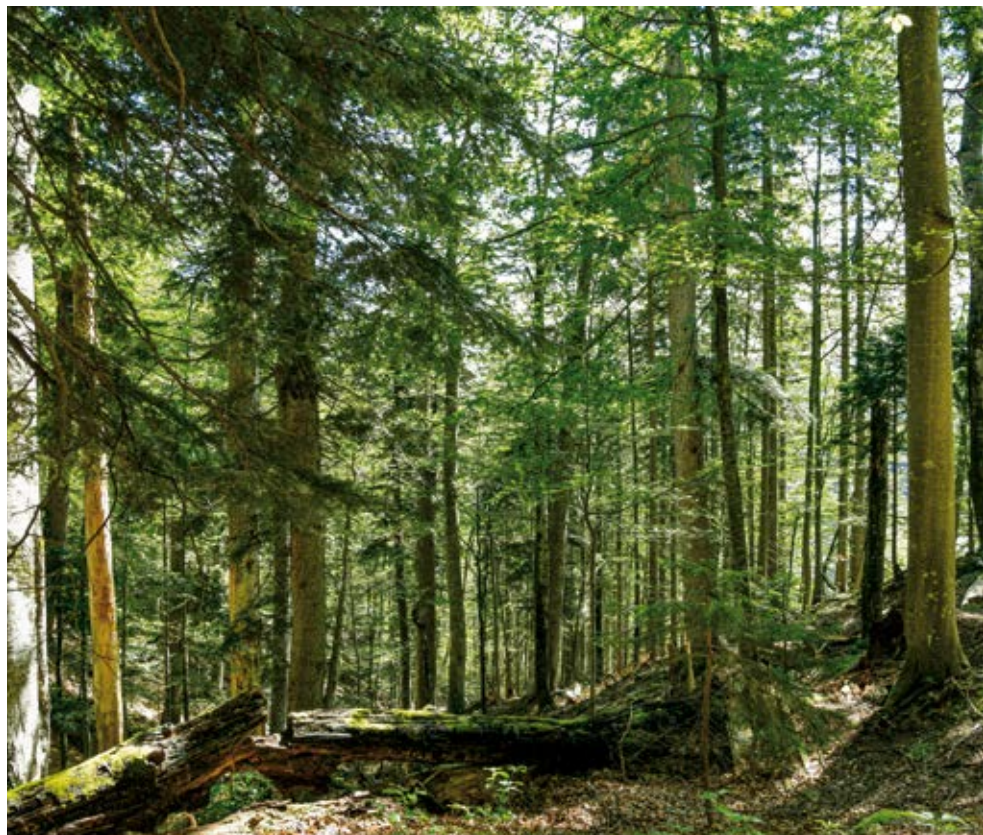
Natural factors have a significant effect on the appearance of forests. Societal influences like population development, changes in land use, emissions from traffic and industry, and usage for silviculture, hunting, or tourism also have a strong impact. The consequences

of climate change are now also affecting these existing systems. Under these circumstances, preserving biodiversity and helping forests adapt to climate change are the greatest immediate challenges.

Measures also improve climate fitness

Profitability and nature preservation do not have to be mutually exclusive within an overall concept of natural forest management, as successful examples from silvicultural practice prove. In this context, the selection of suitable tree species and provenances is one of the most effective instruments for protecting and increasing biodiversity. A similarly effective and relatively easily implementable measure is promoting the quality and quantity of deadwood, which is essential as a valuable habitat for a multitude of plants, animals, and fungi. Trees with no economic value due to their growth habit or damages should also be left standing in some places. As habitat trees, they significantly increase the habitat diversity of a forest stand.

Management measures like more thinning, establishment of mixed stands, and reduction of game populations ensure greater tree species diversity in the course of rejuvenation while simultaneously contributing to climate change adaptation. The use of site-suitable, non-native tree species and provenances can likewise have a positive influence on biodiversity.



The natural forest reserve „Primeval Forest Selkach Part“ is located on the northern slope of the Kahlkogel, southern Carinthia, and is very rich in deadwood.

2.2 Protect and reconnect habitats

Motorways, intensive land use, and urbanisation cause widespread fragmentation of landscapes, which is considered one of the key reasons for biodiversity loss. Many projects therefore aim to re-establish the connections between natural spaces and forests. An additional factor besides fragmentation is climate change, which has severe consequences on species and entire biological communities. There are numerous efforts in Austria to preserve, restore, and improve valuable forest areas. A further goal is to promote the functional connectivity between individual areas.

Options for forest managers begin with retaining habitat trees with microhabitats in the square decimetre range and extend to the establishment of stepping-stone biotopes (between 0.5 and 25 hectares) and natural forest reserves (less than 20 to more than 100 hectares).

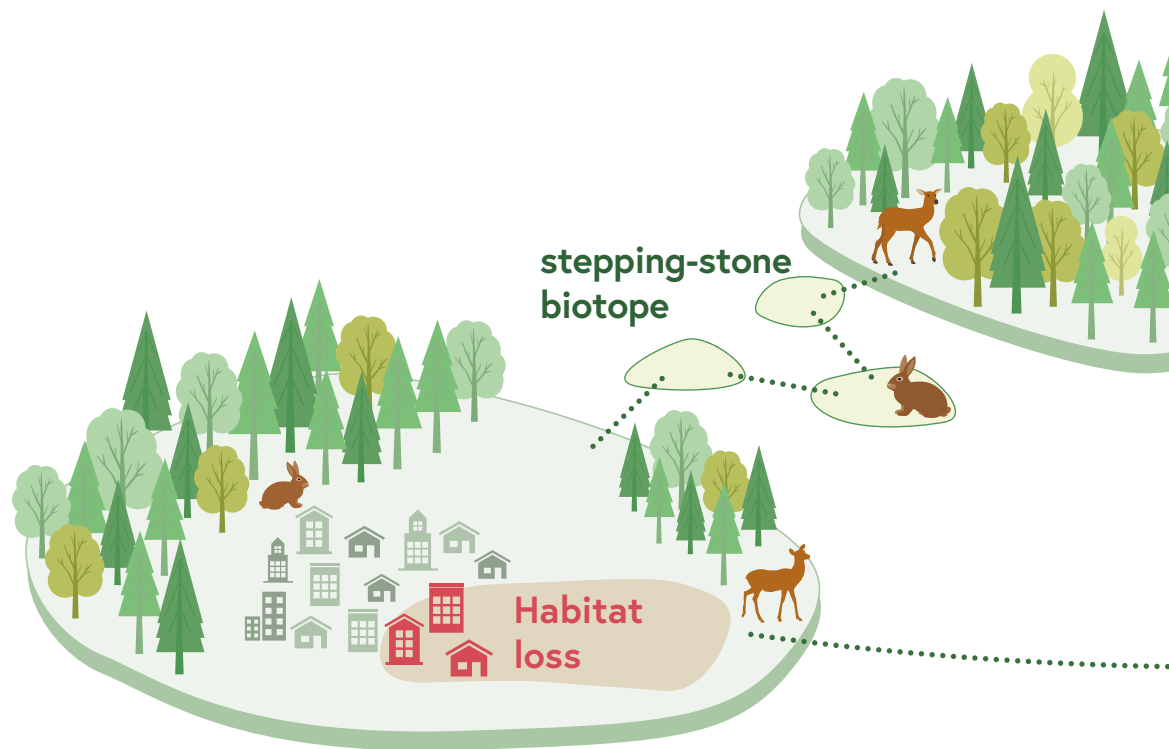
Especially for protected areas, these connections are the basis for ecological processes like gene flow and migration. They also offer endangered animals, plants, and fungi under pressure from climate change the opportunity to find new suitable habitats or recolonise areas. If a certain structural diversity exists in a forest ecosystem, there is an excellent probability that biodiversity will also be high. Structural diversity includes aspects like the presence of deadwood or tree microhabitats – the Alpine longhorn beetle, for example, prefers fresh beech deadwood for laying its eggs.

Around one third of Austria's forest area is protected

According to the European Environmental Agency, around 29% of the territory of Austria are protected areas as per the criteria of the IUCN (International Union for the Conservation of Nature). 31% of Austria's forested area – a total of 12,512 square kilometres – are protected according to international and European guidelines. The stepping-stone and natural forest reserve programmes of the BFW will soon add significantly to this total, improving the connections between larger reserves and thus further increasing the biodiversity of our forests.

The Austrian national parks protect key natural areas covering around 2,391 square kilometres, or roughly 3% of the federal territory. There are currently six national parks: Donauauen, Kalkalpen, Gesäuse, Neusiedlersee-Seewinkl, Hohe Tauern (the largest by area), and Thayatal. They protect unique habitats in which development without human intervention is allowed and biodiversity is preserved.

The Wilderness Area Dürrenstein-Lassingtal in south-western Lower Austria is currently the only such territory in the country and houses the largest remaining patch of primeval forest in the Alpine space, the Rothwald (420 hectares). The Wilderness Area has been gradually increased to its current size of 3,400 hectares and has been under IUCN protection since 2003. There are also other types of protected areas in Austria that aim to prevent interference in ecosystems and thus approach the notion of true wilderness, like the core areas of the Biosphere Parks and other nature protection areas established by the provinces.

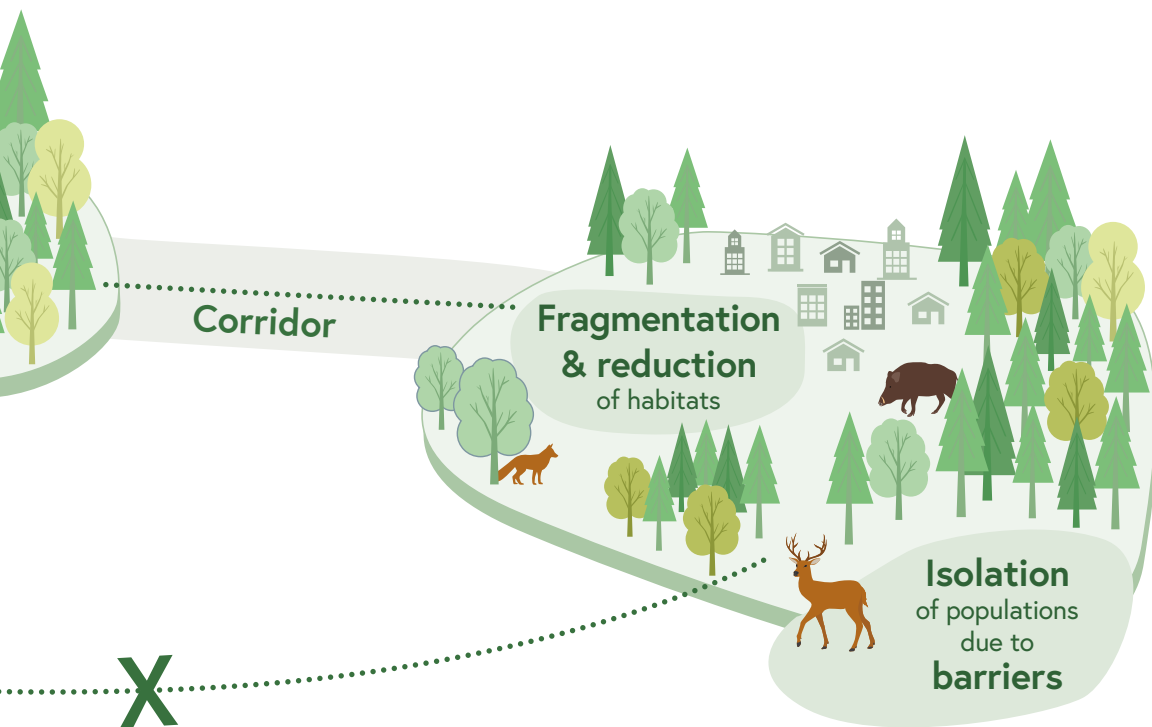


Contract-based Nature Conservation – A success story

Many of these protected areas build on the concept of contract-based nature conservation, in which forest owners receive a compensation for discontinuing economic use of the respective forest areas. This is also the strategy pursued by BIOSA, a voluntary association of owners of agricultural and silvicultural lands who have privately agreed to dedicate selected areas to cultivated landscape research and other scientific projects as well as the development of a new dynamic notion of conservation. BIOSA manages more than 3,500 hectares of contractual conservation area.

Natura 2000

The Natura 2000 network of protected areas is designed to ensure long-term protection of the European natural habitats. The legal foundations for the protection of biotopes and species within the European Union are the Birds Directive and the Habitats Directive. As of January 2022, the Natura 2000 network includes 350 areas in Austria, of which 281 are legally defined as European Protected Areas. They cover a total of 15.1% of the federal territory; 42% or around 530,000 hectares of this area are forests. The network comprises already dedicated protected areas like national parks, nature reserves, and protected landscapes and landscape parts as well as areas outside of internationally recognised protection categories.



Large-scale fragmentation of the landscape creates isolated populations of animals and plants. In order to connect the habitats, stepping stone biotopes are created, among other things, which again enable connectivity between populations.

Planning for microhabitats

So-called microhabitats, meaning small or specially delimited habitats, are not always apparent at first glance. They include structures like caves, crown deadwood, excrescences, or fungal fruiting bodies. For example, the tinder fungus (*Fomes fomentarius*) provides food for the beetle species *Dorcatoma robusta* with its trama (in the cap and stalk), *Pteryx suturalis* with its spores in the gills, and *Peltis grossa* with its mycelium, the threads between the fruiting body and the tree trunk.

Upon arrangement with forest owners, areas left to natural development are defined; here, trees are allowed to age and complete their entire life cycle. For a functional network of typical natural forest structures, managed stands with many habitat trees should also be planned. Habitat trees in productive forests are marked and left standing during harvesting.

What is a stepping-stone biotope?

Besides existing protected areas, ecologically valuable forest areas include small stepping-stone biotopes and corridors. They serve as refuges for many species like mosses and lichens and enable the connection of otherwise isolated areas. This improves the ability of species with limited vagility to spread.

The project “ConnectForBio” established at the BFW allows areas valuable from a conservation perspective to be designated as stepping-stone biotopes. Around 950 hectares are planned in a first step, with the follow-on project “ConnectPLUS” scheduled to add a further 400 hectares (www.trittsteinbiotope.at). In order to ensure an optimal networking effect, areas to be connected (like national parks and wilderness areas) and suitable linking areas are identified. Preferred are areas with habitat tree groups, a high proportion of deadwood, new tree growth after bark beetle infestations, and riparian forests with large shares of beech.

Natural Forest Reserve Programme

Established in 1995, the Natural Forest Reserve Programme supports the promotion of biodiversity in forests. In addition, monitoring and research are conducted on these sites, and they are used for education and excursions. As of February 2023, there are 193 natural forest reserves in Austria covering a total of 8,666 hectares. These areas are removed from commercial use in agreement with their owners: All wood removal and other silvicultural use (except for hunting) ceases and the forest ecosystem can develop naturally.

Explore

www.naturwaldreservate.at

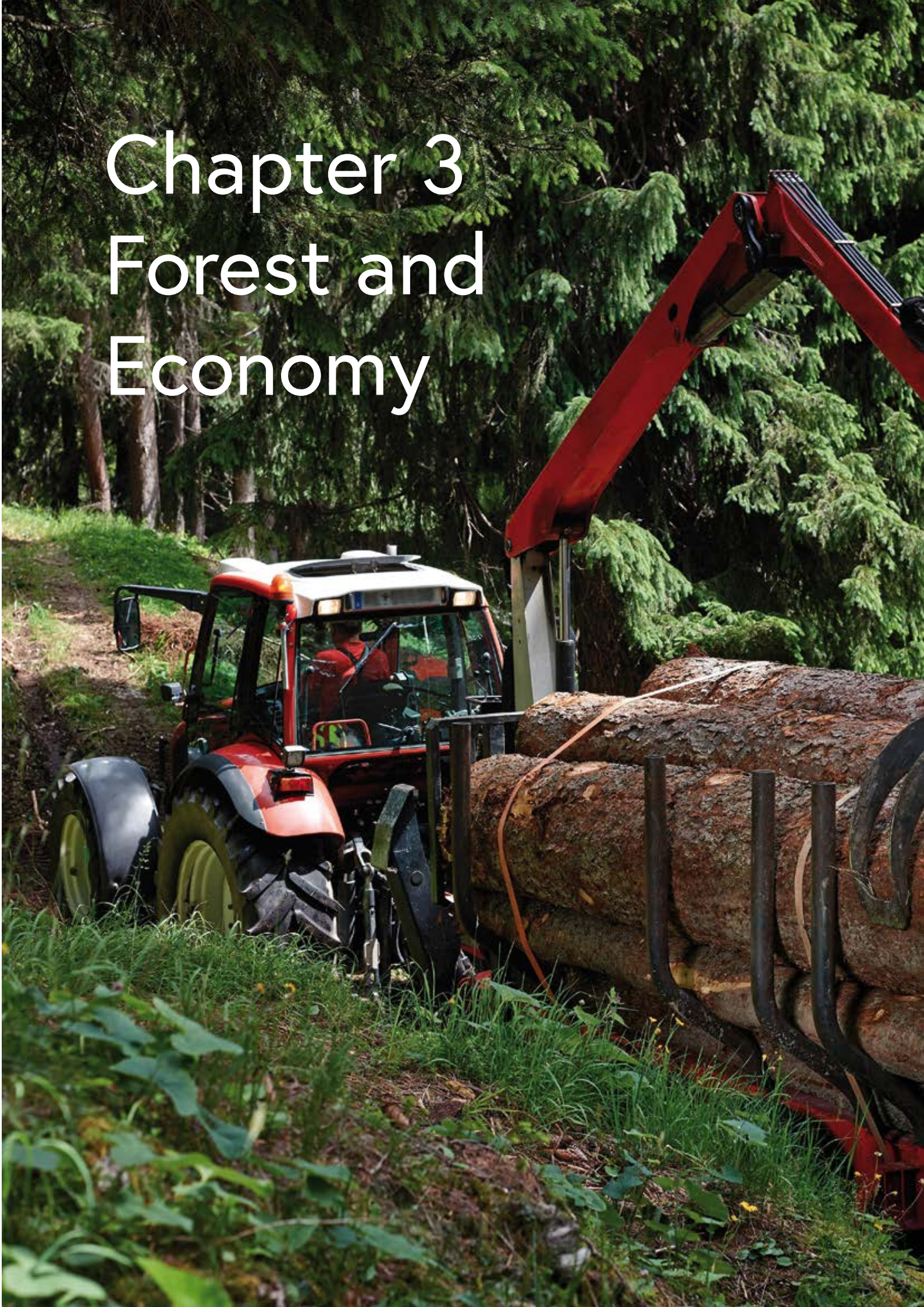
www.trittsteinbiotope.at

www.nationalparke.at

www.biosa.at

Biodiversity Index Forest, BFW-Bericht 149: www.bfw.ac.at/webshop

Chapter 3 Forest and Economy



3.1 Who owns Austria's forest?

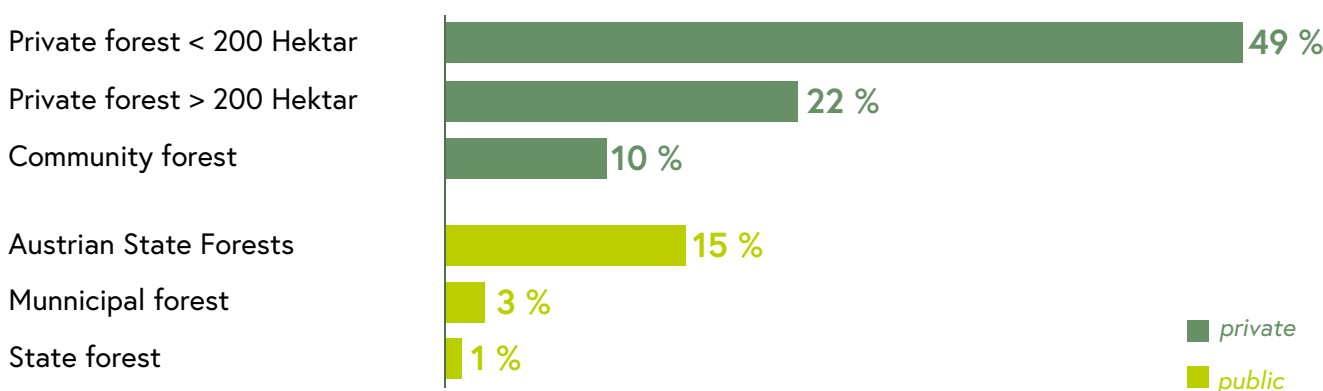
Almost half of the federal territory is wooded, amounting to an area of around 4 million hectares according to the Forest Inventory 2016/21. Austria's forests are largely in private ownership. According to the Agricultural Structure Survey 2020, around 137,000 owners hold 81% of the forest area. This places Austria in second place within Europe behind Portugal by share of private forest ownership. The remaining 19%, the so-called "public forests", are managed by the Austrian Federal Forests, communities, and provinces. Austria's private forests consist mainly of farmer family-owned areas, most of which are relatively small. Owners with less than 200 hectares and thus considered "small forest owners" hold an average forest area of 9.2 hectares per business (equivalent to around 13 football pitches). Around 30% of Austrian forest owners are female, and together they own roughly a quarter of the total forest area.

New Forest owners

Around 59,000 forest owners manage properties smaller than 5 hectares. This group traditionally includes most agriculturists, who use their forests to cover their own demand for wood products and occasionally to finance larger investments.

The ongoing structural shifts in rural areas have changed circumstances for many farmers. While agricultural land is transferred to other agriculturists through sale or lease and continues to be used for farming, forests often remain in family ownership, frequently being transferred within families by way of inheritance. The small size of many forest properties means that turning relevant profits is often impossible. The interest in these "family forests" and their management is correspondingly also often low or only emotional. People owning these kind of forests are described as the "new forest owners".

Forests in private and public ownership



Societal changes affect forest ownership

The mentioned structural change has also reduced the traditional connection between forest ownership and farms. A study by Høgl et al. (2005) at the University of Natural Resources and Life Sciences investigated who the “new” forest owners are and how they view their forest properties.

Around one third of all forest owners are so-called “non-farming” owners who often no longer have an economic attachment to their forests; the aspect of income from forestry plays a subordinate role for them. The greatest motivation for this group to manage their property is to keep or make the forest of their ancestors healthy and climate-fit. The group includes former agriculturists, urban forest owners, and non-agricultural owners. Former agriculturists are persons who grew up in farming enterprises but whose forests are now no longer part of farms. In terms of size, their wooded properties are usually small or very small. They mostly view their forests as places for recreation, and if they do perform silvicultural work, its purpose is often that of providing a balance for their daily jobs and activities. Urban forest owners generally live in larger communities far away from their forests and often have practically no professional connections to agriculture or silviculture. Around three quarters of them own less than 5 hectares of forest and use only small quantities of wood, mostly as firewood. By contrast, the non-agricultural forest owners tend to live in small to medium-sized communities. They share the lack of professional connections to forestry with the urban owners, and more than one third of them became forest owners through purchase. To these owners, their wooded property generally does not represent a source of income; instead, the purposes range from recreation and nature conservation to simple pride in ownership.

3.2 Forests as workplaces

20,500 people in Austria work in forests. In 2021, the Agricultural Labour Act, which also governs work in forestry, was federally harmonised. Besides an enhancement in labour laws, this created an instrument designed to make the industry more attractive with regard to its seasonal dependence: Regional pooling by businesses allows workers to be hired year-round, thereby helping to prevent precarious employment in the industry. Over the past ten years, the number of workers – especially in the primary sector – has been decreasing. On the one hand, forest owners have been outsourcing harvesting work to companies, and on the other, modern silvicultural equipment has increasingly automated the wood harvest.

The higher the rate of fully mechanised harvest using harvesters and forwarders, the fewer workers are required. Roughly speaking, one harvester does the work of ten forest workers each day. But while working with machines improves occupational safety, it is not always possible – especially in rough and steep terrain as well as during the especially dangerous clean-up work after storms and similar damaging events. Since 2015, the share of felling using harvesters has increased significantly.

Cable logging, clean-up work, and planting are areas for which not enough workers are available in Austria. Extraordinary events like bark beetle infestations can increase the



demand for short-term labour and seasonal workers. Overall, 15% of all forestry enterprises employ commuters from abroad. Besides experienced forest workers, trained unskilled labourers are employed seasonally as well. Low-threshold employment offerings are important to increase employment security and occupational safety.

According to the General Accident Insurance Agency (AUVA) and the Social Insurance Agency for the Self-Employed (SVS), there were a total of 1,040 recognised workplace accidents in the forestry industry in 2021, 29 of which were fatal.

Information on accidents and their prevention is provided by the Kuratorium für Verkehrssicherheit (Traffic Safety Board) and the Allgemeine Unfallversicherungsanstalt (General Accident Insurance Agency). In order to improve safety in forestry – also in the private area – various institutions offer training courses for the European Chainsaw Certificate. This certified training helps to make forest work in Austria safer. The Forest Training Centres in Ossiach and Traunkirchen (operated by the BFW) as well as in Pichl offer a wide variety of training and education courses.

Sustainable planning and implementation: Forest roads

Roads are needed to harvest wood in forests. With 45 metres of forest road per hectare, Austria is considered well developed in terms of access to its forests. According to the Forest Inventory, the total length of all forest roads in Austria is 150,000 kilometres. There is little information regarding the condition of most of this infrastructure, however. Plans exist to record the state and location of forest roads automatically in future by way of remote sensing so as to determine the need for maintenance measures or new construction – for if a bark beetle infestation requires immediate action or a forest fire or accident necessitates access by emergency services, forest sites need to be easily reachable.

The Austrian Research Centre for Forests awards the quality label “Certified Austrian Forestry Business” indicating ecologically and socially responsible activity by the respective enterprise. More information can be found at www.zoefu.at. Concepts like social forest work can represent a sensible addition in the context of care and planting activities.

Forestry education system

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| | | | | | | | | 14 |
| Practice, related professions | skilled forest worker examination | skilled forest worker examination | skilled forest worker examination | skilled forest worker examination | skilled forest worker examination | skilled forest worker examination | skilled forest worker examination | |
| 15 years and 3 years apprenticeship with 3 x 9 weeks vocational training school | special apprenticeship training | 3 years of agricultural college, skilled agricultural worker | 3 years of practice, at least 240 hours of courses, 20 years | 3 years of practice | 3 years of practice | forest keeper college Traunkirchen 2 years | 5 years at the Federal Technical High School in Bruck/Mur | 3 years of advanced training course at the Technical High School Bruck/Mur |
| skilled forest worker | | | | skilled foreman | forest keeper | forester | | forest economist |
| | | | | | Manager of a forestry enterprise up to 1000 hectares | Manager of a forestry enterprise up to 3600 hectares | | Manager of a forestry enterprise over 3600 hectares |
| | | | | | | | | 10 semesters - University of Natural Resources and Life Sciences (e BAC, 4 Master) |
| | | | | | | | | 2 years of practice |
| | | | | | | | | State forestry examination |
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| | | | | | | | | Preparatory course |

Many roads lead to the forest: Forestry training and education

Austria's educational and training system is considered a sophisticated best practice model offering numerous points of entry. There are three paths to become a skilled forest worker. One is apprenticeship including attendance of a vocational school. The second is training at one of the three Forest Training Centres (Forstliche Ausbildungsstätten – FAST). The third is additional education after attending an agricultural vocational high school. Persons graduating as skilled foreman may offer their services independently. Education at a forest warden college ends with attainment of the profession of forest warden. Training to become a forester occurs at the Federal Technical College (Bundeslehranstalt) in Bruck an der Mur. Alternatively, graduates from agricultural and silvicultural vocational schools can attend a supplementary training course. The University of Natural Resources and Life Sciences Vienna offers a bachelor programme in Forestry. Subsequent completion of the master programme in Forest Sciences allows a doctoral study. Finally, persons wishing to become a manager of a forestry enterprise must successfully pass the Federal Forestry Examination.

Explore

www.fastpichl.at, www.fastossiach.at, www.fasttraunkirchen.at

www.forstfachschole.at, www.forstschole.at

Bachelor's programme Forestry:

<https://boku.ac.at/studienservices/studien/bakk/uh033225>

Federal forestry examinations:

info.bml.gv.at/im-fokus/bildung/aus-weiterbildung/forstwirtschaft/staatspruefungen.html

3.3 Sustainable wood usage in Austria

Wood is an important raw material that occurs in multiple cycles. Around 80% of the felled or imported material is processed in the woodworking industry, while about one fifth is used as fuel and chippings to produce electricity and heat.

The sawmill industry processed roughly 20.8 million solid cubic metres of roundwood (including bark and off-cuts) in 2020. The paper and panel industry used around 6.6 million solid cubic metres of industrial roundwood (including bark) and 5.7 million solid cubic metres of sawing by-products. More than 90% of all wood imports came from neighbouring countries, especially from Germany, the Czech Republic, and Slovenia.

Sawmill industry and paper and panel industry as largest processors

The diagram “Wood Flows in Austria” illustrates how the valuable resource is used. It is compiled by the Austrian Energy Agency in cooperation with the Chamber of Agriculture within the framework of the climate protection initiative “klimaaktiv” (www.klimaaktiv.at) of the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK).

In principle, the use of wood can be separated into three pathways: The first is processing by sawmills and subsequent manufacturing of high-quality wood products. The second path is material use in the paper and panel industry. As with the sawmill industry, a large share of finished products are exported. The third form of wood use is direct use for energy production.

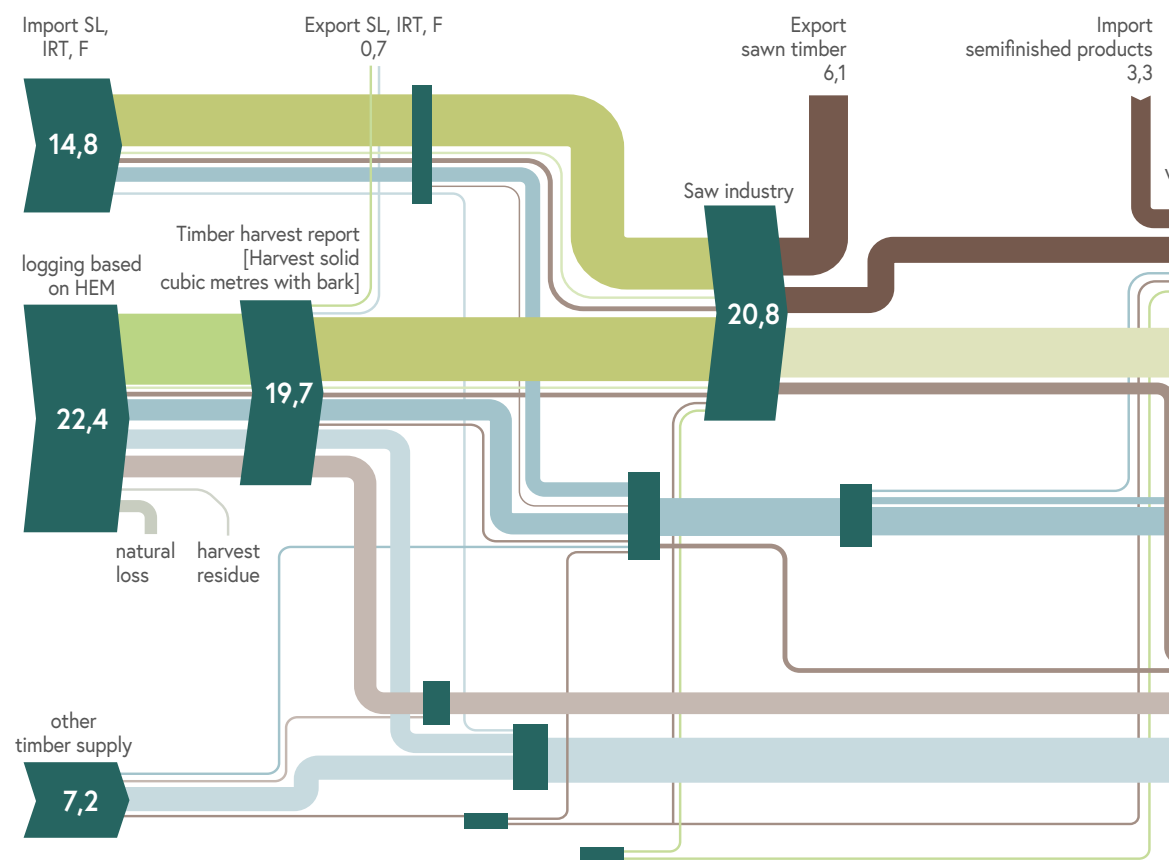
The majority of the wood processed in Austria comes from domestic forests. In the year 2020, 14.8 million solid cubic metres of sawlogs and industrial roundwood (including bark and cross-cut timber as well as small quantities of firewood) were additionally imported and processed into lumber, panels, and paper products in the woodworking industry – with the finished products once again largely exported.

The Austrian sawmills processed 20.8 million solid cubic metres of wood in 2020, making the sawmill industry the largest consumer of roundwood as well as an important source of sawing by-products and thus a valuable part of other usage paths (paper and panel industry, thermal use). A total of 6.6 million solid cubic metres of industrial roundwood (including bark) and 5.7 million solid cubic metres of sawing by-products were processed by the paper and panel industry.

Thermal wood usage

Wood, the most important renewable energy source in Austria, is used as split logs and briquettes in manually fed furnaces and as pellets, chipped wood, and bark in automatically fed furnaces. The lye from cellulose production and other wood-based wastes are likewise used thermally. According to the energy balance, wood use for energy purposes amounts to the equivalent of around 25.3 million solid cubic metres. Besides split logs, pellets, and chips, this total also includes all other wood products and related energy sources like recycled wood, garden cuttings, road maintenance materials, grapevines, sawdust, and lye.

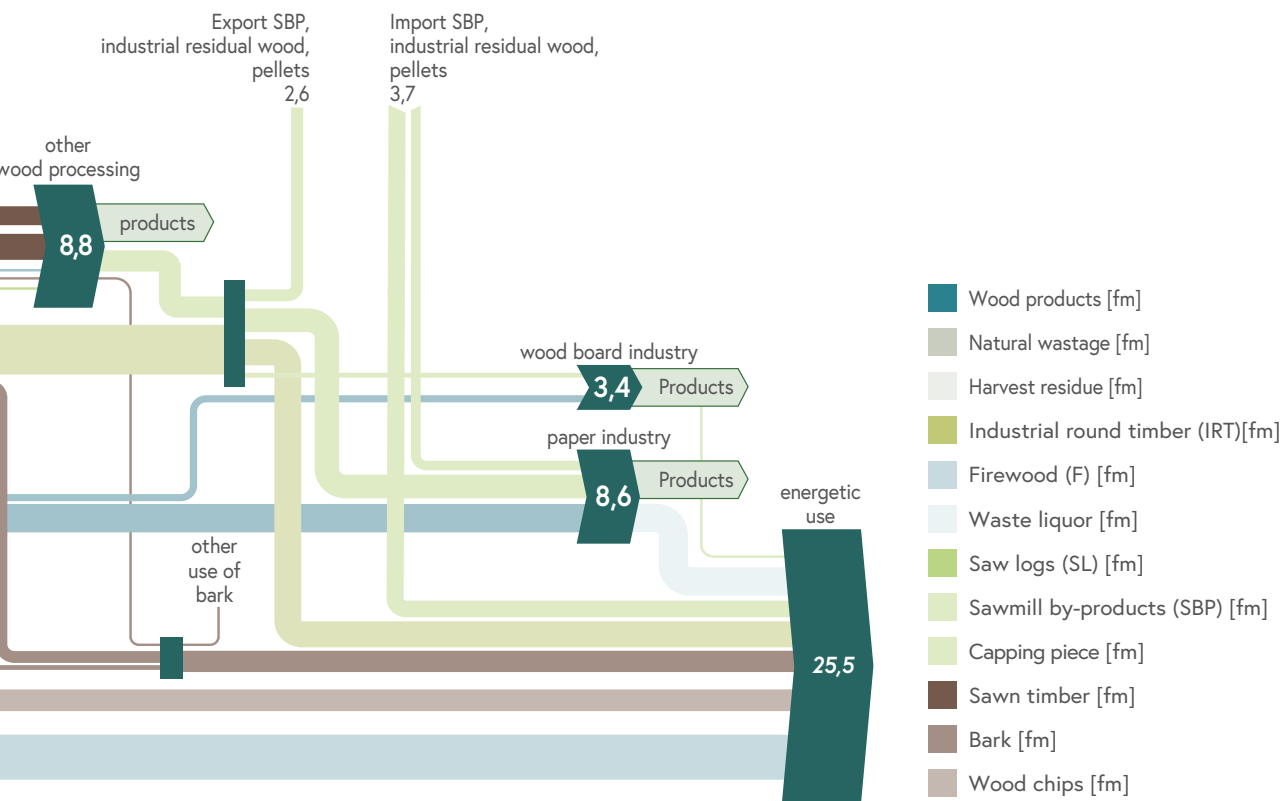
The by-products produced in wood-processing enterprises (6.2 million solid cubic metres of sawing by-products and wood waste, 4.4 million solid cubic metre equivalents of lye from the paper industry) are largely used in thermal power stations to produce heat and electricity. Only a small share of the by-products is processed into pellets and briquettes, which made up a total of around 2.7 million solid cubic metres in 2019. Wood chips are likewise an important fuel in Austrian local and district heating facilities with 5.4 million solid cubic metres. The lion's share of this product comes from lower-value wood types and grades like branches, crown parts, and damaged wood that cannot be used for other purposes. Traditional split log firewood remains the most important thermally used wood product at 6.5 million solid cubic metres and is used exclusively for heating in split log furnaces, cookers, stoves, and tile stoves.



3.4 Forestry creates value for regions

The production value of the entire wood value chain amounts to around 12 billion euros, with an average export surplus of 4 billion euros. The share of the forestry and wood cluster in Austria's total value creation was 6.4% in 2008.

The number of people employed in forestry has diminished slightly from 3.6% to 3.3% (from 2013 to 2019, as a share of total employment numbers in Austria). Although declining in absolute employment figures, forestry is of great importance, especially in rural regions. In many districts of Austria, more than 10% of the working population are in the forestry and woodworking industries. The economic importance of forestry lies in the fact that it provides wood which is processed in numerous downstream industries. The Austrian Institute of Economic Research (WIFO) has calculated that an additional harvest of 1 million solid cubic meters creates 361 full-time jobs in the forestry sector.



3.5 Austria trades with the world

The distinctive feature of the Austrian forestry and woodworking sector can be summarised as follows: Austria imports large quantities of raw timber and exports a wide array of processed wood products for further processing. Some of these eventually return to the country as finished products (e.g. furniture from Italy).

Around 94% of the wood harvested in Austria was processed or used for energy production domestically according to the 2021 foreign trade statistics. More wood was exported than imported in 2021 – a difference equivalent of 4.5 billion euros, to be precise: Wood and wood products worth 10.6 billion euros left the country, while the value of all imports amounted to 6.1 billion euros. Expressed in volumes, the year 2021 saw 11.1 million solid cubic metres of raw timber and 2.4 million tonnes of chippings, shavings, and other wood waste as well as fuel logs, pellets, and briquettes imported into Austria.

3.6 Paper and cellulose industry

8.3 million solid cubic metres of wood were used by the Austrian paper and cellulose industry in 2021, with this total volume comprised of 4.0 million solid cubic metres of industrial roundwood and 4.2 million solid cubic metres of sawing by-products. This is around 4% less than in 2020. The required wood was largely sourced domestically, with an import quota of 26.2%. Imports from regions not far beyond the national borders, e.g. from the Czech Republic, Germany, and Slovakia, are especially relevant in this regard. The second important raw material is recycled paper – around 2.5 million tonnes in 2021. A large share of these secondary fibres came from domestic collection (1.1 million tonnes), with the remainder imported. Paper recycling in Austria works well in principle, although the previous return rate of 68.6% dropped significantly in 2020 due to business closures. The gradual recovery of the economy should eventually propel the return rate of paper towards the mark of 80%, however.



Wood exports

Austria has a strong and successful woodworking industry, and this fact is also reflected in our exports: The total value of wood exports grew to 5.86 billion euros in 2021. The most important export product was sawn timber with a share of 34%, followed by processed wood products (windows, doors, parquet panels, boarding, joinery, etc.; 32%), chipboard and fibreboard (19%), and veneers, plywood, and boards and friezes for flooring (9%). Most of the sawn timber went to Italy, Germany, and the rest of Europe. Raw timber exports (incl. wood chippings, shavings, pellets, and firewood) represented 5% of the exports, with more than half of this amount made up by pellets.

Wood imports

The total value of wood imports rose to 3.2 billion euros in 2021. The share of raw timber was 31%, that of sawn timber 22%; 19% was processed wood, 14% veneers, plywood, and boards and friezes for flooring, 10% chipboard and fibreboard, and 4% were other products. The year 2021 also saw paper and cardboard worth 4.43 billion euros exported, versus imports worth 2.11 billion euros. Because the Austrian wood and paper industry possesses high capacities, wood and sawing by-products are used thermally to a considerable extent, and much roundwood is imported (especially from the Czech Republic and Germany), the mobilisation of existing domestic resources is traditionally one of the key goals of Austrian forestry policy.

Austrian Wood Initiative

Building a sustainable future with wood: To this end, the Federal Ministry of Agriculture, Forestry, Regions and Water Management established the Austrian Wood Initiative in coordination with the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology. In total, around 93 million euros from the Forest Fund are available for measures relating to the material and energetic use of wood.

The aim of the Wood Initiative is to safeguard achieved successes of the economically important forestry and woodworking sector and provide additional impulses in the areas of research, training, and technology transfer.

These measures extend across the entire value chain: On the one hand, research facilities and projects for the production of wood gas, hydrogen, and fuels made from wood are supported. On the other hand, aspects like wood in construction and CO₂-friendly building methods are promoted as well. Further topics include best practice solutions for multi-storey wood buildings, replacement of energy-intensive construction materials, raw materials, and primary products, and endowed professorships.

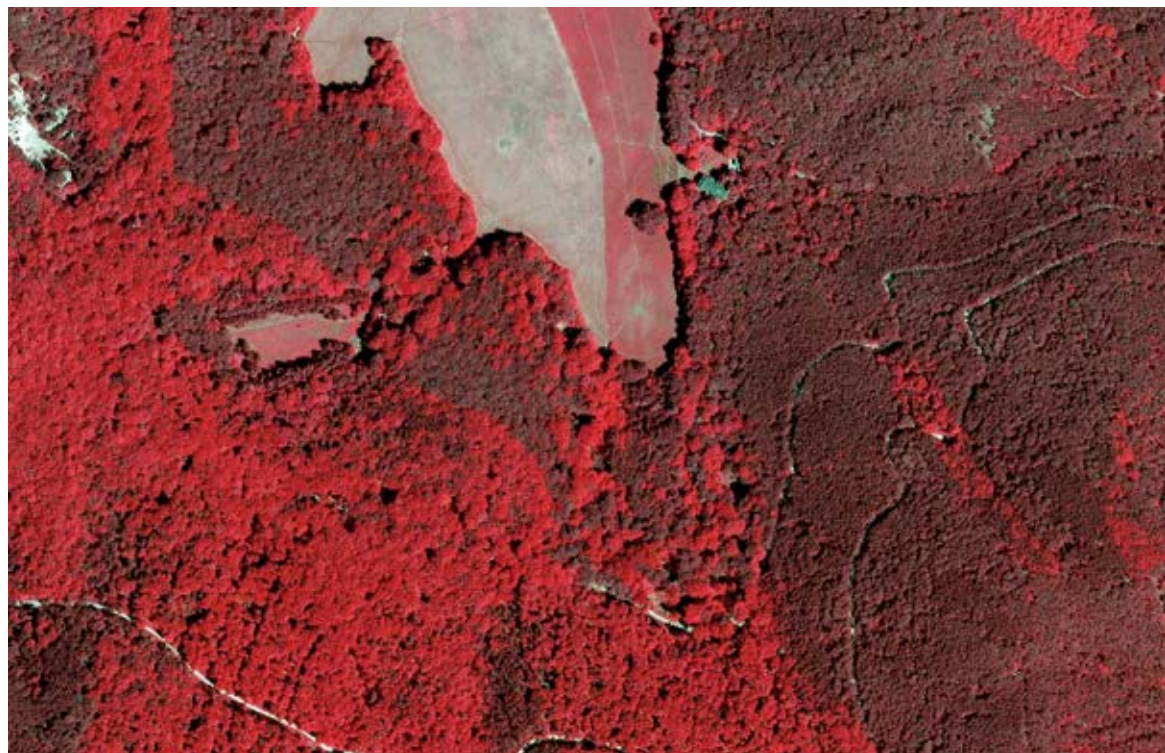
3.7 The digital forest

Digitalisation is changing work in offices as well as in forests. Forest managers naturally continue to work with seedlings and chainsaws, but now they also deal with satellite images and databases.

Sometimes we need to move further away to get a better view – precisely 786 kilometres away from Earth, where two Sentinel-2 satellites orbit the planet. They are part of a set of ten earth observation satellites in the EU Commission’s Copernicus programme. The remote sensing team at the BFW uses the data provided by these satellites: Sentinel-2 generates images of Austria every five days, 20 scenes cover Austria. The images taken during the vegetation period (April to October) are of particular interest.

Coniferous forests appear noticeably darker on the satellite images than deciduous forests. The data are used to calculate a vegetation index that shows a typical progression over the years. When certain areas deviate from these patterns, those forest patches can be assumed to be damaged. Forest usage can also be discerned from the images: If the vegetation index breaks off abruptly, it is likely due to normal wood harvesting. If the curve flattens slowly before dropping sharply, the reason is usually an extraordinary measure, often owing to bark beetle damage.

Aerial photographs from aircrafts are even more precise than satellite images. The BFW often works with resolutions of one metre, which allows individual trees to be distinguished. The result is a forest map of Austria that allows the mix of tree species, harvesting areas, and the stock of wood to be discerned.



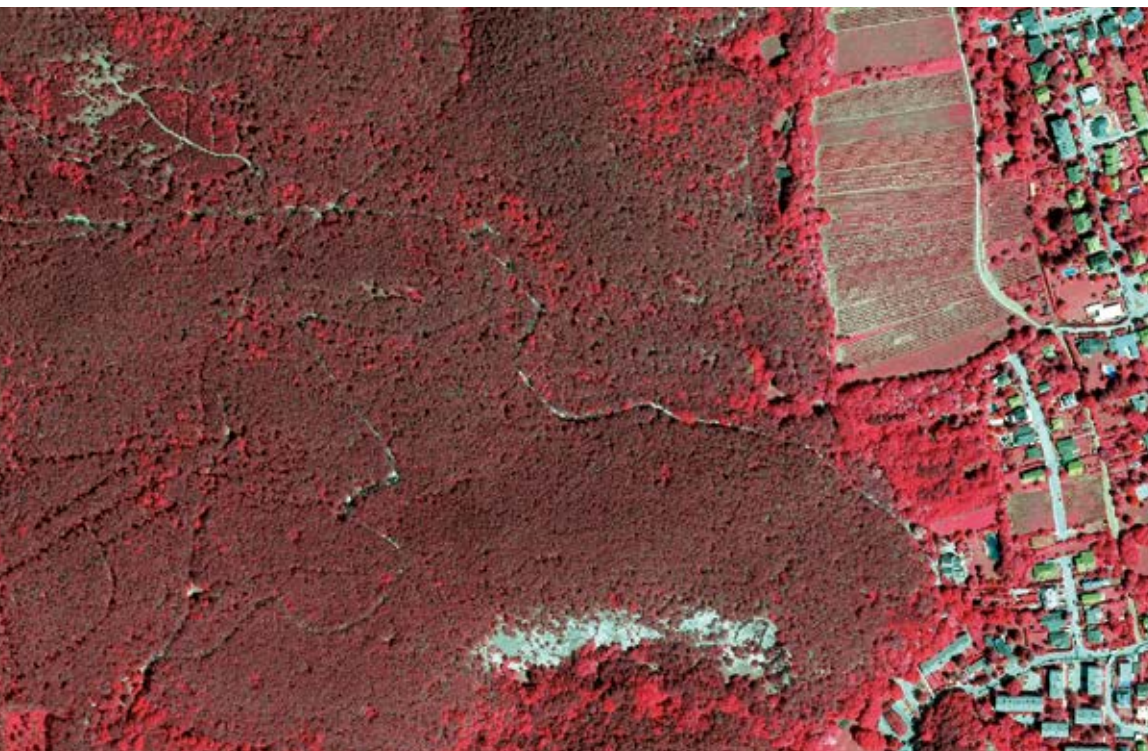
Satellite images provide information on the condition of the forest (in the picture: northern Anninger near Mödling).
dark = black pine
light = deciduous tree

Map of protective forests

Many forests protect train tracks, roads, or houses. In order to determine which areas are potentially protective forests, the Federal Ministry for Agriculture, Forestry, Regions and Water Management commissioned the BFW to create a map of the protective forests as a GIS application. This modern geodata mapping tool allowed an essential milestone in the protective forest action programme “Forests protect us!” to be reached. Based on preliminary scientific projects by the BFW and evaluation by local forestry agencies (District Forest Inspectorates, Forest Engineering Service for Torrent and Avalanche Control), the map shows potential locations where forests protect sites or objects. It explicitly visualises only the protective function of these areas, not their effectiveness, which depends on the actual condition of the respective forests (for more information, see: www.schutzwald.at/karten).

Smart logistic

The economic pressure on the forestry industry has increased over the past decades. Wherever the terrain permits, harvesters and forwarders are now used to cut and transport trees instead of chainsaws and tractors. A harvester harvests per day what used to be harvested by ten forest workers. The pivotal development in this regard is owed to the microprocessors that help control these machines. Harvesters record and store a multitude of data while cutting and processing trees: Tree species, trunk length and diameter, the total number of cut logs and where they were left. All of this information is sent on to the forwarder that loads the wood and transports it to the nearest forest road.



Use of laser scanners

Over the past 20 years, the digitalisation of forest stocks with the help of laser scanners has been developed intensively. The measurement of log varieties is economically essential for forestry enterprises as well as freight forwarders, timber dealers, and the woodworking industry. Programs and mobile applications now exist that can identify individual logs in photos of log stacks and determine their diameters. Laser scanners are also increasingly being employed for various applications. Researchers at BOKU are currently working on automatically identifying logs in stacks and calculating their volume based on laser scan data. The idea is to determine and correlate the diameters of all logs at the front and back sides of a stack, thereby allowing the length and volume of each log to be roughly calculated. The sum of the individual log volumes then provides the total volume of the stack.

Explore

Statistik Austria – forest area:

<https://statistik.at/statistiken/land-und-forstwirtschaft/forst-holz/waldflaechen>

Energy Agency Timber flow diagram:

www.energyagency.at www.wifo.ac.at/publikationen/publikationssuche

The Austrian Wood Initiative:

info.bml.gv.at/service/publikationen/wald/oesterreichische-holzinitiative.html

Chapter 4 Forest and Society



4.1 Forest for the people

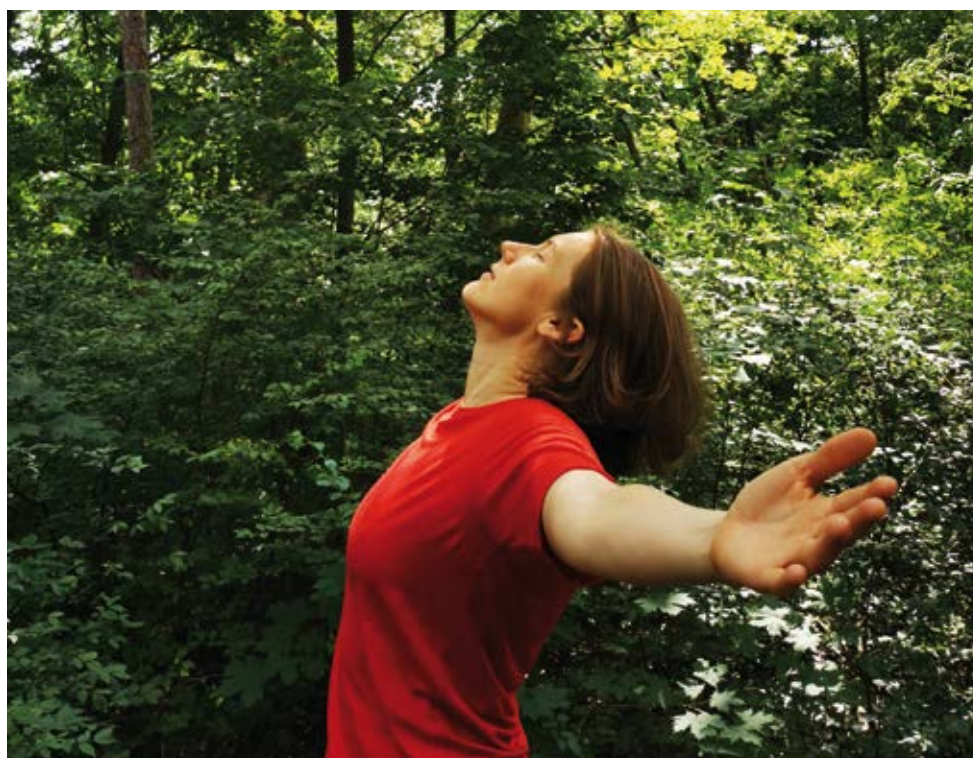
Forests benefit and appeal to us on various levels. In terms of its social services or as a social „concept“, it includes aspects of recreation, knowledge transfer, crisis communication, diversity, conflicts of use and covers the large area of the climate-friendly city under the catchword „urban forestry“.

Hiking, mountain biking, ski tours, breathing the forest air, and nature photography are activities frequently associated with pleasant time spent in nature. Besides economic, protective, social, and welfare functions, recreation is an important dimension within sustainable forest management that has become ever more tangible in recent years. In order to measure recreation in a scientific manner, we need terms, empirical evidence, and tasks that support and institutionalise the social aspects of forests from the perspective of research.

Green Care FOREST

The extended concept of health that encompasses sporting activities, relaxation, and creativity plays a key role in the socio-ecologically oriented initiative Green Care FOREST. This initiative also provides opportunities for agricultural and silvicultural businesses to develop a marketable offer in these areas. Forest owners possess extensive knowledge on their forests that can be converted into viable offerings for persons seeking recreation or learning. Pedagogical, social, and therapeutic offerings and consultancy projects are being developed in cooperation with partners from the fields of education and health services.

The forest gives us strength because it is unprejudiced towards us. The diverse shapes, colours and smells are both stimulating and relaxing at the same time.





By gently guiding recreationists, hotspots can be relieved and conflicts of use defused.

What if? – A thought experiment

Let us assume a typical Austrian small forest owner wishing to supplement their revenue with additional services like a Green Care FOREST project. Depending on the owner's individual professional focus and regional location, their woodlands could offer considerable socio-economic potential – for things like a forest kindergarten, a healing forest area for therapeutic hikes in cooperation with a nearby medical rehabilitation facility, or a destination for touristic trips featuring regional culinary specialties. Or perhaps a social offering for elderly people, a creative space in collaboration with a local lifelong learning institution, an adventure playground, a yoga retreat in the forest...the possibilities are practically endless, and Green Care FOREST represents a hub for networking and information on funding programmes in this context.

Developing gentle tourism

Focused offerings in forests provide a valuable contribution to physical and mental health within our society in terms of prevention as well as therapy. Tourism figures show that regional holidays in Vienna, Lower Austria and Burgenland have become more attractive in an industry otherwise characterised by a west-east divide. It has been understood that gentle guidance of people in search of recreation – using digital as well as analogue media – is required to flatten seasonal and spatial peaks, disburden hotspots, and prevent usage conflicts with the help of forest development plans. The key is to create positive incentives and provide information so as to make the vulnerability of valuable ecosystems comprehensible. One example can be the establishment of sustainably designed cycling tours in coordination with property owners, municipalities, and tourism and sports associations and clubs.

Explore

Information for forest owners: www.greencarewald.at

International platform: www.greenforcare.eu

Planning tool: www.waldentwicklungsplan.at

4.2 Forest or smartphone? On forest education and knowledge transfer

It is not just children who revel in forests – adults, the elderly, and persons with special needs likewise enjoy their many-faceted environments. Forest education is generally most successful when it includes various different plant and animal species and efforts are made to stimulate all the senses as well as including games and enjoyment in the visitor experience. However, understanding the entire forest ecosystem and the important services it provides for society necessitates a holistic approach. Forests can contribute significantly to stabilising and improving the climate in future, and their economic aspects must be included in the equation: The renewable resource wood can help to overcome the fossil fuel age by way of durable wood products and biomass, as well as in the shape of new wood technologies.

The challenge

How to manage the forest in a climate-friendly way has to be assessed by professionals considering regional requirements in a process spanning generations. This is no easy task, as rural and urban areas differ significantly with regard to sustainable forest management. Forest education thus faces the challenge of explaining the complexity of sustainable forestry with different social, ecological, and economic goals and purposes in a



Exploring nature in all its manifestations can help adults to later use these positive experiences as a resource of self-efficacy.



Within the framework of Citizen Science, the population can contribute their knowledge to research.

participative fashion. The joy of exploring nature and its different manifestations along with the pursuit of profound knowledge and an understanding of the economic underpinnings are the major motivations for the 280 certified forest educators in Austria, who undertook nearly 5,000 funded excursions under the motto “Knowing means appreciating” with young students in the school year 2021/22.

Diverse knowledge transfer

But it is not just children who should be guided to positive experiences in the forest that they can later use as resources for their self-efficacy. Adults, senior citizens, and persons with special needs want to explore our forests as well. The keyword here is “citizen science” – the scientific engagement of laypersons that has a long tradition in England. Recognising plant and animal species and observing them over the long term are two important motivations in this context. Sharpening the senses during guided excursions, discovering wild herbs, retelling stories and legends, or even seemingly impossible endeavours like making forests barrier-free – these are only some of the approaches that have been gaining in importance in modern lifelong education. There is a relatively high degree of scepticism towards science in Austria, and scientific communication is thus challenged to share the results of forest science with society in ways that are broadly acceptable, accessible, and certified.

Explore

Forest Pedagogy Association: www.waldpaedagogik.at

Subsidies of forest tours: www.wald-gang.at

Participative science: www.citizen-science.at

Document nature observations: www.inaturalist.org

4.3 Forest fires: Mostly man-made

The causes of fires in forested areas are primarily man-made: unextinguished cigarettes, campfires burning out of control, carelessly discarded ashes, damaged power lines. Dryness alone cannot cause fires – an ignition event is always required, and 85% of these events are caused by humans. Around 15% of all forest fires can be traced to natural influences; in Austria, lightning strikes – which are often accompanied by rain – represent the only relevant natural ignitors. Forest edges, i.e. settled areas near forests, are particularly threatened. The fire protection regulations issued by the respective district authorities specify exactly when and where open fires are not allowed, especially near forests – and even on private property. But what else is needed?

Preventive measures: Silviculture and crisis communication

Silvicultural measures like creating fire barrier strips or planting fire-impeding vegetation are an option. However, such measures are expensive and laborious and require a costbenefit analysis for the respective area. Forest roads that are wide enough can also function as natural firebreaks. They prevent fires from spreading and can be used by emergency vehicles in case of fires. On the other hand, they also generate additional risk due to their use by humans, for example via carelessly discarded cigarettes. It is therefore essential to promote awareness, especially among the target groups of children and youths, tourists, recreational forest visitors, and persons living near forests. They should be appropriately informed about the frequently underestimated danger of forest fires – for the consequences of climate change will increase the intensity of forest fires



Seems harmless, was devastating: the forest fire in Hirschwang (Lower Austria) in 2021 put the emergency services in a state of emergency for about two weeks.

in particular. According to the study “Weißbuch Waldbrand” (Forest fire whitebook), the direct costs for fighting forest fires along with associated measures within the entire Alpine space are currently estimated at around 75 million euros per year (650,000 euros per year in Austria).

Forest firefighting training

Fire departments traditionally play a key role in dealing with fires in forests – often in cooperation with the Austrian army and police forces as well as the respective forest owners. Considerable efforts have been made to prepare our firefighters for combatting forest fires: Appropriate training courses teach them to assess the terrain, develop optimal plans for tactical approaches, and employ specialised tools and equipment in the event of fires in wooded areas. In Freistadt, for instance, the fire department youth are being schooled in tackling the impacts of climate change, which includes forest fires. Perhaps firefighters will be known as “climate change fighters” in future? Ultimately, comprehensive firefighting efforts have so far succeeded in putting out even the largest forest fires in Austria before they were able to cause significant damage to human infrastructure. A key emphasis is therefore on preventive measures and communication like the BML action programme “Brennpunkt Wald” (roughly: Focus on Forests) or funding programmes of the Forest Fund.

Conditions promoting forest fire

Besides humidity, the spread and intensity of forest fires depends on the burning material, the structure and continuity of the vegetation, local topography, and wind conditions. Forests on steep south-facing slopes and dominated by pines are particularly at risk, as are areas near settlements along forest edges. In the worst case, the vegetation can burn down completely and the humus layer, which is essential for the water and nutrient supply of plants, be destroyed. This can delay the rejuvenation of affected forest sites by decades and even cause such areas to remain bare and karstify.

Explore

Action Programme „Brennpunkt Wald”: <https://info.bml.gv.at/themen/wald/wald-und-naturgefahren/waldbrand/aktionsprogramm-waldbrand.html>
Professional exchange: www.waldbrand.at and fireblog.boku.ac.at

4.4 Women in the forest sector

The forestry industry is still considered primarily a domain of men. But is this still true or are noticeable changes underway? The concept of diversity, which was previously applied only in ecological contexts, has increasingly been used to describe aspects of corporate culture in recent years. Equal treatment and opportunities, promotion of women – these and other terms deal with how organisations position themselves with regard to equality independent of gender, nationality, religion, sexual orientation, and special needs, thereby recognising diversity as a form of economic potential.

Example and comparison: Women in forestry

25% of the forests in Austria are owned by women. However, the ratio of women in forestry enterprises as well as in forestry associations and networks is lower at only 20% – with considerable variation depending on the specific activity and region.

Reasons for this include the persisting portrayal of forestry work as “male work” as well as partly still unequal levels of formal training. Women remain rare in silvicultural education and study programmes, with an average of 6% of graduates from the Federal Technical High School for Forestry and 25% from the university programme – with considerable annual fluctuation. The hard physical labour in forests, often in combination with long hours outside and away from home, is an image traditionally not associated with women. Oddly, however, work in the caregiving sector is likewise considered physically strenuous and time-intensive, yet the share of women in these jobs is generally high.



The proportion of female forest workers is only 11%.

Forest area in Austria: 4 Million hectares forest



Reconciling family and career

Among the key issues in this context are the balancing of family life with a professional career as well as the lack of appropriate models to conceptualise leadership positions as other than singular full-time positions. Part-time work remains primarily a female model (almost 50% of all women work part-time), although it has generally been becoming more attractive for younger generations as well as older members of the workforce. The forestry sector is far from the only area where men rarely go on paternal leave or at least make use of the paid “Papa Month” (around 8%). Unpaid housework and caregiving reach almost the same volume as paid employment in Austria – with the difference that women among the elderly are affected by poverty far more often than men (around 18% of women above 65, with a strong increasing trend). A comprehensive evaluation of the distribution of work in small agricultural family businesses has also yet to be performed. These issues are now being increasingly discussed in forestry networks and at international conferences as well as being scientifically studied – among others in the project Fem4Forest which aims to support female forest owners in improving their forestry incomes and female forestry workers in pursuing their careers in the industry.

Knowledge to deepen

Women’s mentoring in forestry: www.boku.ac.at

Women’s network: www.forstfrauen.at

Project „Forests in women’s hands”: www.forstfrauen.at/de/fem4forest

Gender-sensitive adult education: www.nowa.at

Equal treatment and women in leadership positions: www.bundeskanzleramt.gv.at

4.5 Encounters in forests: Who may do what?

In a country half covered by forests, it comes as no surprise that there are very diverse interests concerning the use of forests. Not using them is a topic as well: There are discussions at the European level about partially discontinuing forest use to maintain biodiversity and protect the climate in the context of the EU Biodiversity Strategy 2030. However, this suggestion neglects the fact that forests can become sources of CO₂ if they are not managed sustainably and with consideration for climate change. In addition, reducing harvest amounts would reduce the value contribution of the forestry and wood industries that are economically important in Austria.

Another area of conflict is the sometimes strained relationship between forestry and hunting. The Forestry & Hunting Dialogue, a body of experts representing the Austrian hunting associations, the forestry industry, and the scientific community has been working to find a balance between the ecological needs and interests of forest and game management.

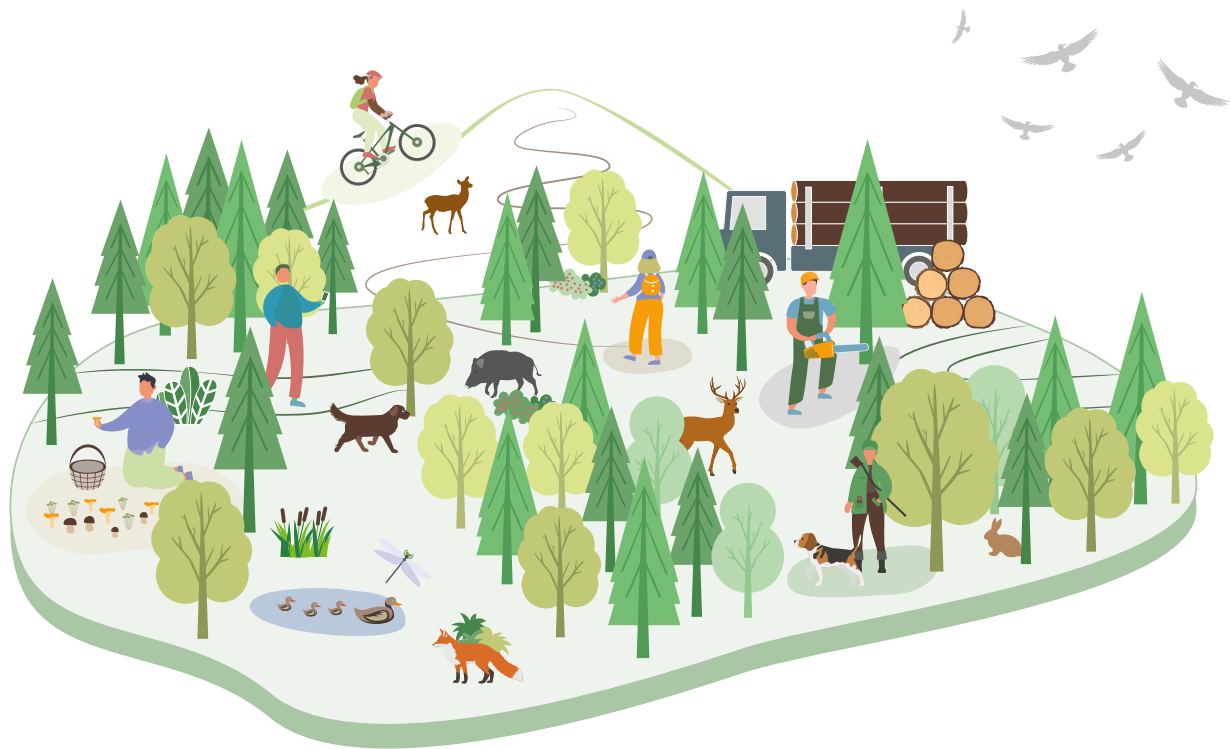
Strategies for conflict prevention

Among the most frequent conflicts pertaining to forests are those between persons using them as places for recreation or sporting activities and their owners. People long for recreation and relaxation in nature, but the fact that forests are economic sites as well is sometimes overlooked. The rapid development of recreational forest use gave rise to the workshop series “Waldbesuche im Fokus” (Forest visits in focus) by the international Alpine protection organisation CIPRA: Around 80 experts from relevant sectors came together to identify hotspots of recreational use and develop practice-oriented solution concepts.

The Austrian Alpine Club conducted an online survey among mountain bikers between November 2020 and January 2021. The results show that problems mostly occur on forest roads and hiking trails not open to cycling use. When roads and trails are “legalised”, these conflicts are often defused. While the question of liability is an important topic for forest owners, it can be resolved by way of insurance and additional agreements in most locations. In order to address the increased usage pressure with suitable strategies, the Environment Agency Austria has initiated a project to develop guidelines for concepts allowing mountain bike use.

Understanding and tolerance

In general, conflicts can often be resolved or at least mitigated by engendering understanding for the position of the respective “other”. Awareness campaigns remind recreational visitors to forests of their role as economic spaces and increase appreciation for the situation of forests. The initiative “Respektiere deine Grenzen” (Respect your boundaries) in the provinces of Salzburg, Carinthia, and Vorarlberg hopes to generate awareness for respectful interaction with nature, with fair behaviour promoted by the motto “Understanding fosters understanding”. Reservations among forest owners and forestry professionals can only be dispelled through respectful communication. This is the goal of



the Austrian Forest Dialogue, which aims to “consolidate the diverse interests concerning forest usage and continually develop careful interaction with forests”. To ensure that our forests can continue to provide their valuable functions in future, all of their users must adhere to an agreed set of rules. The brochure “Wald-Begleiter” (Forest companion) published by the Federal Ministry of Agriculture, Forestry, Regions and Water Management offers a compact overview of the dos and don’ts regarding forests as stipulated by the Austrian Forest Act.

Explore

www.walddialog.at

Recommendations for MTB concepts:

<https://info.bml.gv.at/themen/wald/wald-freizeit/handlungsempfehlungen.html>

Behaviour in the forest:

https://info.bml.gv.at/themen/wald/wald-freizeit/verhalten_wald.html

4.6 More trees for the city

Urban forestry is a young research discipline in the area of urban planning, and the term is generally not translated in German. What is the idea behind this new field?

Forest management in urban areas occurs on the fringes of cities where there are forests according to the definition in the Forest Act (minimum area of at least 1,000 squaremetres and average width of 10 metres). Intra-urban areas feature small stands of trees in parks, along streets, or in gardens and backyards that are usually recorded in the respective tree cadastre and require different approaches with regard to planning, planting, and care. Traditional forest management deals with ecosystems that include the production of the renewable resource wood. This represents the key distinction to urban forestry which is much more about concrete climate change adaptation in small-scale environments – and where recreation and welfare are the most important aspects.

Stress-tolerant tree species

Promotion of stress-tolerant tree species – like the European nettle tree in Vienna – is a key aspect. The primary challenges faced by trees in cities are dryness, limited root space, road salt, urine, and sealed ground. When selecting tree species for planting, their tolerance for the main stressor dryness should be considered. Suitable species include numerous members of the ecologically important rose family like wild cherry, cherry plum, or hackberry, along with many non-native species introduced to Austria as park and garden trees since the early sixteenth century. The goal is to create diverse, multi-layered, and coherent habitats that have a cooling and agreeable effect and thus provide a positive influence on humans and animals in the urban environment.

The need for more green space in the city is deeply rooted in people - not only for recreational reasons. It is also the rising temperatures that make „cooling“ vegetation in the city necessary.



Designing climate adaptation

A climate model for the city of Klagenfurt concludes that heat days could be reduced by around 27% with appropriate measures including afforestation near the city, promotion of green areas, and tree planting. Better use of water expanses, reduction of water usage, improved water infiltration, and optimal use of rainwater can also contribute to establishing a pleasant climate within urban areas. Another strategy employs reduced absorption of sunlight through increased reflection, artificial shading, and changes to street and building geometry to improve air circulation. Last but not least, the concept of protection plays a role in cities as well: The greater the share of the total surface sealed by buildings and roads, the less precipitation can penetrate into deeper soil layers, causing overloading of municipal sewer systems. More green areas thus also help to reduce the probability of natural hazards in cities.



5 Shaping the forests of the future: Sustainable and participative

A conversation between Maria Patek, head of the Directorate-General of Forestry and Sustainability at the Federal Ministry of Agriculture, Forestry, Regions and Water Management, and Peter Mayer, managing director of the BFW, about instruments of forest policy, the consequences of a missing forest convention, and the beauty of the Forest Act.

Let us begin with a dialogue: the Forest Dialogue.

Maria Patek: When it was launched, the Forest Dialogue was a new, participative approach to discussing controversial topics affecting the entire forestry and woodworking sector, and thus to achieving a balance of interests. More than 80 stakeholder groups are now involved. There is still a huge interest after all these years, proving that it is important to keep going. The fact that all of us sit down at one table and perceive and understand each other's feelings, concerns, and fears means a lot.

National policy is closely tied to EU policy, meaning that decisions made at the EU level also affect Austrian forest policies.

Maria Patek: Goals concerning biodiversity and the restoration of natural environments are relevant for forest owners as well as others. They have direct consequences, though some of them may be delayed. These regulations come from the EU, and since forest management falls under national competence in principle, that means that this national



competence is in part overruled. This also leads to conflicts of objectives.

Peter Mayer: By now, there is some awareness that it is also important to integrate regional and national experiences and concerns into discussion processes at the EU level. In 1992, the environmental conference in Rio de Janeiro already failed to adopt a joint forest convention, and the conflicts of interest regarding forests have only intensified since then. We therefore need to face the challenge of participating actively in policy areas of climate action and biodiversity and introduce our positions and issues at the EU level. Policymaking on climate, biodiversity, and energy encompasses topics where legally binding decisions concerning forests are made.

Maria Patek: But the relevant approaches often do not fit together!

Peter Mayer: Exactly; decision making often focuses on sectors. We need to assess what conflicts regarding objectives we face, how specific goals can be reached, and what that means for others. As usual, the keyword is 'trade-offs'. Overarching mechanisms at the EU and international level need to be developed, and in this context it is also important to consider the differing timelines.



A core element of the EU's funding scheme is rural development. What exactly is it about?

Maria Patek: The goal is sustainable development of the rural space. Forestry is a smaller sector within the funding programme compared to agriculture, but nevertheless an integral element. Before such a programme is developed, a strategy plan is drafted in cooperation with all stakeholders as well as the EU bodies. In our area, we have an average investment volume of around 30 million euros per year, with a very good mix of measures available ranging from funding for making forests climate-ready to social programmes.

Peter Mayer: And the Forest Fund was instituted supplementarily at the national level.

Maria Patek: Exactly, we established the Austrian Forest Fund in 2020 with a sum of 350 million euros and extended it for a further two years in early 2023. It is one of the largest funding programmes in history for the domestic forestry sector. Of the total avail-

able

funding, 93 million euros are reserved for the Austrian Wood Initiative. Producing wood and maintaining a healthy forest stock is not enough – we also have to make sure that that wood is purchased and used in diverse and innovative ways. Especially at this point in time when we want to shift from fossil resources towards a bioeconomy, wood is a very valuable resource.

What other measures are taken through the Forest Fund? What are the experiences from the perspective of research?

Maria Patek: In times of climate change, it is essential that we invest into research and thus into the future. In this context, I am very happy that we have the Austrian Research Centre for Forests. Important other players investigating questions dealing with the future include the University of Natural Resources and Life Sciences Vienna, the Environment Agency Austria, and many more – we need everyone on board and tapping into all available know-how. A further package of measures promotes biodiversity. Together with the Ministry for Climate Action, we are able to implement great projects in this area.

Peter Mayer: Our topics reflect the political goals – specifically, questions regarding the climate and biodiversity crises very well. These two huge fields currently dominate the political discussion and thus also define a certain scope within research. Climate change has arrived in our forests, affecting those who work with it and in it. One of the most important questions we are being asked is which trees should be planted. There are many aspects to this topic – forest management, biodiversity, genetics, and natural hazards. It is a very well-coordinated process that can provide answers to the political and societal questions and goals. Another fundamental issue is a bioeconomy oriented towards circular flow, where we seek to develop sustainable models for society itself. The forestry and wood sector has a lot of answers to offer in this regard – we can confidently say that we are part of the solution.

We have already talked about conflicts of objectives and interests. There are intense discussions about whether to use forests or restrict their usage. What is the right way forward?

Maria Patek: We need research and science-based dialogue, not ideologies. It is important to find the best possible solutions to questions of biodiversity, as well as those concerning forest management or bioeconomy.

Peter Mayer: It is essential to establish spaces where the connecting and mutual aspects are emphasised. It is clearly a goal to protect nature, but at the same time we can work on pursuing targets that do not oppose that intent. This allows us to reach more people.

The influence of game in forests also entails some conflict potential. How can we best deal with this situation?

Maria Patek: Hunting has become attractive for many, but here too we need to find the right balance. If we want to make our forests climate-ready but the trees simply cannot

grow because of high game density, then that creates a massive problem for everyone. This is why we have implemented measures like the Forestry & Hunting Dialogue (Forst & Jagd Dialog).

Peter Mayer: With our game influence monitoring and the Austrian Forest Inventory, we provide reliable numbers, facts, and data. Measures need to be discussed and instated jointly and openly between the forestry sector and the hunting community.

One more question for the young generation: What perspectives do forests offer to them?

Peter Mayer: What we do has a long history, but it is simultaneously a very modern field. If you wish to shape the future, you can do so on a more traditional trajectory as a forest ranger or forest manager or go in the direction of digitalisation or product development.

Maria Patek: We are in a period of transformation, and anyone wishing to contribute can do amazing things in this area.

Final question: What should people read to understand the forest?

Maria Patek: I would say the Forest Act, as the basis for our activity in and with our forests. Austria is a role model in terms of sustainable forest management, and the Forest Act reflects that fact magnificently.

Peter Mayer: As head of the Austrian Research Centre for Forests, I would suggest reading our magazine *Lichtung*.



Literature and Sources

- Schüler, Silvio; Züger, Johann; Gebetsroither, Ernst; Jandl, Robert:** Wald im Klimawandel: Temperaturanstieg und sonst? 2012, BFW-Praxisinformation 30: S. 5 – 8
- Buchacher, Rafael; Debojyoti, Chakraborty; Schüler, Silvio:** „Assisted Migration“ und neue Baumarten: ein Beitrag für klimafitte Wälder, 2020, BFW-Praxisinformation 52. S 3 6
- Schaufler, Judith, Schreck, Marianne:** Wertvoller Waldboden. 2017, S. 18
- Weiss Peter et al.:** Endbericht zum Projekt CareforParis. Klimaund Energiefonds Wien, 2020
- Biomasseverband.** Broschüre Basisdaten Bioenergie 2021
- Freudenschuß, Alexandra; Markart, Gerhard; Scheidl, Christian; Schadauer, Klemens** (Hrsg.): Schutzwald in Österreich Wissensstand und Forschungsbedarf. Bundesforschungszentrum für Wald, Wien: 205 S., 2020
- Bundesforschungszentrum für Wald:** Österreichs Baumarten, 2020, 2. Auflage, 174 S.
- Lapin, Katharina; Schüler, Silvio; Oettel, Janine; Georges, Isabel; Haslinger, Renate; Benger, Christian:** Maßnahmenkatalog Managementindikatoren zur Erhaltung und Förderung der Biodiversität in österreichischen Wäldern, 2021, BIOSA, Wien, 55 Seiten, ISBN 978-3-903258-25-9
- Rabitsch, Wolfgang; Essl, Franz:** Endemiten – Kostbarkeiten in Österreichs Pflanzen und Tierwelt. Naturwissenschaftlicher Verein für Kärnten; 2009. Umweltbundesamt
- Rita Bütler, Thibault Lachat, Frank Krumm, Daniel Kraus und Laurent Larrieu:** Habitatbäume kennen, schützen und fördern. 2020, WSL-Merkblatt für Praxis 64, 12 S.
- Jandl, Robert:** Das Verständnis und die Steuerung des Verhaltens von privaten Kleinwaldbesitzern zur Anpassung an den Klimawandel. Studie „PrivateForestAdapt“ für ACRP, 2016, 26 Seiten
- Franz Sinabell, Gerhard Streicher:** Regionale Beschäftigung im Cluster Forstund Holzwirtschaft in Österreich. 2021, WIFO-Monographien, 34 Seiten
- Franz Sinabell, Gerhard Streicher:** Holz im Bau und als Rohstoff für Kraftstoffe Szenarien für die österreichische Volkswirtschaft, 2021, WIFO-Monographien, 32 Seiten
- Johann Zöschner et al:** RESILIENZ. Corona-Krise und landund forstwirtschaftliche Wertschöpfungsketten. Arbeitsplatzund Beschäftigungssituation in der Forstund Holzwirtschaft. Endbericht, 2021, Wien
- Statistik Austria:** Außenhandelsstatistik 2021
- Austropapier,** Branchenbericht 2021/22, 64 Seiten
- BML:** Grüner Bericht 2022, 63. Auflage, 308 Seiten, Wien
- Müller Mortimer, Vilà-Vilardell L., Vacik Harald** (2020): Waldbrände in den Alpen – Stand des Wissens, zukünftige Herausforderungen und Optionen für ein integriertes Waldbrandmanagement.
- Foldal Cecilie et al.:** Die Grüne Stadt aus forstlicher Sicht. Studie im Auftrag der Österreichischen Akademie der Wissenschaften (ÖAQ), 2022

