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Biodiversity Strategy Austria 2030+

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Introduction

Leonore Gewessler

Scientists have been observing for many years now that biodiversity is declining all around the world, including in Europe. This negative development has intensified in recent years. Natural resources, air, water and soil are often utilised beyond their capacity. This is endangering and destroying our habitat. Because human survival depends is in many ways on an unspoilt natural environment. It is, in essence, our life insurance.

That is why the Biodiversity Strategy Austria 2030+ aims to halt the decline in biodiversity and set a positive trend in motion in this regard. Austria is no exception, as natural diversity is under great pressure. In order to implement the Biodiversity Strategy, we need everyone to be on board – policymakers, industry players and a variety of societal groups – because only together can we counteract the current trend and achieve the goals necessary for conserving Austria's biodiversity.

The comprehensive and ambitious Biodiversity Strategy Austria 2030+ was developed as part of a participatory process involving a wider community of experts belonging to various institutions and NGOs and a series of actors and stakeholders affected by the Strategy, and was formulated at the National Biodiversity Commission, two specialist committees and a roundtable with representatives from the federal states.

In cooperation with our partners in the European Union, we would like to provide effective protection to valuable areas, restore destroyed habitats and ensure that our natural areas are utilised in a sustainable and environmentally friendly manner by 2030. The instruments and measures in the Strategy are a vital provision for the future to ensure that future generations are left with a healthy and habitable environment. We must seize this opportunity. Let's make Austria more diverse!

Leonore Gewessler
Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology

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Biodiversity is the basis for human existence and the key to our survival. Nature provides us with food, medicines and building materials; it is home to our recreation and relaxation and is therefore essential for our wellbeing, health and industry. The importance of nature and biodiversity for our health and wellbeing was particularly evident during the COVID-19 pandemic. Diversity allows us to adapt to changing environmental conditions, such as those caused by the climate crisis. Appreciating, conserving, restoring and sustainably managing nature with all its components is not just an end in itself, but a commitment to future generations. Climate protection and biodiversity conservation are closely intertwined. Nature is the bedrock on which our economy is built, and thereby underpins the job market. However, biodiversity is under threat: land consumption, intensive farming and forestry, hydrological shifts and climate change, harmful substances, and invasive species bring about the loss of natural and semi-natural habitats and species – across the globe, throughout Europe and in Austria.

In Austria's Government Programme 2020–2024, the federal government acknowledged its responsibility regarding the conservation of biodiversity. One of the core measures of the programme is to prepare an Austrian biodiversity strategy for 2030 that encompasses all sectors.

As a party to the United Nations Convention on Biological Diversity, Austria has pledged to protect biodiversity, utilise its components sustainably and take responsibility for conserving global biodiversity. The European Green Deal, the EU strategy for sustainable economic development, is based primarily on the protection and restoration of biodiversity.

The present Biodiversity Strategy Austria 2030+ was developed through a broad participatory process, designed to actively involve all relevant actors, stakeholders and experts and to define the issue of "biodiversity" as a common task. The Biodiversity Strategy Austria 2030+ builds on the objectives and measures for the conservation of biodiversity formulated by the European Union and at the international level. A ten-point programme provides national quantitative and qualitative targets and the necessary conditions for the conservation of biodiversity in all habitats in Austria. The sectors relevant for biodiversity are

addressed, as well as necessary framework conditions. These targets and the corresponding measures are aimed at protecting biodiversity in Austria, actively addressing threats and thus preventing further losses, and also creating the appropriate framework conditions:

- Improving the status and trends of species and habitats,
- Effectively protecting and interconnecting all ecologically valuable habitats,
- Restoring ecosystems of particular importance for biodiversity and climate protection,
- Decisively reducing land consumption and fragmentation,
- Initiating transformative change in society and integrating biodiversity into all sectors – "mainstreaming",
- Strengthening global engagement,
- Improving regulatory frameworks for biodiversity conservation,
- Securing funding for biodiversity conservation and support for biodiversity-enhancing action,
- Valuing biodiversity in society and the economy,
- Improving the scientific basis for achieving and evaluating biodiversity targets.

The implementation of the Biodiversity Strategy Austria 2030+ is also intended to contribute to a comprehensive transformative change in our society. As part of this process, it is important to incorporate biodiversity to a greater extent in all aspects of our lives, economic and utilisation sectors, and political decisions. A key factor for success in this regard is to acknowledge that the conservation of biodiversity and sustainable use of resources is a shared responsibility within our society and to take appropriate action. To this end, the Biodiversity Strategy Austria 2030+ formulates 300 specific measures.

From a legal and administrative perspective, the Biodiversity Strategy Austria 2030+ is implemented by the relevant regional authorities, as well as by the actors and stakeholders named in the strategy, with the involvement and, in the event that they are directly affected by its contents, the consent of landowners and farmers. Any additional farming costs or yield losses due to external utilisation and other measures are to be financially compensated. The implementation of the strategy will generally be financed by a broad mix of public and private investments and by making use of EU co-financing programmes. The biodiversity fund created by the Austrian federal government will contribute to the implementation of the Biodiversity Strategy Austria 2030+, in addition to the measures provided for under the European Union's Common Agriculture Policy and the Forest Fund, as well as funding to support the improvement of the ecological status of water bodies. The strategy's implementation period will be determined by efforts to recover from the effects of the

COVID-19 pandemic. Biodiversity and investments in schemes to protect and restore diversity in nature will play a crucial role here. The loss of biodiversity has dramatic consequences for the economy and society. The costs of non-compliance with EU regulations relevant to nature alone are estimated to be in the region of EUR 50 billion per year (EC 2020).

The implementation of the Biodiversity Strategy Austria 2030+ is regularly reviewed by the National Biodiversity Commission, which plans to prepare an interim report on its findings in this regard in 2026 and a final report in 2030. These reports should also refer to the evaluation parameters specified in the Biodiversity Strategy Austria 2030+.

Introduction

A healthy natural environment does us good and keeps us healthy. Furthermore, we can only overcome climate change and epidemics if the world in which we live is healthy. A healthy nature is at the core of our growth strategy, the European Green Deal, and of our reconstruction strategy, as we do not wish to owe our planet any environmental debt. (Ursula von der Leyen, President of the European Commission)

The conservation of biodiversity is our life insurance.

We humans are dependent upon **functioning ecosystems**. They are the key to our physical and mental health, essential for ensuring that we can enjoy a high level of air quality and for providing us with drinkable water and food: They offer protection against natural disasters and the climate crisis, provide us with the basis for medicines, and are important as recreational areas and tourist attractions. Intact ecosystems are vital to sustainable economic development.

In order to guarantee that **development opportunities are available to future generations**, we must take appropriate measures to conserve as many species as possible in their genetic diversity and the diversity of their habitats, even if their role within the ecosystem and their benefit to humans is not yet known in great detail.

The COVID-19 pandemic highlights the **links between our health, intact nature and climate protection**: not only has it brought about an increasing demand for healthy foods and regional products, but people clearly now also have a greater appreciation for nature as an invaluable recreational area. Biodiversity and health are closely intertwined. The pandemic has demonstrated that human intervention in intact ecosystems has an impact on us all. That is why the protection and preservation of an intact and diverse natural environment is also the best way to protect ourselves.

Intact ecosystems contribute to **preventing natural disasters** and lessening their impact: while free-flowing rivers with floodplain forests and other retention areas keep floods at bay, healthy mountain forests and other Alpine landscapes protect against avalanches and

mudslides, and sustainable land use in agriculture protects fertile farmland from erosion. Diverse ecosystems are more resilient to climate change and help filter atmospheric pollutants.

Biodiversity is a key component of the so-called **natural capital**. Many incomes and jobs are directly or indirectly dependent upon nature and the environment: in agriculture, forestry and water management, within the framework of construction and other measures to restore intact ecosystems, in the world of tourism, in the fields of spatial planning, landscape management and nature conservation, in the pharmaceutical sector and in the awareness-raising and research field. Agricultural yields are made possible or increased by pollination and natural pest control in biodiversity-rich cultivated landscapes. The annual market value of global crops attributable to animal pollinators is estimated at between USD 235 and 577 billion (IPBES 2016). Added to this is the intangible value of an intact natural and cultural landscape for humans and all other living beings.

Biodiversity is under threat.

The report issued by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reveals the vast scope of the current loss of biodiversity. None of the global biodiversity targets have been achieved worldwide, but progress has been made on five targets (e.g. dealing with invasive alien species, terrestrial and marine protected areas) (IPBES 2019). At global level, 27% of all assessed species are threatened with extinction. The Living Planet Index, which illustrates the evolution and development of mammals, birds, fish, reptiles and amphibians worldwide, shows an average decline in the populations analysed of 68% compared to 1970. The global forest area currently occupies only 68% of the estimated pre-industrial level (Helmholtz Centre for Environmental Research 2019).

Within the European Union, both the status of bird species and the conservation status of the species and habitat types protected by the Habitats Directive still leave much to be desired, while in Austria, the evolution of the conservation status and trends of protected European species and habitats is also rather unsatisfactory (Environment Agency Austria 2019b).

The proportion of habitat types in Austria assigned to a Red List category is highest in the groups grassland (90%), marshes, swamps and springs (83%) and water bodies (76%) (Essl

& Egger 2010). The proportion of endangered species (in the categories: CR – critically endangered, EN –endangered; VU – vulnerable) is particularly high in Austria for reptiles and amphibians at 64% and 60% respectively; for the other vertebrate groups, the proportion of endangered species is between 26% and 46% (Wolfram & Mikschi 2007).

The causes of biodiversity loss need to be identified.

The IPBES identifies **five main reasons** for the global loss of biodiversity: **changes in land and sea use, direct exploitation of organisms, climate change, pollution and invasive alien species** (IPBES 2019), which are also applicable in Austria. An analysis of risk factors for the Habitats Directive species and habitat types present in Austria revealed that hydrological changes (incl. loss of wetlands), agriculture (e.g. abandonment and intensification, use of pesticides, over-fertilisation), forestry (e.g. deadwood removal) and land consumption are particularly important factors (Environment Agency Austria 2016). Climate change now also has an ever-increasing impact on Austrian biodiversity.

We must act now!

In response to the critical situation of biodiversity, legal provisions have been implemented and numerous measures have been taken internationally, within the EU and also in Austria for many decades. As things currently stand however, these steps have been far from sufficient. Efforts need to be stepped up with the cooperation and active participation of all actors, stakeholders, landowners and farmers. A comprehensive **change in the economy and society** is needed that incorporates biodiversity and climate protection in equal measure and takes into account all three pillars of sustainability – environment, economy and society – when weighing up various interests. Considering these interests includes a thorough examination of farming practices, so that we can preserve our cultural landscape and use it sustainably. If a commercially acceptable method for sustainable management cannot achieve the conservation of biodiversity, the resulting additional costs must be compensated through subsidies or conservation management agreements. The Biodiversity Strategy Austria 2030+ acknowledges that there is an urgent need for action in this regard, with a focus on the conservation, improvement and sustainable use of biodiversity.

Development of the Biodiversity Strategy Austria 2030+

During its development, the Biodiversity Strategy Austria 2030+ considered other relevant strategies and implementation concepts in place at the global level, throughout Europe (the European Green Deal and its central strategies, particularly the EU Biodiversity Strategy, the Farm to Fork Strategy, etc.) and at the national level (e.g. Austrian National Energy and Climate Plan, Strategy for Adaptation to Climate Change, Bioeconomy Strategy, Forest Strategy). These also contribute to achieve the global Sustainable Development Goals (SDGs). The content of the Biodiversity Strategy Austria 2030+ is interlinked with relevant strategies and instruments and geared towards exploiting and expanding synergies in the field of biodiversity and ecosystem services.

The targets of the Biodiversity Strategy Austria 2030+ were defined and the measures set based on a broad participatory process – the "Biodiversitätsdialog 2030" ("Biodiversity Dialogue 2030") (biodiversitätsdialog2030.at). As an initial step, a series of workshops were held in 2019 with representatives from the state and federal administrations, social partners, boards, associations, landowners, members of the scientific community and non-governmental organisations (NGOs). The discussions arising from the workshops were summarised and built the basis for the public consultation on potential elements of a strategy, which was held in 2020. The approximately 800 responses and around 2,200 individual comments were screened, analysed and incorporated into the formulation of the strategy. The Biodiversity Strategy Austria 2030+ details Austria's contribution to achieving the targets of the EU Biodiversity Strategy 2030. As a next step, the draft strategy was subjected to a limited review process. The comments provided in the course of the review were also incorporated. The strategy was then discussed in detail and coordinated at the National Biodiversity Commission that includes representatives from all relevant actors, sectors and additional stakeholders.

The Biodiversity Strategy Austria 2030+ is guided by a vision for Austria's biodiversity in 2050. This vision was identified in the course of a competition, during which young people were invited to share their vision for biodiversity in Austria.

Taking into account the global targets of the Convention on Biological Diversity (cbd.int), the EU Biodiversity Strategy for 2030 (EC 2020) and the requirements for the conservation and sustainable use of biodiversity in Austria, the strategy formulates a ten-point programme for the country's biodiversity, which comprises six overarching objectives and four targets for creating a suitable framework for implementation.

The ten-point programme is specified by a series of **detailed objectives and measures**. Unless indicated otherwise, 2020 is the baseline year and a starting point for the objectives and measures, while 2030 is the year in which they should be achieved. In the case of relative targets that aim to achieve a change compared to a reference value (e.g. increase by 50%), a baseline value from 2020 is used (or from another year if data from 2020 is not available). The baseline values stated in the objectives of the Biodiversity Strategy Austria 2030+ refer to current data available at the time that the strategy was drawn up. If new data is available, e.g. based on changed methodological calculations etc., this will be taken into account accordingly. The measures are divided into those to be implemented immediately (by 2026) and those to be implemented in the medium term (by 2030). In individual cases, measures necessary for several habitats are listed several times in a similar manner.

The evaluation parameters mentioned include those that serve to assess the achievement of objectives and those that are intended to enable an assessment of the extent to which the measures have been implemented. Examples of the evaluation parameters for the measures are provided. In 2026, the progress of implementation will be reviewed with an interim report on the Biodiversity Strategy Austria 2030+, so that the measures can be adapted should this prove necessary. The measures to be implemented immediately will be subjected to an initial review of their results. An overall evaluation of the implementation will take place after 2030. The EU Earth Observation Programme (Copernicus.eu) continuously provides an up-to-date picture of the environment and thus also supports the evaluation of the biodiversity strategy.

The Biodiversity Strategy Austria 2030+ contains objectives and immediate and medium-term implementation measures. It also names the actors essential for its implementation (in alphabetical order) as well as parameters for evaluating the achievement of the objectives and examples of parameters for its measures. Detailed action plans and guidelines can be developed for specific issues or objectives once the strategy has been finalised. For example, a separate action plan will support the implementation of the strategy in the field of insect diversity.

According to the IPBES, the conservation of biodiversity and ecosystem services needsa comprehensive change in societal, technical, political and social systems. The Biodiversity Strategy Austria 2030+ therefore also aims to contribute to this change.

The implementation of the Biodiversity Strategy is a joint venture, which can only be successful if all the responsible actors involved shoulder their individual responsibility, pursue the goals, and implement the measures in their areas of responsibility.

Depending on the objective, certain decision-makers may have a key role and therefore special responsibilities when it comes to supporting its implementation. These responsibilities may include analysing the instrumental implementation of the relevant objectives and measures, deciding on, and executing concrete implementation packages. The decision-makers concerned may belong to federal, state and municipal bodies, interest groups, companies, NGOs or be part of the scientific community. Landowners and farmers also bear responsibility when it comes to biodiversity and are to be involved in all implementation measures relevant to them. Economic losses incurred as a consequence of putting areas under protection and the resulting abandonment of utilization will be compensated under private contracts. Other actors or stakeholders may be included due to their their specific expertise or because they can support the practical implementation of the measures.

For information on the status of biodiversity, measures that have already been implemented, relevant international and national strategies and programmes, etc., please consult the publication “Hintergrundinformationen zur Biodiversitäts-Strategie Österreich 2030+” (“Background information on the Biodiversity Strategy Austria 2030+”).

Vision for Biodiversity in Austria in 2050

The vision presented below was chosen as the winner in an online vote, victorious over three other versions drawn up as part of a youth campaign (wildentschlossen.at):

> We live in harmony with nature. The loss of species and habitats has been halted. Damaged ecosystems have been restored and make a vital contribution to climate protection. Sufficient protected areas form centres of biodiversity and spaces for functioning environmental processes. Native animals, plants and fungi have enough room to flourish and are healthy. Particularly valuable landscape areas such as riverbanks, marshes, floodplains, rough pastures and dry grasslands have been preserved. Habitats are interlinked where necessary. We humans value and protect nature because it is the basis of our existence and our provision for the future!

The ten-point programme for biodiversity in Austria

The ten-point programme for Austria's biodiversity comprises six overarching objectives and four essential enabling conditions for their achievement. The overarching objectives relate to the general protection of biodiversity, its conservation in protected areas, the restoration of degraded ecosystems, the reduction of land consumption and a very important aspect, mainstreaming biodiversity. Mainstreaming in this context means that biodiversity is considered in all areas of society and taken into account in economic processes, while global aspects are taken into consideration. The enabling conditions for achieving the objectives relate to improving the legal framework, funding, raising awareness of the value of biodiversity, expanding knowledge of the causes of biodiversity loss and improving the available data on the status and trends of biodiversity in Austria.

The six overarching objectives are:

- Improving the status and trends of species and habitats
  - The status of 30% of the endangered species, biotope types and habitat types has improved,
  - The decline in pollinators has been reversed,
  - Endemic species and biotope types have been conserved,
  - The import, establishment and impacts of invasive alien species have been reduced.
- Effective protection and networking of all ecologically valuable habitats
  - 30% of the national territory is protected by nature conservation legislation,
  - The proportion of strictly protected areas is significantly higher on this 30% of the national territory,
  - The connectivity of protected areas is ensured by means of habitat corridors.
- Restoration of ecosystems of particular importance for biodiversity and climate protection
  - Forests and their biodiversity have been conserved,
  - Degraded peatlands and other carbon-rich ecosystems have been restored,
  - Floodplains have been conserved and environmental improvement measures have been implemented,
  - Priority restoration areas have been restored or are showing a positive trend.
- Decisive reduction of land consumption and fragmentation
  - Daily land consumption has been reduced to 2.5 ha,
  - Habitat connectivity has been ensured in the long term by designating habitat corridors.
- Initiation of transformative change in society and integration of biodiversity into all sectors – “mainstreaming”
  - Biodiversity conservation and climate protection have been harmonised,
  - Biodiversity is taken into consideration in the processes and cycles of all sectors,
  - People use biodiversity for recreation, health maintenance and recovery.
- Strengthening global engagement
  - Awareness of the biodiversity impacts of imported products and the relevance of sustainable production and consumption patterns has increased,
  - Biodiversity is consistently incorporated into programmes, projects and funding,
  - The share of biodiversity-relevant financing in Austria’s international development financing has increased.

The four essential enabling conditions are:

- Improving regulatory frameworks for biodiversity conservation
  - Options for a possible adjustment of the legal status to enable measures that protect biodiversity have been discussed.
- Securing funding for biodiversity conservation and support for biodiversity-enhancing action
  - Financial resources for -activities that enhance biodiversity have been sufficiently increased and financial products for economic activities that promote biodiversity have been developed.
- Valuing biodiversity in society and the economy
  - Awareness of the value of biodiversity has increased and biodiversity is prominently incorporated into the curricula of all school levels.
- Improving the scientific basis for achieving and evaluating biodiversity targets
  - Data on genetic variety, species, and habitats is available in sufficient quality and monitoring programmes have been expanded and implemented.

1 Improving the status and trends of species and habitats

The distribution of species that have become rare and endangered, as well as the distribution and condition of habitats are being improved by implementing measures that have been coordinated with managers, research institutes, and all other relevant stakeholders.

1.1 Total land area

1.1.1 Species and habitats

Due to its topographical and climatic conditions, Austria is one of the countries with the highest number of species in Central Europe. It is home to around 2,900 indigenous ferns and flowering plants, around 8,500 algae, mosses, and lichens, 85 mammal species, 430 bird species – of which 256 were confirmed as breeding birds at least once (Species list of Austria's birds, Birdlife 2017) – 14 reptile and 21 amphibian species, and 84 fish species. It is assumed that there are more than 46,000 species of invertebrates (Geiser 2018). An estimated 10,000 species of fungi are native to Austria. Accordingly, the total species diversity in Austria amounts to about 68,000 species.

Numerous species and habitats are currently in an unsatisfactory condition. The conservation status of 44% of the habitat types and 34% of the species subject to the Habitats Directive is unfavourable-poor. 35% of the habitats and 48% of the species under the Habitats Directive are at an unfavourable-inadequate conservation status (Environment Agency Austria 2019b). 25% of the 270 bird species in Austria (including selected winter guests and migrants) that are reported to the European Commission show a negative population trend (Dvorak 2019).

Of the 488 types of habitats occurring in Austria, 246 were categorised as endangered or critically endangered; 33 are at risk of complete destruction. Five types of habitats have already been completely destroyed (Essl & Egger 2010). The share of endangered species is particularly high for reptiles and amphibians with 64% and 60%, while the other vertebrate

groups range between 26% and 46%. For the invertebrates, which have not been researched to a satisfactory degree, the values range from 20% to 100% (Red List of endangered species, Environment Agency Austria). Of the endemic vascular plants, 28% of all species are classified into the three most critical endangerment categories. Among the endemic animal species, 33% are categorised as endangered; of these, 62 taxa are threatened with extinction and four endemic freshwater snails are extinct (Rabitsch & Essl 2008). However, some of the classifications of these species groups, endemic species and habitat types in a Red List were completed over ten years ago.

Objectives:

- Maintain, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest. At least 30% of the species and habitats not currently in favourable status are in that category by 2031 or show a positive trend.
- The decline in wild pollinators is reversed.
- The status of 30% of the endangered habitats and 30% of the endangered species is improved or shows a positive trend.
- Endemic and sub endemic species and habitat types are conserved.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1 and 2. The aim is to implement the improvements in all habitats (settlement areas, agricultural landscapes, forests, bodies of water, floodplains, high mountain regions and special locations).

Initial values: 44% of the habitat types (HT) and 34% of the species of the Habitats Directive are at an unfavourable-poor conservation status, 35% of the HT and 48% of the species are at an unfavourable-inadequate conservation status, and 18% of the HT and 14% of the species are at a favourable conservation status (Environment Agency Austria 2019b); 35% of the 270 bird species to be reported to the Commission show a stable population trend and 28% a growing population trend, 25% of the bird species show a negative population trend (Dworak 2019); 58% of the biotypes are endangered (2002, 2004, 2006 (Essl & Egger 2010)); 35.7% of the animal species; 28% of the endemic vascular plants, and 33% of endemic animal species are threatened with extinction. – “Threatened” includes the following categories for Red List species: critically endangered, endangered, vulnerable and near threatened (early warning stage), and for Red List habitats:, critically endangered, endangered, vulnerable (Rabitsch & Essl 2008).

Evaluation parameters of the objectives: Conservation status of conservation objectives under the Habitats Directive and status of the bird species, threat category in the Austrian Red Lists, threat category of the endemic and sub endemic species in the Austrian Red Lists. (Reports under Art. 17 Habitats Directive and Art. 12 Birds Directive are due again in 2025 and 2031; the reporting period for reports under the Habitats Directive and Birds Directive ends in 2024 and 2030).

Measures to be implemented immediately:

- Perform an analysis (based on the results of the reports under Art. 12 of the Birds Directive and Art. 17 of the Habitats Directive) to determine which habitats and species can be improved by which active measures in which regions where there are no other overlapping effects (climate change, eutrophication, etc.).
- Developing and implementing species and habitat protection projects corresponding to the above analysis for conservation objectives that are not currently at a favourable conservation status, but also to permanently preserve EU conservation objectives at a favourable conservation status.
- Promoting wild pollinators by developing and implementing measures, particularly for those habitat types that are relevant for wild pollinators (see Chapter 1.3.1).
- Developing and implementing species and habitat protection projects corresponding to a prioritisation, analogous to the above analysis for endangered species and habitat types, but also to permanently maintain the status of species and habitat types that are not currently endangered.
- Developing and implementing species and habitat protection projects corresponding to a prioritisation aimed to preserve (sub-)endemic species and habitat types.
- Developing and implementing sustainable solutions to manage predators with the goal of improving their conservation status, while simultaneously securing the livelihoods of farmers, together with farmers, authorised hunters, and other relevant stakeholders, also to curb illegal shooting.
- Increase in biodiversity-related advisory activities by the Rural Training Institute (Ländliches Fortbildungsinstitut - LFI), nature conservation authorities, nature guards, hunting associations, or NGOs with a special focus on conservation objectives under the Habitats Directive, Red List species and habitat types, and bird species.
- Update of the study “Development of criteria, indicators, and threshold values to assess the conservation status of conservation objectives under Natura 2000” (Ellmauer 2005a, 2005b, 2005c), taking into account the current state of knowledge.

Evaluation parameters for measures (examples): Number and type of management measures (e.g. fences, shepherding) for predators, number and type of protective measures for endemic species (e.g. buffer zones, protection orders).

Key players for implementation: BFW, BMK, BML, hunting associations, federal states, Rural Training Institute, Austrian Chamber of Agriculture, NGOs, research institutions.

1.1.2 Genetic diversity

It is essential to preserve the genetic diversity of species, since it increases resilience to environmental changes and thus represents a life insurance in times of global change. Technological opportunities have advanced rapidly and must be utilised to gain sufficient knowledge about the state of genetic diversity in Austria. At the same time, it will be crucial to keep landscape areas free from human intervention to enable evolutionary processes (safeguarding open spaces in wilderness areas and national parks).

Objectives:

- The genetic diversity of wild species and traditional varieties of crops and breeds is maintained or improved.
- Knowledge of the genetic diversity of selected wild species is improved.
- Knowledge of the genetic diversity and characteristics of all species and varieties preserved in collections (ex situ) and all species and varieties used on farms is improved.

Note: The targets are aligned with the EU Biodiversity Strategy for 2030, Chapter 2.2.2: "The decline in genetic diversity must itself be reversed, for example by facilitating the use of traditional varieties of crops and breeds."

Initial values: not available for wild species, for cultivated varieties and breeds (see Chapter 1.3.3).

Evaluation parameters of the objectives: State of knowledge, selected indicators from the "Second Global Plan of Action for Plant Genetic Resources" by the UN Food and Agriculture Organization (FAO 2020).

Measures to be implemented immediately:

- Identification of species or groups of species whose genetic variability can be documented as representative of the entire genetic diversity.
- Development and implementation of networking corridors to enable genetic exchanges.
- Documentation, preservation, and promotion of selected cultivated plant species.
- Promote the production and use of regional grassland seeds to counteract the genetic impoverishment of grassland areas.
- Acceleration and further development of projects that aim to propagate autochthonous woods.
- Use of autochthonous woods in federal, state, and municipal projects (e.g. road construction) if autochthonous plant products are available.
- Promote the production of autochthonous stocking fish to counteract the genetic impoverishment of fish stocks (especially salmonids).
- Establishment of a platform for phytogenetic resources, including public and private collections, research, breeders and NGOs.

Promotion of decentralised conservation, development, provision, and research of ex situ, in garden (including private gardens) or on farm propagation material (cultivated and wild plants), as well as projects on crop wild relatives on a local and national level.

Mid-term measures to be taken:

- Documentation, conservation, and promotion of the genetic diversity of selected wild species or groups of species,
- Testing the existing propagation material in all Austrian public and private collections for heat and drought resistance (as a basis for resilience strategies in view of the climate crisis).

For additional measures on crop varieties and farm animal breeds, see Chapter 1.3.3.

Evaluation parameters for measures (example): Use of regional plant material (survey e.g. by local governments, road authorities).

Key players for implementation: AGES, Arche Austria, Arche Noah, BFW, BMBWF, BML, HBLFA Raumberg-Gumpenstein, NHM, NGOs, REWISA Network, collections.

1.1.3 Invasive alien species

So far, over 2,500 alien animal, fungus and plant species have been identified in Austria. Most of these species occur inconsistently and no negative effects are known or assessed.

However, a small part of these so-called invasive alien species have a negative impact on biodiversity and associated ecosystem services (neobiota-austria.at/was-sind-neobiota). Alien invasive species were cited as one of the most prevalent causes of endangerment in the assessment of the conservation status of habitat types under the Habitats Directive. Due to globalisation and climate change, an increase in alien and invasive species can be expected in Austria if no countermeasures are taken. Climate change plays a key role in the establishment and spread of introduced species in Austria. In addition to local, regional, and cross-border measures, the implementation of the EU Regulation 1143/2014 on the management of invasive alien species is a significant tool to prevent the further introduction and spread of invasive species, especially those on the "Union list". The EU regulation prescribes measures for the prevention, early detection, and immediate removal of invasive alien species, as well as for the management of those that are already widespread. Austria is currently home to 28 of the 66 species on the Union list of the EU regulation. Measures are required against them.

Objective:

- The import, establishment and negative impacts of invasive alien species have been reduced and contained.

Note: The objective is based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 9.

Initial values: Current distribution and introduction pathways of species on the Union list occurring in Austria.

Evaluation parameters of the objective: Distribution of the species on the Union list occurring in Austria, status and trends of invasive alien species, number of Habitats Directive species and habitat types threatened by invasive species, number of species and habitat types on the Red Lists threatened by invasive species (if further information from the EU Commission is available).

Measures to be implemented immediately are:

- Implementation of EU Regulation 1143/2014, e.g. monitoring system, pathway action plan, and management measures for widespread species; integrating the EU regulation into relevant legislation.
- Development of national risk assessments for selected species of special interest.
- Taking into account risk assessments when using economically relevant species.
- Updates on the status and trends of invasive alien species on the Union list by 2025, regular updates for all alien species every 12 years.
- Development of a list of invasive and potentially invasive species in Austria in coordination with land managers, scientists, and other stakeholders.
- Continuation of the "Invasive Alien Species" platform for an information exchange between responsible actors and affected stakeholders.
- Development and implementation of early warning systems for selected species in addition to the Union list.
- Development and implementation of measures to prevent the introduction of established invasive alien species, for example through transport and commerce, particularly in protected areas, so that the number of endangered species on the Red List is reduced by 50%. (This measure will be adapted for Austria based on the specification by the EU.)
- Implementation of targeted control measures for invasive alien species in all sectors (agriculture and forestry, water management, manufacturing, tourism, transport, energy, etc.).
- Promotion of measures to monitor and manage alien species.
- Promotion of informational activities and educational projects on the topic of alien species.

Mid-term measure to be taken:

- Development of an overview of implemented control measures and their effects, as the implementation of containment measures for alien species in protected areas can serve as an example for other areas (ÖWAV 2016).

Evaluation parameters for measures: Number and success of alien species management projects.

Key players for implementation: AGES, BAES, managers, BMF, BMK, BML, BMSGPK, botanical gardens, gardeners, commerce, beekeepers, federal states, ÖBB infrastructure, ViaDonau, zoos.

1.2 Settlement areas

1.2.1 Species and habitats

Settlement areas sometimes offer valuable habitats to species. Some species, such as bird and bat species use not only green and open spaces but also buildings (stadtwildtiere.wien). For example, 61% of all grasshopper species in Austria and about 100 butterfly species occur in Vienna (wien.naturschutz).

Almost 50% of the orchard trees are located on non-agricultural land; many of these are also on municipal land. Likewise, many rare types of cultivated plants are preserved in home gardens, and with them genetic diversity (see Chapter 4).

Objectives:

- The proportion of areas with biodiversity-friendly management has grown significantly in densely populated areas.
- Measures to preserve wild species in settlement areas are in place in 50% of the municipalities.
- The number of orchard trees has increased.

Initial values: dependent on the respective municipality (natural area, building density).

Evaluation parameters of the objective: Area with biodiversity-friendly management, status and trends for selected species.

Measures to be implemented immediately:

- Development of an action plan to preserve biodiversity in settlement areas.
- Documentation of initial values through the specific data compilation of selected wild species and groups of species, taking into account the conditions of natural areas.
- Creation of information on biodiversity conservation that is easily accessible for municipal representatives, e.g. pool of specialists, websites.
- Conservation and biodiversity-friendly management (wien.naturschutz) of public spaces in urban and rural areas, increase of biodiversity in these areas, and taking into

account the cross-linking of the areas in question for regional planning, particularly in their development plans.

- Taking into account the changed requirements for plant selection and their care or "non-care" as a result of climate change.
- Planning and implementing semi-natural green spaces when constructing new public (residential) buildings.
- Promotion of insects, particularly pollinators, by preserving and creating semi-natural flower strips and green areas that are mowed only once or twice a year.
- No use of peat-containing products by local governments in public green spaces in settlement areas, which also serves as a role model for private spaces.
- Regular status surveys on selected species and species groups in selected settlement areas.
- Promotion of networks of participants who are involved in citizen science matters, also with the involvement of schools.
- Documentation of fruit plants in non-agricultural areas and promotion of the care for and replanting of orchard trees in public areas, promotion of decentralised conservation in home gardens.
- Initiation of cross-generational activities in the design and maintenance of green areas.
- Implementation or continuation of campaigns, such as "Mut zur Gstettn" ("Embracing untamed green areas") or "Natur im Garten" ("Nature in the garden") to emphasise the value of such areas for the balance of nature.
- Providing incentives to unseal paved surfaces that do not require an impermeable cover (e.g. parking spaces).

Mid-term measures to be taken:

- Renaturing and creating additional semi-natural green areas and bodies of water in densely built-up areas.

Evaluation parameters for measures (examples): Type of management of public areas in selected municipalities, citizen science projects in settlement areas, number of orchard trees in selected municipal areas, number of rare varieties conserved in home gardens via conservation networks.

Key players for implementation: BMK, citizen science platforms, municipalities, youth, educational institutions, institutions for the elderly, federal states, NGOs.

1.2.2 Light pollution

Artificial light can negatively affect animal and plant species as well as ecosystems. It can affect physiological processes, reproduction, development, foraging, and predator-prey relationships. Impacts range between species shifts within symbiotic communitiesand the extinction of isolated populations, especially for species that stay local, are specialised and endangered. Moths are important pollinators and food for other species, such as amphibians and nocturnal mammals. Light pollution causes moth populations to decline, but also affects other species. Flowers under artificial lighting are visited 62% less than those in dark locations. This loss of pollination cannot be offset by diurnal insects (hellenot.org).

Objectives:

- Light emissions as adapted to municipality size during 2010are maintained, or fall below these values (reduction by 20, 10, 0.02 µW/m²/a for city centre, urban fringe, rural settlement area).
- Light pollution is reduced in accordance with the specifications of ÖNORM O-1052 442 "Light emissions – measurements and assessment", as well as the standards EN 12665; EN 12193 for sports facilities.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitments to restoration no. 1 and 2, as well as bdb.at/Service/Normen.

Initial values: Light emission values for individual municipalities and sub-areas are available (e.g. 0.253 mW/m^2 annual median value for Vienna's city centre (wua-wien.at).

Evaluation parameters of the objectives: Light emission values, status of implementation of ÖNORM.

Measures to be implemented immediately:

- Implementation of the Austrian Guideline for Outdoor Lighting (Federal State Governments 2018).
- Identification of main emission sources.
- Equipping public spaces with biodiversity-friendly and energy-efficient lighting systems, reducing the duration and intensity of lighting by means of part-night lighting and motion detectors.

- Avoiding lighting of buildings in natural surroundings (for example, castles or fortresses), near bodies of water, waterfalls, exposed locations, and tall buildings.
- Raising awareness of light pollution and the importance of nighttime for the well-being of humans and animals.

Measures to be taken in the long-term:

- Review of the legal competence (Wagner 2015) and, if necessary, adoption of a light emission control act.
- Development of criteria and implementation of the certification of future building projects in terms of light emissions (e.g. light certification analogous to the energy certification for buildings).
- Creation and implementation of light management plans, primarily within and in the immediate vicinity of high-level, large-scale protected areas (wilderness IUCN 1b, national parks IUCN I) and in biosphere parks.
- Establishment of large light protection areas in currently least polluted regions in Austria, creation and implementation of management plans to safeguard and further improve the status quo in these regions. Promotion of tourism areas with day and night cycles close to nature and clear night skies.
- Establishment of training, research, and testing centres for light emissions, light emission detection and management.

Evaluation parameters for measures (examples): Emissions in protected areas IUCN Cat. I, II (global night light emissions; directional light emissions), lighting permits.

Key players for implementation: Educational institutions, BMK, local governments, federal states, companies.

1.3 Agricultural landscape and agriculture

1.3.1 Species and habitats of agricultural landscapes

Agricultural landscapes are subject to agricultural use. In addition to their significance for food production and food security, they are also extremely important for biodiversity. Many valuable habitats were created through agricultural use. They are adapted to and depend on the continuation of extensive usage, particularly through mowing or grazing once or twice a year. Their intensification or stopping their use would have a negative impact on these habitats and currently represent their greatest threat. However, the complete removal of landscape elements such as hedges, buffer strips or orchard trees have also resulted in degradation of agricultural landscapes. Extensive forms of use are usually characterised by high biodiversity. In arable land, crop diversification (e.g. mixed crops instead of

monocultures, diverse crop rotations, small-scale fields, and the cultivating rare and old crops) has a positive effect on wild biodiversity. Agrobiodiversity is becoming more important than ever in view of a growing climate crisis and as an insurance for future challenges: It is a reservoir for drought and heat resistance, better protection against pests, healthy food diversity, regionally adapted varieties, as well as many properties that are still unknown.

According to the Integrated Management and Control System (INVEKOS), the total agricultural land in Austria amounted to 2,565,690 ha in 2020. The total agricultural land without mountain pastures and meadows was 2,249,563 ha, the arable land area 1,321,692 ha, intensive green area 573,718 ha (BMLRT 2021c). In 2020, the area of landscape elements (hedges, ponds, ditches, stone walls, buffer strips, terraces, UBB biodiversity areas (environmentally friendly and biodiversity-friendly management areas), ÖPUL nature conservation areas) amounted to around 185,000 ha (7.2% of the total agricultural land) (BMLRT 2020). However, landscape elements in mountain pastures and hay meadows, as well as punctual landscape elements are not included in these figures.

According to INVEKOS, the area of extensive grassland (litter meadow, single-mow meadow, mown meadow, and mown pasture with dual use and hay meadow, without mountain forage area and mountain pastures) in 2020 comprised 294,035 ha (about 11.5% of the entire agricultural area) (BMLRT 2021c). In the Green Report (National Agriculture and Forestry Report), mountain pasture is not shown as extensive grassland but represented separately, with the result that, from this perspective, grassland farming in Austria is perceived to be much more intensive than it actually is. Permanent grassland throughout Austria decreased by 60,636 ha from 2012 to 2017. These areas were dedicated to construction, reforested, converted to arable land, or left to succession, which means they are no longer available as a habitat for grassland species. Extensive grassland decreased in the years 2012–2017 as follows: Double-mow meadows by nearly 16%, litter meadows by 10%, and hay meadows by more than 8% (Suske et al. 2019). The 16% reduction for twice-mow meadows indicated for 2012–2017 results from the respective observation period, which began in the Common Agriculture Policy (GAP)‘s programming period 2007-2013 and ended in the 2014–2020 GAP programming period. As such, it includes a change in eligibility requirements that was requested supported by nature protection organisations. Management requirements originally required the establishment of double-mow meadows in the measure “Environmentally friendly management of arable land and grassland areas (UBAG)” (until 2014). The subsequent measure “Environmentally friendly and biodiversity-friendly management (UBB)” (from 2015) required a the delayed mow for the first mowing

and lifted the obligation to establish double-mow meadows. As a result of these changes in agricultural policy, the figures on the extent of the double-mow meadows can only be compared to a limited extent. Using a different time period for comparison completely alters the results. There are also numerous animals and especially plants, which have been greatly benefitting from a later first mow since 2015.

Of all grassland habitat types in Annex I of the Habitats Directive, about 90% are at an unfavourable-poor or unfavourable-insufficient conservation status; of the Habitats Directive grassland species, about 85% are at an unfavourable-poor or unfavourable-insufficient conservation status (calculated from the sum of assessments from both biogeographical regions represented in Austria out of all regions listed in the EU Habitats Directive, Environment Agency Austria 2019b).

Red Lists of all insects that contribute to pollination and data series from systematic monitoring programmes are not yet available for Austria. However, based on local Austrian studies, it can be expected that the documented loss of pollinators in other countries also applies to Austria (Environment Agency Austria 2020). A total of 48 habitat types under the Habitats Directive that are of (special to low) importance for pollinators occur in Austria. These do not only include grassland habitats (Kudrunovsky 2020).

The Farmland Bird Index (FBI) for 2020 was 62.9 % (Teufelbauer & Seaman 2021). The index was last at its target value (75) in 2008/9; the baseline value (100) dates back to 1998. After a decline until 2013, the Austrian Farmland Bird Index appears to have stabilised at an indicator value of 60%, with the population trend in grassland being more negative than in arable land (Teufelbauer & Seaman 2019). This suggests that the current agri-environmental programme can be assessed as having a more positive impact than its predecessors (Teufelbauer & Seaman 2021).

Agrobiodiversity is becoming more important than ever in view of a growing climate crisis and as an insurance for future challenges: It is a reservoir for drought and heat resistance, better protection against pests, healthy food diversity, regionally adapted varieties, as well as many properties that are still unknown.

Objectives:

- At least 10% of utilised agricultural area, excluding mountain pastures and hay meadows, consists of landscape features that promote the biodiversity typical

of the respective landscape section, such as fallow land, hedges, dry stone walls, semi-naturally managed ponds, biodiversity areas, and set-aside areas. Under no circumstances should there be any deterioration in any areas; at the same time, there should be improvements in areas with a particularly low diversity of landscape features.

- The proportion of extensive grassland (excluding mountain pastures) increases to 12%.
- The decline in wild pollinators is reversed.
- The promotion of wild pollinators has been implemented: a favourable conservation status of agriculturally used Habitats Directive habitat types that are of particular importance for wild pollinators is achieved, or the habitat types at least show a positive trend.
- The Farmland Bird Index improves to at least 75%.

Note:
Targets are based on the EU Biodiversity Strategy for 2030, key restoration commitments no. 1, 2.
(1) Biodiversity areas include mandatory and voluntary biodiversity areas under the ÖPUL (Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft; Agri-environmental Programme) measure UBB (Umweltgerechte und biodiversitätsfördernde Bewirtschaftung; Environmentally friendly and biodiversity-friendly management) & Bio as well as areas managed according to nature conservation criteria under the ÖPUL nature conservation measure. According to GAP (Gemeinsame Agrarpolitik; Common agricultural policy) 2023+, farmers must set aside at least 4% of their arable land from an arable area of 10 ha under GAEC 8 (Good Agricultural and Environmental Conditions) (year-round ban on use).
(2) Extensive grassland according to INVEKOS (Integriertes Verwaltungs- und Kontrollsystem; Integrated Administration and Control System; Table 3.1.10 in GB2020): Mown meadow/pasture two uses, single-mow meadows, hay meadows, litter meadows, supplemented by any subsequent grazing depending on the grassland type.
(3) The proportion of 12% (excluding mountain pastures) refers to the total utilised agricultural area. Depending on the existing proportion of grassland, regional specifications are required at federal state level.

Initial values: Landscape elements (hedges, ponds, ditches, stone walls, buffer strips, terraces, UBB biodiversity areas, ÖPUL nature conservation areas excluding the landscape elements of mountain pastures and hay meadows) 7.2% of the total utilised agricultural area (2020); extensive grassland 11.5% of the total utilised agricultural area (2019); Farmland Bird Index 62.8% (2021)

Evaluation parameters of the objectives: Proportion and distribution of landscape elements in the agricultural landscape, conservation status of protected species under the

Habitats Directive, proportion of extensive grassland in terms of permanent grassland, level of endangerment of pollinators, Farmland Bird Index.

Measures to be implemented immediately:

- Conservation and creation of new landscape elements and, where necessary, maintenance in accordance with nature conservation requirements (e.g. overaged orchards, pruning of shelterbelts only from September to February), including educational and advisory services (also online).
- Attractive financial instruments to promote the creation of new landscape elements, as well as the preservation and maintenance of existing landscape elements, e.g. including overaged orchards.
- Increased implementation and sufficient funding of biodiversity-friendly management measures in the ÖPUL, especially for endangered locations with marginal agricultural yields.
- Promotion of locally adapted, biodiversity-friendly pasture farming.
- Development and implementation of concepts for the extensive utilisation of grassland habitat types, especially those relevant for pollinators.
- Identification of habitat types in agricultural landscapes for which a favourable conservation status or a positive trend can be achieved by 2030, and implementation of measures.
- Support to farms in switching from animal to plant production and switching to grassland-based feed and domestic protein feed.
- Promotion of crop varieties that are better adapted to changing climatic conditions in order to reduce water consumption (irrigation requirements) and the use of fertilisers and pesticides, taking into account any negative effects on biodiversity.
- Establishment of landscape conservation associations (based on the German model) for the conservation of rough pastures and special habitats.
- Promotion of operational diversification of mowing and fertilisation intensity, in line with the concept of graduated meadow use (ÖKL- Ö sterreichisches Kuratorium für Landtechnik und Landentwicklung; Austrian Board of Trustees for Land Technology and Land Development 2018), with the effect that more extensive areas with fewer nutrients are created or maintained alongside nutrient-rich areas.
- Promotion of and advice on biodiversity-friendly agricultural practices and equipment (e.g. double-blade mower, mowing direction and mow pattern, not using mower conditioners) and promotion of measures to prevent deaths by mowing.

- Increasing the impact of biodiversity areas in arable land by increasing their proportion, improving their arrangement in terms of nature conservation and incentivising sowing with a high number of mixtures from as many different plant families as possible.
- Initiating and promoting the exchange of experiences between farmers practising environmentally friendly agriculture with a focus on biodiversity.
- Creation of a guideline with new methods for farmers (e.g. selection of resource-saving and higher yielding crops, forest gardens, agroforestry, biodiversity-friendly and integrated agricultural production).
- Increase in training and advisory services relevant for biodiversity to promote farmers' understanding of biodiversity issues, the resulting landscape structures and to promote knowledge of species.
- Raising public awareness of the value of biodiversity-friendly production practices, including raising the understanding of the need to remunerate these services, including through higher food prices.

Evaluation parameters of the measures (examples): Proportion of biodiversity areas in arable and grassland areas, comparison of average field size among other biodiversity indicators used to evaluate the Austrian Rural Development Programme (Federal Institute for Agricultural Economics and Mountain Farming 2019).

Key players for implementation: AGES, farmers, BMK, BML, federal states, chambers of agriculture, NGOs.

1.3.2 Organic farming

All the objectives and measures described in the previous chapters apply to organic farming, but organic farming also offers further specific opportunities if implemented in a way that promotes biodiversity.

In 2019, a total of 670,000 ha of agricultural land were farmed organically. This is an increase of 5% compared to the previous year, and it means that about 26% of agricultural land in Austria is farmed organically. A further increase in the share of organic prodcution should be consistently aligned with market demand for organic products. Measures to promote market development for Austrian organic agriculture should be implemented, and domestic market shares should be increased as much as possible.

The area of arable land farmed organically increased by 12% from 2018 to 2019 to a total of 20%. Since 2000, the area of arable land farmed organically has roughly tripled (BMLRT 2020).

Objectives:

- The proportion of arable land under organic farming is increased to 35% if sales develop accordingly.
- The organic share in public procurement amounts to 55% and is ideally 100% regional.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 5. The share of 35% relates to the entire agricultural area, taking into account regional conditions.

Initial value: 26% of agricultural land (2019), organic share in kindergartens and schools in the City of Vienna: 50% (2019), Vienna Health Association: 33% (2019).

Evaluation parameters of the objectives: Percentage of agricultural land farmed organically.

Measures to be implemented immediately:

- Increased implementation of biodiversity-friendly practices (e.g. landscape elements and other biodiversity areas with a high number of mixture partners) in organic farming (bio-austria.at).
- Promoting the introduction of organic measures in the ÖPUL programme and guarantee their funding after the GAP programming period.
- Support the sale of organic food through campaigns for organically produced food, including measures to market old and rare crops to the general public.
- Gradual increase in the use of organic food to at least 55% in municipal, provincial and federal communal catering (naBe.gv.at, see Chapter 5).
- Increase in biodiversity-relevant training and advisory services to promote organic farm managers' understanding of the impact of management measures on biodiversity and their interactions (e.g. dragging, rolling and harrowing of land).

Evaluation parameters of the measures (examples): Proportion of land used for biodiversity-friendly practices in organic farming, proportion of organic food in public procurement.

Key players for implementation: AGES, Bio Austria, farmers, BMK, BML, federal states, chambers of agriculture.

1.3.3 Rare crop varieties and livestock breeds

Analogous to the genetic diversity of wild species, the diversity of crop varieties (crop species or varieties also include heterogeneous materials, landraces, populations, and old origins) and livestock breeds represents an essential insurance against global change. According to one estimate, around 80-90% of apple varieties in Austria have disappeared since 1900 (ARCHE NOAH 2020). These negative trends in species populations must be reversed. Crop diversity must be preserved and restored in-situ and ex-situ, i.e. in collections, home gardens, on public land and in sustainable agriculture.

In 2019, the area for rare agricultural crops totalled around 12,000 ha (BMLRT 2020); spelt was cultivated on 70% of this area. There are a number of surveys and estimates for extensive fruit growing, some of which are only relevant for certain regions, but all in all, they allow sufficiently reliable conclusions about the situation and trends in Austria (Suske & Huber 2012).

Objectives:

- All rare agricultural crop varieties under ÖPUL are preserved on-farm, the area of cultivation of rare agricultural crops and varieties in the ÖPUL is increased by 20%.
- Orchard trees included under ÖPUL are increased by 5% between 2023 and 2027.
- All livestock breeds of ÖPUL's special guideline are preserved and the number of livestock of particularly endangered breeds is increased by 30%, with corresponding support for market development.

Note: Please also see ÖPUL 2015 Anbau seltener landwirtschaftlicher Kulturpflanzen ("ÖPUL 2015 cultivation of rare agricultural crops").

Initial values: Area of rare agricultural crops 11,967 ha (2019), orchard area around 54,000 ha based on estimates by ARGE Streuobst and Statistics Austria, 40,200 livestock of endangered breeds (2020).

Evaluation parameters of the objectives: Area of cultivation of rare agricultural crops, area of orchards, number of fruit varieties in on-farm cultivation, number of subsidised rare livestock breeds.

Measures to be implemented immediately:

- Increase in funding for the conservation and cultivation of rare crops, for the conservation and new planting of orchards, and for the conservation and keeping of livestock breeds as part of the European Agricultural Fund for Rural Development (EAFRD) and other suitable funding instruments.
- Reinforcement of advisory services on the value of rare crops and livestock breeds.
- Reinforcement of advisory services and promotion of measures for the care of orchard trees, especially on non-agricultural land.
- Data collection on orchards and fruit varieties.
- Support to product sales by developing distribution channels and markets for rare crops and livestock breeds.
- Reinforcing the breeding programme for rare livestock breeds.

- Preservation, promotion, and increase in natural breeding lines through lifetime breeding of livestock.
- Establishment of a platform to coordinate the various actors involved in crop diversity, from public and private gene banks to breeders.
- Preservation and promotion of collections and home gardens with rare crop varieties.
- Development of an agrobiodiversity index that primarily relates to common crop species, varieties (in a broader sense) and livestock breeds (Last et al. 2014).

Mid-term measures to be taken:

- Expanding the list of rare agricultural crops and practicable design of criteria for subventions,
- Establishment of a monitoring system for the use of rare crops and livestock breeds.

Evaluation parameters of the measures (examples): Amount of financial support, biodiversity indicators of the ÖPUL evaluation, indicators of the Second Global Plan of Action for Plant Genetic Resources (Sirami et al. 2019).

Key players for implementation: AGES, farmers, BML, HBLA and BA Klosterneuburg, HBLA Schönbrunn, Chamber of Agriculture, NGOs (ARGE Streuobst, Arche Noah, ÖNGENE).

1.3.4 Plant protection products and fertilisers

The authorisation of plant protection products (herbicides, fungicides, insecticides, and others) in Austria is based on EU Regulation 1107/2009 and also regulated nationally by the Plant Protection Products Act (2011). As part of their assessment, special consideration is given to effects on non-targeted species, including their permanent state and effects on the ecosystem (Regulation (EC) 1107/2009, Chapter II, Section 1, Subsection 1, Article 4, (3) e), ii) & iii)). The provisions for the use of plant protection products are defined within their national authorisation; the federal states are responsible for monitoring these provisions.

The current risk assessment of plant protection products is based on studies assessing certain representative species. With regard to biodiversity, the current assessment assumes that further organism groups of other species, for which evaluative tests are being carried out, are also covered. These include amphibians, reptiles, and bats. However, studies show that some of these species are inadequately protected. The decline in biodiversity in the

agricultural landscape is therefore partly attributed to inadequate risk assessment (Brühl et al. 2019).

Direct, toxic effects on agricultural birds are taken into account in the assessment and should therefore not occur. However, indirect effects through insect pests control and non-targeted insects are to be expected or have already been demonstrated (Hallmann et al. 2017). Another critical point of the current assessment is that it doesn‘t consider potentially synergistic or additive effect on non-targeted organisms through the application of several plant protection products in one season (spraying sequences).

The data on the quantities of active substances used in plant protection products in Austria, which is published annually by the Ministry of Agriculture in the Green Reports (BMLRT 2020, BMLFUW 2015b, 2011, 2009, 2005), shows the following trends: for insecticidal active substances (excluding inert gases), the trend between 2000 and 2020 shows a continuous upward trend. The occurrence of harmful organisms is directly and indirectly influenced by climate change. As the effectiveness of the substances has generally increased at the same time due to higher toxicity, it can be assumed that the impact on the environment has also increased, especially if the application rate remains the same. In contrast, on average fewer herbicidal active substances have been put into circulation since 2000. At the same time, the use of chemically synthesised fungicides and sulphur has increased. Generally speaking, sales figures fluctuate greatly depending on the type of active ingredient. Overall, there has only been a very slight decline in the quantities of pesticide active ingredients (excluding inert gases) put into circulation, despite the entry into force of EU Directive 2009/128 on the sustainable use of pesticides and the National Action Plans.

At a global level, the anthropogenically induced quantities of nitrogen and phosphorus are now so large that the planetary boundaries are already considered to have been exceeded (Rockström et al. 2009). In the case of phosphorus, losses due to erosion constitute a particular challenge in Austria. As far as nitrogen fertilisation is concerned, the challenge from an economic and ecological perspective is to control the nitrogen supply in such a way that crops are optimally supplied and nitrogen surpluses on the land and environmentally relevant nitrogen emissions into the air as ammonia or nitrous oxide and into water bodies as nitrate are minimised. The effects of anthropogenically increased nitrogen flows on biodiversity consist primarily of changes to ecosystems due to increased nitrogen inputs. The atmospheric input of nitrogen also leads to a homogenisation that is harmful to biodiversity.

In Austria, there is an average nitrogen surplus on agricultural land, calculated as the gross nitrogen surplus of the national agricultural nitrogen balance, of around 40 kg N/ha/year (2015–2019) (Environment Agency Austria 2019a). Nitrogen efficiency in Austria increased from 61% in the period 2000–2004 to 70% in the period 2015–2019 (Environment Agency Austria 2021). In the integrated national energy and climate plan for Austria (NEKP), a 20% reduction in the use of mineral fertilisers by 2030 is cited as a measure required to achieve Austria's energy and climate targets by 2030 in the decarbonisation dimension for the agricultural sector (BMNT 2019a).

Objectives:

- The risk to biodiversity posed by active substances in plant protection products put into circulation is significantly reduced, taking into account European requirements (50% reduction) as well as reductions already achieved in Austria. The future Austrian reduction results from the definition of Austrian target values in application of the new EU Regulation on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115.
- The use of plant protection products in active substance group 3 of the Harmonised Risk Indicator HRI-1 ("particularly hazardous substitution candidates") has decreased significantly when compared to the periods 2015–2017 and 2028–2030, taking into account future European requirements (reduction by 50%, new EU Regulation on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115).
- Nutrient losses from fertilisers are significantly reduced, taking into account European requirements (50% reduction, EU Biodiversity Strategy 2030), while avoiding deterioration in soil fertility and taking into consideration reductions already achieved in Austria.
- The need for mineral fertilisers is reduced by 20% in line with the NECP measure while soil fertility is maintained.

Note: Targets are based on the EU Biodiversity Strategy for 2030, key commitment no. 3, 10. – Dafne project in progress "Reduction of plant protection products – current importance and possibilities for reducing the use of higher-risk plant protection products in agriculture" (project management DI Besenhofer/AGES).

Initial values: Active ingredient quantities of synthetic-chemical plant protection products 2,250 t (mean value 2015–2020), sulphur and copper (also permitted in organic farming) 1,060 t (mean value 2015–2020), plant protection products of active ingredient group 3 of the HRI-1 (mean value 2015–2017): currently not available, fertiliser sales 113,475 t nitrogen, 29,948 t phosphorus pentoxide (mean value 2015–2020), average nutrient surplus according to the nutrient balance of agriculture according to EUROSTAT/OECD method: 2015–2019: 40 kg N/ha/a, 1.6 kg P/ha/a.

Evaluation parameters of the objectives: Harmonised risk indicator 1 of the quantities of active substances put into circulation, fertiliser sales: Mean value of pure nutrient quantities (N, P2O5) (AMA sales figures) over five years, mean nutrient surplus according to the nutrient balance of agriculture according to EUROSTAT/OECD method for nitrogen and phosphorus. (baes.gv.at/zulassung)

Measures to be implemented immediately:

- Further development and application of a more suitable ecotoxicological indicator for the risk assessment of plant protection products on biodiversity as part of the active substance assessment at EU level.
- Implementating an impact assessment of the reduction of plant protection products (including competitiveness and security of supply) and of the reduction of fertilisers.
- Implementation of the National Action Plan on the sustainable use of plant protection products (NAP), in particular with regard to reduction targets for plant protection products.
- Promoting research into alternative plant protection methods and active substances and their provision.
- Strengthening natural pest control through the targeted creation of biodiversity areas and landscape elements (see Chapter 1.3.1) and promoting research projects to assess their effectiveness.
- Promoting the use of drift-reducing techniques when applying any plant protection products in order to minimise the impact on non-target areas and organisms.
- Promoting the breeding of resistant varieties of locally adapted crops, including organic and seed-resistant varieties, and greater consideration for these traits in variety testing.
- Promotion of crop rotation measures or specifications for crop diversification that contribute to further reducing the use of pesticides and fertilisers (as a contribution to integrated plant protection).

- Implementation of measures in the future Ammonia Reduction Regulation and the NECP to reduce agricultural gaseous nitrogen emissions, including ammonia emissions, to reduce eutrophying nitrogen inputs.
- Promotion of graduated meadow cultivation as part of rural development (implementation of measures and further training).
- Increase in the proportion of solid manure and compost in the application of farm fertiliser on grassland.
- Increase in advisory and training services for farmers for the increased use of more specific active substances and the more targeted use of these active substances. Advice on precision farming, crop diversity and crop rotation. (Precision farming serves to ensure a more efficient use of resources and the least possible negative impact on the environment; developments in the field of smart farming provide strategies for selecting suitable varieties, plant protection products or fertilisers).
- Evaluation of buffer strips in accordance with the Nitrate Action Programme and GLÖZ 4 (creation of buffer strips along watercourses with a focus on water bodies with material pollution) with regard to their impact on biodiversity.
- Development and implementation of a reduction programme for pesticide applications in domestic and allotment gardens.
- Discussion of a reduction programme for pesticide applications in protected areas.
- Increase in advisory services and educational programmes for non-professional users with regard to the use of plant protection products.
- Continuation and further development of the “plant protection warning service”.

Evaluation parameters of the measures (example): Application of a more suitable ecotoxicological indicator for the risk assessment of plant protection products on biodiversity as part of the active substance evaluation at EU level.

Key players for implementation: AGES, BMK, BML, federal states, chambers of agriculture, NGOs, scientific and research institutions.

1.4 Forests and forestry

1.4.1 Forest species and habitats

Almost half of Austria’s national territory is covered by forests. Due to the high forest cover, forests are of great importance for the protection of native species and habitats. In addition

to four forest impacts, the Forest Act also defines sustainable forest management to a certain degree. It states that the care and use of forests should be carried out in such a way and to such an extent that their biological diversity, productivity, regenerative capacity, vitality, and potential are permanently maintained. This should fulfil ecological, economic, and social functions at local, national, and global level now and in the future without damaging other ecosystems.

Integrative measures for the conservation and promotion of biodiversity in forests should take place across the entire forest area. These include, for example, sustainable forestry agreements or voluntary forest conservation (conservation agreements). Measures include leaving standing and lying deadwood, habitat trees and habitat tree groups, protection of trees with cavities and nests, respect for special habitats (wet habitats, dry sites).Furthermore, it includes active measures such as choosing certain tree species and introducing rare tree species, the creation of small ponds, etc.

In addition to the protection of close-to-natural, ecologically valuable forest areas or primeval forests and in accordance with Section 1 of the Forest Act, integrative biodiversity protection is important across the entire forest area alongside other objectives (utilisation, protection, ecosystem services and recreational function, climate resilience). Additionally, the preservation or improvement of the protective function of protective forests (forests that provide valuable ecosystem services) must always be ensured .

Field of action 4 of the Forest Strategy 2020+ presents the following vision for biological diversity in forests. "Biodiversity in Austria's forests, with its species, genes, ecosystems and landscapes, is promoted by sustainable, multifunctional forest management. This also includes targeted protection of certain trees after reconciling all interests. The forest-based sector is making its contribution to halting the loss of biodiversity in forest ecosystems throughout Austria."

Climate change, forestry and hunting that negatively affects biodiversity, the introduction of nutrients and pollutants and fragmentation lead to the degradation of native ecosystems and associated biotic communities, which are a key factor for biodiversity in forests (BMNT 2018b).

Of the forest habitat types covered by the Habitats Directive, 37.5% are in unfavourable-poor conservation status, based on the sum of the assessments from both biogeographical regions represented in Austria out of all regions in the EU Habitats Directive, Environment

Agency Austria (2019b). Only 24% of all forest habitat types are not endangered (Essl et al. 2004). Spruce-fir-beech forests, spruce-fir forests, oak-hornbeam forests, and thermophilic oak forests are relatively far from their natural state in relation to the total area of the respective forest type, particularly with regard to their tree species composition. In the "special case" of spruce-fir-beech forests (potentially covering almost 30% of Austria's forest area), one of the community-forming tree species is missing on almost half of the areas.

Objectives:

- Forest ecosystems are closer to a natural state, particularly with regard to a composition of tree species similar to all potentially natural forest communities, while taking into account climate change.
- The sate of existing forest communities of natural and semi-natural spruce-fir-beech forests, spruce-fir forests, oak-hornbeam forests and thermophilic oak forests is qualitatively closer to a natural state. The proportion of semi-natural and natural areas per forest community is measurably increased.
- The stability and resilience of protected forests is increased.
- Throughout Austria, the proportion of forests with diverse age structures is increased.
- Reforestation efforts ensure the main tree species characteristic of the respective potential natural forest community are represented.
- Forest biodiversity is measurably increased, and a set of indicators containing complementary biodiversity indicators is developed.
- Biodiversity conservation and its improvement are taken into account in forest management policies that are adapted to climate change.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1; see also the Protection Forest Action Programme (schutzwald.at/aktionsprogramm).

Initial values: Spruce-fir-beech forests <50% natural tree species composition (ÖWAD indicator 4.10), Woodland Bird Index 90% (2012).

Evaluation parameters of the objectives: Forest biodiversity index, area of the respective forest communities with natural or semi-natural tree species composition (ÖWAD indicator 4.10), forest habitat types and species of the Habitats Directive, Woodland Bird Index.

Measures to be implemented immediately:

- Linking forest-related support programmes to the principles of semi-natural forest management, taking into account forest-dependent organisms and climate change.
- Increased promotion of continuous cover forestry and harvesting and extraction methods that protect soils.
- Development of a practicable method for assessing the closeness to a natural state of tree populations and harmonisation with existing monitoring systems.
- Further methodological development towards a scientifically valid, recognised and practical Woodland Bird Index.
- Creation and preservation of structurally diverse forest edges as valuable habitat connectivity networks.
- Increase in contractual agreements to create stepping stone habitats and forest protection areas, as well as promotion of other regionally adapted biodiversity-friendly measures in commercial forests on a voluntary basis.
- Significant reduction of browsing pressure on fir and deciduous tree species to enable their natural regeneration even without protection and, where necessary from a forest ecological perspective, increased promotion of regeneration through protection (fences, individual protection). (see Chapter 1.4.5)
- Methodological development of wildlife impact assessment and evaluation tools at the district or stand level as well as within zones defined based on wildlife ecology.
- Orientation of forestry education and awareness-raising in forest management around the concept of semi-natural silviculture, taking into account the habitat function and the challenges of climate change.
- Increasing the motivation of forest owners through awareness-raising measures and expert support for independent initiatives.
- Giving the greatest possible consideration to natural disturbance processes in the interests of promoting forest biodiversity when designing support programmes and applying the Forest Act.

Mid-term measures to be taken:

- Converting and transitioning non-natural poulations into multi-layered or multi-aged populations, orienting the tree species selection around the potential natural forest community or the recommendation based on forest typification, taking into account the effects of climate change.

Evaluation parameters of the measures (examples): Closeness of populations to their natural state, tree species mix, browsing pressure.

Key players for implementation: BFW, BMK, BML, landowners, hunters, provinces, NGOs, Austrian Federal Forests, Pro Silva Austria.

1.4.2 Old-growth and deadwood

Deadwood and habitat wood or habitat trees are key structures in natural forests that are essential for a natural species composition in the forest (Enzenhofer & Schrank 2019). Deadwood is a habitat for a variety of organisms and, after humification, an important component of the forest floor. Many species are dependent on standing or lying deadwood at certain stages of their life cycle (Linser 2020). Commercial forests situated between heavily protected areas should also provide connectivity in relation to natural forest species. The lack of functional deadwood and old populations, as well as connecting corridors leads to species losses, especially for xylobiont insects (Seibold et al. 2019). Deadwood with a diameter of > 20 cm is particularly relevant for biodiversity. The Forest Strategy 2020+ specifies a target value for deadwood of > 20 cm DBH (diameter at breast height) for at least 3 cubic metres over bark/ha in commercial forests (BMNT 2018b).

In dry years, deadwood in heavily thinned, structurally poor forest populations or devastated areas can lead to an increased risk of forest fires. This risk must be taken into account in forest management concepts at the local and regional levels. For biodiversity reasons, however, it is essential to increase the total proportion of deadwood in Austria's forests. In vigorous forests, deadwood also acts as an important water reservoir.

Objectives:

- The average amount of deadwood in productive forests remains at least stable, with an increase of thicker trees (> 20 cm) in particular and in the proportion of standing and lying deadwood, taking into account regional and structural characteristics of the respective forest ecosystems and the need to increase the proportion of deadwood in regions with a low supply.
- A functionally well-connected network of old-growth stands and deadwood hotspots corresponding to the respective ecological requirements are developed in commercial forests.

Initial value: Initial values according to the Austrian Forest Inventory (ÖWI): Total of standing, lying and stump deadwood in productive forests > 10 cm: 30.9 m³/ha – ÖWI 2016/18, preliminary evaluation (Linser 2020), standing deadwood in commercial forests/timber forests > 20 cm: 4.3 cubic metres over bark/ha. (Linser 2020)

Evaluation parameters of the objectives: Volume of deadwood (standing, lying and stumps) > 10 cm diameter in productive forests in m³/ha.

Measures to be implemented immediately:

- Increased measures to promote habitat trees and habitat tree groups, old-growth and deadwood hotspots with regional densification and/or for the purpose of ecological connectivity.
- Closing knowledge gaps on the ecological necessity of certain compositions and configurations of old-growth and deadwood islands.
- Creation of implementation concepts to increase the proportion of deadwood in natural areas with currently low values according to ÖWI 2016/18.
- Raising awareness among forest managers and other stakeholders about the importance of deadwood for fauna, deadwood-dwelling insects and birds.
- Further developing ÖWI methods for the definition and evaluation of target values specific to regions, forest types and functional aspects.

Evaluation parameters for measures (examples): Level of financial support for habitat trees and habitat tree groups, old-growth and deadwood hotspots.

Key players for implementation: BFW, BMK, BML, landowners, provinces, NGOs, Austrian Federal Forests.

1.4.3 Fragmentation and development of forest areas

The fragmentation of forest areas takes place on several levels, depending on the organism group under consideration. Large infrastructure networks (federal roads, railway lines) pose barriers to large-scale migratory mammals, and disturbances restrict the habitats of animals requiring areas with low disturbance. Smaller transport networks can hinder the migration needs of smaller groups of organisms (e.g. amphibians, insects).

Forest roads can have both positive and negative effects on biodiversity. These can also provide valuable habitats on slopes and roadsides, but they affect the original habitat and can act as potential entry paths for invasive neobiota (Brunner & Schwantzer 2020). It is necessary to create forest roads to grant access to forest areas g for their management in certain areas. However, in addition to direct impacts (e.g. soil compaction, negative influence on the hydrologic balance, especially in mountainous areas, loss of forest soil), this can change forest and wildlife management and thus have an impact on biodiversity. It is therefore necessary to initiate in-depth studies in order to shed a comprehensive light on the topic.

Objective:

- Further fragmentation and development of forest areas, especially in areas with little forest and in large unexploited forest areas, are minimised.

Note: The objective is based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1.

Initial value: Effective mesh size for Austria 77 km², which corresponds to an effective mesh density of 1.3 meshes per 100 km² (Anpassung an den Klimawandel. Fortschrittsbericht 2015 (Adaptation to Climate Change. Progress Report 2015), BMLFUW 2015), 45 linear metres/ha of truck-accessible forest roads in productive forests (Greuter, 2019).

Evaluation parameters of the objective: Extent of fragmentation of total forest areas, extent of fragmentation of large undeveloped forest areas.

Measures to be implemented immediately:

- Identification of habitats with high fragmentation and low fragmentation of ecologically valuable areas, preserving the latter.
- Identification of isolated populations or populations at risk of fragmentation, in particular based on existing data.
- Increased measures to connect (forest) habitats (green bridges, creation of corridors, etc.) for endangered groups of organisms.
- Data-based overview of conservation objectives, existing exploitations and future development areas.

- Regular collection of differentiated data on the existence of forest roads and how they intersect with forest planning.
- Development of a set of indicators for forest fragmentation.
- Launching further comprehensive studies and projects on the impact of forest roads on forest biodiversity.
- Consideration of biodiversity-relevant factors in the planning, construction and authorisation of forest roads.
- Development and application of integral landscape management concepts.
- Consideration of the fragmenting effects on forest biodiversity when planning and authorising wind turbines, climbing aids and other infrastructure facilities, including those relating to tourism.

Mid-term measures to be taken:

Development and implementation of projects to connect separated forest habitats, e.g. habitat corridors, stepping stone habitats.

Evaluation parameters for measures (examples): Forest road density in linear metres/ha, connectivity projects in forests.

Key players for implementation: BFW, BML, landowners, provinces, authorised hunters.

1.4.4 Invasive alien tree species

Invasive alien species are organisms introduced by human activity into habitats outside their natural distribution, where they have a negative impact on biodiversity and associated ecosystem services. Not every alien or naturalised tree species is also invasive.

Due to climate change, non-invasive alien tree species will continue to be actively utilised in the future.

The current area of invasive alien tree species in Austria amounts to 33,000 ha (ash-maple, tree of heaven, etc.). (BFW-Praxisinformation No. 50 (2019), data from ÖWI 2016/18, – preliminary evaluation, as per Linser (2020)). However, the available data is less than satisfactory due to the recording method (sampling grid). The hybrid poplar is another potential problem as it sometimes jeopardises the black poplar through cross-pollination due to its occasional fertility.

The problem of invasive alien tree species is particularly relevant for the east, south and southeast of Austria (e.g. riparian forests of high conservation value) and large parts of the northern Alpine foothills in Upper Austria. Site-specific risk assessments must be carried out to evaluate tree species with regard to their invasiveness. Invasive tree species such as black locust, red ash (Fraxinus pennsylvanica), ash-leaved maple and tree of heaven are currently spreading uncontrollably, particularly in riparian zones, and displacing native species. This results in considerable additional work in forestry management for these areas and sometimes extensive silvicultural measures in order to preserve target tree species that are desirable from an ecological and economic point of view. The Austrian Forest Strategy's objective of preventing the uncontrolled spread of invasive tree species was not achieved. Contrary to the categorisation of Douglas fir as potentially invasive in the Austrian Action Plan on Alien Species, Eberhard, B. & Hasenauer, H. found no evidence of its invasiveness (in Linser 2020).

Objectives:

- The total proportion of established invasive alien tree species does not increase and is reduced, particularly in areas that are sensitive in terms of nature conservation.
- The establishment of already introduced invasive alien tree species is prevented by active control.

Note: In this context, "established" means the existence of a self-sustaining population (see Blackburn et al. 2011). Based on the current assessment, the focus here lies on the following species: tree of heaven, ash-leaved maple, black locust, red ash, princess tree. – The expert community has differing opinions on the invasiveness of hybrid poplar, but the main point here is that it endangers the black poplar.

Initial value: 33,000 ha of forest area with invasive alien tree species.

Evaluation parameters of the objectives: Forest area with invasive alien tree species.

Measures to be implemented immediately:

- Clarifying alien tree species' invasiveness through risk assessment with the involvement of research institutes and land users.
- Updating the Austrian inventory of alien tree species.

- Combating invasive alien tree species and reducing the affected area, especially in protected regions.
- Combating invasive alien tree species that are not yet established but have already been introduced.
- No introduction of invasive alien tree species in areas of nature conservation value and their surroundings.
- No promotion of afforestation with potentially invasive alien species in regions where these species are, or could be, invasive.

Mid-term measures to be taken:

- Establishment of a monitoring system for the spread of alien, invasive and potentially invasive tree species (including species that are not yet established and taking advantage of synergies with the early warning system of the provinces in accordance with the EU IAS Regulation).

Evaluation parameters for measures (example): Number of control projects.

Key players for implementation: BMK, BML, landowners, provinces, scientific and research institutions.

1.4.5 Hunting

Hunting influences the condition, diversity and development of ecosystems by extracting and preserving huntable wildlife species. Impairment of biodiversity through hunting can result from hunting predators and endangered species with low population levels (e.g. turtledove, capercaillie and black grouse) too intensively or too minimally. One-sided promotion of selected hoofed game species can cause a shift in the competitive structure and can even lead to massive changes in habitats for other species.

Excessive browsing pressure jeopardises the regeneration of the forest and leads to the loss of important characteristic tree species and ecologically important mixed tree species in the individual forest communities. Regions with predominantly mixed forests are more vulnerable to browsing than those with predominantly coniferous or beech forests, with fir being a particularly vulnerable tree species. Improvements in the influence of game have been observed in around two thirds of the districts, with slight increases in around a quarter of

the districts. A sustained positive trend towards reducing the influence of game on the regeneration status hasn't been assessed since monitoring began in 2004.

Sustainable hunting in line with the principle of "protection through utilisation" is also effective for some aspects of biodiversity (e.g. hunting as an incentive to implement habitat improvement measures).

Objectives:

- Game populations are properly recorded and adapted to natural conditions, taking into account their winter and summer habitats and the requirements of forest regeneration.
- The populations of protected animal species that are subject to hunting rights and have a favourable conservation status are at least stable. The populations of endangered animal species subject to hunting rights have increased.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1, as well as the Mariazell Declaration: The regeneration of all site-appropriate tree species should generally be possible without protective measures.

Initial value: Lynx – unfavourable-poor status (Alpine region), unfavourable-inadequate status (continental region); bear – unfavourable-poor status (Alpine region); wolf – not assessed (Environment Agency Austria 2019b), number of confirmed wolves (2020): 22 (Austrian Centre for Bear, Wolf and Lynx (baer-wolf-luchs.at).

Evaluation parameters of the objectives: Browsing intensity (results of game impact monitoring), proportion of natural regeneration, conservation status, population sizes of rare/endangered huntable game species.

Measures to be implemented immediately are:

- Regulation of hoofed game populations to an ecologically sustainable level that ensures the regeneration of characteristic tree species and important mixed-forest tree species without protective measures.
- Examining and adapting hunting and game management practices for hoofed game, with the aim of creating and maintaining hoofed game populations that exhibit a more natural habitat and space utilisation pattern from a daily and seasonal

perspective and reducing feeding practices to a level required by the natural environment.

- Delimitation of game refuges (including hunting bans) to reduce browsing pressure due to stress while maintaining ecologically sustainable populations of hoofed game, especially in protected forests. This should be coupled with appropriate awareness-raising measures to achieve compliance in practice.
- Increased establishment of sites to evaluate and compare browsing , especially in protection forests.
- Implementing browsing control methods at the level of hunting grounds and of demarcated habitats in terms of game ecology.
- Further development and increase in conflict management systems for application at the regional level, targeted reconciliation of interests (e.g. in dealing with predators) and establishment of permanent dialogue structures to promote mutual understanding between hunting, nature conservation and forestry (e.g. forest and hunting dialogue).
- Deepening and expanding knowledge of ecological relationships, preservation of biodiversity, nature conservation (habitat improvement) and the principles of nature conservation law as a central element in the education and training of hunters.
- Strengthening measures to prevent poaching and illegal pursuit of protected animals (e.g. birds of prey).
- Development of a legally binding roadmap to phase out lead in ammunition to prevent risks to biodiversity and human health; ban on non-biodegradable plastic casings for shotgun ammunition.
- Initiatives to further strengthen the voluntary application of criteria and indicators for sustainable hunting (Reimoser et al. 2008).
- Scientific monitoring of existing ecological, pilot hunting exercises and experimental hunting grounds to gain more knowledge about the influence on biodiversity of measures taken on hunting grounds.
- Ongoing evaluation of the results of game impact monitoring and, if necessary, further development of game impact monitoring methods.

Evaluation parameters for measures (examples): Available methods and instruments for the ecological assessment of game browsing at the local, regional and district levels; further development of game impact monitoring.

Key players for implementation: BML, landowners, hunting associations, authorised hunters, provinces.

1.5 Waters, floodplains, water management and fisheries

1.5.1 Species and habitats

Wetlands, small standing bodies of water, lakes and watercourses harbour a wide variety of special habitats and provide important ecosystem services, such as flood protection (together with the surrounding area), regulation of the hydrologic balance or CO_2 storage. The expansion of settlement and agricultural areas, river engineering and the utilisation of watercourses for energy production have had a major impact on the habitats typical of water bodies and the species that depend on them. Of the water body habitat types listed in the Habitats Directive, 47% are in unfavourable-insufficient and 53% in unfavourable-poor conservation status. The soft (91E0) and hard (91F0) riparian forests, which depend on intact watercourses, are in an unfavourable-poor conservation status in both biogeographical regions represented in Austria out of the regions in the EU Habitats Directive (Environment Agency Austria 2019b). In the Red List habitat type group of inland waters and aquatic vegetation, 21% of Austrian habitat types are threatened with complete destruction and the majority (47%) are endangered (Essl et al. 2008).

14.2% of watercourses are in very good ecological status, and 26.2% are in good ecological status, i.e. there are only minor deviations from unimpaired status. Just under a third of water bodies (30.1%) can be categorised as moderate, 10.5% as unsatisfactory and 4.3% as poor. 2.5% have good or better ecological potential, 11.6% have moderate or worse ecological potential; no assessment is available for 0.4% (BMLRT 2022).

The majority of the 43 natural and 19 artificial lakes larger than 50 ha are in very good (6.5%) or good ecological status (35.5%), 40.3% have good or better ecological potential. 14.5% of the lakes have a moderate ecological status, and 3.2% have an unsatisfactory ecological status (BMLRT 2022).

To improve the overall situation, synergies between watercourse and floodplain ecology and flood protection must be optimised. Planned and existing uses of water bodies and floodplains should be coordinated more closely and in greater depth with the requirements of flood protection, the protection of natural resources and nature conservation. Accordingly, improvements should also be sought within the scope of operational possibilities.

Land availability plays a pivotal role in forward-looking flood and floodplain protection, and semi-natural watercourse design. The framework conditions in this area must be improved and appropriate instruments and resources must be provided to safeguard them.

Objectives:

- Good ecological status or good ecological potential of all water bodies according to the 3rd National Water Management Plan (NGP) is achieved. Those stretches of water that are already in a very good ecological status are preserved and secured.
- A programme for biodiversity-friendly management of riparian strips (including planting characteristic native and semi-natural vegetation) adapted to the respective type of a water body, its surroundings and its pollution status has been developed, taking into account local conditions, and its implementation has begun.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 8.

Initial values: Habitats Directive water body habitat types: 47% in unfavourable-insufficient, 53% in unfavourable-poor conservation status; Habitats Directive water species: 6% in favourable, 45% in unfavourable-insufficient, 49% in unfavourable-poor conservation status; Red List habitat type group inland waters and aquatic vegetation: 21% critically endangered, 47% endangered.

Evaluation parameters of the objectives: Conservation status of aquatic Habitats Directive species and habitats, classification of water bodies according to the Water Framework Directive and National Water Management Plan, number of river kilometres with characteristic native and semi-natural riparian strips adapted to the water body type.

Measures to be implemented immediately are:

- Implementation of measures as defined in the National Water Management Plans to achieve good ecological status or good ecological potential.
- Development and implementation of measures to achieve favourable conservation status and improve the endangered status of all aquatic species and habitat types, as

well as species of adjacent terrestrial habitat types dependent on river dynamics (especially pioneer sites and regularly flooded floodplains).

- Utilisation of the potential of public water resources for biodiversity purposes.
- Implementation of measures with multiple benefits for flood risk management and water body development based on planning based on catchment areas (e.g. water body development and risk management concepts).
- Watercourse renaturation and other comprehensive flood risk management measures in future flood protection projects in order to combine flood safety with ecological improvements.
- Expansion and active management of public water resources in the interest of nature conservation and forward-looking flood risk management.
- Increased measures to reduce soil erosion in order to avoid high material inputs during heavy rainfall events.
- Promotion of investments in green and blue infrastructure, e.g. maintenance or creation of wooded and green strips adapted to the type of watercourse with native plants appropriate to the location.
- Increasing or expanding continuity in watercourse systems, removal or – if not possible – rehabilitation of all barriers not in operation (grey infrastructure) that are not actively used or cannot potentially be used for electricity generation and protection against natural hazards.
- Ensuring sustainable bed load and suspended sediment management, taking into account all natural sedimentation areas, including those currently used for agricultural purposes.
- Reduction of material and chemical inputs from point and diffuse sources.
- Renovation and optimisation of existing power plants, taking into account ecological requirements as part of re-awarding water rights or through sufficient incentive funding in the Renewable Energies Expansion Act (EAG).
- Construction of additional functional ascending and descending fish ladders (migration aids) for continuous fish migration (including fish protection facilities at hydropower plants) (BMLRT, 2021b) and maintenance of existing funding.
- Conducting research on the effectiveness of descending fish ladders.
- Promotion of semi-natural, small standing water bodies.
- Intensification of conflict management measures and participatory processes involving all interest groups to develop targeted solutions for achieving and maintaining a favourable conservation status of all water bodies.
- Strengthening active conflict management based on an assessment of the causes and extent of impacts by predators and aimed at the favourable conservation status of all

affected species, and development of sustainable, locally differentiated solutions for dealing with predators.

Evaluation parameters for measures (examples): Length or percentage of stretches with good or very good ecological status (or potential in the case of heavily modified water bodies), stretches with ecological connectivity, their ecological status or potential (according to the survey and assessment methods under the Water Framework Directive).

Key players for implementation: BML, fishing associations, landowners, provinces, regulatory companies, water rights holders.

1.5.2 Fishing

Fish fauna in Austria is particularly affected by interruptions to the water continuum caused by migration barriers such as hydropower plants, transversal structures, flood protection measures, navigation, water extraction (e.g. irrigation), changes to the flow regime, water level fluctuations (hydropeaking), bank stabilisation, water use (e.g. tourism) and, in some cases, wastewater pollution (including hormonally active substances). Local to regional economic damage is caused by fish predators (especially in artificial waters, but also in small natural waters). Fishing, which in Austria is primarily a recreational activity, can influence the species spectrum of aquatic biotic communities typical of water bodies through fish stocking and fish harvesting. All fish of the Habitats Directive except the European bullhead (Cottus gobio), which has a favourable conservation status in the Alpine region, are either in an unfavourable-insufficient or unfavourable-poor conservation status. According to Austria's Red List, 46% of native fish species are categorised as CR – critically endangered, EN – endangered or VU – vulnerable (Wolfram & Mikschi 2007).

Objective:

- Sustainable fishing is established and contributes to the conservation of species specific to water types and to the improvement of aquatic habitats.

Note: The objective is based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1.

Initial value: Of the 28 Habitats Directive fish species, only one is in favourable conservation status in the Alpine region (2019).

Evaluation parameters of the objective: Conservation status of Habitats Directive fish species, status of the fish species community according to the Water Framework Directive.

Measures to be implemented immediately:

- Development of a catalogue of criteria for sustainable fisheries management(e.g. habitat improvement, protection of highly endangered species, fish stocking measures only in justified cases and under consideration of ecological risks), taking into account the condition of the water bodies (Environment Agency Austria 2021b).
- Promotion of sustainable fish farming, wild fish stock management and sustainable, extensive management of ponds.
- No fish stocking with non-indigenous species and reduction of non-indigenous stocks in native waters.
- Carrying out mappings of spawning grounds and promoting the protection and preservation of spawning sanctuaries (pursuant to Art. 15 (2) of the Water Rights Act).
- Breeding and (re)colonising native fish, crayfish and mussels from suitable parent stocks in river courses and standing waters with collapsed populations, taking into account the IUCN criteria (IUCN 2013).
- Legal ban on stocking with alien, non-native aquatic animals in all provinces.
- Increased inclusion of aquatic ecology in training and further education programmes for land users, association officials and supervisory bodies and as a prerequisite for statutory fishing qualificationexaminations.
- Development of a range of high-quality training and further education programmes or corresponding (digital) documents for water education, taking into account sustainable fisheries. For example, a course could be developed – based on the structure of the training modules for forest education – aimed at lecturers and examiners for official fishing qualification examinations, nature educators and trainers/guides for water-related leisure activities, such as boating.
- Increase in support for the protection of farm ponds against fish predators (e.g. fencing).

Evaluation parameters for measures (example): Fish Index Austria (FIA baw.at), quality and quantity of fish stocking measures.

Key players for implementation: BML, BMSGPK, fisheries managers, fisheries associations, provinces, research institutions.

1.6 Mountain pastures and high mountain regions

This section covers all Austrian mountain pastures (regardless of altitude) and the Austrian high mountain regions. According to the relevant directories of the federal states, the area of mountain pastures in Austria adds up to around 900,000 ha. According to INVEKOS, around one third (approx. 316,000 ha in 2019) consists of mountain pasture forage area. With regard to mountain pastures, however, it consists of not only pure forage area or areas eligible for compensation under the Common Agricultural Policy (CAP) that is decisive in terms of biodiversity performance, but of the entire mountain pasture area (gross area). Area data from INVEKOS are also subject to fluctuations, which are mainly of an administrative nature, especially in the case of period transitions (from 2023 on). The number of animals driven up for grazing in high mountain areas is often a more suitable indicator for assessing the development of mountain pasture farming, which, like the mountain pasture forage area, is declining (BMLRT 2020). Sufficient grazing livestock is the basis for the preservation of mountain pastures and a high level of biodiversity.

High mountain regions include areas above the tree line. Austria's high altitude regions cover around 10,800 km² (12%) of the country's surface area. They harbour a specific set of species and specific habitat types. The majority of Austria's endemic species are found at high altitudes in Austria. Austria's "very semi-natural" areas in the high mountain region cover 5,900 km^2 and thus around 7% of the country's surface area. The predominant habitats are glaciers, rocks, scree slopes, cushion plant meadows, alpine grasslands, dwarf shrub heaths and mountain pine and green alder scrub. "Semi-natural" areas cover 11,800 km^2 (14%) of the country's surface area, while areas with the greatest naturalness are found at higher altitudes, and 64% are at the highest level, the alpine-nival region (WWF 2016). Due to their high natural state, the high mountain regions offer the best conditions for the establishment of large-scale wilderness areas. The establishment of additional large-scale wilderness areas should under no circumstances be at the expense of mountain pasture farming in the affected areas. The option of farming former mountain pastures should also be retained.

More than two thirds of the Habitats Directive habitat types at high altitudes in Austria are in a favourable conservation status. However, permanent glaciers and mountain meadows are in unfavourable-poor conservation status. The conservation status of mountain matgrass grasslands and alpine and subalpine chalk grasslands is unfavourable-insufficient. Eight of the ten species listed in the Habitats Directive, mainly in the high altitudes of the Austrian Alps, are in a favourable conservation status. The two plant species little grapefern

and rock clover are assessed as unfavourable-insufficient (Environment Agency Austria 2019a).

Objectives:

- A management adapted to mountain pastures is ensured.
- In terms of nature protection, a relevant proportion of the very semi-natural and semi-natural high mountain areas is protected as large-scale wilderness areas and nature reserves (IUCN 1a, 1b, II), with a focus on interconnected areas larger than 3,000 ha.
- The larger, mostly undeveloped natural areas in the high mountains are legally protected from large-scale development, while the largest possible proportion of the remaining semi-natural areas in high mountains is protected by quiet areas that also permit semi-natural alpine pasture management, with possible exemptions for an increase in renewable energy sources in line with climate targets.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitments to restoration nos. 1 to 5.

Initial values: 80% of Habitats Directive species, > 66% of habitat types in the high mountain region in favourable conservation status.

Evaluation parameters of the objectives: Conservation status of Habitats Directive species and habitats in the high mountain region.

Measures to be implemented immediately:

- Further development of nature conservation measures for mountain pastures, including the preservation of extensive sites through the establishment and increase in site-appropriate herd management.
- Ensuring controlled stocking of mountain pastures, e.g. through livestock unit-based subsidies and upper limits for livestock numbers.
- Avoidance of abandonment and overgrazing.
- Promotion and further development of advisory services for mountain pasture farming that promotes biodiversity.

- Improved support for the conservation of mountain grazers.
- Supplementary feeding of concentrated feed only to a minor extent to maintain animal health. In principle, the natural feed basis on mountain pastures must be sufficient to supply the animals.
- Stronger anchoring of nature conservation objectives in the mountain pasture management plans.
- Development and implementation of species and habitat protection projects for all endangered species and habitat types, including aiming to permanently maintaine the status of non-endangered species and habitat types in mountain pastures and high mountains.
- Designating nature reserves in close-to-natural and semi-natural areas within Austrian high-mountain landscapes that are not (or no longer) utilised for alpine farming, with a focus on contiguous blocks of land with a minimum size of 3,000 hectares. Protection all other undeveloped (close-to-natural and semi-natural) high mountain areas as alpine resting areas.
- Development of sustainable solutions for the management (herding, herd protection, removal) of large predators, together with the mountain pasture users and other relevant actors, taking into account reasonableness and proportionality.
- Ensuring of favourable legal and infrastructural conditions for herd protection (e.g. shepherd accommodations, legal framework for the implementation of herd protection, such as herding, paddock husbandry, herding dogs) and adequate financial support.
- Full monetary compensation for damage caused by predators to livestock herds.
- Ban on large-scale development in alpine and nival ecosystems with possible exemptions for the increase in renewable energy sources in line with climate targets.
- Continued active participation in the Mountain Farming and Mountain Forestry Working Group within the framework of the Alpine Convention and increased inclusion of biodiversity aspects in this working group.

Mid-term measures to be taken:

- Development of a concept for the protection and sustainable use of the mountain region in accordance with the Alpine Convention.
- Realisation of campaigns and implementation of measures to strengthen sales of mountain pasture products.

Evaluation parameters for measures (examples): Number and success of species and habitat protection projects, preservation of mountain pasture farming measured by the number of grazing animals and the extent of existing mountain pasture areas, existence of a concept in accordance with the Alpine Convention.

Key players for implementation: Almwirtschaft Österreich, land users, BMK, BML, provinces, Austrian Chamber of Agriculture (LKÖ), Austrian Centre for Bear, Wolf and Lynx.

1.7 Special habitats

Special habitats are rare habitats with extreme hydromorphological or geomorphological site conditions (e.g. extreme wetness or dryness, coarse blocky material, pure sand or peat in the subsurface and other extreme chemical soil properties). Special habitats can be created naturally or anthropogenically. Special habitats include, for example, bogs, dry grasslands, salt marshes, inland dunes, petrifying springs with tufa formation and other springs, thermal streams, quarries and gravel pits, caves and cave waters. This does not apply to sites created by the extraction of raw materials (quarries and gravel pits) as long as they are actively operated. Bogs and other special habitats are characterised by distinctive habitat types and a specialised set of species.

Agricultural and forestry management is still possible if the management is compatible with conservation and renaturalisation objectives. For infrastructure projects in the public interest, special habitats must be taken into account in the planning process. If necessary, state-of-the-art conservation measures must be developed or adequate compensatory measures implemented.

Objective:

- Special habitats (e.g. bogs and mires, salt marshes, dry grasslands) are in a favourable conservation status, show a positive trend or their most significant degradation factors are measurably reduced.

Note: The objective is based on the EU Biodiversity Strategy for 2030, key commitment to restoration no. 1.

Initial value: 65% of the 17 Habitats Directive special habitat types are in an unfavourable-poor conservation status, 29% in an unfavourable-insufficient conservation status (Environment Agency Austria 2019b), only the caves habitat type is in a favourable conservation status; priority bog sites should be restored (level 1) 12,435 ha (Environment Agency Austria 2021c).

Evaluation parameters of the objective: Conservation status of the Habitats Directive conservation objectives in special habitats according to the Habitats Directive assessment, endangerment status of habitat types in special habitats.

Measures to be implemented immediately are:

- Development of an inventory of all special habitats (including bogs).
- Restoration of prioritised special habitats (including bogs) based on contractual nature conservation (see Chapter 3).
- No new installation of drainage systems within/to special habitats.
- Cancellation of water rights that have become obsolete and require the maintenance of drainage systems (ditches, drainage channels).
- Development and implementation of measures to preserve and improve individual special habitats.
- Establishment of buffer strips appropriate to the respective special site around the special habitat's outer boundary that are impaired by adjacent farming, setting up the following restrictions: no use of fertilisers and pesticides. Locally adapted farming is permitted if it preserves the unique character of the special habitat.
- Preparation for a complete peat phase-out, including through further development of suitable substitutes in the required quality.
- Implementation of the Austrian Bog Strategy 2030+.
- No grazing on raised bogs.
- Improved protection of all special habitats through habitat protection under public and private law.
- Development and implementation of targeted measures to preserve salt marshes in the Seewinkel region.
- Avoidance of groundwater and spring water abstraction in the vicinity of special habitats that are dependent on high groundwater levels and could be negatively affected by extraction.
- Assessment of technical options for groundwater recharge and their influence on the hydrological composition of the salt marshes.

Mid-term measure to be taken:

- Regular assessment of the condition of selected special habitats.

Evaluation parameters for measures (examples): Inventory of bogs and other special habitats is available.

Key players for implementation: BMK, BML, provinces, chambers of agriculture, scientific and research institutions.

2 Effective protection and connectivity of all ecologically valuable habitats

Protected areas in its various categories are centres of biodiversity, refuges for endangered species and spaces for functioning environmental processes. The status of protected areas, conservation objectives and their implementation, the category and size of protected areas are important parameters for nature conservation.

The protection of areas of particular importance for biodiversity or the landscape is one of the key elements of public nature conservation. Around 29% of Austria's area has been protected under nature conservation law since 2021. The extent of protection varies between the different categories of protected areas. Around 3% of the area is strictly protected (focus on protection of ecological processes, e.g. wilderness area, national park, IUCN categories I and II), around 14% is protected (focus on species and habitat protection, e.g. nature conservation area, European protected site, IUCN categories II and IV) and around 12% is partially protected (focus on preservation of the landscape, e.g. protected landscape, IUCN category V). In addition, 0.1% of the terrestrial area is protected as natural forest reserves.

Exemplary implementation of ecological process protection were achieved in recent years in Lower Austria and in 2021 in Styria with the Dürrenstein-Lassingtal wilderness area. Based on contractual nature conservation models, compensation was agreed between ÖBf AG and the provinces of Lower Austria and Styria for non-utilisation and participation in protected area management. Natura 2000 areas (European protected sites) are one of the most important categories of protected areas in terms of their size. They are assigned to IUCN category IV unless they are also designated as national parks or wilderness areas. If an area belongs to different protection categories at the same time (e.g. European protected site and national park), the area is assigned to the stricter protection category.

Objectives:

- At least 30% of the national territory is under effective protection (e.g. as a wilderness area, national park, European protected sites, nature conservation area, protected landscape, legally protected habitats) – IUCN categories I to VI.
- This network of protected areas has been developed in a participatory process with all stakeholders and is representative of Austria's habitats. It is linked and functionally optimised through a functioning green infrastructure (ec.europa.euecosystems).
- The proportion of strictly protected areas is significantly higher on this 30% of the national territory. A participatory process has been initiated with a view to achieving the target of 10% strictly protected areas in relation to the biogeographical regions of the EU, and concrete steps have been taken by 2030 to establish strictly protected areas.
  ec.europa.eu/transparency
- The natural forest reserve network (NWR) includes all natural forest ecosystems that still exist despite climate change. At least one reserve of sufficient size has been established for each of these forest ecosystems in each of the 22 sites, and the total area of the network has been increased by 50% to 13,000 ha.
- With the aim to significantly increase the area of selected habitats in the protected area network, the process to expand and establish strictly protected areas prioritises the following aspects :
- (1) Strict protection and preservation of primary and old-growth forests and forests with structures similar to primeval forest (as national parks, special nature conservation areas, core zones of biosphere parks, natural forest reserves, special conservation areas, wilderness areas) as well as considerations to designate new wilderness areas in accordance with the 2020–2024 government programme.
- (2) Strict protection of a corresponding proportion of the high mountain region (as national parks, nature conservation areas, core zones of biosphere parks, special conservation areas, wilderness areas).
- (3) An appropriate proportion of watercourses of special interest for conservation shall be strictly protected.

- (4) In addition, areas of high nature conservation value shall also be considered as strictly protected areas, and active management (e.g. mowing or grazing at an intensity that aims to optimise the protection of conservation objectives) shall be employed to maintain or promote natural processes.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitments to nature protection 1 to 3. The definition of watercourses of special interest for conservation was based on the following criteria: (1) stretches with very good ecological status, (2) stretches with very good hydromorphology,
(3) stretches on/in floodplains with outstanding nature conservation significance, (4) free-flowing stretches, (5) stretches in the potential distribution area of endangered (critically endangered, endangered or vulnerable) fish species. The Water Framework Directive prohibits the deterioration of these stretches.

Initial values: 3% of the total land area is strictly protected, 14% protected, 12% partially protected; of the watercourses identified as deserving special protection (Scheikl et al. 2020), 43% are under protection; 8,602 ha are natural forest reserves (as of 1 Feb. 2022).

Evaluation parameters of the objectives: Percentage of protected land area of each IUCN category, forest areas of category 1.2 and 1.3 according to Forest Europe criteria (MCPFE Forest Europe categories were developed because the global IUCN categories are only partially applicable to specific European forest conditions). Coverage of forest communities by natural forest reserves, quality of conservation objectives formulation, degree of achievement of conservation objectives in the protected areas.

Measures to be implemented immediately:

- Definition of ambitious steps to achieve the targets together with all stakeholders by the end of 2023.
- Definition of criteria for additional area scenarios for protected areas (ec.europa.eu/transparency).
- Development and implementation of regionally specific conservation objectives and management measures in coordination with land users for effective regional protection and, if necessary, definition of corresponding objectives and measures in management plans.
- Establishment of long-term, comprehensive management of protected areas.
- Continuation of the processes with all stakeholders to draw up scenarios for any additional areas to enlarge protected areas; i.e. areas that – due to their ecological

features – are suitable for protection or should enlarge existing protected areas, such as nature conservation areas, national parks, wilderness areas, etc.

- Designation of further protected areas in consultation with landowners and with possible financial compensation.
- Implementation of national park enlargements as defined in the 2020–2024 government programme.
- Assessing options for the establishment of further protected areas within publicly owned forests, taking into account adequate management standards for protective forests.
- Completion of the Austrian network of natural forest reserves by putting previously missing forest communities under protection.
- Support for nature conservation organisations or nature management associations in land protection activities and land maintenance.
- Putting watercourses areas under protection along particularly stretches of water of special interest for conservation; regional programmes for the protection of watercourses (as per the Water Rights Act Section 55g, as in Styria, Lower Austria or Upper Austria) may be suitable as a protection instrument.
- Modifications to existing hydropower plants are only possible in protected areas with IUCN category I to IV if no negative impacts on the protected areas are to be expected or if these can be offset and accompanying measures to improve biodiversity are implemented.
- Construction of new hydropower plants is only possible in areas with IUCN category II and IV if no negative impacts on the protected areas or the defined conservation objectives are to be expected, or if these can be offset and accompanying measures to improve biodiversity are implemented.
- Assessing options for upgrading habitat corridors through structural ecological improvements as part of contractual nature conservation and targeted selection of compensation or offsetting areas to connect protected areas.

Mid-term measures to be taken:

- Identification and preservation of connected areas with low light pollution (dark areas).
- Depiction of habitat corridors at all levels of spatial planning in the respective planning documents and optimal consideration in planning and decision-making processes.
- Pilot strengthening of green infrastructure by improving the connectivity of protected areas in the European Green Belt.

Evaluation parameters for measures (examples): Completed evaluation of protected areas (category, number, area, impact, management).

Key players for implementation: Land users and landowners, BFW, BMK, BML, energy supply companies, local governments, provinces, Austrian Chamber of Agriculture (LKÖ), NGOs, research institutions, Austrian Economic Chambers (WKO).

3 Restoration of ecosystems of particular importance for biodiversity and climate protection

Improving the condition of ecosystems serves to preserve biodiversity, mitigate climate change, prevent the increasing frequency of natural disasters caused by climate change and maintain other ecosystem services.

The restoration of ecosystems plays an important role both globally (International Climate Initiative) and in the EU up to 2030. In this context, "restoration" is understood as ecosystem renaturalisation in the broader sense: "Ecosystem restoration supports the development and restoration of an ecosystem that has been more or less degraded or completely destroyed by humans to bring it back into a more natural state. By doing so, certain ecosystem services and structures are restored against the background of current ecological, socio-economic and nature conservation conditions" (Zerbe et al. 2009). The restoration targets contained in the Biodiversity Strategy 2030+ contribute to the EU Nature Restoration Law, which is currently being coordinated and will set legally binding EU targets for nature restoration.

3.1 Restoration of bogs, floodplains, water bodies

Bogs, floodplains and water bodies are generally carbon-rich ecosystems and habitats for endangered and sometimes highly specialised species. 68% of the bog habitat types of the Habitats Directive are in an unfavourable-poor conservation status, none of the bog habitats are in a favourable conservation status (calculated from the sum of the assessments from both biogeographical regions represented in Austria out of the regions in the EU Habitats Directive,Environment Agency Austria 2019). More than 300 internationally significant bog sites in Austria with an area of around 12,000 hectares are a priority for restoration. An analysis of the distribution of priority level 1 bog sites (internationally important bogs according to Steiner (1992) which are not considered reference objects) across the nine Austrian provinces shows that, with the exception of Vienna, priority bogs are located in every

province, particularly in the provinces of Vorarlberg, Salzburg and Tyrol. Priority action is required for around 18,000 ha of floodplains, around 6,000 kilometres of rivers and around 5,000 ha of seven standing water bodies (Environment Agency Austria (2021c).

Due to their relatively high carbon storage capacity, forests are also of particular importance in connection with climate change mitigation and adaptation and are therefore also categorised as carbon-rich habitats (see Chapter 1.4).

The implementation of the Austrian Bog Strategy 2030+ (BMLRT 2022) and the implementation of the Austrian Floodplain Strategy 2030+ (in progress) will make a decisive contribution to achieving the restoration targets of the Biodiversity Strategy Austria 2030+.

Objectives:

- Through the implementation of comprehensive peatland restoration measures, damaged bogs have been hydrologically restored and show intact bog habitats and improved ecosystem services.
- Restoration measures have been implemented in an area of degraded bogs according to the relevant habitat types in the Habitats Directive. This area is compliant with European requirements (EU Restoration Act) and aims to achieve a good local degree of conservation (i.e. categories A and B of the structure and functions parameters of the Habitats Directive).
- Completely degraded bog areas without corresponding bog vegetation are identified, and feasibility assessments with regard to restoration are available.
- All floodplain areas listed in the floodplain inventory (in progress) for Austria have been preserved.
- Restoration measures have been initiated for 30% of the area of all prioritised floodplains (Environment Agency Austria 2021c) with a view to achieving an improved status.
- 5,000 ha of degraded or lost floodplains have been restored as effective flood retention areas.
- The measures provided for in the National Water Management Plans to achieve good ecological status or good ecological potential have been implemented. All priority restoration areas according to the National Water Management Plan are in good ecological status or have achieved good ecological potential.

- Longitudinal and transverse ecological connectivity of aquatic habitats and the terrestrial habitats ecologically linked to them has been achieved over a distance of 1,000 km.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitments to restoration of nature 1 and 8; see National Water Management Plan 2021 (NGP 2021), BMLRT (unpublished) draft Floodplain Strategy BMLRT from 11 November 2021.

Initial values: 68% of Habitats Directive bog habitats are in an unfavourable-poor condition; 12,435 ha of bog sites to be restored as a priority (level 1); priority action (level 1) required for 18,000 ha of floodplains (or high restoration potential for 80,000 ha of floodplains) as well as for around 6,000 kilometres of rivers and around 5,000 ha of standing water bodies (Environment Agency Austria 2021c).

Evaluation parameters of the objectives: Conservation status of relevant Habitats Directive species and habitat types, status of priority bogs to be restored and priority floodplains to be revitalised, status of restoration areas according to the National Water Management Plan, length of longitudinally and transversely ecologically linked water habitats.

Measures to be implemented immediately are:

- Development of a guideline and action plan for restoration projects, especially for bogs.
- Identification of completely degraded bogs, including boglands used for agriculture and forestry and promotion of their transition to sustainable, bog-friendly land use systems; raising of water levels; avoiding fertilisation and intensive grazing and preserving grassland (without ploughing up) in order to prevent greenhouse gas emissions.
- Development and implementation of restoration measures:
  - for impaired floodplain sites and their reconnection to flood protection projects (e.g. relocation of dams) as well as for the protection and increase in ecological corridors within river landscapes,
  - to improve the morphology, hydrology and ecological status of water bodies.
- Consideration of floodplain systems and their spatial requirements in relation to river morphology in local and supra-local planning.

Evaluation parameters for measures (examples): Number and area of bog sites where restoration measures have taken place, number and area of restored floodplains, number of kilometres of restored rivers in priority restoration areas.

Key players for implementation: BMK, BML, landowners, provinces.

3.2 Restoration of additional habitats

Restoration projects also make sense for other degraded habitats, especially if they make a valuable contribution to the survival and conservation of endangered species and rare habitats or provide essential habitats for nature conservation in a small area, as in the case of many special habitats (see Chapter 1.7). For the restoration of agricultural and woodland habitats, see Chapters 1.3 and 1.4.

Objectives:

- Based on robust criteria, selected degraded habitats – such as those home to highly endangered species, dry grasslands, and other special habitats – are preserved or restored to a lower state of degradation through restoration measures.
- Knowledge of the quality and functions of these habitats is improved and the restoration requirements for these habitats have been prioritised.

Note: Objectives are based on the EU Biodiversity Strategy for 2030, EU Nature Restoration Plan, key commitments to 2030, no. 1.

Initial values: The habitat types “Pannonic salt steppes and saltmarshes” and “Calaminarian grasslands” (Viola calaminaria) – as defined in the Habitats Directive – are highly endangered throughout Austria (Essl et al. 2004). The habitat types “Petrifying springs with tufa formation (Cratoneurion)” (Traxler et al. 2005) and “Pannonic loess steppic grasslands (6250)” (Essl et al. 2004) – as defined in the Habitats Directive – are threatened with complete extinction.

Evaluation parameters of the objectives: Number, surface area and distribution of habitats where restoration measures have been implemented.

Mid-term measures to be taken:

- Developing and implementing steps to restore the selected additional degraded ecosystems – with consideration of future targets by the EU, of existing area prioritisations (Environment Agency Austria 2021c), of protected area networks and wild animal corridors or of other habitat connection systems (aimed at safeguarding connectivity with national and European areas (e.g. Grünes Band).
- Promoting tailored management concepts for particularly valuable land, such as wetland meadows, dry grasslands and other special habitats, developed in collaboration with farmers and ecologists.

Evaluation parameters for measures (example): Degree of implementation of the staged plan.

Key players for implementation: BMK, BML, landowners, federal states, NGOs.

4 Decisive reduction of land consumption and fragmentation

Balancing the various interests in soil as a resource is the central task of a regional planning system, and one that is becoming increasingly important. Land consumption and the fragmentation of habitats for new building projects is currently immense, but can be reduced by implementing foresight planning guidelines on a regional and inter-regional level. The use of vacant buildings can make a significant difference.

Land consumption refers to the loss of biologically productive soil through building for residential and transportation purposes, but also through its intensive use for leisure activities, landfill, cultivation areas, power plants and other similarly intensive use cases. Land consumption in Austria raises by around 11.5 ha per day (umweltbundesamt.at/flaecheninanspruchnahme). These areas of land are therefore no longer available for agriculture or nature conservation. Fragmenting habitats with infrastructure, such as roads, also breaks down the links between habitats.

As around 90% of all land species are tied to soil as their habitats for at least part of their lifecycle, and as there are more soil-dwelling organisms in a handful of fertile soil than people on Earth, our soil requires particularly significant attention as a habitat. The following general criteria are important and necessary for biodiversity in soil habitats: (1) Land use that facilitates the processes around the natural formation of a soil and that are adapted to a specific site, (2) Protection from soil degradation (physical and chemical), (3) General diversification and diversification of plant populations, (4) Ban on mulching roadsides, (5) Reintroduction of mowers, no use of leaf vacuums/blowers, (6) Reducing maximum mowing frequency for public green spaces to twice per year, (7) No trimming of hedges/bushes during the breeding season.

The EU Green Infrastructure Strategy defines green infrastructure as “a strategically planned network of natural and semi-natural areas”. These areas should be designed and managed to deliver a wide range of ecosystem services, such as water purification, improv-

ing air quality, and climate protection. Natura 2000 areas are at the heart of this green infrastructure. This network of green, brown (vegetation, soil) and blue (water) areas aims to improve environmental conditions and thus the health and quality of life of local residents. (Green Infrastructure brochure)

Alongside the protected area network, the Grünes Band is the most vital habitat network in Europe. The connectivity along the Grünes Band forms the ecological backbone of many ecosystem services and represents an important refuge area and migration corridor for numerous endangered species of animals and plants.

Objectives:

- Austria's daily rate of land consumption is substantially reduced in line with future targets of the soil strategy, aimed to achieve a reduction target of 2.5 ha, as laid down in the 2020–2024 government programme.
- Habitat connectivity is permanently safeguarded by preserving ecological corridors. Narrow passages and refuge areas for nature are kept clear of construction.
- At least 80% of public green spaces in residential areas and at least 50% of public green spaces along transport routes are planted with local plants in a semi-natural manner suited to the location, provided the functional demands on these spaces are not thereby negatively affected and the spaces are maintained in the context of nature conservation.
- Planning instruments for green spaces are integrated into existing regional planning instruments.

Note: The objectives are based on the EU Biodiversity Strategy for 2030, key commitment to nature conservation no. 1, key commitment to restoration no. 12, Chapters 2.2.3 and 2.2.8.

Initial value: 11.5 ha daily land consumption, 4.83 ha of which daily sealing (42%).

Evaluation parameters of the objectives: Daily land consumption; surface area of public green spaces of semi-natural design.

Measures to be implemented immediately are:

- Launching calls for action to encourage conservative use of land and soil as stated in the ÖREK 2030 through the appropriate deployment of existing and new instruments (quantitative targets for each federal state, mobilisation of building land, active soil policy, unused capacity management, brownfield recycling (reactivating former manufacturing and industrial sites), reversal of building land approvals, regional planning agreements, etc.).
- Developing and implementing a soil strategy for Austria to reduce further land consumption and soil sealing, bearing in mind biodiversity and ecosystem services provided by the soil.
- Anchoring biodiversity protection (in terms of adaptation to climate change and climate protection) in the regional development and regional planning laws, and accounting for biodiversity protection in local development concepts.
- Developing and implementing a method to systematically identify locations with contaminated soils, for which contamination can be traced back to large-scale, diffuse inputs of substances and as a result, various soil types are significantly affected by mid-term- to long-term degradation in ecosystem services.
- Defining the level at which reclassification to building land will become impossible in the event of endangered species and biotype types being identified at the site, or only possible if adequate compensation areas are created.
- Preserving former Austrian Armed Forces training sites (GÜPL, TÜPL); no construction or sealing.
- Creating incentives to minimise sealing when constructing new forestry and agricultural transportation routes.
- Creating opportunities to withdraw building permissions in areas relevant to nature conservation – for example though a soil or biodiversity fund – and assessing legal options to withdraw permissions in accordance with ÖROK 2030.
- Reallocating building land on a municipality level, only considering existing reserves of building land and options for their utilisation.
- Taking measures to create a register of building land reserves, and considering a register of vacant buildings to facilitate their use rather than building anew.
- Creating a nationwide land registry for compensatory and replacement areas in order to better safeguard areas valuable for nature conservation over the long term, and connect them with each other (Environment Agency Austria 2022b).
- Constructing regional pools of sites for compensatory measures, monitoring and evaluating compensatory measures, and developing land budgeting concepts.
- Compulsory designation of blue, green and brown habitat corridors (ecological infrastructure) in line with their roles in regional and interregional planning and their

legally safeguarded protection status in the land zoning and construction planning regulations (networking corridors, green pathway network, strengthening town centres).

- Preservation and appropriate biodiversity management of public spaces in urban and rural areas, considering updated requirements for plant selection and care in view of climate change.
- Preserving elements within public spaces rich in biodiversity, such as orchards.
- Assessing the implementation of an approval criterion to minimise soil sealing in the EIA Act 2000; higher standard for EIA justifications for projects such as industrial parks, logistics centres and car parks that will cover unsealed soils.
- Improving awareness of the value of greening façades and flat roofs (including improving awareness of options to combine these with solar power systems), and of other private areas with local, locally adapted and climate change-resilient plants – particularly by strengthening ecological garden management through educational activities, e.g. certificates like naturimgarten.at or GRÜNSTATTGRAU).
- Promoting and implementing the introduction of rooftop greenery in combination with photovoltaic systems on new buildings with flat roofs.

Mid-term measures to be taken:

- Compensating every instance of land consumption by unsealing an equivalent area to achieve a daily equivalent land consumption total of 0 ha over the long term.
- Developing “urban greening” plans in cities with more than 20,000 residents.
- Nationwide protection of agricultural areas by anchoring quantitative soil protection in legislation (Art. 15a Federal Constitutional Law Framework Agreement between the Federal Government and States).
- Developing biodiversity criteria for certification, e.g. in line with the criteria set up by the German Sustainable Building Council.
- Further implementation of Austria’s national soil protection strategy.

Evaluation parameters for measures (examples): Temperature measurements (cooling effect through greening).

Key players for implementation: BMAW, BMK, BML, local governments, federal states, NGOs.

5 Initiation of transformative change in society and integration of biodiversity into all sectors – "mainstreaming"

Our way of life and of doing business will have to change significantly in the coming years and decades if we are to achieve the environmental and biodiversity targets we have set ourselves, and establish sustainable, resilient development on all levels. The objectives to achieve these changes need to be defined on several levels and for a range of industries.

The impacts of climate change on biodiversity can already be felt, for example whenever climate areas migrate northwars and to higher altitudes. This leads to a shift in plant and animal phenology and animal behaviour (e.g. migratory birds), and alien species normally found in warm climates (neobiota) become more widespread.

To achieve climate objectives, and thereby preserve indigenous species and habitats and the functionality of ecosystems, we need to reduce our use of energy derived from fossil fuels and improve energy efficiency in line with climate protection plans.

Retaining biological diversity is currently insufficiently integrated into business processes (if at all). In some cases, processes and procedures in industrial and manufacturing enterprises and other sectors have very strong negative impacts on natural and cultural landscapes (e.g. due to roadways). Creating and transitioning to sustainable, biodiversity-friendly jobs (green jobs) and establishing new career paths (e.g. neophyte managers and biodiversity officers in companies) could help to improve this situation.

The ecological footprint (bmk.gv.at/fussabdruck_rechner) demonstrates how much space each individual person needs on planet Earth. It demonstrates how available resources are not infinite, and gives us a clear picture of our planet's ecological limits. All natural raw materials that we need to eat, live, travel, etc. require both physical space and forests to

absorb carbon dioxide (CO_2). As a mathematical measurement, the ecological footprint is the easiest way of figuring out how the sustainability of one's own lifestyle. It provides an opportunity to rethink our day-to-day habits and live more sustainably. The ecological footprint of a person or country is measured in global hectares (gha). If we divide the biologically productive, useable space on Earth (2010: 11.9 billion ha) by the global population, we arrive at approx. 1.7 gha per person. Land consumption, loss of habitat and habitat changes, as well as climate change, are all largely the result of our human lifestyles, and lead to considerable, continuous, spatial and temporal changes in ecosystems.

In its current programme, the Austrian Federal Government has set itself the target of becoming a role model by implementing a climate-neutral administration and thus making a key contribution to achieving climate objectives. To achieve this, a paradigm shift to decarbonisation and a circular economy is essential. Public procurement was defined as a significant area for action. It is relevant for around 14% of GDP and therefore a key economic factor in Austria that shows corresponding environmental impacts. Leveraging change is therefore crucial to preserve and promote biodiversity. Acknowledging product impacts throughout the product lifecycle can help to reduce negative impacts on species diversity, diversity of habitats and landscapes, and genetic diversity.

The Austrian Action Plan for Sustainable Public Procurement (naBe.gv.at) was approved by the government in 2010 and updated in June 2021 through a decision by the Council of Ministers. Its aim is to improve awareness amongst public sector agencies of the impact of procurement on sustainability and biodiversity, and to offer specific criteria for procurement procedures. The naBe criteria catalogue, which is binding for federal institutions and for the Austrian Federal Procurement Agency, is also recommended for federal states and local governments.

Significant environmental impacts are addressed across 16 procurement groups, including engineering, mobility, electricity, food and catering, and public space maintenance services. It states that the engineering sector, for example, should use low-carbon construction materials and prioritise renewable construction and working materials. The concept of replacing mineral raw materials with renewable ones is based on conclusions drawn from objective life-cycle analyses. In mobility, public transport has priority, and the shift to e-mobility is encouraged. Electricity demand should be covered through renewable energy sources, and accompanied by investment incentives for energy suppliers. Organic farming plays an important role in naBe and is promoted through the definition of target quotas. Forgoing pesticides helps to improve ecological garden management. With a procurement volume of

EUR 22 billion per year, local governments play a key role in implementing sustainable procurement policies. Through their responsibilities with regard to area zoning and urban planning, they also have a direct impact on local habitats beyond procurement alone.

Objectives:

- Biodiversity is considered in the processes and cycles of all relevant sectors.
- The ecological footprint of each person is reduced by 50%.

Initial value: Ecological footprint in Austria: 5.31 gha/person.

Evaluation parameters of the objectives: Statistics Austria (or Eurostat) energy balance, integration of biodiversity-relevant aspects into federal and state climate protection and energy plans, consideration of biodiversity in relevant sectors, ecological footprint.

5.1 Climate protection and climate change adaptation

The two major environmental policy challenges, the loss of biodiversity and the climate crisis, are closely linked in terms of both their causes and their solutions. A successful climate policy supports the preservation of biodiversity, while a successful biodiversity policy in turn supports climate protection and adaptation to climate change (Federal Ministry for Sustainability and Tourism 2017, Balas et al. 2021, IPCC 2022). Both challenges are of equal value in terms of their political relevance, and must be considered alongside one another.

Objective:

- Biodiversity conservation, climate change mitigation and adaptation have been harmonised, synergies are leveraged to the fullest.

Note: Objective is based on the EU Biodiversity Strategy for 2030 Chapter 1 “Urgent Need for Action”. Chapter 3.3.1 “Business for Biodiversity”.

Initial value: Net greenhouse gas emissions in 2020: 73.6 million t. (Environment Agency Austria 2022a).

Evaluation parameters of the objective: Greenhouse gas emissions, indicators from climate change impact monitoring (e.g. changes to vegetation and altitude distribution of selected species in high mountains).

Measures to be implemented immediately:

- Enhancing the federal and state climate protection and energy plans with biodiversity-relevant aspects.
- Integrating impacts of climate change and the need for climate change adaptation into nature conservation instruments (e.g. in management plans, regional policies).
- Assessing energy and climate policy measures not subject to EIAs with respect to their impacts on biodiversity, and prioritising measures that are both nature and climate-friendly (moore-im-alpenraum).
- Developing informational material with positive examples to demonstrate the leveraging of synergies between climate change mitigation, climate change adaptation and biodiversity measures.
- Defining, preserving and improving richly biodiverse areas with potential climate relevance (high carbon content).
- Promoting additional measures for carbon storage in agricultural soils, e.g. through incentives for further increasing carbon storage in the context of “carbon farming”.
- Creating corridors between protected areas and habitats to improve connectivity and facilitate climate-induced species migration (range shifts for local species) and safeguarding the connectivity elements in environmental planning (habitat corridors) (see Chapter 4).
- Preservation and improvement of free and green spaces for climate change mitigation (carbon storage) and climate change adaptation (e.g. for protection from natural hazards and floods, rainwater infiltration, fresh and cold air supplies etc.) and to retain biodiversity.

Evaluation parameters for measures (example): Conservation status of climate-relevant habitat types as defined in the Habitats Directive; number and surface area of restored ecosystems (see Chapter 3).

Key players for implementation: BMK, BML, federal states, the Austrian Economic Chambers.

5.2 Energy

To retain the basis of our existence, we need comprehensive biodiversity conservation, restoration programmes, and a systemic shift from fossil fuels (currently 65% of our gross final consumption of energy) to all-renewable energy sources. The conversion of our energy system to renewable energy sources is the key factor in combatting the climate crisis, and therefore also part of the solution to counteracting the loss of biodiversity. The essential increase in the renewable energy system must therefore be implemented in line with effective nature conservation and biodiversity criteria. To achieve climate neutrality by 2040, Austria‘s entire electricity consumption (in net national terms) must be covered 100% by renewable energy sources by 2030. All options to expand the renewable energy system and increase efficiency in energy generation and energy use must be fully utilised.

The design of technologies to exploit renewable energy sources must incorporate biodiversity aspects appropriately. The construction of photovoltaic power plants on brownfield sites in cleared landscapes or on former landfill sites can encourage the return of biodiversity to areas that were previously devastated ecologically. Fish ladders and shallow water zones in hydropower plants reduce the negative ecological impacts of these sites.

Objectives:

- Synergistic solutions toincrease renewable energy systems and biodiversity conservation are identified and implemented.
- Complete phase-out of fossil fuel-based energy generation by 2040, shifting 100% of electricity generation to renewable energy sources by 2030, and further increase in renewable energy systems and their necessary infrastructure (grid and storage) have been promoted through suitable framework conditions and incentives in a way that ensures or facilitates biodiversity preservation.

Initial values: Renewable sources made out 36.5% of the gross final consumption of energy in 2020 (according to the current energy balance, calculated using the Eurostat SHARES methodology).

Evaluation parameters of the objective: Proportion of renewable energy sources in electricity generation, proportion of renewable energy in the gross final consumption of energy.

Measures to be implemented immediately:

- Coordinating climate protection and biodiversity measures, focusing on implementing measures that serve both objectives.
- Alongside the increase in the renewable energy system, prioritising all measures to conserve energy and use it efficiently.
- Ensuring a nature-friendly increase in renewable energy systems through relevant incentives and targets. Where targets conflict with biodiversity conservation, synergistic solutions should be sought, and interests balanced where necessary.
- Commitment by the national government and federal states to improve energy efficiency and energy efficiency in public buildings.
- Increasing the efficiency or revitalising existing hydropower plants by optimising energy generation. Furthermore, implement ecological support measures aimed to achieve the objectives of the National Water Management Plan.
- Reducing the negative impacts of hydropeaking and their consequences on water biocenosis as intended in the NWMP.
- Gradual reduction of grey infrastructure (e.g. transverse structures in bodies of water) that is not necessary in terms of hydraulic engineering or not used to generate energy to improve ecological conditions in these habitats.
- Providing a basis for decision making (e.g. calculations of cost effectiveness, environmental impact assessments, habitat mapping, landscape surveys) to establish suitability or exclusion criteria for renewable energy generation plants in green spaces.
- Designating priority zones for renewable energy plants with accelerated approval procedures and exclusion zones where necessary (e.g. for ecologically sensitive areas in which no approvals are currently granted) based on ecological, technical and economic criteria.
- Installing photovoltaic systems in open spaces, leveraging synergies with biodiversity measures (technical and organisational).
- Using renewable raw materials and biogenic waste from the agricultural and forestry industries for energy generation with a cascading use approach.
- Activating available roof space and other potential areas for integrating photovoltaic (PV) systems into buildings through incentives within public support systems, and simplifying construction approval processes and rental law.
- Biodiversity-friendly grid expansion.
- Developing dual solutions for rooftop greening and photovoltaic systems, considering the needs of homeowners and tenants.

- Developing relevant concepts to process the resulting biomass generated by greening buildings.
- Raising awareness of energy saving and light pollution in general in the private and public spheres (see Chapter 1.2.2). (energieeffiziente-landwirtschaft)

Evaluation parameters for measures (examples): Greenhouse gas emissions and proportion of renewable energy sources, priority or exclusion zones, total area covered by photovoltaic systems by surface type (roofs, housing, farmland, grassland etc.); proportion of PV rooftop systems in terms of overall PV output (%) (BfN 2020).

Key players for implementation: BMAW, BMK, BML, energy supply companies, local governments, federal states, the Austrian Economic Chambers.

5.3 Transport and transport infrastructure

Objectives:

- Motorised personal transport by travelled distance is reduced to 42% (by 2040).
- Distance covered by motorised transport per person per day is reduced to 33.2 km (by 2040).
- Freight transport has only risen moderately and the share of rail in modal split is considerably increased (40% in 2040).

Initial values: 64% of journeys made using motorised personal transport, 35.4 km per person per day, increase in land take due to road construction 5.5 km^2 (2020) or 1.5 ha/day (umweltbundesamt.at/flaecheninanspruchnahme).

Evaluation parameters of the objective: Journeys taken using motorised personal transport, land consumption by roads.

Measures to be implemented immediately:

- Orienting the goals and measures for transport and transport infrastructure based on the Mobility Master Plan 2030. (bmk.gv.at/themen/mobilitaet/mobilitaetsmasterplan.html).
- Developing models to decouple economic development from the use of freight transport so that freight transport volumes do not rise as rapidly as economic growth.
- Promoting biodiversity-friendly modes of transport and mobility – such as walking, cycling, public transport and rail – to reduce further fragmentation through the construction of infrastructure and air and noise pollution in protected areas.
- Accelerating (steering) measures to reduce road transport, e.g. through changes to the commuter allowances and subvention of company car use (company car privilege).
- Boosting awareness and creating incentives for people to change their mobility habits.
- Reducing the barrier effects caused by the transport infrastructure by creating, maintaining and servicing crossing aids such as green bridges, crossings for small species and amphibian tunnels, etc.
- Preserving and creating ecological road landscaping – such as green strips and embankments – through biodiversity-friendly, ecologic maintenance measures (considering transport safety), and through the exclusive use of regional and indigenous seeds and plants, as well as forgoing the use of pesticides.
- Promoting the production of indigenous, regional trees and bushes.
- Further development of a functional wildlife warning system to reduce the risk of collisions with large mammals, consisting of audible and visible wildlife warning devices on federal and state roads, as well as speed limits in amphibian crossing areas, in particular around safety fences while these are in operation.
- Evaluating wildlife warning systems and wildlife steering measures.
- Implementing targeted measures to counteract invasive plant species on roadsides and railway embankments.
- Minimal use of salt road on roads, cycle- and footpaths while maintaining transport safety.
- Holding biodiversity training sessions for road maintenance employees.
- Examining legal options and nature conservation framework conditions for “temporary nature conservation” (for railway embankments out of use), and implementing relevant activities when compatible with biodiversity objectives.

Mid-term measures to be taken:

- Assessing the options available to limit ship speeds and water displacement in ecologically sensitive river sections or lake segments to reduce damages caused by waves, and changing the relevant legal basis where relevant.

Evaluation parameters for measures (examples): Transport volumes in Austria, choice of transport in Austria (modal split: percentage of the various modes of transport against the overall traffic volume), number of wildlife crossings on the highway network (e.g. green bridges), number of animals killed on the road per year (Roadkill – Citizen Science): Number of species and individuals (mammals, birds, amphibians, reptiles, etc.), annual rate of land consumption through road construction.

Key players for implementation: ASFINAG, BMK, BML, local governments, federal states, ÖBB, the Austrian Economic Chambers.

5.4 Industry, commerce, manufacturing, and consumers

Objective:

- The use of resources and land take for industrial, commercial and trade activities has decreased significantly.

Note: Objective is based on the EU Biodiversity Strategy for 2030 Chapter 3.3.3 "Measuring and integrating the value of nature" - see also Austrian Ecolabel.

Initial value: Land consumption by operating areas, incl. agricultural buildings and farm-land) of 10.6 km^2/year (2020) or 2.9 ha/day (https://www.umweltbundesamt.at/umweltthemen/boden/flaecheninanspruchnahme-bis-2021)

Evaluation parameters of the objective: Land consumption by operating areas.

Measures to be implemented immediately:

- Development of a method for calculating and pricing external environmental costs, including biodiversity impacts.

- Calculation and pricing of external environmental costs, including biodiversity impacts, at national (and EU) level caused by industry, trade and commerce as well as agriculture and forestry, taking into account possible effects on supply, business locations, imports and any competitive disadvantages (impact assessment).
- Promoting product manufacturing with low resource consumption and long product obsolescence contributing to a sustainable circular economy and with bio-based raw materials that contribute to the bioeconomy (reparability of products, spare parts, recycling, green chemistry, bio-based products, etc.).
- Development of a biodiversity check for both companies and services, that can be used voluntarily (umweltzeichen.at).
- Labelling of sustainably manufactured products, including voluntary biodiversity assessments, e.g. through a traffic light system or the Austrian Ecolabel.
- Carrying out voluntary biodiversity assessments for products such as textiles and building materials. (For each respective product, the species affected by production are listed and rated according to their impact on the population and the Red List endangerment level of the respective species.)
- Development and implementation of measures against green washing, e.g. by applying GRI 304: BIODIVERSITY Standards. (The Global Reporting Initiative is currently one of the most widely used standards in sustainability reporting; https://www.globalreporting.org/).
- Increased inter-municipal coordination as part of preparing regional spatial planning programmes for business settlements; avoid settlement on ecologically valuable areas or on agricultural and forestry areas, and increased incentives for the reactivation of areas previously used for commercial and industrial purposes.
- Deconstruction of sealed areas no longer used (e.g. vacancies, decommissioned operating facilities) and soil recultivation; reuse of existing infrastructure; unsealing of paved areas (e.g. car parks) in dialogue with companies.
- Development of guidelines and increase in advisory services for the ecologisation of operational green spaces, e.g. suggestions for bee-friendly planting, nesting aids, creation of open ground areas, avoidance of frequent lawn mowing or herbicides. (Naturland-NÖ).
- Potential examination and implementation of a biodiversity-friendly redesign of operational open spaces and fallow sites (green flat roofs, facade greening, car parks, green spaces, avoidance of bird strikes and light immissions, species protection on buildings, etc.), as well as biodiversity-friendly planning, natural design and greening on new sites, taking into account the space needed for photovoltaic systems.

However, future operational projects shall not be banned on these areas ("temporary nature conservation").

- Raising awareness and promoting the benefits of trading in goods from regional and ecological production.

Evaluation parameters for measures (examples): Biodiversity product assessments; land utilisation by areas of operation.

Key players for implementation: BMAW, BMK, federal states, NGOs, entrepreneurs, Austrian Federal Economic Chamber.

5.5 Raw material extraction and production

Raw materials are crucial foundations for industrial production. Innovative key technologies that aim to secure our future viability and contribute to solving central challenges in the areas of climate and energy, as well as health, nutrition, mobility, digitalisation, security and communication, can only be implemented if there is a sufficient supply of sustainably produced primary and secondary raw and basic materials, and material cycles considerations are integrated. (BMLRT 2021b)

Objective:

- Biodiversity is taken into account in the extraction and production of raw materials according to local conditions.

Initial values: No data is currently available.

Measures to be implemented immediately:

- In collaboration with relevant industries, develop a concept to optimise ecological measures to reduce their impact on biodiversity in the extraction of raw materials (e.g. securing habitats for breeding birds in rock faces or cliffs or on areas under gravel and crushed stone).

- Integrating biodiversity concerns recultivation and restoration measures (especially after the end of mining operations), preferably using native, suitable plants that are resistant to climate change.
- Assessment of legal options and nature conservation considerations for "temporary nature conservation" (for quarries, gravel pits, railway embankments, etc. that are not in use), ensuring that future utilisation remains possible on areas authorised for raw material extraction.
- Introduction of a standardised scheme for gravel levy (BMLRT 2021a) for landscape-consuming measures (except for bedload removal for flood protection or wild stream control) through mineral raw material extraction for specific uses in all federal states, e.g. for nature or landscape conservation funds.

Evaluation parameters for measures (examples): Gravel levy, concept for optimising ecological measures in raw material production.

Key players for implementation: BMAW, BMK, BML, federal states, entrepreneurs, Austrian Federal Economic Chamber.

5.6 Tourism and leisure use

Objectives:

- Tourism and leisure activities integrate conservation and the promotion of biodiversity into their offers.
- Tourists, recreational visitors and hobby athletes accept possible restrictions to protect species and habitats.

Note: Objectives are based on the EU Biodiversity Strategy for 2030 Chapter 3.3.1 "Business for Biodiversity".

Initial values: Eurobarometer: 77% of the population acknowledge a responsibility for nature (2018). (Attitudes of Europeans towards Biodiversity)

Evaluation parameters of the objective: Tourism regions that particularly consider biodiversity in their activities, acceptance of biodiversity-related restrictions.

Measures to be implemented immediately:

- Integration of biodiversity objectives in tourism development concepts and in federal, state and regional tourism strategies.
- Cross-regional and transnational development of coordinated strategies for an environmentally friendly summer and winter tourism and nature-friendly leisure use (including visitor guidance) in collaboration with regional stakeholders, taking into account protected areas and quiet conservation areas.
- Definition of standardised, obligatory regulations for artificial snowmaking to limit its ecological impact, its consumption of resources and to concentrate snowmaking in tourism regions that offer long-term climatic conditions for ski tourism.
- Integrating concerns around snowmaking facilities, such as snowmaking ponds in the EIA Act 2000, as well as stricter specifications for projects in glacier ski areas to preserve the particularly sensitive Alpine regions and their biodiversity.
- Increase in cross-sector networks to strengthen communication, social interaction and the integration of biodiversity objectives (BMNT 2018a) between tourism, agriculture, forestry, hunting, nature conservation, mobility and spatial planning as well as the civil population (e.g. further development of tourism associations into a “habitat organisation”).
- Development of a targeted visitor management inside and outside protected areas in cooperation with regional stakeholders. The steering of visitor flows ensures the conservation of protected areas.
- Strengthening cooperation between tourism and nature conservation regarding the development of tourism offers, e.g. sustainable travel aimed to increase the appreciation for nature – “feeling nature instead of consuming it”, promoting the acceptance of (wildlife) rest areas and rest areas as spawning sanctuaries – also supported by digital media (e.g. trail information systems), involving guests in citizen science projects. (citizen-science.at)
- Development of new concepts such as shepherd volunteers, volunteering in protected areas, citizen science in exchange for board and lodging, e.g. along the Green Belt.
- Specific information to visitors about local biodiversity to generate awareness of their holiday destination.
- Expanding the mountain and nature guard services or other organisations and associations to provide more vigilance in protected areas through points of contact for guests and visitors.

- Adapting the promotion of commercial tourism towards sustainability goals; development of the corresponding criteria and indicators in collaboration with sustainability experts.
- Increased focus on offering soft mobility for arrival,departure and travel within the region, as well as on comprehensive sustainable travel offers within the Austrian Ecolabel. (Umweltzeichen-Reisen) (Ecolabel travels)

Evaluation parameters for measures (examples): Number of tourism businesses certified with the Ecolabel; number of tourist destinations certified with the Ecolabel.

Key players for implementation: BMAW, BMK, BML, local governments, federal states, NGOs, protected area authorities, tourism associations, entrepreneurs, science & research.

5.7 Biodiversity and health

Biodiversity and health are closely linked. The positive impact of nature and biodiversity on our health has been proven in various international studies (Arvay 2015).

In a report by the WHO and the Secretariat of the Convention on Biological Diversity (cbd.int/health/), the connection and close interaction between biodiversity and human health are explained in detail:

- (1) Biodiversity comes with numerous health benefits. The diversity of species and genotypes provides nutrients and medication. Biodiversity also contributes to working ecosystems, the benefits of which are essential to people and their health. These include clean water, soil and air, fighting pests and diseases, as well as pollination and recreation. However, biodiversity can also be a source of pathogenic agents that may have negative effects on health. One example are zoonoses, diseases that can be transmitted from animals to humans and conversely from humans to animals. Interest in zoonotic diseases has increased in recent years, particularly in connection with Covid19.
- There are numerous reciprocal effects between biodiversity and health. Air, soil and water pollution lead to a decrease in biological diversity and directly affect health in negative ways.

- The consumption of medication can cause the release of active ingredients in the environment and damage ecosystems and species, which again has negative repercussions on humans.

The Global IPBES Assessment of Biodiversity and Ecosystem Services published in 2019 also points out that nature and the conservation of biodiversity are imperative for human existence, a good quality of life and our health. (ipbes.de)

One Health: The cross-sectoral and interdisciplinary One Health approach can offer a potential solution. Originally it was broadly defined by the World Health Organisation (WHO) as a concept for the design and implementation of programmes, policies, legislation, and research, where multiple sectors communicate and collaborate with each other to achieve better public health results. One Health (who.int) takes into account the numerous correlations between people, animals, plants, and our environment and acknowledges that human health is closely connected to that of animals, plants, and our shared environment. On a local, regional, national, and global level, the One Health approach strives to achieve optimal health results while taking into account the correlations between humans, animals, plants, and their shared environment. The fields of work where a One Health approach is particularly relevant include food safety and the control of zoonotic diseases.

In Resolution XII/21, the Conference of the Parties to the Convention on Biological Diversity (CBD) recognised the value of the One Health approach to address the interdisciplinary topic of biodiversity and human health as an integrated approach in line with the ecosystem approach (Resolution V/6), which integrates the complex relationships between humans, microorganisms, animals, plants, agriculture, wildlife, and the environment. (Biodiversity and human health / cbd.int)

Objectives:

- People are aware of the connection between biodiversity and health.
- Biodiversity and semi-natural habitats are increasingly being used to maintain and restore personal health.

Initial values: Eurobarometer: 63% of the population consider nature and biodiversity the foundation of health and well-being (2018). (Attitudes of Europeans towards Biodiversity)

Evaluation parameters of the objective: Estimation by residents of Austria of how strongly biodiversity affects their wellbeing and health (representative survey).

Measures to be implemented immediately are:

- Supporting international activities to protect and restore nature as a means to prevent the occurrence and spread of future pandemics according to the "One Health" concept and anchoring them in all policy areas.
- Promoting and reviewing the implementation of recommendations for a "biodiversity and health" action plan and possible adaptation to the "One Health" concept, taking into account the proposed measures.
- Promoting health and disease prevention by implementing specific measures with biodiversity benefits, such as school gardening projects, gardening as therapy, green gyms, outdoor classrooms, nature park schools and natural kindergardens, integration of gardening education in teacher training institutions, oases in sealed-off urban areas.
- Including the correlations between biodiversity and health in the training of educators, doctors, and caregivers.
- Working with health and biodiversity experts to develop campaigns on topics such as gardening without chemical-synthetic plant protection agents or peat, gardening with native, locally adapted plant varieties, composting, using native medicinal and wild plants to support and promote health.
- Promoting increased awareness of the value of biodiversity for health.
- Switching to seasonal, regional, if possible organically produced food in the canteens of all public and private catering facilities and school buffets to promote health and biodiversity in line with the "Austria eats regionally" initiative.

Evaluation parameters for measures (examples): Number of canteens that offer organically produced food.

Key players for implementation: AGES, educational institutions, BMK, BML, BMSGPK.

6 Strengthening global engagement

Austria has assumed responsibility for the conservation of global biodiversity based on international agreements and has much to contribute to the global protection of biodiversity in the European context, for example through the consumption behaviour of its residents.

Species extinction around the globe is at least ten to one hundred times higher than its average in the last ten million years and continues to increase (IPBES, 2019). Since the start of the modern era, more than 650 vertebrate species have already gone extinct around the globe and the pace of potential threats is accelerating: With an average of about 25%, the risk of extinction has reached its peak in the last 40 years, affecting 40% of amphibian species and a third of reef-building corals. Furthermore, more than a third of marine mammals are threatened with extinction. Of the estimated eight million animal and plant species (of which 75% are insects), one million species are threatened with extinction. Terrestrial habitats are in a similar situation: The loss and deterioration of terrestrial habitats caused by anthropogenic factors has reduced the global quality of habitats by 30%. More than 500,000 species will not have an adequate habitat for long-term survival.

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, 2019) has documented the main reasons for the global loss of biodiversity: intensive land and water use, unsustainable resource extraction, climate change, pollutant inputs and invasive species. Unsustainable production methods and consumer behaviour are also among the main reasons for the worldwide loss of biological diversity. That is why industrialised countries, including Austria, are called upon to change their consumer behaviour and support developing countries in their efforts to protect and safeguard the sustainable use of their biodiversity. This is also in line with the SDGs and their goal to “leave no one behind”. The implemented measures must follow the principles of partnership (“ownership”) and be aligned with partner countries‘ objectives.

Objective:

- The EU's efforts to assume a global pioneering role in tackling the worldwide biodiversity crisis are actively supported and national initiatives are being implemented within the scope of international agreements and organisations.

Note: Objective is based on the EU Biodiversity Strategy for 2030 Chapter 4 "The European Union on the path to an ambitious global biodiversity agenda."

Initial value: no data is currently available.

Evaluation parameters of the objective: Number and quality of Austrian biodiversity-friendly initiatives within the scope of international agreements and organisations.

Measures to be implemented immediately:

- Development and implementation of specific approaches to enable Austria to actively participate in multilateral agreements or organisations to promote biodiversity protection (CBD, Access and benefit-sharing (ABS), Nagoya Protocol, Cartagena Protocol, IPBES, FAO, UNFCCC, CITES etc.).
- Intensified efforts to "mainstream" biodiversity in multilateral agreements in general and with regard to climate change mitigation and climate change adaptation in particular.
- Acceleration of efforts towards a supply chain act that integrates biodiversity and climate criteria at the national and EU level.
- Translations of the main assessment results into German to facilitate access for policy makers, business, media, and interested general public.
- Assess the impacts of trade agreements and of globally relevant subsections of Austrian agriculture and forestry (e.g. imports of soy, wood, etc.) on biodiversity, climate and the environment in general and explore the possibility of including "buy local" regulations.
- Implementation of an ABS information initiative to improve knowledge of potential public users, taking into account the issue of Digital Sequence Information (DSI).

Evaluation parameters for measures (example): Number of reviewed trade agreements.

Key players for implementation: ADA, BMEIA, BMF, BMK, countries, NGOs, Österreichische Entwicklungsbank (Austrian Development Bank – OeEB).

Objectives:

- International biodiversity financing from all sources, including the public sector, is increased by 100%.
- Biodiversity is consistently taken into account in bilateral and multilateral development cooperation.

Note: Objectives are based on the EU Biodiversity Strategy for 2030 Chapter 4 "The European Union on the path to an ambitious global biodiversity agenda"; the relevant current CBD goal, supported jointly by the EU.

Initial value: The average value of public international biodiversity financing (2015–2020) adds up to EUR 21.7 million. This includes bilateral and multilateral public Official Development Assistance (ODA) and other official flows (OOF). The assessment of funding relevant for biodiversity is performed using the same criteria for their recognition and weighting applied to the Austrian climate financing strategy. (Austria | Financial Reporting Framework)

Evaluation parameters of the objectives (In line with the CBD's Financial Reporting Framework): public contribution to international biodiversity financing, number of development cooperation (DC) strategies and programme documents in which biodiversity is anchored.

Measures to be implemented immediately:

- Gradual increase in financial resources for development cooperation towards 0.7% of GDP and an increase in the share of biodiversity-relevant financing for biodiversity in development cooperation.
- Intensified efforts towards joint and transparent reporting by multilateral development banks and other international institutions.
- Support for projects that catalyse a more effective use of financial resources, such as for technology transfer and capacity development.
- Through the Austrian Development Cooperation (OEZA): Continued strengthening of higher education institutions and support of local expertise aimed to establish networks between universities in Austria and partner countries.

- Outside of the OEZA programmes: Provision of funding for 30 scholarships in sustainable, biodiversity-oriented land management each year for students from developing countries for academic studies at the level of Master's degrees and PhD.
- Establishment of "migratory bird partnerships" with developing countries; cultural, informal, and financial exchanges, joint actions to protect bird species.

Evaluation parameters of the measures (examples): Share of biodiversity-relevant funding in bilateral and multilateral development cooperation or total public flows (including OOF), number and quality of initiatives and projects in set out priority measures.

Key players for implementation: ADA, BMEIA, BMF, BMK, countries, OeEB.

Objectives:

- Awareness of the impact of consuming imported products on biodiversity is increased.
- The share of food from sustainable production in imported foods has doubled.

Note: Objectives are based on the EU Biodiversity Strategy for 2030 Chapter 4 "The European Union on the path to an ambitious global biodiversity agenda."

Initial values: e.g. fair trade 2020: green coffee 5,108 t, bananas 32,815 7 t, cocoa beans 5,265 t, rice 1,755 t. (fairtrade.at)

Evaluation parameters of the objectives: Awareness of the impact of consuming imported products on biodiversity (representative survey), market share of imported food (e.g. coffee, bananas) from sustainable production (foreign trade statistics).

Measures to be implemented immediately are:

- Development of a baseline and information base to focus measures to increase awareness of sustainable consumption for the conservation and sustainable use of biodiversity on targeted key topics and target groups.
- Creation of transparency schemes (e.g. with traffic light system) for processes within global value chains that harm biodiversity and use a large amount of resources. This should include designation of origin (especially in retail and restaurant businesses) for

end consumers in coordination with relevant processes at EU level (EU Ecolabel, Sustainable Product Initiative, Ecodesign Directive, etc.).

- Development and implementation of a strategy to reduce imports of products that harm biodiversity (e.g. palm oil, soybean oil) and products that were made with cultivation methods and means that harm biodiversity (e.g. biocides or genetically modified organisms that are banned in Europe). Labelling of such products, taking into account the biodiversity effects of other vegetable oils (BK 2020).
- Development and distribution of information materials regarding the effects on biodiversity of consuming products produced in intensively farmed monocultures in countries of the Global South (e.g. palm oil and soy).
- Development and implementation of outreach activities, including campaigns, dialogue formats, consultations, and mobilisation campaigns, with specific target groups or for the general public, aimed to raise awareness of sustainable buying decisions.
- Development and implementation of monitoring changes in consumption, for example of food, and explore extending this to other products,as well as and the continuous communication of the developments to all stakeholders and consumers.
- Implementing capacity-building projects in developing countries for the precautionary and critical handling of genetically modified organisms in agriculture and raw material production (risk assessment, socioeconomic impacts, documentary evidence and monitoring); raising awareness of alternatives and their availibility.

Evaluation parameters for measures (examples): Volume of financial support for capacity-building projects for the precautionary and critical handling of genetically modified organisms in agriculture in developing countries.

Key players for implementation: ADA, BMEIA, BMF, BMK, BML.

7 Improving regulatory frameworks for biodiversity conservation

Environmental topics are so-called “interdisciplinary matters”; their jurisdiction is shared between the federal government and states in accordance with Art. 10 to 15 B-VG or other provisions on responsibilities. Communal legal acts repeatedly deal with new matters or result in changes in existing regulations. This always involves an integration with existing national law, both at federal and state levels. Changing the legal framework conditions can lead to a more efficient collaboration between the various levels of government, and also emphasise the value and significance of biodiversity.

The conservation of biodiversity lies within the competence and areas of responsibility of the federal government, the federal states, and local governments. Nature conservation, hunting, fishing, and regional planning fall into the jurisdiction of the federal states, in terms of both legislation and implementation.

The responsibility for the conservation and sustainable use of biodiversity is comprehensive and lies with the federal government, particularly for agriculture, forestry, and water management. Other relevant competences of the federal government relate to EIA (only legislation), Strategic Environmental Assessments (also regulated within the scope of the respective federal state competences, e.g. regional planning), control of air pollution, climate change mitigation (interdisciplinary matter, as part of other federal government and federal state competences), trade in endangered species (CITES), development cooperation.

The federal government is also active, for example, in the establishment and preservation of national parks, activities to implement international conventions (e.g. Convention on Biological Diversity, Ramsar Convention). In particular areas, the implementation of the EU regulation on invasive alien species is the responsibility of the federal government (e.g. customs). The federal states are active in areas that are regulated by the federal government, such as public financial support for the forestry sector. Depending on the type of initiative,

the Environmental Impact Assessment act 2000 (UVP-G 2000) is implemented by the federal government or the federal states. Local governments are responsible for zoning and building development planning.

Objectives:

- Options for possibly adapting the legal situation in the various matters related to measures aimed to protect biodiversity have been discussed.

Initial value: current legal situation.

Evaluation parameters of the objectives: Decision on adaptating the legal situation.

Measures to be implemented immediately:

- Strengthening the UVP-G 2000 in respect to biodiversity through stricter requirements for projects such as ski resorts, hydropower plants and drainage systems (especially in areas worth protecting), taking procedural efficiency into account.
- Initiating a dialogue between the relevant administrative units on the federal government and federal state levels about possible advantages and disadvantages of changes to legal matters, e.g. for international nature conservation tasks or municipal regional planning (building authority).
- Close coordination with other Austrian strategies and concepts (e.g. bog and floodplain strategies, strategy for adaptation to climate change, Austrian spatial development concept, Austrian forest strategy, bioeconomy strategy) and EU legislation (e.g. Invasive Alien Species Regulation, Water Framework Directive) in order to make the best possible use of synergies.
- Carrying out a biodiversity check in conjunction with climate checks for relevant laws, regulations and subsidies with regard to their impact on biodiversity (impact assessment).
- Review international (trade) agreements and EU requirements, e.g. Common Agricultural Policy (CAP), for negative or positive consequences on biodiversity (mandatory “biodiversity check”).
- Cancellation of official notices that have become obsolete and require landowners to maintain drainage systems (ditches, drainage channels).

- Evaluation of existing and potential creation of further opportunities to implement and strengthen mediation and participatory processes in connection with the conservation and restoration of biodiversity.

Mid-term measures to be taken:

- Make any necessary changes to laws.

Evaluation parameters for measures (example): Study produced, dialogue group established.

Key players for implementation: BMK, federal states, federal state parliaments, National Council.

8 Securing funding for biodiversity conservation and support for biodiversity-enhancing action

Changes in economic activities also require changes in funding and financial frameworks. Funding for the conservation and sustainable use of biodiversity and for additional staff will be increased. Incentives and subsidies that are harmful to biodiversity will be largely reduced, increasing at the same time incentives that support biodiversity.

Financial resources for the protection and sustainable use of biodiversity are provided by all levels of government, although primarily by the provinces due to their competences. The federal government supports, for example, the operation of national parks or takes on work to implement international conventions, and local governments carry out their own species and habitat protection projects. Biodiversity measures co-financed by the EU under the Common Agricultural Policy as well as the Austrian Forest Fund are also of great importance for nature conservation. The newly created Biodiversity Fund represents an important contribution to the implementation of the Austrian Biodiversity Strategy. Furthermore, the engagement by NGOs and private individuals is also highly relevant.

At any level, biodiversity concerns must be taken into account or be at the centre of all public financial support or other financial measures.

Objectives:

- Sufficient funding is available for the conservation and restoration of biodiversity and for its sustainable use.
- Subsidies that are harmful to biodiversity are reduced, redirected in a positive direction or stopped altogether.

- Public and private financial products for biodiversity-friendly economic activities are developed.

Note: Objectives are based on the EU Biodiversity Strategy for 2030 Chapter 3.3.2 “Investments, pricing and taxation”.

Initial values: No data is currently available.

Evaluation parameters of the objectives: Amount of subsidies, number of financial products certified with the eco-label (UZ49).

8.1 Financing

Measures to be implemented immediately are:

- Analysis and evaluation of all possible sources of funding for the implementation of the biodiversity strategy at the federal, provincial and municipal levels, e.g. structural funds, agricultural-environmental programme, EAFRD, Fisheries Fund, LIFE, Horizon Europe, Forest Fund, funds from the restructuring of incentives and subsidies harmful to biodiversity.
- Conducting negotiations on necessary funding for the implementation of the Biodiversity Strategy Austria 2030+ between the administrative bodies concerned.
- Evaluation and minimisation of incentives and subsidies harmful to biodiversity, including in an international context, and their transformation into biodiversity-friendly incentives and subsidies.
- Adequate funding for the National Biodiversity Fund, transparent allocation of funds and evaluation of results.
- Exploring the development of concepts for compensations for non-marketable ecosystem services in agriculture outside the CAP.
- Exploring the establishment of an interim financing model for non-governmental organisations (NGOs) to implement biodiversity-related projects.
- Explore the introduction of an earmarked landscape protection levy (e.g. for nature conservation or landscape conservation funds) in all federal states for measures that consume land (e.g. extraction of mineral raw materials).

8.2 Financial sector

Measures to be implemented immediately:

- Implementation at the national level of criteria for financing sustainable economic activities that contribute to the achievement of biodiversity goals.
- Implementation of the EU Taxonomy as soon as it is available.
- Development of financial products that benefit the economy and the environment (e.g. impact investment, green bonds) including verified standardisation against biodiversity criteria or integration of biodiversity criteria into existing public labels and certifications.
- Scientific studies to establish a basis for the valuation of financial products.
- Integration of environmental and social concerns in corporate business strategies (initiative for sustainable corporate governance to be presented by the European Commission in 2021).
- Development of a standardised rating system to map the biodiversity impact of companies, organisations and production chains (e.g. adapted Environmental Social Government Rating), taking into account ongoing EU activities.
- Deepening the complex specialised knowledge of green finance among financial market players and entrepreneurs in the real economy, as well as within the biodiversity community.
- Amendment of the Sustainability and Diversity Improvement Act in line with EU activities on the Non-Financial Reporting Directive (NFRD) 2014/95: e.g. inclusion of the reporting obligation for biodiversity impacts and adaptation of the global reporting standard GRI 304 for practical implementation.

Evaluation parameters for measures (examples): Application of biodiversity indicators to financial products and rating systems.

Key players for implementation: BMAW, BMEIA, BMF, BMK, BML, provinces, companies.

9 Valuing biodiversity in society and the economy

Collectively pursuing goals requires an understanding of the concerns and needs of all stakeholders. Increased education, awareness-raising and communication on the value of biodiversity improve opportunities for each individual to contribute to the conservation of biodiversity.

It is important that society is aware of the value of biodiversity. Responsibility for the conservation of biodiversity can only be assumed if knowledge about species, ecosystems and their complex interactions, as well as their sustainable use is available. The extent to which personal and political decisions can affect biodiversity must also be known.

Objective:

- Awareness of the value of biodiversity in society and the economy has increased.

Note: The objective is based on the EU Biodiversity Strategy for 2030 Chapter 3.3.4 "Improvement of knowledge, education and competencies".

Initial values: 77% acknowledge a responsibility for nature (2018). (Attitudes of Europeans towards Biodiversity)

Evaluation parameters of the objective: Awareness of the value of biodiversity (representative survey).

9.1 Awareness-raising and communication

Measures to be implemented immediately:

- Communication in suitable formats (e.g. radio series and programmes, lecture series) concerning:
  - Biodiversity research and nature conservation projects,
  - Impact of consumer behaviour and effects of behavioural change (including eating habits) on local and global biodiversity,
  - Causes of higher producer prices for high-quality and biodiversity-friendly foods,
  - "Natural" green spaces and their importance in public spaces (local governments, cities and public facilities),
  - Advantages of small-scale agricultural production and biodiversity-friendly agricultural practices, including rare crops,
  - Advantages of a varied and diverse diets (in terms of health, ecology and flavour),
  - The importance of traditional forms of biodiversity use and the importance of crop diversity for innovative organic farming, including adaptation to climate change and resilience in a modern agroecological farming system,
  - Identifying and respecting the ecological, spiritual and economic values of ecosystem services,
  - Criteria for assessing the impact of financial services and investments,
  - Etc.
- Organisation of an annual nationwide campaign on biodiversity and intact ecosystems and their importance for humans (e.g. via the national broadcasting company ORF, print media and social media).
- Increased investment to expand ORF's educational programme: (1) raising awareness, (2) positive, informative and target group-relevant reports, (3) highlighting positive options for action.
- Increase in biodiversity-related advisory services for farmers with a special focus on the Habitats Directive and Red List species, endangered habitat types, bird species, endemic species, crop diversity, seed production and propagation, diversification in cultivation, local varieties and endemic varieties of crop species.
- Strengthen awareness raising to increase the understanding of the issue of invasive alien species (neobiota) among both the public and stakeholders working in landscapes (e.g. hunters, anglers, farmers, municipal/construction employees).
- Raising awareness among (small) garden owners of the impacts of pesticides and fertilisers on biodiversity and sharing knowledge on biodiversity-friendly gardening, such as using peat-free soil, permaculture, crop diversity, mowing in patches and promoting beneficial organisms.

- Increased development of targeted information materials for decision-makers and increase in training and advisory services for professional groups specialising in agriculture, forestry, horticulture and landscaping.
- Reinforcement of an Austria-wide network of multipliers (e.g. via the chambers of agriculture) in order to communicate biodiversity issues in the best possible way at the local level, e.g. as part of citizens' councils, excursions, consultations, workshops (e.g. farmers as biodiversity focal points in municipalities or districts).
- Increased support for providers who develop and carry out awareness-raising and communication in the biodiversity sector.
- Greater involvement of the general public and all relevant stakeholders, especially young people through youth organisations, as well as farmers and foresters, in biodiversity-related communication processes, e.g. in any scheduled continuation of the "Biodiversitätsdialog" (biodiversity dialogue). (Example in Upper Austria: agenda21-ooe.at)
- Increased communication of biodiversity issues to young entrepreneurs, e.g. through the organisation of start-up competitions with biodiversity objectives or the integration of biodiversity targets.

9.2 Education

Measures to be implemented immediately:

- Identifying educational institutions and developing programmes to build up capacities for biodiversity issues in the training and vocational retraining of workers (e.g. technical colleges, apprenticeship training, educational institutions specialising in horticulture and landscaping, agriculture and forestry) and in professional training, particularly in the area of resource use and land management (gardening and landscaping, road maintenance, etc.).
- Anchoring biodiversity topics in all relevant curricula as well as in the education, vocational training and advanced training of educators.
- Increase in training programmes at universities and colleges in the areas of species knowledge, taxonomy and the recognition of interrelationships in ecosystem, as well as in the areas of crop diversity, genetic resources and ecological breeding.
- Development of a programme for seed sovereignty that transfers knowledge on the propagation of organic, local, seedfast seeds.

- Strengthening the experience of nature and outdoor learning settings in schools to promote knowledge of species; promoting encounters with nature and nature education in extracurricular learning centres. Develop additional ideas for the implementation of outdoor formats and practical guidance for educators.
- Anchoring specific biodiversity topics in the training of technical specialists, architects, economists, lawyers and doctors in order to promote an understanding of measures that influence biodiversity.
- Strengthening the training of data stewards, data curators and data scientists; promoting biodiversity data management. (Data steward - Wikipedia)
- Development of educational programmes on biodiversity in adult education centres and other community education institutions.
- Promoting the transfer of knowledge between science and society, e.g. through popular science articles in magazines, radio and television programmes, social media; awarding a state prize for the protection and conservation of biodiversity.

Evaluation parameters for measures (examples): Number of campaigns, anchoring of biodiversity in curricula, number of kindergartens, schools and other educational institutions certified with the eco-label (UZ301/302/303).

Key players for implementation: BMBWF, BMAW, BMK, BML, local governments, provinces, NGOs and natural history associations, ORF and other media, formal and non-formal educational institutions.

10 Improving the scientific basis for achieving and evaluating biodiversity targets

The ability to assess the risks to biodiversity and to develop appropriate measures depends on a sound scientific basis concerning the distribution and conservation status of genes, species and habitats, the current threats to biodiversity, its social benefits (ecosystem services), and the effectiveness of conservation strategies, conservation measures and support measures.

The available foundation of data and the communication of findings to decision-makers and the public are not yet sufficient. Interdisciplinary research (e.g. combining ecology with sociology and psychology) and cooperation in the subject area, as well as appropriately derived applied research projects could provide a scientific basis for constructive cooperation and conflict resolution between land users, nature conservation and other population groups. This would enable further development of conflict management and resolution for many conflicts involving the utilisation of natural resources (renewable energies and nature conservation, food production and nature conservation, etc.). The following instruments can fulfil these tasks: (a) at the national level, both conventional public support and financing instruments, such as Austrian Science Fund (FWF), global budgets of university work program agreements, as well as new public support and financing instruments, e.g. the Austrian Biodiversity Funds; (b) European programmes and funding instruments, for example Horizon Europe, structural funds and – if supported by Austrian institutions – also partnerships (such as Biodiversity) and missions.

Objectives:

- Practical data on genetic diversity, species and habitats in general and in particular on the Habitats, Birds and Water Framework Directives are available in sufficient quality.

- A systematic, nationwide biodiversity monitoring programme is implemented and secured for the long term.
- Indicators for the assessment of Austria's biodiversity are developed, taking into account existing indicators.
- The Central Biodiversity Information System for Austria (BISA) is established (analogue to the EU portal Biodiversity Information System for Europe (BISE), biodiversity.europa.eu); datasets are publicly accessible, subject to data protection requirements and take into account sensitive data (e.g. breeding sites of rare species).
- Taxonomic research is secured and increased.
- Research on the interactions of biodiversity with global change and economic activities is expanded.

Note: Objectives are based on the EU Biodiversity Strategy for 2030 Chapter 3.3.4 "Improvement of knowledge, education and competencies".

Initial value: Habitats Directive Art. 17 report – reporting was partly not required (e.g. wolves) or impossible (e.g. leeches) (Environment Agency Austria 2019b), Birds Directive Art. 12 report – for approx. 4% of breeding birds, the population trend is unknown (BirdLife 2019).

Evaluation parameters of the objectives: Generated data on genetic diversity, species and habitats; implementation of monitoring programmes; publicly accessible central biodiversity information system; volume of research projects on taxonomy and on the impact of global change and the economy on biodiversity.

Measures for monitoring to be implemented immediately:

- Developing and securing the long-term sustainability of a nationwide, systematic Austrian Biodiversity Monitoring Programme (ÖBM), taking into account existing programmes: in particular the EU's Earth observation programme and land monitoring service, Copernicus, as well as inclusion of citizen science projects (including quality control), development of methods for the integration of resulting data, development (and establishment) of an autonomous, low-maintenance, tightly knit network of sampling points for biodiversity measurement in all habitats (including soil) and

associated biotic and abiotic factors and linking the findings to the already available satellite remote sensing data.

- Preparation of data sets and a standardised descriptive basis for the BISA central data portal to provide access to all publicly funded biodiversity data, taking into account previous activities in this area, such as GBIF Austria.
- Securing a valid base of data for the Farmland Index and Woodland Bird Index and further developing the Woodland Bird Index.
- Increasing resources for biodiversity research in museums and universities.
- Collection of distribution data for other selected species and habitats in addition to those subject to compulsory monitoring. Further development and implementation of soil biodiversity research methods and development of a monitoring programme for soil biodiversity.
- Development and implementation of a concept to track genetic diversity.
- Establishment of a platform for plant genetic resources aimed to connect Austrian collections and stakeholders (see Chapter 1.1.2 “Genetic diversity”).
- Mapping and documentation of old, rare and undescribed regional varieties in Austria.
- Expansion in monitoring in accordance with NEC Directive 2016/2284 (transposed into national law in EG-L2 018, Federal Law Gazette I No. 75/2018) to other habitat types (bogs, rough pastures, etc.).
- Integrated monitoring to detect the ecological effects of chemical plant protection in the agricultural landscape.
- Monitoring and evaluation of protected area management plans and their implementation.
- Regular publication of monitoring reports on the status and trends of biodiversity in Austria.
- Development of a biodiversity index for Austria that to quantify the development of biodiversity and evaluate the measures taken.
- Monitoring for the evaluation of restoration projects and publication of the results in the BISA.
- Digitisation of existing collections (e.g. as part of the BISA).

Evaluation parameters for measures (examples): Nationwide monitoring programme established, monitoring data and reports available.

Measures in the area of research to be implemented immediately:

- Increase investment in research, innovation and knowledge exchange, taking into account the new skills agenda and the research agenda for biodiversity (Horizon Europe programme, research and innovation / European Commission) and support for projects dedicated to biodiversity research.
- Detailed assessment of the support to research or scientific support needed to implement measures to achieve the objectives set out in this strategy.
- Establishment of an efficient knowledge transfer between research institutes and policymakers, e.g. through the introduction of a scientific service in the National Council or the establishment of an environmental council based on the German model (umweltrat.de).
- Strengthening of taxonomic knowledge in exchange with international scientists and strengthening of natural science collections, including gene banks and botanical gardens and of their research activities.
- Updating Austria's Red Lists of vertebrates, butterflies, grasshoppers, dragonflies and habitat types as well as compiling a Red List of wild bees.
- Collection of data on genetic diversity and utilisation of options to identify species via DNA barcoding (species identification using e-DNA is sometimes viewed critically by some experts (Maletzky et al. 2020)) as well as to identify diversity and species composition using e-DNA and metabarcoding as part of the Austrian Barcode of Life initiative (abol.ac.at) and setting up a long-term continuation of these activities.
- Research into the genetic diversity of species of native flora and the flora of immediately neighbouring biogeographical regions from which natural immigration is possible and to be expected, in order to identify autochthonous seed and planting material that is better adapted to changing climatic conditions.
- Research on the biology and ecology of species and habitats and related ecosystem functions and services (including biotic communities in soil and water).
- Further development and application of methods to assess ecosystem services.
- Developing and implementing a method to systematically identify locations with contaminated soils, whose contamination can be traced back to large-scale, diffuse substance inputs and as a result various soil types face significant mid- to long-term degradation in ecosystem services.
- Research into the ecological and economic importance of pollinators and exploring the establishment of a separate chair for pollinators in coordination with universities and the BMBWF.
- Research on interactions between biodiversity, climate change, climate change mitigation and adaptation.

- Research on the links between land use and biodiversity, in particular for the following topics:
  - Biodiversity effects of land use and of current and new management forms, including abandonment, production of plant-based and animal-based foods, crop diversity, organic farming,
  - Crop wild relatives and crop species and varieties,
  - Ecological effects of synthetic pesticides and their alternatives, including organic practices, use of true-breeding, rare crop species and varieties,
  - Innovative biodiversity-friendly solutions in the areas of digitalisation, precision agriculture and biological crop protection,
  - Research on the biodiversity impacts of international/global trade in agricultural and other products.
- Intensification of invasion ecology research, in particular on economically and health-relevant alien species and on interactions with other threat factors.
- Conducting impact assessment studies on the use of genetic engineering techniques for "gene drive", where new genetic engineering techniques are used to modify genes in such a way that the manipulated trait is passed on to all offspring within a few generations.
- Carrying out research projects on the effectiveness of conservation measures (e.g. protected areas, habitat corridors, species conservation projects).
- Evaluation of the causes of conflicts between stakeholders and individual animal species and establishment of coordinated conservation measures accepted by stakeholders.
- Support for infrastructure (e.g. databases, apps) aimed to provide quality assurance and communication (e.g. training, reporting on results) to citizen science initiatives.
- Austria's planned participation in European research infrastructures (within the framework of ESFRI), such as eLTER-RI or DISCCO, will be supported by the responsible ministries as far as possible. Preliminary work for a Central Biodiversity Information System for Austria (BISA) includes the establishment of the Austrian consortium Open Scientific Collections Austria (OSCA), whose goal is to develop a digital inventory of all natural and geoscientific collections in Austria as well as to digitise (2D/3D) selected high-priority elements. The OSCA benefits from the development of standards and workflows as part of DiSSCo4, an EU project involving the Natural History Museum Vienna (NHMW). To enable relevant contributions and benefit from European research funding, the OSCA consortium needs resources for the digitisation and indexing of collections. This digitisation contributes tremendously to strengthening collections through increased visibility and to expanding taxonomic expertise through

the improved accessibility of objects and object data. An increased training of data stewards, data curators and data scientists can support capacity building.

Evaluation parameters for measures (example): Number of projects or volume of public financial support for individual research on the topics specified, scientific publications on the research topics specified.

Key players for implementation: BMBWF, BMK, BML, research institutions, provinces.

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Glossary

Term	Explanation
Adaptability	Adjustment of an organism to the respective environmental conditions, which takes place relatively quickly in the individual case or, in the case of species and genera, throughout geological history.
Agrobiodiversity	In crop plants, agrobiodiversity refers in particular to genetic variability or variance and its diversity, which concerns both differences between different species and varying characteristics within a species.
Agrobiodiversity Index	The Agrobiodiversity Index measures biodiversity in three areas: Food, agriculture and genetic resources.
Agroforestry	Form of land use in which arable farming and/or grassland use is combined with forestry on the same premises.
Aichi Goals / Aichi Targets	At the 10th Conference of the Parties to the Convention on Biological Diversity in 2010, the Global Strategic Plan 2011–2020 was adopted. The plan contains five strategic objectives (Strategic Goals), which are further elaborated by 20 core objectives (Aichi Biodiversity Targets). As the conference took place in the Japanese prefecture of Aichi, these targets are known as the "Aichi Biodiversity Targets".
Alien species	See Neobiota
Alpine region	See biogeographical regions
Anthelminthics	Medicines for the treatment of worm infections.
Autochthonous	Local, established, native, indigenous
Biocoenosis	Community of species of plants, animals and microorganisms regularly occurring in a biotope, whose species interact with each other and with other species.
Biodiversity	The term biodiversity or biological diversity encompasses the diversity of ecosystems, species and genetic diversity.
Biodiversity hotspots	Regions with a particularly high density and diversity of characteristic species, populations and habitats.
Biogeographical regions	Europe was divided into seven biogeographical regions, using natural and climatic classification criteria: Alpine, Atlantic, Boreal, Continental, Macaronesian, Mediterranean and Pannonian. These regions play a particularly important role in the selection of Natura 2000 sites and in reporting on the measures of the Habitats Directive to the EU Commission.

Term	Explanation
Bioeconomy	An economic system based on renewable raw materials. Not only plants, wood and farm animals can be used as raw materials, but also organic residues, microorganisms, algae and insects.
Bioindicators	Living organisms that visibly react to or indicate environmental conditions and impacts (ÖKO-L 1988).
Biomass	Total mass of living organisms found in a habitat (ecosystem) in grams or kilograms of fresh or dry weight per m^3 volume or m^2 surface area.
Biosphere reserve	Biosphere reserves are areas that were internationally recognised as part of the UNESCO "Man and the Biosphere" (MAB) programme. The aim of biosphere reserves is to create a balance between the protection of biodiversity, the promotion of economic and social development and the preservation of the respective cultural values.
Biotope	The natural habitat of a community of plants and animals adapted to the environmental conditions (soil, water, climate).
Biotope or habitat trees	Biotope trees are not of interest for timber utilisation. With their multitude of special structures, however, they are a habitat for numerous plant, animal and fungal species. Most of them are very old trees, some of which are already dying or dead.
Biotope type	Abstracted type from the totality of similar biotopes. With its ecological conditions, a biotope type offers largely uniform conditions for biotic communities that differ from other types. Typification includes abiotic (e.g. moisture, nutrient content) and biotic characteristics (occurrence of certain vegetation types and structures, plant communities, animal species). The majority of biotope types in Central Europe are also characterised by an anthropogenic use (agriculture, forestry, traffic, etc.) and disturbance regime (pollutants, eutrophication).
CAP	Common Agricultural Policy (CAP) of the European Union (EU)
Capacity building	Building capacities and competences.
Carbon-rich ecosystems	Ecosystems that store large amounts of carbon in relation to others, e.g. bogs, followed by forests and extensively used meadows and pastures
Carbon storage	About half of the soil's organic matter consists of carbon and is an important characteristic of soil fertility. Soils with a high organic matter content can store and release more nutrients and water to plants, than soils with less organic matter. Soils are the largest terrestrial storage ("sink") for carbon.

Term	Explanation
Circular economy	Model of production and consumption in which existing materials and products are shared, leased, reused, repaired, refurbished and recycled for as long as possible. This extends the life cycle of the products.
Citizen Science	In citizen science, scientific projects are carried out with the help of or entirely by interested amateurs.
Coherent	Adhering or belonging together
Compensation areas	Serve to compensate for the damage caused by unavoidable interventions in nature and the landscape.
Conservation status of a natural habitat	The conservation status of a natural habitat is considered favourable if its natural spread area and the areas it occupies within that range are stable or expanding and the structure and specific functions necessary for its long-term maintenance exist, and are likely to continue to exist in the foreseeable future, and the conservation status of its characteristic species is favourable.
Conservation status of a species	According to the Habitats Directive, the conservation status of a species is considered favourable if • based on the data on the population dynamics of the species, it can be assumed that this species forms, and will continue to form in the long term, a viable element of the natural habitat to which it belongs, and • the natural spread area of this species is neither declining nor likely to decline in the foreseeable future, and a sufficiently large habitat exists, and is likely to continue to exist, to ensure the long-term survival of populations of this species.
Continental region	See Biogeographical regions
Continuum interruption	The “passability” of a watercourse, e.g. for fish, is interrupted by transverse structures or natural watercourse stages.
Coppice forest	Forest managed by cutting, with age classes distributed by area (cutting or coppicing operation) and with stand renewal (regeneration) through the re-cutting of the harvested wood.
Core or natural zone	The core or natural zones of Austrian national parks are characterised by complete or extensive naturalness, and the protection of nature here in its entirety is considered to be in the public interest.
Crop wild relative	Wild plant that is closely related to a domesticated plant. One example is wild emmer, a relative of wheat.
Cultivated plant varieties	Varieties that have developed over thousands of years due to human utilisation.

Term	Explanation
Cultural landscape	Landscape characterised by human settlement and land cultivation. See also Natural landscape
Dark areas	Areas with low light pollution.
Data situation insufficient, data deficit, data situation deficient	The available data do not permit categorisation into the individual categories.
Dark sky place	• See Dark sky parks
Degradation	Negative change (soil, habitat); often caused by human activity, e.g. through changes in cultivation or land use.
Discharge regime	Seasonal course of the water flow in running waters.
Ecological status	EU Water Framework Directive: The ecological status is determined by comparing the organisms living in the water with the population that should be naturally present there: invertebrates living on the water bed (macrozoobenthos), aquatic plants (macrophytes) and algae attached to the water bed (phytobenthos), floating algae (phytoplankton) and fish.
Ecosystem	Relationships of living organisms (microorganisms, plants, fungi, animals, humans) with each other (biocenosis) and with a habitat (biotope). Biotope and biocoenosis never occur in isolation. They always occur in combined form as an ecosystem. This is because the absence of one would make the existence of the other impossible (without habitat, no living beings; without living beings, no habitat).
Ecosystem level	The diversity of communities of species and their interactions.
Ecosystem services (ESs)	Services provided by nature that are utilised by humans to secure their livelihood and food supply. Examples: fertile soil for food and raw material production, recreational use, drinking water.
Effective mesh size	Method for measuring the degree of fragmentation of a landscape, which indicates the probability that two randomly selected points lie in the same area (interpretation: possibility of encountering animals of the same species).
Ex lege protected areas	Ex lege protected areas include habitats that are directly protected by the Nature Conservation Act on the basis of the applicable legal situation. No additional designation or special labelling as a protected area is required.
Endangered species	10% probability of extinction in 100 years
Endemic species	See Endemites
Endemites	Species that only occur in a clearly defined area, e.g. Austria.

Term	Explanation
EU conservation objectives	Species and habitats of importance to the European Union. See also Natura 2000.
European protected site	See Natura 2000
Evolutionary factors	In biology, evolutionary factors are processes that change the gene pool (the totality of all gene variations in a population). These processes are the central cause of evolutionary change.
Evolutionary processes	See Evolutionary factors
Ex-situ conservation	Ex situ conservation refers to the conservation of genetic resources of plant species outside the ecosystems in which they naturally occur, of animal species outside their native habitats, e.g. in gene banks, botanical gardens or zoos.
Extensification	Reduction of land use intensity in favour of low-intensity land use, which is directly related to "renaturation" in the narrower sense (e.g. grassland extensification).
Extinct	A taxon is considered extinct if there is no reasonable doubt that the last individual is dead. A taxon is considered extinct if exhaustive assessments in the known or suspected habitat at suitable times of day and year over the entire former distribution area have brought no evidence of individuals.
Fallow land	Unutilised farmland or grassland; former industrial or commercial areas that are no longer used (industrial or commercial wasteland).
Farmland Bird Index (FBI)	The Farmland Bird Index consists of the population trends of typical species that predominantly occur in farmland, whereby different habitats within the farmland are mapped via the requirements of the selected bird species (Teufelbauer & Seaman, 2020).
Farm to Fork Strategy	EU "Farm to Fork Strategy" Farm to Fork Strategy (europa.eu)
Fauna-Flora-Habitat Directive (Habitats Directive)	Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The main objective of the Habitats Directive is the conservation and restoration of biodiversity. This goal is to be achieved by establishing the European Natura 2000 network of protected areas. Member States are obliged to identify, conserve and develop sites where species and habitats of European importance occur.
Forest growth district	Austria's forest growth districts are large landscapes (natural areas) defined according to forest ecology aspects with a largely uniform climatic character and uniform basic geomorphological units.

Term	Explanation
Fragmentation	Fragmentation of animal or plant species habitats, e.g. by transport infrastructure, making a genetic exchange between the resulting sub-habitats impossible.
Gene	Hereditary trait that is responsible for the expression of certain characteristics (ÖKO-L 1988).
Genetic diversity	Genetic diversity refers to the presence of divergent genetic information in individuals of the same species. This forms the basis for diverse individual characteristics which, among other things, enable organisms to react specifically to environmental influences. These flexible capabilities to respond to habitat requirements are the basis for the stability of ecosystems.
Green Belt	The ecologically precious habitats that developed and preserved themselves in the shadow of the Iron Curtain, are currently the largest habitat network in Europe.
Green infrastructure	Interconnected, planned network of green spaces and open spaces that serves various purposes, such as increasing biodiversity, flood protection and recreational use.
HBaE	Holzboden außer Ertrag = non-productive forest area (unit of area)
Habitat	The habitat of a species is the environment in which this species occurs in one of the stages of its life cycle as determined by specific abiotic and biotic factors.
Habitat continuity (habitat tradition)	Continuity of a forest or stock of trees in terms of its tree species composition and its deadwood and structure supply. However, humanity has been interrupting this tradition for over a millennium.
Habitat	See Biotope; see Habitat
Habitat networking	Conservation or restoration of functionally interconnected habitats of the same type, e.g. green spaces. Roads, railway lines, river obstructions and settlements counteract the connectivity of habitats.
Habitat type	The natural habitats of Community interest are listed as habitat types in Annex I of the Habitats Directive. Habitat types are abstracted sections of the land surface that are characterised by similar biotic communities (in the sense of a regularly recurring species community) on largely uniform sites.
Hydromorphology	Describes water body structures and the associated discharge behaviour of a water body in its spatial and temporal extent.
Indicator	A bioindicator, indicator species or indicator organism is a form of life that reacts to environmental influences with changes in its vital

Term	Explanation
	functions or accumulates substances or incorporates them into the organism. These environmental influences are often caused by humans. Indicators are used in nature conservation and landscape planning for studying current conditions and monitoring the success of measures taken.
In-situ conservation	In situ conservation refers to the conservation of genetic resources of plant species within the ecosystems in which they naturally occur and of animal species within their native habitats.
Integrated pest management	Combination of natural measures and sparing use of chemical pesticides to protect crops from diseases and pests.
Intrinsic value	The inherent worth of nature exists independently of its benefit to humans.
Invasive alien species	See Neobiota
IUCN categories	**Categories I and II: Strictly protected areas** Ia – Strict nature reserve Ib – Wilderness area II – National park **Categories III and IV: Protected areas** III – Natural monument or feature IV – Habitat/species management area **Categories V and VI: Low-protection areas** V – Protected landscape/seascape VI – Protected area with sustainable use of natural resources
Land consumption	Loss of biologically productive soil through construction for housing and transport purposes, but also for intensive recreational uses, landfills, quarrying sites, power plants and similar intensive uses.
Landscape conservation area	Lower Austria as example: The landscape conservation area is a form of protection that serves to preserve characteristically shaped cultural landscapes and a natural, healthy habitat for people.
Landscape elements	Area landscape elements: Field copses / groves of trees or shrubs, hedges or riverside copses, and field boundaries / embankments / dry stone walls Point landscape elements: Trees / shrubs including scattered orchard meadows and rows of trees
Land use	Land use refers to any kind of utilisation of soils and land areas (parts of the earth's solid surface) by humans.
Light immission	See Light pollution
Light pollution	The illumination of the night sky by light sources created, installed and operated by humans.

Term	Explanation
Livestock breeds	Breeds that have evolved through centuries of breeding selection and adaptation. These include specialised domestic and farm animal breeds with a wide range of uses.
Living Planet Index (LPI)	A measure of the global state of biodiversity based on population trends of vertebrate species in terrestrial, freshwater and marine habitats.
Low-protected conservation areas	Protected areas according to IUCN categories V and VI
Mainstreaming	A specific content specification is the central component in all decisions and processes.
Management plans	Flexible instrument for achieving protected area objectives with the possibility of continuous adaptation to new findings and changes on the ground and to resolve conflicts of use.
Management zone	In this zone, which may be established in a national park, for example, intervention is permitted or required in order to meet objectives such as species and habitat protection.
Market value	The value attributed to an economic object (goods, services, etc.) on a market by the market participants through the market price.
Median	Central value of a data series
Mesh density	The effective mesh density or mesh size can be used to achieve a standardised quantitative view of fragmented spaces.
Mode of cultivation	Type of use of agricultural or forestry land, e.g. pasture, arable land, forest, etc.
Monitoring	Regular observation, surveillance and measurement, e.g. status of species and habitats.
Mulching	Covering the soil with bark compost, leaves, wood fibres or straw, for example, to protect the soil from evaporation or erosion.
MW	Megawatt – unit for specifying energy output. A megawatt is one million times the power of a watt.
$\mu W/m^2$	Microwatts per square metre – unit for specifying illuminance. A microwatt is one millionth of a watt (10-6°W).
National park	Nature conservation and species preservation have top priority in national parks. The renunciation of any economic utilisation on at least 75% of the area is a prerequisite for the establishment of a national park. National parks are also important recreational, educational and research areas. See also IUCN categories.

Term	Explanation
Natura 2000	Natura 2000 is the name given to the pan-European network of protected areas that aims to preserve special animal and plant species and habitats worthy of protection for current and future generations. This network of protected areas is established by all European Member States according to the same framework conditions. All EU Member States are obliged not to impair the functionality or condition of Natura 2000 sites. Economic, cultural and regional requirements should be taken into account with regard to the safeguarding and further development of protected areas.
Natura 2000 region	An area designated as a European protected site. This includes both the bird sanctuaries and the Habitats Directive areas.
Natural capital	According to TEEB DE (2012), natural capital consists of the biodiversity and natural services provided by ecosystems.
Natural landscape	Landscape unaffected by human activity and characterised only by the interaction of natural ecological factors (parts of the high mountains, primeval forests, etc.).
Nature conservation area	Lower Austria as example: Nature conservation areas serve to preserve habitats that are as pristine as possible or those of particular natural importance (e.g. sites of rare plant or animal species). In principle, any intervention is prohibited in nature conservation areas, and they may only be entered on the paths designated for this purpose.
Natural forests	Natural forests comprise forest stands in primary or secondary forests that have developed structures and a species composition that would be found naturally in primeval forests of the same forest type.
Natural forest reserves	Natural forest reserves are forest areas that are intended for the natural development of the forest ecosystem and in which all direct influence is avoided.
Neobiota	Neobiota or alien species are plants, fungi, animals and microorganisms that are introduced by humans into regions that they cannot reach on their own. Some of these species can reproduce (establish) and spread permanently in the new areas. Some species, known as invasive alien species (IAS), can endanger or adversely affect native biodiversity and the associated ecosystem services.
Neomycetes	Newly established fungi species.
Neophytes	Newly established plant species.
Neozoa	Newly established animal species.

Term	Explanation
ÖBM-K	Austrian biodiversity monitoring – cultural landscape: The Austrian biodiversity monitoring of the open cultural landscape provides an overview of long-term developments in biodiversity.
Old growth forest/ ancient forests	Old forests; see also Natural forests
Open space	Open space is an undeveloped area that is directly connected to the building, such as front yards, home gardens, playgrounds and car parks.
ÖPUL	Austrian agricultural and environmental programme: Environmentally friendly farming by promoting environmentally sound, extensive agriculture that protects the natural habitat.
Organic farming	Organic farming describes a way of farming in harmony with nature. The goal is to produce high-quality food through a closed material cycle, in particular by using own natural resources that are not harmful to the environment.
ÖWAD indicator	As part of the Austrian Forest Strategy 2020+, 65 indicators were developed for Austrian forests. This makes it possible to measure how a forest and its sustainable management are changing in relation to the goals agreed in the forest dialogue.
Plant community	Specialised combination of plant species adapted to the prevailing habitat conditions (ÖKO-L 1988).
Plant variety	A term used in plant breeding to distinguish between different variants of a crop species. A variety is distinguished from other varieties of the same species by various characteristics (size, colour, quantity and pattern).
PEFC-certified	Programme for the Endorsement of Forest Certification Schemes - PEFC. Transparent and independent monitoring system for verifying sustainable forest management on the basis of national standards.
Pesticide	Collective term for chemical substances that kill organisms (animals, fungi, plants, microorganisms) – including viruses under certain circumstances – or otherwise prevent them from having a harmful effect. The terms plant protection product and biocide are also commonly used.
Pollinators	Animals that visit flowers and transfer pollen from one flower to the stigma of another flower of the same species. In temperate latitudes, pollinators are exclusively insects (especially bees, butterflies and flies).

Term	Explanation
Population	The totality of individuals of a species that can reproduce with each other (ÖKO-L 1988) and are thus genetically linked over multiple generations.
Predator	Predators are essential components in the food webs of natural habitats and have important functions in the various ecosystems. They are land-bound animals that feed mainly on meat. This group includes some representatives of the order of carnivores, some marsupials and birds of prey.
Preservation zone	See Management zone
Primary forest	See Primeval forest
Priority species	Habitat types listed in Annex I and animal and plant species listed in Annex II of the Habitats Directive, for whose conservation the European Union has a special responsibility due to their rarity or endangerment, are considered priority conservation targets. The distinction between priority and non-priority conservation targets is particularly relevant in the context of the nature impact assessment and also plays a role in the ranking of conservation objectives.
Priority natural habitat types	According to the Habitats Directive, natural habitat types of Community interest that are threatened with extinction within the European Union are prioritised.
Process protection	One aim of nature conservation is to protect and preserve naturally occurring processes, such as undisturbed forest development or watercourse dynamics, over large areas of the landscape.
Raised bog	A bog dependent exclusively on precipitation water.
Rangeland	Low-yielding, grazed permanent grassland (usually without maintenance cutting) on which mechanical fodder production or maintenance is not possible or not carried out due to the ground conditions.
Recycling	The return of already processed raw materials to the economic cycle.
Recultivation	Active restoration to a usable state (especially with regard to agricultural and forestry interests), such as after extremely intensive use or destruction. This primarily involves the creation of new habitats for which there is no direct reference in the natural and cultural landscape.
Red Lists	Red Lists are inventories of extinct, lost and endangered animal, plant and fungal species, plant communities, habitat types and

Term	Explanation
	habitat complexes and reflect the impact of humans on the state of biodiversity.
Regional authorities	The federal state government, regional and local governments are so-called regional authorities, i.e. they are each responsible for a specific area of the state (in partial functions) and for the people living there.
Reporting obligation under Article 12 of the Birds Directive	The Birds Directive (Art. 12) requires the preparation of a report on the measures implemented under the directive, providing extensive information on population sizes, distribution and causes of endangerment. The current status of the protected assets is evaluated and trends are estimated. The report must be prepared every six years and is comparable to the report under Art. 17 of the Habitats Directive concerning the content to be reported and its format.
Renaturalisation (in the narrow sense)	Achieving a more natural state, i.e. a state of lower utilisation or intervention intensity. If land use is abandoned, this is combined with allowing natural succession. This enables a step-by-step approach to a predetermined goal (e.g. watercourse renaturalisation with corresponding development goals, semi-natural forest restructuring).
Reporting obligation under Article 17 of the Habitats Directive	The Habitats Directive obliges the member states of the European Union to monitor the conservation status of the respective habitats and species within their national borders. The conservation objectives defined in the Annexes of the Habitats Directive are evaluated according to comprehensible criteria. The results of these assessments, together with information on the conservation measures implemented in the Natura 2000 sites and their effects are to be presented in reports to the European Commission every six years.
Resilience, resilient species	Ecology: The ability (and as a measure, the speed) with which a biotic community returns to its original state after a disturbance thanks to its own regulatory mechanisms.
Restoration	Returning to the original, clearly historical state through various, mostly technical measures (e.g. in the case of still and flowing waters or bogs).
River catchment area	An area bounded by watersheds and drained by a river and all its tributaries. The underground catchment area can differ considerably from the surface catchment area, especially in karst areas.
Rough pasture	Species-rich pasture that is only mowed once or twice a year and hardly ever fertilised.

Term	Explanation
Semi-natural areas / wild spaces	Areas that are one quality level below “true” wilderness. These are relatively natural areas in which natural processes still play a major role compared to human intervention, but which are more strongly influenced by humans in various ways than true wilderness areas. In most cases, extensive forms of land use take place in such areas, such as traditional pasture and alpine farming, careful forest utilisation is practised, game is hunted and the landscape is not completely free of settlements and transport infrastructure.
Semi-natural forest	Areas with a semi-natural composition of tree species: The tree species that characterise the forest community occur in the given area but do not reach 50% of the total canopy cover.
Services of nature	See Ecosystem services
Short rotation / short rotation coppice	Short rotation coppice (SRC) refers to agricultural land on which fast-growing deciduous tree species characterised by above-average juvenile growth (e.g. poplar or willow) are planted.
Small production area	Due to the natural and agricultural production conditions, Austria is divided into eight agricultural main production areas by the Federal Institute of Agricultural Economics, which in turn are divided into a total of 87 small production areas (KPG).
Spatial planning	Spatial planning is the planned organisation, development and safeguarding of large territorial units (regions, provinces, federal territory) to ensure the continued use of living space. Various demands on the space must be coordinated, conflicts must be balanced and long-term development options must be kept open. In Austria, spatial planning is the responsibility of the provinces.
Sustainability	Management and development principle according to which no more natural resources are consumed than are replenished, preserving the (life) opportunities of future generations.
Quiet areas	Tyrolean protected area category: Quiet areas are areas which, in addition to protecting nature, are also intended for outdoor recreation. A special feature of the quiet areas lies in the absolute prohibitions. For example, the construction of cable cars for passenger transport and the construction of roads for public transport are not possible.
Water continuum	Longitudinal course of running waters.
Wetland	Wetlands are wet meadows, marshes and swamps or bodies of water that are natural or artificial, permanent or temporary, standing or flowing, fresh or brackish or salt water, including marine areas that do not exceed a depth of six metres at low tide (definition of the Ramsar Convention, Art. 1).

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