Convention on Protection and Use of Transboundary Watercourses and International Lakes

SEMINAR ON THE ROLE OF ECOSYSTEMS AS WATER SUPPLIERS
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Role of Ecosystems, Forests and Wetlands as Water Suppliers in Austria - National report

Introduction – Growth Conditions in Austria

47.2 % of Austria’s federal territory are covered with forests. Forests have at all times contributed to securing people’s economic position and they have always been part of the cultivated landscape.
What is a particularly typical feature of Central Europe is the great variety of its landscapes, which offer a multitude of different growth conditions. Differences in sites over rather small-scale areas characterise forests.
Being an Alpine country, Austria has a high share of mountain and highland forests. 25% of Austria's forests are considered protection forests, that is 750,000 hectares, of which the major part (64%) are steeper than 60%. Trees are thus harvested on small areas and opening up forests well through roads and lanes is an absolute necessity. Small-scale utilisation makes it possible that also shade-tolerant and penumbra tree species can be managed regularly. Under these conditions, the cutting of individual trees and the selective cutting of groups of trees do not only offer ecological advantages (protection against erosion etc.), but, through plus trees and the development of special assortments, also permit ecological optimisation.

Thanks to the geographic versatility of Austria’s landscape numerous, regionally differentiated forest ecosystems have developed. In Austria, one can find 125 different forest communities. The potential natural forest community most significant in terms of size is the spruce-fir-beech forest, which covers approx. 1.16 million hectares.
However, Austria is not only a country of mountains, but also a country with prominent riverine landscapes. There is also a large number of high moors and low moors, which means there are also important forest ecosystems influenced by groundwater and surface water. Among the potential natural forest communities most abounding in water is the pine-birch moor, which covers about 4,000 hectares, and about 41,000 hectares of riparian forests. We have to preserve these ecologically valuable habitats and to make the public aware of their important role.

Protection against natural hazards

Not only settlement density, but also the risk of natural hazards is high in Austria's mountain and highland regions.
Due to the landscape relief these natural hazards comprise avalanches, torrents and, consequently, various types of soil erosion.
Optimum forest structures and vital forest ecosystems play a particularly important part in protecting the living space and the economic area. The management of forests thus requires appropriate know-how with respect to tree species selection, forest stocking and measures for forest tending and regeneration. Forest engineering for the purpose of avalanche and torrent control is a traditional field of activity in the alpine Federal Provinces.

Already in 1950 the so-called "integral project" was developed in the framework of the forest-engineering service for torrent and avalanche control. The project aimed at utilising the combined effect of technical protective structures and high-altitude afforestation (raising of the timber line) and at the re-organisation and replacing of counterproductive forest utilisations (e.g. forest pasturing, branch coppice) in catchment areas. These effects served as the basis for regeneration and improvement measures in protection forests. According to the provisions of the Hydraulic Engineering Act ("Wasserbautengesetz") these measures were funded from the Disaster Fund.
After the entry into force of the Forest Act in 1975 the Forest Engineering Service of Torrent and Avalanche Control in addition to "pure high-altitude afforestation" included also silvicultural measures in so-called "area-management projects". The term used was for this was "green catchment area".
Over the past two decades an always higher number of interest groups made always higher requirements to protection forests (tourism: Promoting the development of skiing courses and artificial snowing systems, tourism: Changes in infrastructure systems, municipalities: Development of settlements as well as hunting)

In 1991 the Federal Government and the Federal Provinces adopted the "Joint Declaration on Measures for the Improvement of the Protective Effect of Forests" ("Gemeinsame Erklärung über Maßnahmen zur Verbesserung der Schutzwirkung des Waldes") in order that local and regional protection forest projects can be supported more efficiently.
Instruments of forest landuse planning serve as the basis for the protection forest concepts of the Austrian Provinces: the Forest Function Plan and the Hazard Zone Plan.
In 1993 the digital establishment of the protection forest concepts of the Federal Provinces was completed.
At the same time it was determined which and how many protection forests were to be improved in the course of the ten years to come.
Using the areas selected by the Provincial Forest Service together with the Forest Engineering Service for Torrent and Avalanche Control it was possible to survey the need for improvement of individual forest areas in terms of urgency and to present them by Federal Provinces.
To be able to carry out measures in protection forests even more efficiently, the working group "Re-orientation of the Austrian Strategy for the Safeguarding and Improvement of the Protective Effect of Forests" was established in 1999.

Further, the definition of a protection forest was adapted to international terminologies through the 2002 Amendment to the Forest Act; in addition to the term "site-protecting forest" also the term "object-protecting forest" was included.

Implementation of the Water Framework Directive in Austria

In order to establish the activities to preserve the extraordinary quality of water also in legal terms, and also to implement the European Union's Water Framework Directive in Austria,
the Amendment to the Water Rights Act was adopted in 2003.
This meant new tasks and challenges in particularly for the operators of hydraulic power stations and the Forest Engineering Service for Torrent and Avalanche Control.

Within the framework of the EU WFD Austria's water bodies were examined for the risk not to comply with the requirements of the WFD in the year 2015. 17% of the running waters were assigned to the category "no risk" and 41% to "safe risk". For 42% of the running waters a risk classification was not possible. They were assigned to a third category ("risk not classifiable").
8 out of 62 stagnant waters > 50 hectares which were examined show hydromorphological pressures and were thus identified as "safe risk".

The most important elements of the EU Water Framework Directive are:

- The Europe-wide standardisation of the protection and sustainable development of water.
- The ban against action liable to cause a deterioration of surface and ground water
- Reversal of the trend towards increasing pollution in ground water
- Heightened effort to evaluate water from an ecological standpoint
- Adaptation of management policies to river catchment areas
- Coordination of the river catchment plans with neighbouring Member States
- Public involvement in planning

First results of the identification of water bodies show that the relatively high share of "candidates for heavily modified water bodies" is on the one hand due to the intensive use of water power, on the other hand a consequence of the flood control measures required in alpine areas.
Austria is trying to comply with the ecological requirements of the European Union without questioning the utilisation of hydraulic power or flood control.
The following issues will be those with which the operators of hydraulic power stations and also the Forest Engineering Service for Torrent and Avalanche Control will be faced primarily.

- **Ecologically oriented run-off regime**
  Also in the cases of hydraulic power stations groins not passable by fish are the most frequent factor leading to the identification of pollution. It is to be pushed, that running water bodies get connected to groundwater bodies in the form of fish ladders. Also the connection of subsidiary water bodies and measures of ecological development on embankments are to be improved.
- **Quantity and dynamics of water flow**
  The question of remaining water and flood problems are the issues of major concern in this context.
- **The ban against action liable to cause deterioration**
  This requirement laid down in the Directive will make further development of hydraulic power more difficult.
- **Cost-covering water prices**
  The Directive provides for the introduction of cost-covering prices for water services, however allowing scope for the individual nations.

Protection of waters in Austria

The Austrian federal territory is located in three international river catchment areas. About 96% of the area are located in the catchment area of the Danube and empties into the Black Sea, about 3% empty via the Rhine to the North Sea, approx. 1% empty via the Elbe into the Baltic Sea. The network of running waters comprises some 100,000 km, a little fewer than 2,200 running water bodies have a catchment area of more than 10 km². There are more than 25,000 stagnant water bodies with a size exceeding 250 m². 2,142 of these water bodies have a size of more than 1 hectare, of which 38% have developed naturally and the remaining 62% were created by man. 67 water bodies have a size of more than 50 hectares and thus represent Austria's most important stagnant water bodies. What is characteristic for the Austrian situation is also its comparably large abundance of water. The average annual precipitation is 1,170 mm. The amount of utilisable water per year is approximately 84 billion m³, of which one third is groundwater. Taking the average water demand of 2.6 billion m³ as a basis of calculation, 3% of the total water supply and 6% of the groundwater supply are used for economic purposes. Austria obtains 99% of its drinking water from groundwater and springwater. The most abundant water resources are located in the karstic regions of the Northern and Southern Limestone Alps as well as in the valleys and basins with sediments from the Quarternary.

Every three years a report on the status of the protection of waters has to be submitted to the National Council. In the "Waters Protection Report" the pressures on water bodies are subdivided according to three aspects: 1) Pollution from point and diffuse sources 2) hydraulic installations liable to cause changes in the structure of water bodies, the connection to groundwater bodies and the interconnection with the surrounding area 3) other sources of pollution.
According to the 2002 Waters Protection Report the water quality of Austria's water bodies is altogether satisfactory. The development of the water quality of running waters is particularly encouraging. 87% of the stretches of running water bodies are already in quality class II or better. Thanks to the successful restoration concepts the water quality of lakes is good to very good again. Also the quality of Austria's groundwater is in most cases excellent. Exceedances of the threshold values for groundwater over large areas have been observed essentially with nitrate and atrazine (see Chapter Drinking Water).
To minimise material pressures the waste water surveys and purification has again been intensified in Austria over the past few years. At present, more than 86% of all inhabitants are connected to public waste water purification plants; in any case waste water is made subject to a biological purification. A higher level of supply with sewage plants is not possible due to the scattered location of residential units.
90% of the dirt produced is even made subject to further treatment (removal of nutrients). The waste water produced by the remaining part of the population is disposed via purification systems of individual houses and cesspools.

Between Passau and Vienna the water of the Danube is again in quality grade II. Only where, on the right side of the river, the purified waste water from the area of and around Vienna are introduced, the Danube has, from the entry of the 'Donaukanal' (Danube Canal) in Wien-Simmering to Wien-Albern, to be designated quality grade II-III. The development of the main purification plant of Vienna which is presently going on and the associated further reduction of waste water emission will lead to a further improvement of the water quality also along this stretch of the Danube. Altogether the chemical water quality of Austria's running waters can – with few exceptions – be called good to very good.

Austrian drinking water

99 % of the Austrian drinking water originates from groundwater. The obligation to keep domestic waters clean and to protect them is laid down in the Austrian Water Rights Act (Österreichisches Wasserrechtsgesetz). According to this Act the quality of groundwater and spring water must be so high that it can be used as drinking water. This Act falls within the competence of the Federal Ministry of Agriculture, Forestry, Environment and Water Management (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft) which is also responsible for the application of pesticides and fertilizers. As soon as groundwater is withdrawn for the purpose of drinking water the competence rests with the Federal Ministry of Social Security, Generations and Consumer Protection (Bundesministerium für soziale Sicherheit, Generationen und Konsumentenschutz). Since 1992 contaminations have been recorded in Austria by means of the Water Quality Survey (Wassergüteerhebung) in a way covering almost the whole territory. The protection of waters is also laid down in the Agenda 21 of the United Nations with the objective to protect waters from contamination. This is also one of the reasons why the Austrian agricultural policy aims at an increased promotion of organic farming.

The situation regarding the chemical quality of Austrian groundwater is as follows:

- The pollution of porous groundwater is primarily due to nitrate and to the pesticide agent atrazine and its degradation products, which is first and foremost concentrated on the intensively used arable areas. Atrazine was primarily used for maize growing, but also for pest control, on track systems, and on industrial and transport areas. As this herbicide is suspected to have an undesired estrogenic effect, atrazine was prohibited in Austria in 1995. However, due to its persistence, it is still traceable in groundwater, even though with a significant downward trend. An improvement of the situation could also be observed as far as nitrate is concerned.

- The groundwater contained in karstic and deep percolation aquifers is water of an extremely high quality. The karstic limestone and dolomite of the Limestone Alps act as storage stone for the Austrian drinking water. Possible increases in the values of individual parameters proved, and even then only slight increases, are considerably below the Groundwater Threshold Regulation (Grundwasserschwellenverordnung) and have, as a rule, geogenic causes, or are due to a natural enrichment with minerals. Individual cases of higher values due to anthropogenic causes occur only in the agriculturally used hilly areas of deep percolation aquifers with a low storage capacity (e.g. in the Bohemian Mass).

Forest Act – Safeguarding Sustainability

By “sustainable use” according to the applicable forest act we mean that forests are managed and utilised in such a way and with such an intensity that their biodiversity, their productivity and their regenerative capacity is maintained and they will be able to fulfil their ecological, economic and social functions at local and regional levels now and in the future.

In Austria the utilisation of forests was regulated by the Imperial Forest Act (Reichsforstgesetz) in a way taking into consideration the principle of sustainability as early as in 1852. The first section, which dealt primarily with sustainable forest management, was applicable until 1975. With the Forest Act 1975 it has been laid down that the parallel forest effects (functions) are, as far as possible, to be safeguarded now

and in the future. These are the economic, protective, beneficial and recreational functions.

The 2002 Amendment of the Forest Act stipulated, among other things, a deregulation (strengthening of the sole responsibility of the forest owner) and the adaptation to the requirements of a modern administration.
The Amendment constitutes the basis for a sustainable management of Austrian forests from the economic, ecological, social and cultural points of view. The supreme goal is safeguarding the various functions, if possible for the whole forested area, and ensuring the sustainability of forest management.

Among others the following provisions aim at the preservation of forests, their sustainable management and their multifunctionality:

Section 1
- Preservation of forests and forest soils
- Ensuring that forests are treated in such a way that the productive capacity of the soil is maintained and the forest functions are sustainably preserved.
- Safeguarding a sustainable forest management, among other things, for the preservation of ecological, economic, and social functions.

Sections (8 -10)
- Forest land use planning

Section 13
- Obligation to reafforest clear-cut areas and gaps.
- Encouragement of natural regeneration as a general objective of sustainable forest management.

Section 16
- Prohibition of forest devastation

Sections (17 -19)
- Prohibition of clearing
Clearing of wood is prohibited in principle, however, in the case of public interest the authority can issue a licence to clear a forested area.

Section 27
- Protected forest
- The purpose of the protection can be, among other things, the safeguarding of water supplies

Sections 37 and 38:
- Regulation concerning by- products in forestry

Section 80
- Protection of immature stands (regulation providing that in high forest stands final cuttings can only be carried out from a certain (average) age onwards (the age depending on the tree species).

§ 82
- Prohibition of clear cuttings, if they affect, among other things, the water balance of the forest soil considerably or permanently.
Prohibited are: Large-scale clear-cuttings in high forests (in the case of a cutting width of up to 50 metres, if a length of 600 metres is exceeded, or in the case of a cutting width of more than 50 metres, if an overall area of 2 hectares is exceeded)
Special provisions are applied to protection forests.

Section 85

- Fellings subject to authorisation (in principle, if a contiguous area of 0.5 hectares is exceeded.

Sections (113 -115)
- Obligation to appoint forest agents
Owners of forests of a size of at least 1000 ha are obliged to appoint an executive forest agent (up to 3600 hectares a forester, beyond that a forest manager). The total number of forest agents to be appointed depends on the size of the forestry holding.

To put it in a nutshell one could say that sustainability in forestry has already been practised in Austria for centuries. The stringent Forest Act constitutes the basis for it and guarantees the basis of the resource forest. One example to be mentioned in this respect is the management of the spring protection forests of the City of Vienna, which ensure the supply of a city with more than one million inhabitants with high-quality drinking water.

Spring protection forests

In particular forests with a multilayered canopy, ground cover, and tree species with an intensive root system reduce the eroding force of precipitation and store great quantities of water. The management of spring protection forests must comply with the required framework conditions in order to ensure that the numerous springs supply a constant quantity of cool drinking water, which shows little temperature variation.

The drinking water of the federal capital originates from the Northern Limestone Alps (Lower Austria, Styria), and is transported via the First and the Second Vienna Aqueduct from the mountain springs to Vienna. According to information provided by the City of Vienna these two aqueducts supply every inhabitant with a total of 235 litres of water per day.
In the catchment area of this drinking water reservoir of Vienna there are about 32,000 hectares of “spring protection forests” owned by the City of Vienna. The spring protection forests are managed by three forest administrations. The economic goal is the preservation or the creation of an optimal soil condition for absorbing, storing and filtering the drinking water for the about 2 million inhabitants of Vienna. The management takes place in a particularly nature-friendly way:

- No clear cuttings, interference only on small areas
- Encouragement of natural regeneration
- Special promotion of rare, ecologically valuable tree species
- Tending of special sites such as wetland biotopes, dry lawn, or dry meadows
- No use of chemical substances
- Non-removal of groups of old trees and dead wood
- Creation of new and extension of existing natural forest reserves

- Transformation or conversion of existing instable pure spruce stands on protection forest sites into site-appropriate mixed stands
- Intensive silvicultural treatment of protection forests and providing a renewed regeneration
- Opening-up of forests by means of the construction of forest roads by a landscape-friendly excavator construction method in connection with temporary haulage facilities such as skyline cranes
- Re-raising of the timberline by means of reafforestation of high altitude areas-

The fixed price per m³ water guaranteed by the City of Vienna enables timber harvesting by means of skyline cranes also in those areas, where this could not be financed from the timber value alone.

On a medium-term perspective pure spruce stands of the same age with an unfavourable water balance shall be replaced by stable, crisis-proof, all-aged mixed stands with an optimum water balance and sufficient natural regeneration. More small-scaled types of regeneration, namely strip and selection cutting, help to avoid unvegetated phases in production forests and to reach the goal of a so-called continuous forest.

Technical forest plan "Forest and Water"

Not only public institutions such as the administration of the City of Vienna, but also private forest enterprises get support for the implementation of water-relevant projects. According to the Forest Act forest owners or the forest administration have for example the possibility of drawing up a technical forest plan. The forest technical plan on the issue of "Forest and Water" offers for example the opportunity of planning and presenting projects aiming at safeguarding and improving the water-absorbing, water-storing, and filtering effect of forests.
The forestry enterprise "Stiftung Liechtenstein/Forst Kalwang" (Liechtenstein Foundation/Forest Kalwang") has set up together with the Federal Ministry of Agriculture, Forestry, Environment and Water Management a pilot technical forest plan. In the forest of Kalwang there are exploited and unexploited springs from smaller and bigger water courses. For this reason the plan aimed at the "well-targeted protection and utilisation of water resources in a forestry enterprise" with the principle objective of creating "traceable bases for the forthcoming implementation of the EU Water Framework Directive". All facts and objects relevant to Water Law (concerning groundwater as well as surface water) were described and significant interferences, such as groins or discharges/and/or diversions, are closely examined and documented. In order to ensure the development of an operative monitoring network, as required by the Directive, the data were set up in a digital form and in a way which is compatible with geo-information systems.

One example for international projects under the leadership of the Federal Ministry of Agriculture, Forestry, Environment and Water Management is ILUP. The purpose of the project "Integrated Landuse Planning and River Basin Management" is to set up the basic plan for a comprehensive, network-oriented landscape management for the whole river basin of the river Ybbs (a receiving body of water of the Danube river). It aims at the preparation and implementation of an integrated strategy for the valuation of the foothill and hill country with regard to the natural hazard and use potentials and resulting conflicts, as well as at prevention support (floods, mudflows, etc.) with trans-national coordination (transferability of valuation approaches).
In the risk zones, e.g. in the Danube region, water management is decisive for the regional development. The project is carried out at international level together with Hungary, the

Czech Republic, Greece, and Germany and should bring about an integrated riparian area management as a new, efficient, inter-disciplinary planning tool.
A more pronounced focus on the risk potential of riparian areas has become necessary, because the risk potential has considerably increased due to the enormous pressure caused by human utilisation. In view of the demographic concentration in river basins and potential climate changes, the safety in valleys can only be ensured by means of cooperation between protective water management and other disciplines. Within the framework of the model project exemplary new methods are being tested, strategies are developed and pilot projects are implemented in 10 selected river basins of the partner countries. The experiences gained in the various river basins will be exchanged at several international conferences.

The instrument of the technical forest plan within the framework of forest management has turned out to be also useful for ILUP. It serves as a planning and monitoring instrument, which aims at achieving an optimum effect of forests on water, namely its storage, filtering, and absorptive capacities.

Cooperation between authorities and nature conservation organisations

Participatory approaches to solutions in the environmental sector often lead to cooperation between authorities and NGOs. Comprehensive information on the effects of measures as well as interdisciplinary dialogues, talks with beneficiaries, landowners and authorities enable a broad consensus.
In this way high-quality projects are developed, which are readily supported by all interest groups. Nowadays there are no longer necessarily conflicting interests between flood control and biotope and/or landscape protection. In hydraulic engineering a trend away from purely technical, regulating structures towards an ecologically compatible, landscape- and nature-friendly water design has developed, which meets nevertheless all security-requirements.

In the interest of the preservation of the quality of life of the Austrian population the Federal Ministry of Agriculture, Forestry, Environment and Water Management cooperates with competent and active NGOs.
As far as the water sector is concerned the project WasSerLeben (WaterLIfe, experiencing water) has been launched together with the Austrian Association for the Protection of Nature (Naturschutzbund) and the Austrian Federal Forests (Österreichische Bundesforste).
By the example of model projects it could be demonstrated how Austrian water habitats can be actively protected. Among other things a “wetland inventory“ has been developed, examples for near-natural flood-areas have been demonstrated, wetlands have been renatured, near-natural and dynamic river landscapes have been restored, the conservation of forest brooks and forest springs has been promoted, etc.

In the course of revitalisations more space is granted to rivers and brooks. In this way floods, whose discharge was before restricted to a small effluent trough, have again more space to spread in a harmless way. Thus the force and the height of the flood are reduced. Within the borders of the extended river basin the water body can develop an independent dynamism. In this way diverse habitats for various animal and plant communities develop sustainably.
Thus the inhabited areas along running waters are made flood-safe by ecologically oriented flood control measures, making the protected retention areas an indispensable recreational and adventure area for the population.

One example for successful cooperation for the purpose of waters protection is the working group "Lebenswerte Traun" (liveable Traun) dealing with the Upper Austrian river Traun. It works out alternatives on the improvement of the section of the Traun from the confluence with the river Alm to the weir of Wels in terms of ecology and protective water management. This river section is one of the few free-flowing stretches of the river Traun and has a considerable area of riparian forests. As a result of rigid river regulation measures (structures) the natural dynamism of the river is strongly restricted. Moreover, the progressive deepening of the river bottom and the declining ground-water level endanger the bordering riverside plain landscape.
The type of river regulation developed by the working group leads to a good status according to the Water Framework Directive and meets at the same time all requirements of protective water management and ecology. The whole area of the riverside plain along the two banks of the river Traun is to be connected again with the main stream and a multi-bed flume is to be created. In this way the dynamism, which is characteristic of this class of riverside plain and type of water, is rendered possible again.