



Each European River Basin authority is represented within an international network called the International Network of Basin Organizations (INBO) that aims at exchanging experiences in watershed management including specifically the WFD implementation. Basin organizations, governmental administrations in charge of water management as well as bi- and multi-lateral cooperation agencies may be members of INBO. According to its objective of promoting integrated water resources management at the level of river basins, as an essential tool for sustainable development, INBO endeavours to:

- Develop lasting relations between the organizations interested in such a comprehensive management, and favour exchanges of experiences and expertise among them;
- Facilitate the implementation of tools suitable for institutional and financial management, for inventory and updating of water resources, for the organization of data banks, for the concerted preparation of master plans and action programs in the medium and long term;
- Develop information and training programs for local elected officials, for users' representatives and for the different stakeholders involved in water management as well as for the executives and staff of the organizations in charge of water management at the river basin level;
- Encourage education of the population regarding these issues;

- Promote these principles in international cooperation programs;
- Evaluate ongoing actions initiated by the member organizations and disseminate their results.

After this overview of the EU WFD, two articles follow, dealing with specific projects in Europe on forest and water issues.

For more info see: http://ec.europa.eu/environment/water/water-framework/index_en.html; <http://water.europa.eu/>; <http://www.mcpfe.org>; and <http://www.inbo-news.org/>

The European Commission Joint Research Centre (EC-JRC)



The EC-JRC, based in Ispra, Italy, in its mission to provide customer-driven scientific

and technical support for the conception, development, implementation and monitoring of EU policies, is actively involved in protection forests. The Centre acts as a part of the overall EC administration and the protective issue is among the highest priorities. This is due to the intersectoral aspects linking protection forests to climate change, natural hazards, risk management, and water and soil resources conservation. The activity of the JRC is aimed at characterizing and locating in Europe the spatial distribution of those forests that provide protective

functions and contribute to enhancing water quality in downstream areas. Most of them are located in the upper zones of watersheds. One of the JRC's projects is the "Development of harmonised indicators and estimation procedures for forests with protective functions against natural hazards in the alpine space." The main objective is to explore the possible contribution of the national forest inventories to assess forest protective functions, by:

- Identifying key components of the forest protective function;
- Selecting useful indicators and surrogates;
- Harmonising definitions and estimation procedures;
- Proposing a strategy for monitoring aspects of protective functions of alpine mountain forests;
- Identifying features of remote sensing techniques and field assessments for harmonised monitoring.

See: <http://forest.jrc.it/ForestResources/ForestProtection/>

The new COST Action on Forest and Water



"Forest Management and the Water Cycle" (FORMAN) is the title of the

new scientific and technical cooperation action across Europe (COST) focusing on the enhancement of knowledge on forest-water interactions in Europe, and on the elaboration of science-based guidelines for a better management of forests. The FORMAN concept on forest/water interactions comprises the water resource aspect and the problem of potential hazard to the human population. Water regulation contributing to flood control, and water supply by forest soils and aquifers are among the most prominent forest ecosystem services. These are potentially at risk under a changing climate and changing management practices, but knowledge concerning actual risk is still very limited. This COST Action will pull together the enormous potential of forest- and water-related research in Europe in an interdisciplinary approach. The Action is planned on four years with three Working Groups. These act as links between the COST Action and existing research programmes and investigate on:

- Expected changes in forest tree species composition and forest structures in Europe;
- Expected effects of climatic changes on forest vitality status;
- The different scales relevant in the assessment of forest management/water relations.

The major cross-cutting question addressed by the scientific work is: how will the water status and the protective function of forests be affected by the expected changes? See: http://www.cost.esf.org/index.php?id=143&action_number=FP0601

EUROPEAN FORESTRY COMMISSION

Working Party on the Management of Mountain Watersheds

In this issue:

- The European Union Water Framework Directive (WFD): why it is important for the EFC Working Party on the Management of Mountain Watersheds (WP-MMW)
 - Protection forests is a priority area of activity at the European Commission Joint Research Centre (EC-JRC)
 - Start-up Meeting of the new COST Action on Forest and Water in Brussels, on 29 May 2007
 - Country page: Polish Ministry of the Environment: Forest Research Institute

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The European Union Water Framework Directive (WFD)



In 2003, the EFC WP-MMW prepared, in collaboration with the European Observatory of Mountain Forests (EOMF), a questionnaire addressed to 32 EFC member countries with the aim of collecting and consolidating basic information on issues related to watershed management, as well as identifying the main issues and problems to be solved in the management of mountain watersheds for the coming years across Europe. Some of the main outcomes were presented and discussed at the 25th Session of the Working Party in Salzburg, Austria, 24-26 April 2006 (see also the Background Paper for the Session at: <http://www.fao.org/forestry/site/forestsandwater/en>). Among the priorities, countries recurrently and unanimously referred to the main target and deadlines of the European Union Water Framework Directive (WFD, 2000). We will provide below a brief overview of the WFD and its links with the WP-MMW.

The WFD provides the basis for an integrated policy on water through a set of planning and technical tools based on the river basin, defined as the "natural geographical and hydrological unit" to be adopted instead of the administrative or political boundaries. For each river basin district - some of which cross national borders - a "River Basin Management Plan" must be established and updated every six years. A biannual EU conference allows a regular exchange of views and experiences in the implementation of plans (outcomes of the 2007 Conference are available at: http://ec.europa.eu/environment/water/water-framework/2007conference/index_en.htm). The main targets of the WFD are:

- Expanding the scope of water protection to all waters, surface waters and groundwater;
- Achieving "good status" for all waters by a set deadline;
- Implementing water management based on river basins;
- Applying a "combined approach" of emission limit values and quality standards;

- Getting the prices right;
- Getting the citizen involved more closely;
- Streamlining legislation.

All Member States are legally-bound to implement the following steps:

- Elaborate an appraisal of the current situation (2005);
- Analyse and establish river basin, cross-border management plans (2009);
- Establish policy plans (2012);
- Implement plans (2015).

It should be noted that the WFD is also adopted by the non-EU EEA Countries and by the non-EU Countries who are members of the Danube Commission.

Referring to forest area found in river basin, the WFD has a relevant interest in both policies and practices. As recently mentioned by the European Commission during a preparatory meeting for the 5th Ministerial Conference on the Protection of Forests in Europe (MCPFE) that will adopt a Resolution on Forests and Water in Warsaw, Poland, next 5-6 November 2007, the following aspects should be taken into account in sustainable forest management in relation to WFD implementation:

- Water is not a commercial product like any other but rather a heritage which must be protected;
- All waters have to be protected: surface and ground water;
- Both, water quantity and quality are concerned;
- All influences on water have to be taken into account: household, agricultural, industrial, forestry, etc.;
- Waters which have not yet achieved "good water status" are subject to a non-deterioration objective, in order to maintain their present quantity and quality;
- Equitable and cost conscious pricing of water and water related services should be considered;
- Links between long term planning of water management and forest management plans should be considered.



Poland is mainly a lowland country. Areas over 500 m a.s.l. occupy about 10 000 km² (3% of the total national territory). These constitute the northern part of the European arc of the Carpathians and the Sudeten, extending about 700 km along the southern Polish border. Their average height is 1 500 m, with a maximum elevation of 2 499 m, and they are featured by diversified climate, geology, soil, vegetation and anthropogenic impact. Forest vegetation varies depending on elevation and can be classified as follows:

- Foothills, up to an altitude of 500-600 m. Vegetation: Galio-Carpinetum and Pino-Quercetum;
- Lower mountain zones, at an altitude of 500-1 000 m in the Sudeten and up to 1 200 m in the Carpathians. Vegetation: Dentario enneaphyllidis, Fagetum (the Sudeten), Dentario glandulosae, Fagetum Luzulo nemorosae (the Carpathians), Fagetum and Abieteti, Picetum montanum;
- Upper mountain zones, at an elevation of 1 000-1 250 m in the Sudeten, and 1 200-1 650 in the Carpathians. Vegetation: Plagiothecio, Piceetum hercynicum (the Sudeten), Plagiothecio, Piceetum tatricum (the Carpathians);
- Dwarf pine zones, at an elevation of 1 250-1 450 m in the Sudeten and above 1 500-1 800 m in the Carpathians.

Three main factors decided about present condition of forests in the Polish mountains: schematic silviculture in the past, air pollution and climate changes. The present species composition of forests differs significantly from the primeval composition because of centuries of improper management (monoculture plantations, lack of natural tree regeneration, and cutting system type). In the Sudeten the coniferous sites occupy 46% of forest area but the current percentage of spruce stands area is about 78%. In the Carpathians the coniferous sites occupy only about 3% but currently the average percentage of coniferous stands reaches almost 64% of forest areas. Deterioration of species composition of mountain forests is much worse at higher altitudes. Lack of conformity of stands and forest sites has negative influences on vitality of trees, susceptible to insects, fungi, wind and state of plants communities. The mountain forests in Poland are also under permanent threat of air pollution, which stimulates acidification of soils and toxic action on organisms, as well as of climate changes, with anomalous weather conditions resulting, between others, in floods, soil erosion, landslides, and the occurrence of pests.

At the end of the 70's of last century, symptoms of forests degradation appeared in the Sudeten Mountains. This process acquired the size of an ecological disaster, and its peak occurred at the beginning of the eighties. Acid rains were the main cause of this phenomenon; they occurred due to air pollution from industrial plants seated in this transfrontier region, and mainly from coal power

plants. They caused a weakening of forests, resulting in damages by pests. The widespread forest degradation changed natural conditions of water circulation in mountain rivers and brook catchments. It influenced also other processes linked to surface water flow, as intensification of erosion processes and changes in biogenic compound cycles. In the years 1981-1997, the renewal over the extensive deforested areas covered about 160 km² (Photos 1,2).



Photo 1. The ecological disaster in the Sudeten



Photo 2. The Sudeten's Forests, 20 years after the ecological disaster

The situation in the Carpathians is definitely more favourable, especially because of the lower level of pollution and the more fertile forest sites. However, evidences of forest degradation were observed also here, particularly in the Silesian Beskid which belongs to the western Carpathians (Photo 3). This part of the Carpathians is constantly threatened by air pollution coming from the upper Silesian and Ostrava industrial regions. Even though in the last decade the level of air pollution in Poland and in the Silesian Beskid has noticeably decreased because of improved technologies and emission control, the existing level of wet and dry pollution sedimentation in this area is still significant for forest ecosystem functions. Additionally, recent climate changes, in particular as far as annual precipitation and temperature patterns are concerned, influenced the water cycle and the balance of forest watersheds. These phenomena

intensify attacks by insects and fungi to the vegetation. The most dangerous species of insects in Polish mountain forests are: Ips typographus, Ips amitinus, Polygraphus poligraphus, Pityogenes chalcographus, Lymantria monacha, Pristiphora abietina and Zeiraphera diniana. Cephalcia sp., Heterobasidion sp. and Armillaria sp. are the main pathogens causing root system disease. Honey fungus disease is spreading widely and affected more than 50 000 ha of forests in the Polish side of the Carpathians. Damages caused by game are also significant in mountain areas. Natural and artificial renewals are in some cases affected up to 80%.

Besides air pollution, severe and extreme climatic conditions play an important role for mountain forests.

Poland is located in a temperate zone with a variable climate. Year-to-year climatic data show a big variation with respect to the average long-term values, that contributes to occurrence of weather anomalies. In the last 50 years the average temperatures increased by around 1° C and precipitation decreased by some 100 mm. Forecast climate changes will lead to worse growth conditions of existing mountain spruce stands. The more and more frequent weather anomalies (violent downpours, floods, landslides and rotary storms related to global climate change) are causing the destruction of many species and ecosystems.



Photo 4. A protected torrent in the Carpathians

Soil and water resources are the basic elements of mountain forest sites. Precipitation variations along time and space cause several weather phenomena: drought responsible of crop failure, increasing forest fire risk and drying up of wells. On the other hand, unexpected snowpack melt and avalanches cause periodical water surplus and dangerous floods. Mitigation of such phenomena is possible thanks to integrated watershed management projects. Presently many projects aimed at increasing water resources as well as at protecting mountain forests against erosion are under execution (Photo 4,5).

The ecological disaster in the Sudeten in the past decades gave the impulse to search for effective methods by which to preserve and protect endangered forest species and ecosystems. It was decided to establish the Forest Gene Bank in Kostrzyca (LBG), which was opened on December 1995 (Photo 6).

LBG safeguards the most valuable gene resources of forests through long-term storage of seeds in cold rooms, under programmed temperature and humidity conditions. An integrative part of LBG is an arboretum, on whose collection of ligneous plants a research of great importance for forestry is carried out. An inventory of forest ecosystems and plant stands of the Sudeten Mountains and the promotion of

environment protection and education are some of the LBG's activities.

Development of protected areas and updating of lists of endangered species are valuable means for conserving forests and preventing loss of bio-diversity. Nowadays almost all mountain forests are under a protection regime, that entails different protection patterns: passive conservation

in national parks and nature reserves and active management of forests with protection functions for soil, water and landscape. 9 out of the 23 National Parks in Poland were established in mountain areas, covering a surface bigger than 1 000 km². Plans for conservation areas adopt measures designed to eliminate or minimize threats to nature. In the framework of forest management plans, nature

conservation programmes are developed at the Forest District level. Techniques and management addressing nature conservation are constantly improved. One of the measure adopted in mountain forests protection is monitoring, that covers health conditions of forest and non-forest phytocenoses, vascular plants, predatory mammals (wolf, lynx, wildcat and bear), chamois and alpine marmot, dormice (Gliridae), birds, amphibians, reptiles, etc.



Photo 3. Forest degradation in the Silesian Beskid



Photo 5. A small water reservoir in the Sudeten



Photo 6. Forest Gene Bank in Kostrzyca