

Management of wetlands – changes and challenges
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1. Introduction

Aquatic and wetland ecosystems serve as natural water reservoirs that are very valuable to changes in the hydrological regime and insensitive anthropogenic interventions. They cover a substantial part of the Earth's surface and have a number of unique functions. They stabilize the landscape and constitute key ecosystems for maintaining biodiversity, as they provide irreplaceable habitats for many fauna and flora species.

In Slovakia we give the emphasis to the integrated management of water ecosystems which would result in the use of valuable water sources on the basis of sustainability principle and with the aim to conserve biodiversity. The basis for conservation of aquatic biodiversity lies in the ecosystems approach which includes monitoring and evaluation of biodiversity of water ecosystems, impact assessment, prevention of pressures in the framework of river basins and effective international cooperation in the area of management of water sources.

2. Nature Protection and Water Legislation

2.1. National Legislation

According to the Act No. 543/2002 on Nature and Landscape Protection which is the most important act in the area of wetland conservation, the territorial and landscape protection specifies five levels of protection. The extent of restrictions increases depending on the increase of level of protection. In the territory of the Slovak Republic with the first level of protection the approval of nature protection body is required for conducting activities changing state of wetlands or river-beds, mainly for their regulation, back-filling, drainage, extraction of cane, peat, mud and river sediments. This approval is often given only after Environmental Impact Assessment. This means that all wetlands in Slovakia are highly protected.

There are several other documents which are fundamental for protection and wise use of wetlands.

- National Strategy on Biodiversity in Slovakia was prepared in accordance with Convention on Biological Diversity (Rio de Janeiro, 1992) and it is one of the basic documents of nature protection (approved by resolution no. 231/1997 of the Slovak Government and then also by the Slovak Council in June 1997). Its implementation is ensured by *Updated Action plan for implementation of the National Strategy on Biodiversity in Slovakia for years 2003 – 2010* (resolution of the Slovak Government no. 1209/2002). This document includes also Wetland Chapter.

- Action Plan for years 2003 – 2007 to the updated Programme on Management of Wetlands in Slovakia (National Wetland Policy) was approved by the Slovak Government in February 2003 (resolution no. 200/2003).
- Wetland issues have been incorporated to the frame of *Rural Development Plan for the years 2004 – 2006*.
- Integrated Approximation Strategy in Environment Chapter and its annexes approved by the Slovak Government (resolution no. 1138/2001) was prepared for the implementation of EU directives in Environment Sector and estimations of financial needs and human capacities for their transposition to Slovak legislation.

2.1. International legislation

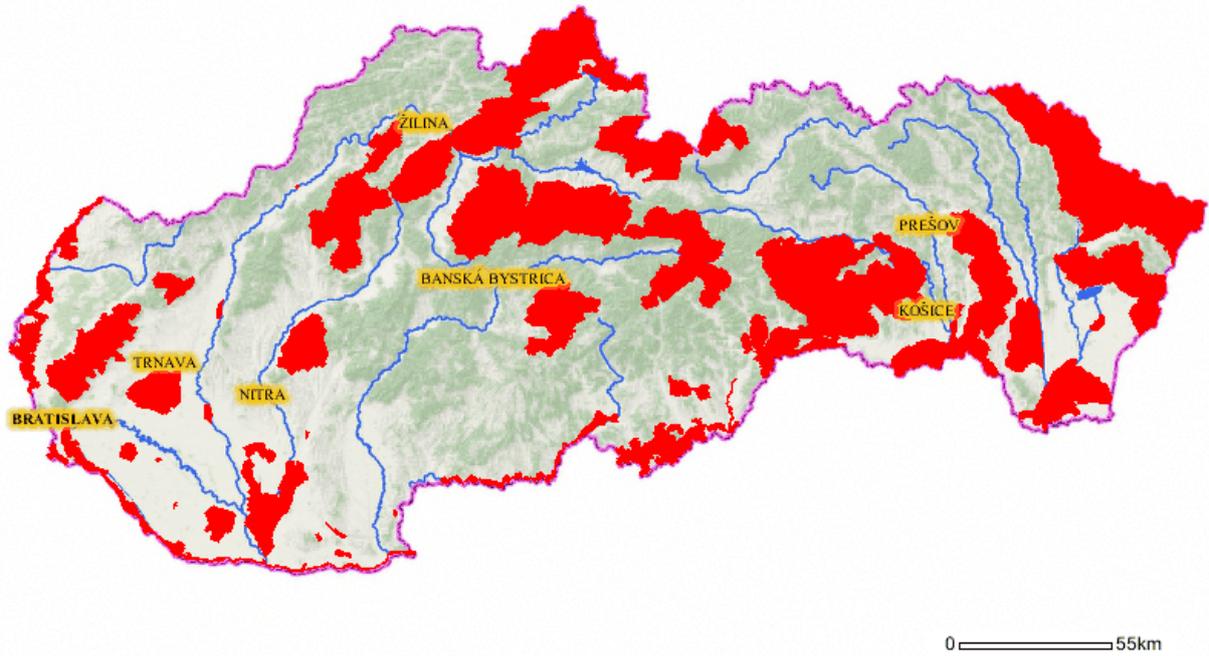
In 2004 the Slovak Republic became Member State of the European Union. Currently the Council Directives 79/409/EEC on the conservation of wild birds (Bird Directive), 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Water Framework Directive 2000/60/EC are the most important European legislative tools concerning wetland protection in Slovakia.

The main purpose of Bird Directive is to protect habitats of bird species of European interest and habitats of migratory birds. Such areas are very often wetland habitats. The Government of the Slovak Republic for the purpose to protect such bird areas approved by its resolution the List of proposed Special Protected Areas (SPA). The „List“ consists of 38 sites (15 of them are wetlands) which cover 25.2 % of the whole territory of Slovakia. Bird species for which special protected areas are developed, are listed in Annex 1 of Bird Directive. 81 birds of above mention Annex (31 of them are water birds) occur in Slovakia. According to the Act No. 543/2002 on Nature and Landscape Protection the activities that may have negative impact on subject of protection in SPA are prohibited.

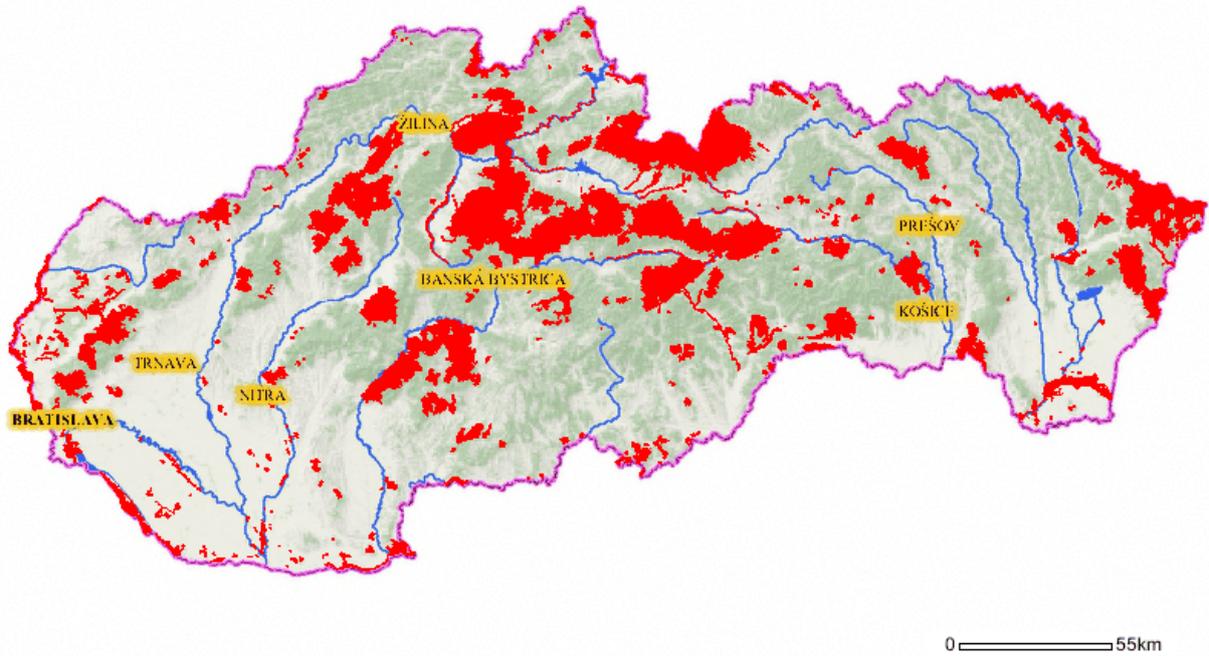
The main purpose of Habitat Directive is to protect natural habitats of European interest or species of European interest. The Government of the Slovak Republic approved the National List of Special Areas of Conservation (SAC) which contains 382 sites of European interest. These sites cover 11,7 % of the whole territory of Slovakia. The subject of protection in these sites are 51 plant species of European interest (8 of them are water plants), 151 animal species of European interest (68 of them are aquatic species) and 66 habitats of European interest (24 of them are wetlands).

Special Protected Areas and Special Areas of Conservation form a part of coherent European network of protected areas aimed at conservation of a favourable status of both natural habitats of European interest and species of European interest. The activities that may influence the area of coherent European network of protected areas are considered to be intervention in the area which may cause substantial changes in biological diversity, structure and function of ecosystems. Impact of such activities upon environment must be assessed.

Special Protected Areas in the Slovak Republic



Special Areas of Conservation in the Slovak Republic



Another very important directive concerning water protection which I want to mention in my presentation is Water Framework Directive (WFD).

Water Framework Directive 2000/60/EC is fundamental document stipulating the approach of the EU, as well as of the Slovak Republic, as the EU Member State, to conservation of surface waters

and groundwater. The methods of implementation of this document is a matter of each Member State, however, the set environmental objectives are obligatory. There was developed the Strategy for the implementation of Water Framework Directive in the Slovak Republic by the Ministry of the Environment, Water Division and approved by the Slovak Government. (resolution no. 46/2004).

What is the main purpose of the Directive?

The Directive establishes a framework for the protection of all waters (including inland surface waters, transitional waters, coastal waters and groundwater) which:

- Prevents further deterioration of, protect and enhance the status of water resources,
- Promotes sustainable water use based on long-term protection of water resources,
- Aims at enhancing protection and improvement of the aquatic environment through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances,
- Ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and
- Contributes to mitigating the effects of floods and droughts.

What are the key actions that European Union Member States need to take?

- To identify the individual river basins lying within their national territory and assign them to individual River Basin Districts (RBDs) and identify competent authorities **by 2003**
- To characterise river basin districts in terms of pressures, impacts and economics of water use, including a register of protected areas lying within the river basin district, **by 2004**
- To carry out the intercalibration of the ecological status classification systems **by 2006**
- To make operational the monitoring system networks **by 2006**
- Based on sound monitoring and the analysis of the characteristics of the river basin, to identify **by 2009** a programme of measures for achieving the environmental objectives of WFD cost-effectively
- To produce and publish River Basin Management Plans (RBMPs) for each RBD including the designation of heavily modified water bodies, **by 2009**
- To implement water pricing policies that enhance the sustainability of water resources **by 2010**
- To make the measures of the programme operational **by 2012**
- **To implement the programme of measures and achieve the environmental objectives by 2015**

1.3 International Environmental Conventions and Agreements

The Slovak Republic is Member State of several International Environmental Conventions and Agreements which aim is to protect aquatic and wetland habitats and ecosystems.

The most important are:

Convention on Wetland of International importance Especially as Waterfowl Habitats (the Ramsar Convention)

Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention)

Convention on Migratory species (the Bonn Convention)

African-Eurasian Water bird Agreement

2. Current Conditions

We understand the term “wetlands” to mean habitats determined by water in the meaning of the definition of the Ramsar Convention. These are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”.

In 2000 we finished the inventory of wetland areas in Slovakia. The mapping of the wetlands of Slovakia was realized with the use of standard forms including the most important data about the location, area, character and the main biotops and plant and animal species, about the use, rarity and degradation of the site. The following summaries contain information based on the baseline data provided by the compilers of the individual forms. These summaries are arranged according to the importance of the selected sites.

The results of the wetland inventory:

- Wetlands of international importance
(13 sites, 39, 337 ha)
- Wetlands of national importance
(72 sites, 147,261 ha)
- Wetlands of provincial importance
(467 sites, 10,431 ha)
- Wetlands of local importance
(1,050 sites, 4,550 ha)

Both in the Slovak Republic and throughout Europe, aquatic and wetland habitats are the most affected and degraded types of ecosystems. Their biodiversity is endangered more than biodiversity of terrestrial ecosystems. Communities of aquatic and wetland ecosystems, phyto/zooplankton, phyto/zoobentos, macrophytocenoses and ichthyocenoses are rarely found in their natural species composition. A majority of vertebrates, amphibians, reptiles, water birds and mammals bound on water belong amongst endangered species.

Habitats that are closely bound on water include the vegetation of water courses and reservoirs, wetland and river bank vegetation and vegetation of spring and peat bogs, and, in relation to semi-aquatic ecosystems, vegetation of damp and flooded meadows, bank tree species and floodplain forests.

Human activities, particularly in the recent decades, have markedly affected the state and function of aquatic and wetland habitats in Slovakia.

The greatest impact was caused by extensive drainage of the landscape for the purposes of agriculture and forestry, intensive farming, physical modification of both longitudinal and transverse profiles of water courses, their regulations and canalization, construction of structures, discharging of municipal and industrial wastewater and atmospheric deposition.

The total length of water courses in the Slovak Republic has been reduced through past modification of the channels. Regulation of water courses leads to a substantial loss of their environmental functions and to marked disturbance of water regime of the landscape.

Technical modifications of channels, including unsuitable flood-protection measures, still remain a fundamental problem in management of inland water ecosystems. Numerous structures on water courses cause obstacles preventing drifting and migration of aquatic organisms.

After 1989, the volumes of industrial and agricultural production substantially decreased and number of wastewater treatment plants were built, resulting in fast and radical improvement of water quality. However, point and also diffuse pollution sources have not yet been fully eliminated and the effects of the eutrophication process are still marked. In spite of substantial reduction of emissions, the impact of acidification on biodiversity is still clear, particularly in oligotrophic mountain ecosystems.

3. Problem Issues

3.1. Unfavourable ecological condition of aquatic and wetland ecosystems caused by weakening hydrological functions of the landscape.

- Major exploitation of the landscape has led to extensive and spatial reduction of wetlands.
- The landscape lacks riparian vegetation and bank trees and bushes.
- The deficit of water in the landscape causes increased trophy of wetlands and acceleration of their transformation to terrestrial habitats.

3.2 Inconsistent management of conservation of aquatic and wetland organism

- Spreading of invasive and geographically non-indigenous fauna and flora which suppress indigenous species.
- Massive tourism affects the natural dispersion and life cycles of aquatic organisms, the most important impact consists in disturbance of water birds during nesting period.

3.3 Pollution and change in the quality of physical and chemical components of aquatic ecosystems

- Washing up of nutrients deposited in the past and intensive management connected with excessive use of artificial fertilizers and pesticides have resulted in pollution of aquatic environment, which has contributed to the eutrophication process.
- Hardly degradable, synthetic, toxic organic substances and heavy metals from the past are still present in the aquatic environment.
- Substantial reduction of emissions (particularly of sulphur dioxide) has not resulted in marked improvement in relation to acidification of aquatic ecosystems in mountain areas, which is also partly caused by extensive deforestation of the territory.

3.4. Physical modifications and destruction of habitats of aquatic and wetland species of organisms

- Regulation, canalization, use of pipes and straightening of water courses and other technical interventions in aquatic and wetland ecosystems have resulted in destruction of natural habitats, particularly due to elimination of natural banks and water courses and reservoirs as biologically active zones for self-cleaning processes and various hydromorphological bodies as places for development of rare communities.
- Straightening of water courses in the past led to substantial reduction of the length of the water network in the Slovak Republic faster outflow of water from the landscape, spatial reduction of channels, pools and arms, and destruction of meanders.
- Construction of water works has led to interrupting of the continuity of water courses by barrages and dykes, the regime of suspended solids has been modified, the physical and chemical characteristics have been changed, and genetic exchange, active and passive drifting, migration and natural dispersion of aquatic organisms has been prevented.

4. Objectives

4.1. Improvement of the unfavourable ecological condition of aquatic and wetland ecosystem and the hydroecological functions of the landscape

- Improve the retention function of the landscape by diversification of the manners of use of the landscape and landscape features and by removing amelioration measures in parts of the landscape that are unsuitable for farming.

- Enforce effective anti-flood measures in the cultural landscape with the use of natural hydroecological functions.

4.2 Conservation and management of aquatic and wetland ecosystems

- Implement extensive conservation measures and maintain the current nature-like water and wetland ecosystems in the Slovak Republic and halt their destruction.
- Provide for intersectoral coordination of management of aquatic and wetland ecosystems.
- Prevent further spreading of invasive alien species and geographically non-indigenous organisms and adopt measures to limit the current populations of these species.
- In accordance with water Framework Directive 2000/60/EC, create a national, integrated and comprehensive monitoring system, including monitoring of hydromorphological and biological components of surface waters.

4.3 Limitations of pollution and improvement of the quality of physical and chemical components of aquatic and wetland ecosystems.

- Finalize the system of effective treatment of wastewater in the territory of the Slovak Republic.
- On a country-wide scale, reduce the use of fertilizers and pesticides and, thus, support the reduction of intensity of pollution of the aquatic environment from diffuse sources.
- Reduce the risks of pollution of groundwater and surface waters from old environmental burdens and ecological accidents.
- Strictly comply with the set emission limit values.

4.4 Diversification of hydromorphological components of aquatic and wetland ecosystems

- In places where regulation is not essential, remove regulation and renew the original state of river channels with the use of cheap technologies.
- Maintain varied hydromorphological formations in aquatic ecosystems, allow their occurrence and existence, and provide for their conservation.
- Renew the continuity of the river network by removing unused and non-functional water works and provide for passage of fish through functional and necessary structures by means of fish ladders.

4.5 Limitation of unfavourable impact of agriculture and fishing on aquatic and wetland ecosystems

- Ensure sustainable farming in the landscape, with respect to the principles of good agricultural practice and with support for development of organic farming.
- Introduce a system of measures preventing eutrophication, erosion and excessive transport of sediments in the cultural landscape.