Viera Straskrabova – **Biodiversity in aquatic systems – what are the important drivers and pressures?**

This talk covered the different types of freshwater ecosystems and their main differences to terrestrial systems and further examined the threats to aquatic systems as well as the consequences for goods and services provided to humans. In addition we discussed the EU Water Framework Directive (WFD) and its relevance to the protection of biodiversity in aquatic systems.

There are several types of aquatic ecosystems all differing in their physical and ecological structure, including lakes, river and wetlands, as well as man-made structures such as reservoirs. In comparison to terrestrial ecosystems the main characteristic differences are that light and oxygen are often limited, heterogeneity is smaller and that primary producers consist of very small, fast growing species. Aquatic systems are often net heterotrophic, with primary production within the systems coming from the catchment area (e.g nutrient enrichment from the terrestrial system) and respiration increasing above production. Thus aquatic systems and terrestrial system are strongly linked and the boundaries are often gradual. These gradual boundaries (littoral regions) are hotspots of biodiversity, nutrient cycling and other chemical and biological processes. The main pressures and drivers affecting biodiversity in aquatic systems are human induced and act either *directly* through overexploitation, species invasions or changes in habitats, or *indirectly* through for example acidification, eutrophication, as well as changes in climate and land-use. One of the largest problems in aquatic systems is eutrophication of the system, which is largely dependent on the catchment area in terms of the amount of agriculture. Nutrient input is difficult to control, as there are also internal sources of nutrients from the benthos, which may cause eutrophication, however at a much slower rate than human induced eutrophication. Once the system is eutrophic it is very difficult to return to a non-enriched state, especially in slow flowing and shallow aquatic systems.

There are big human demands to aquatic systems. The amount of water available is vital for human use in terms of flood control, water storage and irrigation. In addition there is a large amount of human demand on water for transport and energy production, drinking and food as well as recreation. The large human demand on freshwater often results in conflicting use and effects on water resources, such that a pre-dam for example, may reduce eutrophication in lakes, but may at the same time cause low nutrients in the lower part of the river, which will have a knock on effect on fish biomass.

The WFD combines the sustainable use of water with the protection of aquatic systems, terrestrial systems and wetlands directly depending on them. It is aimed at protecting the water quality and quantity for human use and not directly at protecting aquatic ecosystems. The WFD does not directly refer to biodiversity. However biodiversity (species richness and abundance) is used to as an indicator for water quality.

During the discussion it became apparent that there is a general consensus that the WFD has missed out on the opportunity to conserve biodiversity AND water quality. In addition this missed opportunity has had a knock on effect on the ground water directive and the soil directive, which also did not include the protection of

biodiversity. Using biodiversity only as indicators for ecosystem quality can have its drawbacks as a shift in the baseline may occur without detection. We agreed that as a result of lack of information about biodiversity and ecosystem processes we should conserve both biodiversity AND the habitat quality at the same time rather than using on as an indicator for the other.

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