Nutrient management in the Elbe basin – targets and measures

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Introduction
In accordance with the Water Framework Directive the transboundary river district Elbe has prepared a draft River Basin Management Plan (www.fgg-elbe.de). The draft plan is currently open for public consultation. During the preparation of the plan, it was recognized that the goals set by the WFD can only be achieved if important pressures e.g. nutrient inputs, specific substances and hydromorphology alterations are reduced. To analyze these problems three working groups were installed with the task to develop targets and measures for pressure reduction. The working group results were used during the preparation of the management plan.

Target
A reduction of nitrogen and phosphorus loads from the Elbe basin is required to achieve a good ecological status in all surface water bodies to combat eutrophication effects. The necessary reduction from the river basin to the North Sea was calculated from the chlorophyll a concentration in coastal waters. The current chlorophyll concentration data exceed the concentration at the good to moderate boundary by 24 %. This value is used as the long term target for the nitrogen and phosphorus load reduction.
This goal can not be achieved within short time scales until the end of the first management period. Therefore the load reduction was distributed equally over the three management periods.

Measures
With the MONERIS model, the sources of nitrogen and phosphorus emissions were quantified and are reported on sub-unit level. In the Elbe basin, more than 80 % of the nitrogen emissions and more than 60 % of the phosphorus emissions originate from diffuse sources. These model results are used for identifying the most pathways with the largest input and are considered by the measure planning. Measures are planned individually by each federal state. Base measures include the implementation of the Nitrate directive. All Federal States in the Elbe basin in Germany improve the agricultural advisory services to allow farmers to use best practice. Some states have set up specific advisory programs when the chemical status of groundwater bodies is not good. In addition all states have developed agri-environmental schemes to reduce nutrient losses from agricultural areas. These measures focus mainly on the reduction of nutrient losses due to erosion. Some states use river and wetland restoration plans to improve nutrient retention in the landscape.

Effectiveness
It is assumed, that the measures in the Elbe basin will lead to a load reduction for nitrogen by 7% and for phosphorus by 9%. If this goal will be reached, will be evaluated with the monitoring program. However, quantifying the effect of the measures is highly uncertain due to several factors. It is uncertain, how and when a reduction of nutrient surpluses will have measurable effects in surface water bodies due to long transient groundwater transport times. It is uncertain, how many farmers will apply for agri-environmental funds and how the effect of these measures can be quantified.

Perspectives
From the development of the River Basin Management Plan it became clear, that a significant reduction of point and non-point nutrient sources is required to achieve the ecological goals set by the WFD. Measures planned for the first management period will be important but are only a first step in the direction of the required nutrient load reductions. For the future, it is necessary to consider these environmental objectives in all policy planning at European level, and to focus both on reduction of nutrient inputs from point and non point sources, and to improve nutrient retention in the landscape.