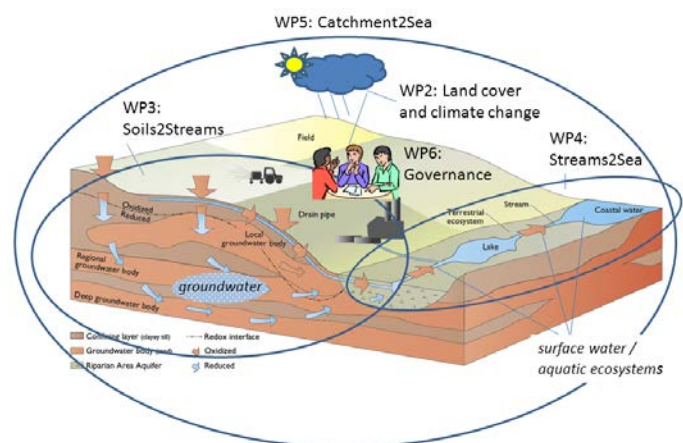


Summary of Scientific/technical Report 2014

Context and objectives

Both the Baltic Sea Action Plan and the EU Water Framework Directive requires substantial further reductions of nutrient loads (N and P) to the Baltic Sea during the coming years. Achievements of these goals will only be possible by the implementation of fundamental changes in agricultural practices and land use. This will require the introduction of additional new and innovative measures, because the easiest applicable measures have, in most cases, already been utilised. Soils2Sea proposes to exploit the fact that the retention (removal by biogeochemical processes or sedimentation) of nutrients in groundwater and surface water systems shows a significant spatial variation, depending on the local hydrogeological and riverine regime to achieve the goals for nutrient load reduction set out in the Baltic Sea Action Plan. The traditional uniform regulations do not account for local data and knowledge and are much less cost-effective than spatially differentiated regulations with measures targeted towards areas where the natural retention is low. In order to fully exploit the potential of differentiated regulations it is required to utilise all local information and find locally designed and optimised solutions. Besides the need for improved knowledge on the subsurface and nutrient transport and retention processes on a local scale, this calls for new innovative governance regimes with active involvement of key stakeholders. Not the least as the new measures most probably will differentially affect stakeholder groups with conflicting interests.

If we more accurately can predict where in a catchment N and P are retained by estimating the retention in the different compartments along the flow path, and also include the delayed effects of mitigation measures due to long solute travel times in groundwater, then we can more cost-effectively design measures to reduce the nutrient loads to the Baltic Sea. Soils2Sea will therefore study the retention of N and P between the soils/sewage outlets and the coast, including transport pathways such as overland flow and flows in macropores, subsurface tile drains, shallow and deep groundwater, rivers, wetlands and lakes. The concept and the Soils2Sea work packages are illustrated in the figure.



Work carried out in 2014

The project has been successfully initiated in 2014 with two full project meetings, several WP meetings, the first meeting of the Advisory Panel, launching of the project website www.Soils2Sea.eu, preparation of dissemination material and completion of a detailed Requirements Report mapping the interdependencies between work packages and partners and providing detailed descriptions of case areas, methodologies and work plans.

A major review of current literature on the use of land use scenarios has been undertaken. This will form the basis for definition of how nutrient loadings are considered in the land use scenarios for the Baltic Sea Basin.

The sites for detailed field studies in the three case areas in Denmark, Sweden and Poland have been selected and field installation and measurements as well as setup of numerical models for the field sites have been initiated. The field sites will be further developed with more equipment and more measurements in 2015, and we expect that they can provide new knowledge on flow pathways, transport and retention of nutrients in both the groundwater and the surface water systems.

Work has been initiated on improving the pan-Baltic model, Balt-HYPE and testing it on the Pregolya river catchment in Russia and Poland. Furthermore, a study on intercomparing the Baltic Sea scale HYPE with a more detailed local (100 m grid) and national model (500 m grid) for the Norsminde catchment in Denmark has been initiated. This aims at deriving methods for upscaling of data and process descriptions from local scale for use in HYPE and hence for applications at the Baltic Sea scale.

Three workshops were held in November and December 2014, in Sweden, Poland and Denmark. The goal was to introduce Soils2Sea, and to begin understanding the needs and perceptions of the people living and working in the regions studied by the project. Those attending included farmers, fishers, representatives of local governments, water managers, and other community organizations, as well as academics.

Expected final results

- New methodologies for the planning of differentiated regulations based on new knowledge of nutrient transport and retention processes between soils/sewage outlets and the coast.
- Evaluation of how differentiated regulation can offer more cost efficient solutions towards reducing the nutrient loads to the Baltic Sea.
- Analysis of how changes in land use and climate may affect the nutrient load to the Baltic Sea as well as the optimal location of measures aiming at reducing the load.
- A high-resolution model for the entire Baltic Sea Basin with improved process descriptions of nutrient retention in groundwater and surface water tailored to make detailed simulations of management regulations differentiated in space.
- New knowledge based governance and monitoring concepts that acknowledge the relevant aspects of EU directives and at the same time are tailored towards decentralised decision making. The proposed spatially differentiated regulations will aim for incorporation of local scale knowledge to optimally design solutions.

