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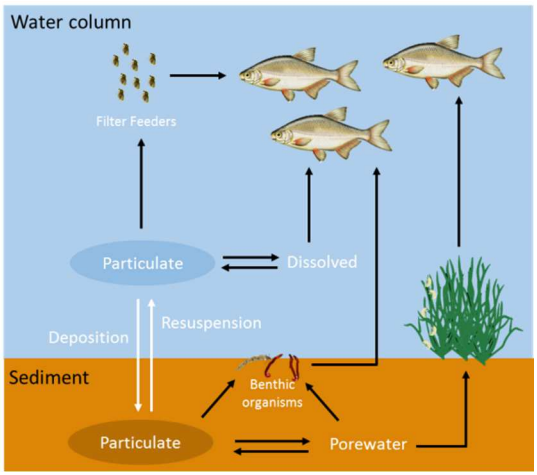
A module "Sediment" within the framework of the MSK

Factsheet

A new module is planned for conducting sediment quality assessments within the MSK framework. The project started in January 2015 at the Ecotox Centre in partnership with BAFU and Eawag and aims at harmonising approaches for sediment quality assessments for use by cantonal and private laboratories, and supporting cantonal water protection agencies in assessing sediment quality.

Context

Sediments are an ecologically important compartment of surface waters. According to the Swiss Water Protection Ordinance [1], "the water quality shall be such that: the water, suspended matter and sediments contain no persistent synthetic substances" to ensure the protection of aquatic life. Although a national program for the monitoring of sediment quality such as the one implemented for soils[1] does not exist, available data illustrate that sediment contamination is present in Switzerland and there are cases where it is of concern for the health of aquatic ecosystems [2]. Despite this, to date no harmonised methods or quality criterua are available for sediment-quality monitoring in Switzerland.



Conceptual model of sediment contamination dynamics

Since 2010 a discussion group established at the Ecotox Centre has brought together experts from academia, private labs, and cantonal environmental agencies to address the issue of sediment quality monitoring in Switzerland. This initiative has allowed to gain an overview of the cantons' expertise and activities regarding the evaluation of *in situ* sediment quality and to prioritise cantonal interests and needs. As a top priority, the cantonal agencies ranked the need for sediment quality criteria for selected chemicals to classify *in situ* sediments according to their ecotoxicological risk [3]. Of second priority was the harmonisation of sampling strategies, including the preparation of samples for further analyses.

The module "sediment"

In response to the needs of the cantons and other stakeholders, the Ecotox Centre together with Eawag and BAFU, is initiating a module "Sediment" within the framework of the Modular Stepwise Procedure ("MSK"). The module is intended to aid cantonal and private agencies in conducting sediment quality assessments in a harmonised manner and to support the cantonal water protection agencies in assessing sediment quality. The module "Sediment" will complement existing MSK modules and thereby achieve a more holistic assessment of Swiss surface waters by incorporating the sediment compartment.

Within the general MSK framework, the module "Sediment" will enable the Cantons to classify sediment quality primarily on the regional scale (Stufe F). Nevertheless, methodologies developed will also be suitable at the basin (Stufe S) and section (Stufe A) scales. They will allow screening and prioritisation of sites and substances, and facilitate a detailed assessment of the ecological risk at sites of potential concern. Thus, depending on the spatial distribution of such "hot spots" as well as the intended assessment intensity and questions, methods developed could also be used in more detailed investigations.

Development of the sediment module - a stepwise procedure

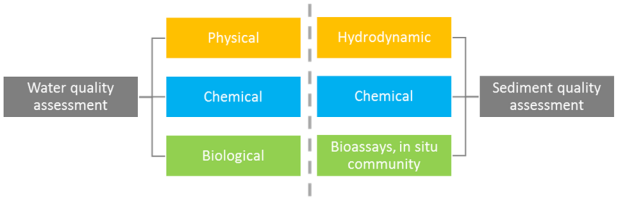
The first phase of the project is aimed at the development of a sediment assessment system based on chemical status, and will address the two top priorities of the cantons: 1) develop a harmonised protocol for sediment sampling and pre-treatment and 2) derive numerical sediment quality criteria for selected contaminants along with a quality classification system.

[1] Swiss Soil Monitoring Network (NABO).

The development of sediment quality criteria requires a harmonised protocol for sediment sampling and pre-treatment [4], thus guidelines for sediment sampling and pre-treatment focussed on surveillance, operational and investigative monitoring will be addressed first. The output should be a technical guidance document with a validated and calibrated methodology ready for use by cantonal and private laboratories.

In a second phase, sediment quality goals will be derived for a number of priority substances, and a sediment quality evaluation system in line with the classification procedure used in the MSK will be developed. A list of substances relevant for sediments in Switzerland does not exist, despite the fact that some cantons have already performed monitoring campaigns addressing chemical quality of sediments. This list should be developed through a prioritisation exercise for sediment-relevant substances according to their environmental fate and effects, and based on their use and presence in Swiss water bodies.

Like surface water quality assessment, sediment quality assessment requires multiple and diverse types of information. Sediment quality goals must be considered as a starting point of a tiered approach [5]. Such an approach should combine physical, chemical, ecotoxicological, and ecological tools in order to address the toxicity of contaminant mixtures and the combined effects of multiple stressors. Thus, in the future, the approach developed in the current module "Sediment" should be complemented by effect- methods for sediment quality assessment, e.g. a battery of ecotoxicological bioassays and an *in situ* benthic community index specific for sediments.



Possible structure of an evaluation system for sediment quality (right hand side) and its relation to the general framework applied in the Swiss Modular Stepwise Procedure (left hand side).

Links

More information about the modular stepwise procedure (MSK) can be found at: http://www.modul-stufen-konzept.ch

More information on sediment quality assessment can be found at the Ecotox Centre website: http://www.centreecotox.ch/projekte/sedimentqualitaet/index_FR

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