German Working Group on Water Issues of the Federal States and the Federal Government

Permanent working group

‘Surface and coastal waters’

LAWA-AO

Part B

General concept for the preparation and contents of an integrating sediment management plan

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German Working Group on Water Issues of the Federal States and the Federal Government (LAWA)

Permanent working group ‘Surface and coastal waters’ (LAWA-AO)

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Contents: Keyword list of relevant aspects of an integrating sediment management plan and for the derivation of measures that can be used in the preparation of a sediment management plan according to the specific needs and issues of the respective river basin district ('modular system').

Objective

- To identify basic objectives and requirements of a sediment management plan (SMP)
    - WFD/MSFD objectives (good chemical/ecological status/potential according to the WFD and good environmental status according to the MSFD) and/or
    - if available: further objectives for the specific river basin to be achieved with the SMP

Description of the AS-IS status (body of water under consideration)

- Define sections and boundaries of the body of water (for instance entire river basin, water bodies according to the WFD, marine reporting units according to the MSFD) – as required: regulated, free-flowing, tidal areas, floodplains and oxbow lakes, relevant tributaries and port facilities
- Relevant tributaries, if necessary, to be differentiated according to (significant) quantitative impacts on the main stream (sediment volume) and/or significant pollutant loads (at least one pollutant relevant for the river basin; for this purpose, the relevant pollutants must be defined in advance (see below))
- Description of the river history, influence on qualitative and quantitative sediment status as well as hydromorphological and ecological status of the water body
- Data basis for sediment quality and quantity/hydromorphology[1], along with other water components, such as hydrology, water quality (oxygen/nutrients/phytoplankton), flora, fauna – measuring points, methodology of use/assessment

[1] The data basis for hydromorphology can be established, for instance, using basic data (grain size compositions for riverbed, bank and floodplain substrate; sounding data for water body structures, changes in riverbed elevation, depth variation; digital terrain models, for example, for the survey of floodplain structures, width variation, shallow water zones, bank structure; measuring points for suspended matter concentrations; headwater discharge, etc.) as well as the measuring points in the context of the WFD, but also using data from water body structure quality mapping, water level data from the Federal Waterway and Shipping Administration (WSV) and federal states, for instance, for analyses of discharge dynamics, Valmorph mapping results from the German Federal Institute of Hydrology (BfG), water balance procedures/LAWA, etc. for evaluating or monitoring hydromorphology and its significance for the water body system.

- Identify/describe the status of the water body (with reference to water bodies (WFD) and/or marine reporting units (MSFD)); aspects to be considered: sediments and hydromorphology/hydrology/water quality (oxygen/nutrients)/flora (phytoplankton and macrophytes)/fauna (benthic invertebrates, fish and marine mammals)
    - Sediment quality (and, if applicable, impact on water quality)
        - Relevant pollutants
        - Relevant input pathways (agriculture, sewage treatment plants, industry, etc.) and existing sources of pollution in the water body and in the catchment area
        - Identify pollution hotspots (identification of pollutant inventory)
    - Sediment quantity
        - Sediment inventory: bedload and suspension loads, grain size distributions of the bed and the transported material
        - Relevant input pathways (tributaries, direct yield from floodplains, anthropogenic sources, etc.)
        - Relevant output pathways/sinks (floodplain sedimentation, side channels, anthropogenic removal etc.)
        - Riverbed levels
    - Hydromorphology[2]
    - Hydrology
    - Water quality
    - Flora
    - Fauna
- Land use of the catchment area, topographical relief in the catchment area

[2] Hydromorphological aspects must be considered both for the river basin under consideration and its sections as well as for the relevant lower reaches of tributaries. The hydromorphological situation should be recorded and evaluated in as much detail as possible and can then be aggregated for other observation levels [for example, mean riverbed level changes should be recorded, analysed and assessed using sounding data in sections measuring at least 100m, with aggregations based on the detailed data then possible for larger sections, such as sections measuring 1km and 5km in order to develop regional scales (for instance, Lower Rhine with a length of 225km) and supraregional scales (for instance, Inner Elbe with a length of almost 600km or entire catchment area)]. Hydromorphological indicators relevant for sediment management should be considered and classified (for instance, bed height, bed substrate, suspended matter concentration, water body structures, etc.). Five assessment levels from class 1 (‘very good’) to class 5 (‘poor’) are typically applied.

- Specific uses (navigation, agriculture, hydropower, drinking water production, tourism, etc.) as well as flood protection and nature conservation (protected areas as well as protected species and biotopes, if applicable) and any resultant restrictions/requirements
- Change processes in the context of climate change

Deficit analysis and risks

Weigh up the risks, also taking climate change into account, if possible

A: In relation to the WFD, MSFD (implications, for example, for descriptors D6 ('seabed') and D7 ('changes in hydrographic conditions (swell, current, salinity and turbidity profile')) and other objectives listed under 'Objectives' (if necessary, using the assessment of the WFD quality elements from the management plan)

- Sediment quality
    - Methodology, data basis
    - Pollutant sources and sinks, load/load potential and remobilisation potential
        - Diffuse and point sources (for instance, sediment and old sediments, legacy pollution at the water body, other sources)
        - Sinks (for instance, floodplains, zones with water from mines, groyne fields, weirs and locks)
- Sediment quantity
    - Methodology, data basis (sediment budgets (separate for fine sediments (< 63µm) and gravel/sand, gravel/sand ideally considered as several fractions), sediment availability/deficits, riverbed level changes)
- Hydromorphology (abiotic habitat conditions, such as bank structures, shallow water zones, sediment continuity, depth variation, width variation, discharge dynamics, riverbed substrate, riverbed level changes)
- Hydrology
- Water quality
    - Methodology, data basis
- Flora

- Methodology, data basis
- Aquatic and semiterrestrial organisms (vegetation)

- Fauna
  - Methodology, data basis
  - Aquatic and semiterrestrial organisms (for instance, benthic invertebrates, fish, carabids, birds, etc.)

B: In relation to uses, flood and environmental protection/nature conservation

- Navigation
- Agriculture
- Use of hydropower
- Drinking water production
- Tourism
- Fisheries
- Flood control
- Environmental protection and nature conservation

Measures and measures planning

- Options for measures (which are also effective in the case of a changing climate) – general options and, if possible, also site-specific ones
  - Proposed measures from a qualitative point of view
    - Reduction of the transfer of pollutants into water bodies from relevant recent emissions (point sources)
    - Management options for polluted sediments in order to minimise the remobilisation of pollutants (for instance, reduction of loads from legacy pollution, removal of old sediment deposits, fine sediment management in water body side structures and in barrages)
    - Technical feasibility (for instance, framework conditions for relocation of sediments within the water body)
  - Options for measures from a quantitative and hydromorphological perspective

        - Measures to minimise erosion and to influence sediment transport processes
        - Measures to control sediment transport processes
        - Measures to provide sediment for water body development (for instance, gravel deposits, allowing lateral erosion)
        - Measures for water body development, for instance, to secure and maintain water depths, discharge conditions, to create and secure shallow water and retention areas and to improve the structural quality of water bodies (measures to improve habitats, connection of floodplains)
    - Options for measures from a biological point of view (preservation and promotion of biodiversity, creation of a biotope network, improvement of water quality, etc.)
    - Multiple benefits, target conflicts
- Prioritisation of measures

  Based on technical/scientific aspects and financial feasibility
    - Impact analysis of the options for measures in relation to the components of the WFD and MSFD relevant to the assessment
    - Proportionality assessment of the options for measures, for instance, on the basis of a cost and effect analysis
- If necessary, implementation planning, recommendations for implementation (responsibilities, financing)

Monitoring for general water monitoring and success control

- General: Define objectives in such a way that success can be measured and represented by indicators (ideally, these indicators should already be used in the description of the as-is situation and the deficit/risk analysis)
- Specific requirements for monitoring and integration of monitoring requirements according to the WFD, the EU Directive on the assessment and management of flood risks and the MSFD
- Success monitoring with regard to:
    - Sediment quality
    - Sediment quantity
    - Hydromorphology

- If applicable, hydrology, water quality, flora, fauna, flood protection and nature conservation
- Requirements of the uses