

# Monitoring WFD hydromorphology and sediments

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## Introduction

Hydromorphology is at the basis for the ecological state of a water body and the subsequent water quality. Alterations in the hydromorphological conditions of a water body could affect the ecological functioning of the system. The European Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) both aim at improving water quality and the monitoring of hydromorphological characteristics of a water body has gained special interest. Sediments play an important role in hydromorphology, especially in rivers and coastal areas.

In the Netherlands, the WFD hydromorphological parameters have been elaborated in a handbook for hydromorphological monitoring [van Dam et al. 2007]. The handbook describes several parameters in relation to morphology, sedimentation and substrate or sediment quality and quantity. The analysis and interpretation of these hydromorphological parameters in relation to sediments can be improved if the monitoring of basic data collected for other projects like dredging is improved or extended. This can eventually save time and money.

## Sediment parameters and ecology

The sediment quantity parameters hypsometry and dry period duration are closely related to sedimentation and erosion. Hypsometry (water depth variation, based on bathymetry) is an important factor for ecological habitat diversity. The bathymetry is also the basis for dry period duration, which represents period of dry fall as percentage of total time and is an important factor for the habitats of certain vegetation and soil organisms. Adequate monitoring of water depth variation is essential for these parameters.

The sediment quality parameters soil type and substrate are related to the composition of the sediment and are important for macro fauna, aquatic vegetation and fish. Monitoring data of

substrate can be collected prior to dredging activities.

## Discussion

Sediment quality and quantity and sedimentation related morphology are important parameters for the ecological potential of a water body. These parameters can assist in coast and river management. Collecting of high quality hydromorphological data is essential. Suggestions for applying hydromorphological monitoring are:

- The ecological alternative for artificial structures such as dikes and dams, build for flood protection at coastlines, could be sand suppletion. Although suppletion is a 'soft' measure, it still has major impact on the ecosystem. The assessment of these measures in relation to the WFD and the MSFD have to be investigated in closer detail.
- Dredging is being carried out to maintain waterways. Hydromorphology can help to show measure – effect relations. For example, what is the effect of dredging on hypsometry and dry period duration?
- Hydromorphological parameters are not always well implemented in monitoring programs. There are ample opportunities for extending and improving hydromorphological monitoring when combined with maintenance works carried out at coast lines and in waterways.

Hydromorphology relates sediment quantity and quality to ecology in a relatively simple and straight forward way. We suggest to further implement the hydromorphological monitoring to ecological analysis and water works. Also, a further analysis of the impact of hydromorphological alterations is needed.

## References

**Van Dam, O. A.J. Osté, B. de Groot en M.A.M. van Dorst, 2007.** Handboek hydromorfologie. Monitoring en afleiding hydromorfologische parameters Kaderrichtlijn Water. RWS Waterdienst rapportnummer: WD 2007.006.