

Developing a Sediment Management Framework for WFD River Basin Planning in the UK

Sue White¹, Susan Casper², Sabine E Apitz³

¹ Cranfield University, Natural Resources Department, School of Applied Sciences, Building 53, Cranfield, MK43 0AL, UK.

Phone: +44-(0)- 1234 752984

E-mail: sue.white@cranfield.ac.uk

² Environment Agency Science Group, Olton Court, 10 Warwick Road, Olton, West Midlands B92 7HX, UK

³ SEA Environmental Decisions, Ltd., 1 Cottages, The Ford, Little Hadham, Hertfordshire, SG11 2AT, UK.

Introduction: Although there is a need to develop a sediment management framework that can be used in any catchment, it is important to remember that each catchment is different and the complex role that sediment plays means that different objectives, pressures, impacts and mitigation measures will need to be considered in different catchments and even in different sites within a given catchment. Due to the potential complexity and budget constraints, no reasonable monitoring programme can sufficiently address all aspects of potential interest in all catchments; sediment frameworks must be designed to identify, on a regional basis, the most important issues requiring assessment, their uncertainties, and the kind of decisions they will inform. *Thus, the challenge is to develop tools and frameworks that are generic enough to be relevant throughout the UK, but that can be tailored to specific catchments in a consistent, transparent and cost-effective manner.*

Methods: Clearly, when management decisions are being made at a large scale, addressing the effects of multiple stressors on multiple receptors in various habitats, it becomes increasingly difficult to determine what issues might be dominant throughout a region. Given the realities of limited resources for targeting and implementing mitigation options, it is clear that any expectation of complete risk characterisation and/ or removal will not be met. Rather, risk mitigation at the regional scale seeks to provide maximum net risk reduction within the region with the resources available. Successfully achieving such goals will require meaningful conceptual models, but will also require a clear understanding and definition of net risk within a catchment or region. Whilst there are well-established methods for assessing ecological or human health risk at a specific site or region, if only one type of pressure is considered at a time, it remains difficult to inform decisions effectively which have to address cumulative or net risk to various receptors at various scales, the primary objective of this project. After a broad assessment of tools for various projects and programmes, we are of the view that the most promising approach to addressing such complexity is the relative risk model

(RRM; [1]), which develops regional-scale risk assessments at a landscape scale.

Adapting DPSIR-based sediment models developed for a number of catchments and a sediment-specific adaptation of the RRM, this project is developing a generic framework to support decision-making in deriving a catchment sediment management plan to support the evaluation and selection of (multiple) measures for reducing risk to catchment management objectives in support of the WFD. The framework is being designed to allow for the combination and ranking of disparate sediment risk sources and drivers at many sites within a region in a transparent way. In this manner, it should be possible to rank and prioritize mitigation and management actions such that they most effectively reduce net risk (to selected assessment endpoints) in a region. A proper selection of mitigation approaches will be driven by a regional prioritization of sites, a rigorous evaluation of efficacy and associated uncertainty, a matching of available technologies to site characteristics and transfer pathways and an evaluation of various socioeconomic and regulatory issues.

There are many types of data, tools and approaches that can be used to quantify sources, habitats, exposure and effects, within the Regional Sediment Risk Ranking Model (RSRRM). Tool availability, appropriateness (link between measure and what it indicates), uncertainty, scaling issues including whether the scales at which data are available match the scales of other measures and how spatio-temporally variable measures are, are assessed collaboratively by regulators, stakeholders and scientists.

Discussion: Sediment risk ranking and management framework and tool development and evaluation, and candidate test catchments, will be presented.

References: [1] Landis W. 2005. *Regional Scale Ecological Risk Assessment Using the Relative Risk Model*. Boca Raton: CRC Press.