

Sustainable Approaches to the Assessment, Risk and Remediation of Urban Watershed Waterways Utilizing SSWiM Strategies

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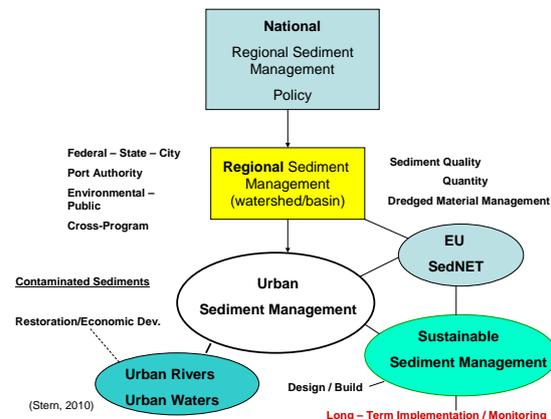
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Urban waterways with legacy contamination pose unique challenges. Remediation and restoration of these urban environments are usually subject to multiple regulatory authorities with conflicting mandates. Urban waterways suffer from severe habitat loss, multiple sources of contaminants, continuing sources, human pressures, climate change adaptation, responsible parties and many stakeholders creating a laborious, contentious and expensive process. Legacy contamination is usually multi-contaminant (inorganics/organics) and media (soils, sediments, solid waste) with human and ecological stressors. The assessment, remedy, design and construction of a remedial solution in a complex urban environment may take well into a decade. Furthermore, a sustainable perspective is needed that takes into account environmental, social, economic, and political factors which are particularly critical if we are to maximize benefits to the environment and society.

It is important that we move from our narrow focus of just *cleaning up* contamination, to a more *holistic* and sustainable approach that integrates the relative risk of remedial scenarios, with ecosystem health and social benefits of the revitalized site and economic impacts. In doing this we must balance these various needs and quicken the pace of the remedy and restoration with this more comprehensive approach in mind. One that encompasses a Sustainable Sediment Watershed (integrated) Management (SSWiM) approach to urban environments must be realized since re-vitalization and re-development of these impacted areas are critical for economic development which can have significant social benefits for the community. Remediation and restoration are also economic drivers and is often overlooked in the typical remedial process where human and ecological risk assessments drive the response with no consideration of any economic and social factors. An SSWiM approach balances the long-term community and industrial use of an urban environment with the design of the remedy and reductions in contaminate related risk.

In general, national sediment strategies have broad policy elements pertaining to watershed approaches. Regional Sediment Management (RSM) management programs have been in development globally over the last several years. RSM has components addressing sustainable sediment management within riverine, coastal and urban aquatic environments focusing on both (non) and contaminated sediments. The nature of urban watersheds and ports impacted by contaminated sediments has evolved RSM further from a national environmental management focus to regional estuarine and coastal targeted watershed initiatives within an urban sediment management environment (Fig.1).



Environmental management in these multi-complex urban settings requires a coordinated cross-programmatic – interdisciplinary SSWiM approach. This entails reducing the time for long protracted clean-ups by utilizing sustainable placement practices, sediment treatment (ex/in-situ) if applicable as opposed to landfill placement, and beneficial use opportunities coupled with ecological restoration. Cost sharing of these projects between the private and public sectors as well as designing long-term monitoring of these complicated systems to understand results achieved should be considered.

Examples of applying SSWiM in the Great Lakes, USA, the Port of New York and New Jersey and in the Port of Venice, Italy will be presented.