In situ management of contaminated sediment, habitat restoration, and community interests – can they co-exist?

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Introduction: Environmental cleanup projects in the aquatic environment are developed with a primary goal to reduce risks to human health and the environment. However, many cleanup projects also include a secondary goal to restore the impacted areas as functional and sustainable habitats. From an in situ sediment management standpoint, these habitat considerations pose a challenge to design of isolation caps, which must remain stable without substantial long-term maintenance. Isolation caps located in areas subject to regular hydrodynamic forces (e.g., wind waves and propeller wash) generally require placement of a robust armor layer to remain stable in the long term. This is at odds with habitat restoration goals which often include finer substrates. The desire or need to incorporate supplemental community goals, such as public access and recreational uses, can further complicate the design process with requirements of finer substrate.

Methods: Traditional design approaches used in developing solutions for aquatic environment cleanup, habitat restoration, and community access projects, respectively, are often not in harmony. In situ management of contaminated sediments typically involves the construction of an engineered cap designed to isolate contaminants from the environment. Under conservative design approaches, a thick layer of large rock armor is placed over the cap – similar to the original shorelines shown on Figures 1a and 1b. Habitat restoration and public access designs typically incorporate gentler slopes, finer grained materials, and aquatic or riparian vegetation. One potential solution to bridge the gap between stability requirements and habitat considerations is the use of dynamically stable or overbuilt slopes. Although these alternative slopes have the potential to erode, the risk can be reasonably managed by implementing a long-term maintenance and monitoring plan.

Results/Discussion: This presentation will discuss several case studies that were successful in combining aquatic environment cleanup, habitat restoration, and community goals. Lessons learned from unsuccessful projects will also be discussed.

Fig. 1a: Example restoration approach adjacent to bulkhead shorelines. In the conceptual section, the original shoreline is shown in white, and enhancements are drawn in green. The photograph is included as pre-restoration context.

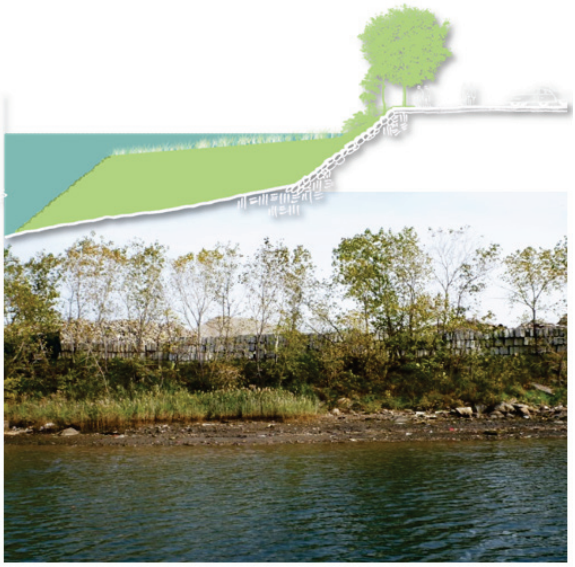

Fig. 1b: Example restoration approach adjacent to armored shorelines. In the conceptual section, the original shoreline is shown in white, and enhancements are drawn in green. The photograph is included as pre-restoration context.