

# Restoring the Elizabeth River from the Bottom Up: A Unique Approach to Sediment Remediation by Restoring along a Habitat Gradient

**Josef Rieger** (jrieger@elizabethriver.org) and David Koubsky (The Elizabeth River Project)  
Michael Unger (Virginia Institute of Marine Science)

**Background/Objectives.** Most of the industrialized waterway of the world exhibit elevated concentrations of contaminants in the sediments. The Elizabeth River in southeastern Virginia is no different, and areas in the river system contain high levels of polycyclic aromatic hydrocarbons (PAHs), from former creosoting facilities. One of these areas that has been the focus of restoration efforts is the contaminated area around Money Point, on the Southern Branch of the Elizabeth River. This site, previously the location of a large creosoting wood treatment facility in operation from the late 1800s to late 1980s, exhibits extensive subaqueous and upland contamination. A fire and several spills in the 1960s resulted in some of the highest known concentrations of PAH in the Chesapeake Bay. Since the contaminated sediments at Money Point were adversely impacting the benthic community, and no remedial efforts were foreseen in the future, there was a critical need to address these contaminated sediments. Therefore in 2009, the nonprofit Elizabeth River Project undertook intense remediation of the site which included restoration of four key habitat types along a habitat gradient.

**Approach/Activities.** The remedial efforts at Money Point included dredging over 16,000 cubic yards of highly contaminated sediments (>10,000 ppm TPAH), and installation of a “living cap” which included restoration and creation of an upland buffer, tidal wetland, and oyster reef. Biological and chemical monitoring have shown a significant reduction in cancerous lesions in Atlantic killifish (*Fundulus heteroclitus*), an increase in fish diversity, oyster recruitment on the newly created habitat, and significantly reduce in TPAH over 9 years. In addition, PAH porewater concentration has been monitored for over three years over the capped area. Overall, this remedial approach provided significant reductions in cost, a net increase in critical habitat in a highly urbanized river, increased site resiliency to significant storm events such as nor'easter and hurricanes, and diverse partner involvement.

The project involved all major industries in the corridor who are also remediating and restoring upland habitat to complement the offshore remediation effort and prevent recontamination after the sediment remediation is complete. The collaborative approach and innovative remedial approach taken at Money Point has been an effective and efficient method for forwarding a sediment remediation project in a realistic timeframe and in a cost effective manner. This project is a model for moving a collaborative sediment remediation project forward and could serve as a model for other national and international projects.

**Results/Lessons Learned.** Taking a collaborative approach and working to restore multiple habitat types across an environmental gradient at sediment remediation sites can result in maximum results for a triple bottom line project. The triple bottom line consists of social equity, economic, and environmental factors. Money Point is in an underserved community, and during this process both residence and industry worked together to develop a plan that improved the community quality of life. The project approach resulted in a significance cost reduction by accelerating project implementation and incorporating habitat elements reduced dredging and disposal costs. More importantly we have seen a significant improvement in the environmental response with a decrease in fish cancer and an increase in fish diversity.