

## EAST CHICAGO SEDIMENT REMEDIATION DEMONSTRATION PROJECT

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**Abstract:** The U.S. Army Corps of Engineers (USACE), Chicago District, in partnership with the East Chicago Sanitary District (ECSA) has proposed to conduct a project that will demonstrate an approach for remediation of contaminated bottom sediments in the non-Federal portions of the Indiana Harbor Canal (IHC) and the Grand Calumet River (GCR) located in northwest Indiana. The IHC/GCR is listed as one of 43 Areas of Concern in the Great Lakes and holds impairments on all 14 beneficial use categories, an indication of the significant environmental contamination present. The main cause of impairment to the IHC/GCR is contaminated bottom sediments. Habitat restoration of the area cannot occur without management of the contaminated sediment.

The proposed demonstration project site encompasses a 600 by 40-foot channel that carries discharge from the ECSA water reclamation facility into the GCR. This site is representative of the conditions within the GCR, including contaminated sediment and similar overbank conditions. The proposed demonstration project includes the dredging of contaminated sediments, installing a sediment recontamination barrier, creating a new meandering channel, and resloping and replanting the banks of the channel. After completion of construction activities, the project will undergo a three-year monitoring program. Finally, a report on the demonstration project, monitoring results, and lessons learned will be prepared and presented to Congress.

Work completed to date includes coordination, environmental sampling, baseline biological monitoring, and preliminary design and formulation of construction methods. An environmental sampling activity was conducted. Samples were taken from five locations; in general, the results gave elevated levels of polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs), and determined the material is toxic to benthic organisms. Baseline biological monitoring activities including inventories of fish, benthic, and flora species were conducted at the site to determine the species present at the site prior to the implementation of the proposed demonstration project, and to help develop the post-construction monitoring plan.

Design features include a barrier to prevent sediment recontamination that will be of great importance in the developing a much larger study (referred to as the GCR Feasibility Study) to investigate and recommend alternatives for management of contaminated sediment in the non-Federal portions of the IHC and the GCR, and subsequently identify areas for potential habitat restoration. The GCR Feasibility Study is aimed at managing the contaminated sediment, which will most likely include partial dredging of the entire river system and isolating remnant contaminated sediments in a channel after dredging. The sediment barrier will be located just upstream of the confluence of the channel and the GCR and will separate the remediated channel from contaminated sediment migrating from the GCR. Due to the size of the GCR and extent of contamination present, the remediation activities proposed in the GCR Feasibility Study will most likely be approached in a series of reaches with sediment barriers preventing

recontamination by separating the reaches that are contaminated from the reaches that have been remediated. The proposed sediment barrier design consists of a series of vertical precast concrete panels, installed across the width of the channel. The vertical panels are supported on both sides by horizontal panels placed along the channel bottom.

Dredging is a critical feature to the success of the demonstration project; contaminated sediments present in the channel are the most severe impediment to developing a healthy aquatic ecosystem at the project site. The dredging activities will demonstrate how the removal of contaminated sediment alleviates environmental impairments. The remaining features of the project include the installation of the natural streambed, resloping and replanting of the channel banks, and post-construction monitoring. These features will demonstrate environmental restoration and habitat improvement, and will provide valuable knowledge and tools that can be applied throughout the development and implementation of the GCR Feasibility Study. The installation of the natural streambed will feature a series of pools and riffles and will demonstrate the feasibility of in-stream capping and the creation of aquatic habitat. The proposed meandered channel will function similar to a natural riverine system, but at a much smaller scale. The natural streambed features will be constructed of sand and stone similar to those originally found in the region, and will isolate the remnant contamination from the biological communities in the channel. The channel banks will be resloped and replanted with native species to demonstrate bank stabilization, recontamination avoidance, and improvement of terrestrial habitat. The three-year post construction-monitoring program will evaluate the effectiveness of project features to restore water quality and aquatic habitat and to resist recontamination.

The proposed demonstration project strives to achieve environmental sustainability, and seeks ways and means to assess and mitigate cumulative impacts to the environment. The project will provide a direct environmental enhancement; the sediment remediation will effectively remove a considerable source of sediment contamination, and the installation of the natural streambed and resloping and replanting of the banks will add a significant source of habitat enhancement and diversity. The proposed demonstration project will build and share an integrated scientific, economic, and social knowledge base. The project will demonstrate technologies that can be applied to the GCR Feasibility Study and to other Great Lakes Areas of Concern, and the project holds interdisciplinary partnerships with various agencies and organizations. By holding the partnerships, the project respects and esteems the views of individuals and groups interested in Corps activities.

The proposed demonstration project holds interdisciplinary partnerships with various agencies and organizations, including the U.S. Environmental Protection Agency, Indiana Department of Natural Resources, Indiana Department of Environmental Management, The City of East Chicago, Indiana, The Nature Conservancy, Aquatic Research Interactive, Chicago State University, John G. Shedd Aquarium, U.S. Army Engineer Research and Development Center, and Tetra Tech Environmental Management, Inc.