

Special Dredging Methods Applied to Contaminated Sediments

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CH2M HILL conducted a pilot study to test the application of suction dredging and mechanical dredging technologies for removing contaminated sediments. The team was unable to find any record comparing these technologies for the removal of contaminated sediments in confined areas with heavy wetlands vegetation.

The site involved pesticide (DDT) contamination in sediments within a tidal bayou and branch tributary. Of substantial concern were the tributary water depths which ranged from less than one foot to three feet, and stream widths which ranged from 20 feet at the upstream end to 100 feet at the mouth. Contaminants of concern were typically found in the top foot of sediment, but did occur occasionally at depths up to 4 feet below the sediment/water interface.

A combination of site conditions and environmental concerns combined to limit the applicability of conventional dredging technologies, such as large mechanical or hydraulic dredges. Contaminated sediments occurred on the bottom of a small stream with vegetated banks, and in the root mass of needle rush grasses growing within the stream. Environmental concerns over damage to wetland vegetation and resuspension of sediment precluded most conventional dredging methods. Two potential technologies were selected for pilot testing based on their potential to meet dredging goals without significant damage to the ecosystem.

The suction dredge was a small, portable hydraulic dredge specifically designed to remove sediment in confined areas. Developed by Streamside Systems Inc., the unit consisted of a metal hood with a water jet and suction hoses connected to pumps mounted on small pontoon floats. The hood was designed to optimize the action of the jet and suction forces to loosen and capture sediment. Several pontoons were connected in tandem to convey the dredged solids over 500 feet to a containment area. The dredge slurry was delivered to a Geotube[®] where solids were retained and excess water was allowed to drain into a containment basin.

The mechanical dredge consisted of conventional back hoe and tilting dump machines, but each was mounted on a "Marsh Buggy". Each Marsh Buggy was a wide tracked vehicle with flotation tanks, giving it accessibility over water and very soft ground. The hoe was able to excavate sediment that could not be reached from the bank, and place it in the dump buggy for transport to high ground. The transported solids were dumped on a sand bed for gravity drainage.

The presentation provides comparative dredge rates and costs, processes for treatment and disposal of dredged materials, and site management practices for containment and support of the operations.