

## EXECUTIVE SUMMARY

---

Confined aquatic disposal (CAD) cells have been used in multiple locations within New England as the preferred alternative for the disposal of dredged material deemed unsuitable (UDM) for unconfined open water disposal. The technique involves placing UDM within existing depressions or cells cut into the seafloor for containment and optionally placing a layer of suitable cap material to further sequester the UDM. A monitoring survey was conducted at CAD cells located in four New England harbors in October 2009 as part of the U.S. Army Corps of Engineers New England District Disposal Area Monitoring System (DAMOS) Program. The 2009 CAD cell investigation was conducted as a baseline for longer term study of the performance of CAD cells, including physical stability and biological recovery, under the range of environmental conditions present in four New England harbors, including Norwalk and New London, Connecticut; Providence, Rhode Island; and Hyannis, Massachusetts.

The specific objectives of the investigation were to conduct bathymetric surveys of the CAD cells in each of the four harbors to document depths in and around the CAD cells, characterize cell morphology, and assess changes in morphology relative to available previous surveys; to assess the benthic recolonization status of the CAD cells, relative to representative reference areas within each harbor, using sediment-profile imaging (SPI) and plan-view video; and to complete a towed underwater video survey of select CAD cells to further assess the general physical condition of the cells and further document the presence and abundance of marine organisms within the CAD cells compared to representative reference areas within each harbor.

The 2009 bathymetric surveys revealed the CAD cells as identifiable features on the harbor bottom in all four harbors. A comparison of the 2009 bathymetric data with available previous bathymetric data for each cell showed distinct changes that were dependent on specific harbor conditions as well as the construction, disposal, and capping strategies for each cell or set of cells. The two Norwalk River CAD cells remained as stable, prominent features on the harbor bottom nearly four years following construction and capping. No significant changes in depth were observed since the previous survey conducted in 2007, well after cap placement. The New London CAD cell also remained a prominent feature on the river bottom three years following construction and capping, with only limited consolidation since the previous survey conducted in 2007.

The Providence CAD cells remained uncapped at the time of the 2009 survey, and the surfaces of each of the six cells remained well-depressed below the surrounding seafloor. Since the previous bathymetry survey conducted in 2005, additional non-Federal project material had been placed into one cell, and there had been some consolidation of the largest, most recently filled cell, but relatively little change over the

## EXECUTIVE SUMMARY (continued)

---

remaining inactive cells. The Hyannis CAD cell was also still identifiable on the harbor bottom more than 10 years since construction, but was not as prominent a feature as the CAD cells in the other harbors. Comparison of the 2009 bathymetric data with the 1999 post cap bathymetric data indicated a decrease in depth, attributed to cell infilling along the steep-sloped southern boundary of the cell, and redistribution of sediments in the flatter interior areas of the cell, highlighting the physical processes at work on a CAD cell placed in a more dynamic coastal environment.

SPI and underwater video analyses found distinct assemblages of benthic infauna and epifauna over the range of environmental conditions, from stressed to healthy, present in the four harbor settings. Advanced Stage 3 succession was apparent across the Norwalk and New London cells and the adjacent reference areas; however, the Norwalk cells were higher in organic content and had a lower apparent redox potential depth than the New London cell. The benthic community across the Providence CAD cells had not yet recovered to the condition at the adjacent reference area; however, both methane gas and extensive *Beggiatoa* sp. bacterial mats were observed across the CAD cell and reference area, indicative of overall stressed conditions throughout the harbor. The biological condition of the Hyannis CAD cell was similar to the adjacent reference area, and the community present within both areas was more characteristic of a mobile community. While biological assemblages differed from harbor to harbor, they reflected the environmental conditions of each area and showed no evidence of detrimental impact from CAD cell construction.

The results of the 2009 survey, coupled with previous monitoring conducted within each of the four harbors, further supported the use of CAD cells as an effective tool for managing UDM in near-shore sites. While all the CAD cells surveyed in 2009 remained as identifiable features on the bottom, the diverse range of environmental settings coupled with distinct construction, disposal, and capping strategies had significantly influenced the current status of each of the CAD cells and the understanding of how to construct and manage CAD cells for the disposal of UDM in near-shore sites.