## EXECUTIVE SUMMARY

The Central Long Island Sound Disposal Site (CLIS) is one of the most active disposal sites in the New England region. Sediments deposited at CLIS have originated from major dredging projects in New Haven, Bridgeport, Stamford, and Norwalk Harbors, as well as numerous smaller harbors in the adjacent coastal areas. CLIS was monitored as part of the Disposal Area Monitoring System (DAMOS) from 11 through 23 September 1999 aboard the M/V *Beavertail* and on 8 and 9 September 2000 aboard the R/V *Ocean Explorer*. Prior to these survey efforts, the last DAMOS environmental monitoring survey was conducted at CLIS in September 1997. The purpose of this report is to provide a synthesis of the 1999 and 2000 survey results.

The 1999 field operations consisted of single-beam bathymetry, as well as sediment-profile imaging surveys, over multiple disposal mounds and reference areas. The bathymetry data were used to document changes in seafloor topography resulting from the placement of dredged sediments during the 1997–98 and 1998–99 disposal seasons. The sediment-profile images were used to map the distribution of dredged material on the seafloor and examine the benthic recolonization status over the recently formed CLIS 95/96 and CLIS 97/98 Mound Complexes. In addition, the images were utilized to assess benthic habitat conditions over the New Haven 1993 (NHAV 93) Mound center, as well as the historic Field Verification Project (FVP) and Mill-Quinnipiac River (MQR) Mounds relative to the three CLIS reference areas and the results of past monitoring surveys.

The 2000 data collection effort consisted of a precision multibeam bathymetric survey that provided full bottom coverage over an 8.6 km² area of seafloor. The 2000 multibeam survey at CLIS was used to develop a high-resolution master bathymetric data set for the entire disposal site that documents the effects of more than 25 years of dredged material deposition and provides a new baseline survey for future survey comparisons. Furthermore, these data were employed to map the distribution of dredged material deposited at the site during the 1999–2000 disposal season. The multibeam data confirmed the general findings from previous single-beam bathymetric surveys and highlighted numerous small-scale features throughout CLIS that were not detected previously in the single-beam data.

The 2000 multibeam data were compared against both the 1996 and 1999 single-beam bathymetric surveys to evaluate the consistency of the survey results and to detect changes in seafloor topography. These comparisons suggest that reasonable and consistent results can be obtained with both single-beam and multibeam bathymetric techniques. The depth difference comparisons showed the only significant seafloor changes in CLIS were the result of recent dredged material placement activity or disposal mound consolidation. In comparison to the 1996 bathymetric survey, changes in seafloor topography were noted over CLIS 95/96 and CLIS 97/98 Mound Complexes, as well as the CLIS 99 Mound.

In addition to the prominent positive depth differences associated with recently formed mounds, the results also showed some areas of negative depth differences that were evidence of the varying rates of disposal mound consolidation that occurred over multiple bottom features.

The 1999 REMOTS® survey conducted at CLIS showed generally improving benthic conditions throughout the survey area. The REMOTS® data over the active region of CLIS indicated substantial benthic recovery of the dredged material deposits with rapid recolonization over the most recently placed sediments. The benthic conditions showed continued improvement over the CLIS 95/96 Mound Complex relative to the September 1997 survey.

The NHAV 93 Mound, identified as having a decline in benthic community conditions in the 1997 monitoring survey, showed some improvement in the 1999 REMOTS® survey with somewhat deeper redox potential discontinuity (RPD) depths and higher organism-sediment index (OSI) values. This mound contains organic-rich sediments, which fosters increased sediment oxygen demand as the organic material within these sediments decomposes over time. Because of this high sediment oxygen demand, benthic recolonization tends to be impacted during summer low-dissolved oxygen events affecting the entire western and central Long Island Sound regions, when bottom water dissolved oxygen concentrations at CLIS decrease to levels between 5.0 and 3.0 $mg \cdot l^{-1}$. The presence of methane bubbles, a product of anaerobic decomposition of organics, in some of the REMOTS® images confirmed the elevated organic material content within the NHAV 93 capping sediments. It is anticipated that benthic conditions should improve over this mound with increased biological activity promoting further oxidation of the organic matter within the sediments.

NHAV 93 exhibited overall improved conditions in September 1999, with the exception of Station 200S that continued to demonstrate poor benthic habitat conditions, with lower than expected OSI values for a five-year old dredged material deposit. Spatial variability was identified in the replicate photographs collected at Stations 200S, 200E, and 200W, which suggests an alternative management approach (i.e., cap augmentation) may be required along the fringes of the mound.

The MQR Mound was formed during the 1981/82 and 1982/83 disposal seasons, with additional cap material placed during the 1993/94 disposal season. The September 1999 survey provided evidence of improved benthic conditions since the last monitoring event over this mound in July 1994. Additional monitoring may be required in the southern area of the MQR Mound, where low OSI values indicated slower benthic recovery at Stations 100S and 150S.

The 1999 REMOTS® survey indicated healthy benthic conditions existed over the FVP Mound, with OSI values comparable to the nearby reference areas. However, since the long-term study of this uncapped deposit of unacceptably contaminated dredged material (UDM) has now been conducted for over 18 years, it is recommended that this mound be considered for future capping to isolate the UDM from the surrounding marine environment.