EXECUTIVE SUMMARY

The Disposal Area Monitoring System (DAMOS), managed by the New England District (NAE) of the US Army Corps of Engineers, conducts detailed monitoring studies to detect and minimize any physical, chemical, and biological impacts associated with dredging and dredged material disposal activities in New England. This report presents the results of a DAMOS monitoring survey conducted by Science Applications International Corporation (SAIC) in July 2002 at the Mark Island Disposal Site (MIDS) near Jonesport, Maine. The objectives of this survey were to document the distribution of recently deposited dredged material on the seafloor and assess the physical sediment characteristics and benthic community status within the disposal site.

Dredging of the US Coast Guard dock facilities in Moosabec Reach was performed during the winter of 2001/2002. A total estimated volume of 4,300 m^3 of dredged material was deposited at MIDS, a small 500 m $\times$ 500 m area of seafloor situated in the mouth of Chandler Bay in eastern Maine. A monitoring survey was completed under the DAMOS program to evaluate the impacts of dredged material placement. As part of the July 2002 field effort, a precision bathymetric and side-scan sonar survey was performed to assess the distribution of the recently deposited sediment. In addition, a REMOTS® (Remote Ecological Monitoring of the Seafloor) sediment-profile imaging survey was conducted to further delineate the spatial distribution of dredged material on the seafloor and assess the benthic recolonization status over the disposal site relative to two nearby reference areas.

The baseline assessment performed at the MIDS in March 2000 under the DAMOS program was used to determine the potential impacts of placing small volumes of sediment within this area of seafloor. The comparison of the March 2000 and July 2002 bathymetric data indicated no acoustically detectable mound (i.e., $>$20 cm) due to the small volume of material disposed. However, the side-scan sonar mosaic detected evidence of discrete disposal events within the MIDS. These disposal event features correspond well with both the disposal locations recorded on barge logs and REMOTS® survey data indicating the distribution of dredged material on the substrate.

The REMOTS® results agreed relatively well with the bathymetric and side-scan results over MIDS and indicated that the small dredged material deposit was contained within the confines of the disposal site. The REMOTS® images allowed measurement of relatively thin (i.e., less than 20 cm) dredged material layers that were not detected through the bathymetric depth differencing. Dredged material was evident in 5 of the 25 inner disposal site stations and was composed of primarily fine-grained sediment (silt). Dredged material thicknesses ranged from greater than the penetration depth of the sediment-profile camera to discrete dredged material layers observed in the profile images at these stations.

As anticipated, benthic recolonization over the surface of the relatively thin dredged material layer at MIDS was advanced due to minimal benthic disturbance and the ability of Stage III organisms (advanced, deeper dwelling infauna) to migrate up through the thin layers (< 10 cm) of fresh dredged material. Stage III activity occurred at the majority of the inner disposal site stations. The average depth of the apparent Redox-Potential Discontinuity (RPD) over the inner stations of the MIDS (2.8 cm) was considered indicative of moderate to well-oxygenated surface sediments at the time of the July 2002 survey. Overall mean RPD depths at the six inner stations corresponding to the six stations sampled in 2000 within MIDS were slightly shallower in 2002 than in the March 2000 survey (3.1 cm) and likely reflect a slightly higher sediment oxygen demand (SOD) associated with the recent placement of dredged material.

Advanced Stage III activity was more prevalent at the outer and reference area stations. The overall mean RPD depths at the outer and reference areas (3.4 cm and 2.9 cm, respectively) were slightly deeper than those observed at the inner disposal site stations, but were likewise indicative of moderate to well-oxygenated surface sediments.

Benthic habitat conditions within MIDS were comparable to the ambient sediment at both the outer and reference area stations, with relatively deep RPD depths and a considerable presence of Stage III organisms. Overall OSI values of +6.3 (inner disposal site stations), +7.7 (outer stations), and +7 (reference area stations) were calculated during the July 2002 survey, and were indicative of undisturbed benthic habitat conditions. Slightly higher median OSI values at the outer and reference area stations reflect moderately deeper RPD depths and a high frequency of advanced Stage III activity. Comparison of the six corresponding stations in March 2000 and July 2002 REMOTS® data indicated a slight increase in overall OSI values from +6 in 2000 to +6.5 in 2002. However, these values are comparable and suggest that undisturbed benthic habitat conditions have prevailed over much of the surveyed MIDS area despite the recent placement of dredged material. Comparisons between individual stations suggest dredged material placement may have actually stimulated productivity by providing an input of organic matter (a food source for primary consumers), as reflected in higher OSI values at certain stations displaying the addition of dredged material since the March 2000 survey.