

EXECUTIVE SUMMARY

Maintenance dredging involving the removal of 840,000 yd³ from the New Haven Harbor main navigational channel took place between October 1993 and January 1994. Concern about the transport and fate of the resuspended sediments resulting from the dredging operations was expressed by the State of Connecticut's Department of Environmental Protection (DEP). The problem centered on the shallow water areas flanking the navigation channel which had been identified as winter flounder spawning grounds. An agreement was reached wherein field surveys, using an acoustic echo sounder, would be conducted while the dredge was operating. Additionally, a bottom-mounted instrument array, recording suspended sediment concentrations and other hydrographic parameters, would be deployed near the site of the flounder spawning grounds. This monitoring of the dredged sediment plume would provide a case history for future reference.

The two major objectives of the study were to 1) establish what the background suspended sediment concentration is before and after dredging, and 2) document the movement of the dredge plume relative to fishery resource areas such as winter flounder spawning grounds.

The results of the acoustic surveys revealed that the dredge-induced sediment plume did protrude into the shoal areas to the east and west of the main navigation channel. These excursions onto the shoals occurred only when the dredge was in the immediate vicinity. The DAISY, which was deployed on the eastern edge of the winter flounder spawning area, also showed elevated suspended material concentrations attributable to the dredge operating in the upper reaches of the harbor. The time series of DAISY data showed numerous aperiodic short duration spikes of approximately 100 mg·l⁻¹. The observed concentrations were an order of magnitude larger than the predredging background concentrations. However, in the last half of the deployment, while the dredge was located well south of the DAISY site, there were several long duration (1-3 days), very high concentration perturbations. During these events concentrations reached 700 mg·l⁻¹ which could not be related to dredging operations. Evidence from meteorological data and sewage effluent records indicate that these events are likely a result of winds and wind-generated waves, alone or in combination with, discharges from wastewater treatment plant outfalls.

Based on these findings, dredge-induced sediment resuspension is a minor perturbation relative to the much longer duration, larger amplitude events associated with wind, wind waves, and effluent discharges from outfalls. The effects of dredging related spikes in suspended sediment on the winter flounder spawning grounds, and the regional water quality in general appear limited in duration and of relatively low amplitude.