

EXECUTIVE SUMMARY

The biological impacts of open water dredged material disposal have been assessed by studying structural changes in benthic communities (e.g. Saila et al., 1972; Oliver et al., 1977; Rhoads et al., 1976) and by examining indicator organisms for chemical or physiological changes (e.g. Ancerlini et al., 1975; DeGoursey and Vernberg, 1975; Engler, 1979; Arimoto and Feng, 1982). We have developed a quantitative histological assay of mussel reproductive tissues to study the condition of experimental field populations deployed at the DAMOS (Disposal Area Monitoring System) disposal sites along the New England Coast from New Haven, CT. to Rockland, ME. The assay of reproductive condition was based on measurements of numbers and sizes of ova, and the data enabled us to study the variance within and between populations.

Laboratory studies by Bayne et al. (1978) showed that when mussels (*Mytilus edulis*) were subjected to temperature and food ration stresses, they produced smaller eggs (by weight) than unstressed controls. In the stressed animals, ripe gametes occupied a smaller proportion of mantle tissue than in the controls, and when the stressed animals were induced to spawn, they released fewer eggs than controls. Clearly, animals living on or near dredged material disposal sites may be affected by the physical and chemical changes induced by the disposal operations. Consequently, we conducted investigations to determine whether reproductive tissues of mussels deployed on or near several disposal sites differed from those of reference (control) animals.

Mussels and other bivalve molluscs have been used as sentinel organisms in monitoring programs such as the Mussel Watch (Goldberg et al., 1978), and, for another part of the DAMOS program, the trace metal and polychlorinated biphenyl (PCB) concentrations of certain populations have been monitored (Arimoto and Feng, 1982). The research presented here complements the chemical monitoring studies because reproductive cycles of indicator organisms can affect the body burdens of chemical contaminants (Phillips; 1977 and 1978).