
Reconstruction of pollution history in two Atlantic Canada estuaries impacted with two pollution kinds: industrial (Sydney Harbour) vs. domestic (Halifax Harbour) using benthonic foraminiferal proxies

S.A. DABBOUS, J. GRIFFITHS, AND D.B. SCOTT
*Department of Earth Sciences and Centre for Environmental
and Marine Geology, Dalhousie University, Halifax, Nova
Scotia B3H 3J5, Canada <saaddabbous@dal.ca>*

The extensive analyses of foraminiferal assemblages were conducted on seven sediment cores from two impacted environments, Halifax Harbour (domestic) and Sydney Harbour (industrial) in Maritime Canada, to reconstruct an extensive history of pre- and post-impact environmental conditions of both areas. Presently, and without any baseline (target environment) studies, both areas underwent a remediation program at a cost of \$400 million, after long, intensive, and untreated pollution.

The characteristics of the foraminiferal assemblage (e.g., diversity, abundance, deformities, and inner linings) provided very strong evidence on pollution type, rate, and duration in both harbours. In Halifax Harbour, the major species were agglutinated since the high organic content caused low pH in the sediments that precluded preservation of calcareous tests. However, in Sydney Harbour many calcareous species were found, among them *Ammonia beccarii*, which had not been observed sub-tidally in high West Atlantic latitudes previously. The high diversity, dominant calcareous record, and presence of other fossil groups (e.g., ostracods, pelecypods, etc) within the cores of Sydney Harbour reflect the type (i.e., industrial), rate (i.e., low), and duration (i.e., short) of pollution in this area when compared to Halifax Harbour. In addition, ratios and types of deformities in foraminiferal shells showed a remarkable relation to pollution type and rate in both harbours.

The present study provides a pollution record as well as a target environment for current remediation program and/or any future long term monitoring programs in both environments. Additionally, it is the first work to be done on benthonic foraminifera in Sydney Harbour. Furthermore, it documents the use of benthonic foraminifera as an accurate and cost effective tool for environmental studies.