
**Evaluating the effects of wastewater treatment
on marine sediment chemistry in Halifax
Harbour, Nova Scotia**

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Halifax Harbour has been the receiving water for residential and industrial sources since the founding of Halifax in 1749. Prior to 2008, approximately 181,000,000 L of untreated sewage and wastewater from hospitals, universities, shipyards, and city dumps was released into the harbour each day. Halifax Regional Municipality is presently constructing three advanced primary wastewater treatment facilities, which are scheduled to become fully operational by Fall 2010. In 2008 and 2009, marine sediment grab samples were collected throughout Halifax Harbour to establish existing near-surface concentrations (metals, polycyclic aromatic hydrocarbons, and coprostanol) against which the future success of wastewater treatment can be examined. Sediment cores, which provide a detailed record of sediment deposition and contaminant history, were analyzed to establish pre-industrial baseline concentrations. This research will help to predict the magnitude and possible consequences of chemical changes in sediments after the new wastewater treatment facilities begin operating. It highlights the importance of monitoring sediments for assessing the recovery of marine ecosystems. Wastewater treatment should result in a large decrease in the flux of organic carbon to the harbour, which will likely alter sediment redox conditions and affect the bioavailability of legacy contaminants. In 2009, the Canadian Council of Ministers of the Environment established new guidelines requiring all municipalities in Canada to treat wastewater at a level equivalent to secondary wastewater treatment within 30 years. This study will evaluate the effect of existing secondary wastewater treatment on levels of contaminants in Halifax Harbour and use this information to predict the effects of upgrading wastewater treatment facilities from advanced primary to secondary treatment levels in the future. Conclusions from this research will be incorporated into an ongoing multidisciplinary study evaluating the success of wastewater treatment by examining water circulation, sediment chemistry, water chemistry, and marine organisms in Halifax Harbour.