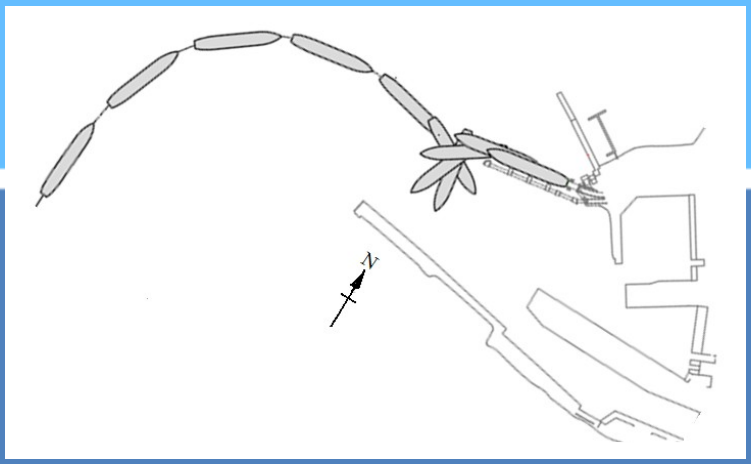
PROJECT Souris Harbour Sedimentation



CLIENT
Souris Harbour Authority Inc.
Souris, PEI

LOCATION
Souris, PEI

DATE
2011

PROJECT DESCRIPTION
Coldwater Consulting Ltd. was engaged by the Souris Harbour Authority Inc. (SHAI) to evaluate sedimentation in the harbour and to investigate potential contributing factors. The scope of the study was to review available data, maps, charts and reports, quantify sedimentation patterns and rates and develop a conceptual model for sedimentation.

DESIGN APPROACH
Coldwater's study began with a review of existing conditions, including the historical evolution of the harbour as evidenced by maps, charts and engineering reports, and an overview of the published literature concerning sedimentation processes in the harbour.

Bathymetric datasets from 1948, 1989, 2005 and 2008 were geo-referenced, corrected for datum and analysed to determine volumetric changes during each period. The results indicated that certain areas within the harbour have experienced increased sedimentation recently. The deposition patterns match quite closely the sediment plumes generated by berthing of the Magdalene Islands ferry, which docks in the harbour. During berthing the ferry pivots around the terminal dolphin to get to the berth. The combined use of propellers and bow thrusters during berthing manoeuvres mobilizes bed sediment in the harbour.

To investigate sediment mobilization Coldwater undertook a series of numerical simulations using our proprietary PropWash model. The PropWash model provides an estimate of the three-dimensional propeller-induced flow field as a function of water depth, ship geometry (propeller diameter, propeller spacing, etc.) and propulsion thrust for both propellers and bow thrusters. The simulations showed that during berthing the predicted flow fields at the sea bed exceeded the critical velocity of the sediments for a distance of some 300 m behind the propellers and about 200 m away from the bow thruster. The patterns were found to be consistent with the sedimentation patterns observed in the bathymetric analysis.

Coldwater Consulting Ltd
5510 Canotek Road, Suite 203, Ottawa, ON K1J 9J4
(613) 747-2544 info@coldwater-consulting.com