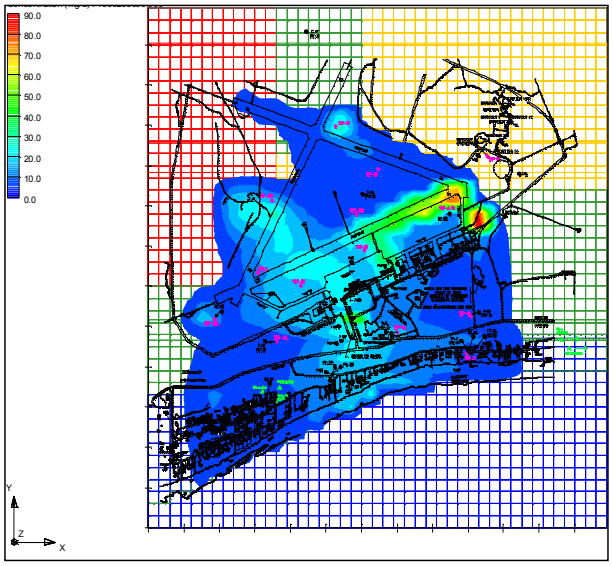
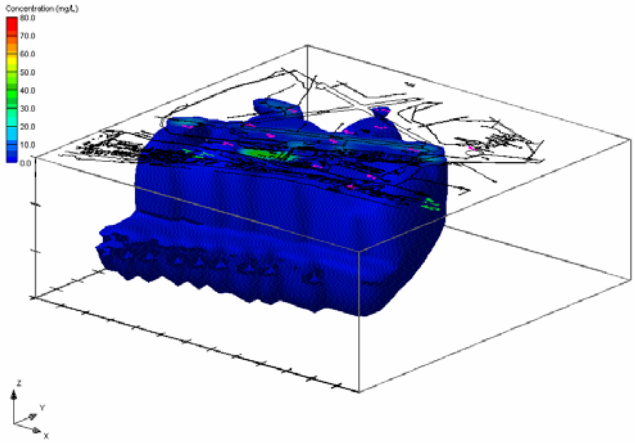
PROJECT DESCRIPTION

☐ Characterization ☐ Restoration ☒ **Hydrogeology** ☒ **Modeling** ☒ **Risk Analysis**
☒ **Research and development**

MATHEMATICAL MODELING OF CONTAMINANT TRANSPORT AT SEPT-ÎLES, QUEBEC

Parameters of Concern :	Nitrates and ammonium
Project Duration:	Since 1997
Performance :	Definition of management rules for water ressources
Cost:	$115 000
Client :	Transports Canada





Issue:

The environmental program at the Sept-Îles Airport resulted in the identification of several locations, which exhibited nitrate concentrations that were superior to Quebec's 10 mg/L drinking water standard. More than 140 houses downstream from the airport were affected by this problem. In order to determine the fate of the nitrates within the shallow aquifer, a hydrogeological study utilizing mathematical modeling was performed.

Work Performed:

In addition to borehole drilling, excavation of test pits and hydraulic tests, the hydrogeological evaluation also included: 1) a laboratory study, 2) statistical analysis, 3) a geochemical study of electron acceptors, 4) a geostatistical analysis, and 5) mathematical modeling utilizing numerical models (Agriflux, FRAC3DVS). An evaluation of potentially applicable management alternatives was also performed.

Results:

The geochemical characterization and statistical analysis results confirmed that dilution is the principal nitrate attenuation mechanism. The results of the mathematical modeling were used to develop water management rules in order to ensure that the affected population has access to a high-quality water supply.