

# **ESTIMATES OF AIR POLLUTION MITIGATION WITH GREEN ROOFS USING THE UFORE MODEL**

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Master of Applied Science  
Environmental Applied Science and Management  
Ryerson University

## **Abstract**

The purpose of this study was to investigate the effect of green roofs on air pollution in urban Toronto. The researchers looked for synergistic effects in air pollution mitigation by manipulating quantities and species of trees and shrubs at grade level and grass on roofs within the study area. The effect of these vegetation manipulations were simulated using the Urban Forest Effects (UFORE) computer model developed by the USDA Forest Service Northeastern Regional Station, Syracuse, New York. Originally UFORE was developed to help forestry managers and researchers quantify urban forest structure and risks based on standard field, meteorological and pollution data. While UFORE contains four different assessment modules A - D, Module D quantifies the effect of vegetation on air contaminants such as NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub> and ozone. UFORE also provides data about hourly air contaminant removal rates and it predicts an economic externality value in USD for total air contaminant removal. Six vegetation scenarios were developed within the Toronto study area to compare how different amounts of vegetation affect air contaminant levels. Results of the study indicate that grass on roofs (green roofs) could play a significant role in air pollution mitigation in an urban neighbourhood. By extension, a 10-20% increase in the surface area dedicated to green roofs on downtown Toronto buildings would improve air quality and quality of life for citizens in Toronto.