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Foreword to a Special Issue of the Water Quality Research Journal of Canada: The contamination of Groundwater in Canada from Pesticides

By:

A. Crowe & P. Milburn

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Foreword to a Special Issue of The Water Quality Research Journal of Canada:

THE CONTAMINATION OF GROUNDWATER IN CANADA FROM PESTICIDES

by

A.S. Crowe[1] and P. Milburn[2]

[1]The Groundwater Remediation Project,
National Water Research Institute,
Environment Canada,
Burlington, Ontario, L7R 4A6.

[2]Soils and Engineering Section
Fredericton Research Station,
Agriculture and Agri-food Canada,
Fredericton, New Brunswick, E3B 4Z7.

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MANAGEMENT PERSPECTIVE

The widespread application of massive quantities of pesticides in agricultural regions throughout Canada has resulted in numerous incidences of groundwater contamination, and associated potential health risk to human health. Numerous federal and provincial government agencies, university research groups, pesticide manufacturers and environmental consulting firms are involved in addressing various aspects of the problem, including conducting field and laboratory research on the fate of pesticides in the subsurface, undertaking sampling program to assess the extent of the problem, and investigating specific cases of pesticide contamination of groundwater. Unfortunately, given the large numbers of people in Canada involved and the multi-disciplinary nature of these studies, it is difficult to keep abreast of all the current information and programs. Therefore, the special session of the 29th Canadian Symposium on Water Pollution Research entitled *"The Contamination of Groundwater by Pesticides in Canada"* was held on February 9-10, 1994, at the Canada Centre for Inland Waters in Burlington, Ontario, to bring together all of those individuals and groups involved with issues related to groundwater contamination by pesticides in Canada.. The objective of this special session was to provide an opportunity to exchange information and evaluate methods and procedures related to pesticide contamination of Canada's groundwaters. This paper is the foreword and introduction to a collection of papers based on presentations from this special session.

THE CONTAMINATION OF GROUNDWATER IN CANADA FROM PESTICIDES

During the last 15 years, there has been growing concern about the potential for groundwater contamination from pesticides and its associated health risks. This potential link between groundwater quality and human health has prompted Canadian federal and provincial government agencies to assess the fate of pesticides in the subsurface and to enact regulations designed to protect Canada's groundwater from pesticide contamination.

Unfortunately pesticides have been widely detected in Canada's groundwater (usually at low concentrations) in spite of government regulations and the usage of pesticides within recommended application guidelines. Contamination of groundwater by pesticides is my no means a problem unique to Canada as pesticides have been detected in groundwaters throughout the world wherever they are widely used.

Pesticide contamination of groundwater represents a unique problem, not only because these chemicals are specifically manufactured to be highly toxic to specific organisms, but also because they are deliberately and widely introduced into our environment in massive quantities (approximately 35,000,000 kg used in Canada during 1991). Further, most pesticide usage occurs in agricultural areas where the vast majority of rural residents obtain their drinking water from wells (over 90% in Canada).

Given the potential aerial extent and seriousness of the groundwater-pesticide issue, many organizations including federal and provincial governments, universities, pesticide manufacturers, and environmental consulting firms are addressing various aspects of the problem:

- government agencies, universities, and pesticide manufacturers are conducting valuable laboratory and field research designed to assess the factors that influence the mobility and persistence of pesticides in soil and groundwater;
- government agencies and universities have initiated groundwater sampling programs in rural areas to determine the extent of groundwater contamination by pesticides;
- private groundwater and agricultural companies have investigated specific cases of pesticide contamination of groundwater.

Because of the multi-agency, multi-disciplinary nature of this work, it is difficult to remain abreast of the various study results, new initiatives, and innovative applications of technology. Thus, it was recognized that there was a need to bring together all of those individuals and groups involved with issues related to groundwater contamination by pesticides in Canada.

To address this need, the special session *"The Contamination of Groundwater by Pesticides in Canada"* was held as part of the 29th Canadian Symposium on Water Pollution Research, on February 9-10, 1994, at the Canada Centre for Inland Waters in Burlington, Ontario. The objective of this special session was to provide an opportunity to exchange information and evaluate methods and procedures related to pesticide contamination of Canada's groundwaters including (1) reporting the results of regional monitoring programs undertaken to assess the extent of groundwater and rural well contamination by pesticides, (2) describing case studies of pesticide contamination of groundwater, and (3) presenting the results of laboratory and field research studies designed to understand the factors controlling the fate of pesticides in the subsurface.

Of the 21 papers presented orally and as posters at the Symposium, the 10 papers published in this special issue of the Water Quality Research Journal of Canada represents a valuable overview of contamination of Canada's groundwater from pesticides. Two

papers, one by Briggens and Moerman, and the other by Lampman focus upon the extent of groundwater contamination in rural areas of Nova Scotia and Ontario, respectively. The papers by Lawrence and Hendry, Milburn et al., McNaughton and Crowe, and Reynolds et al. present field and laboratory studies designed to assess factors influencing the migration and fate of pesticides in the subsurface. Two other papers by Gaynor et al. and Fischer et al. investigate pesticides in surface water or runoff and its relationship to groundwater contamination. An interesting case study of a point source pesticide contamination of groundwater at pesticide manufacturing facility is presented by Carter et al. Finally, Caux has contributed a paper that addresses the new Canadian protocols for deriving pesticide water quality guidelines for irrigation and livestock watering.

We hope that this collection of papers will prove valuable to everyone interested in understanding the nature and extent of pesticides in groundwaters in Canada.

Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario
L7R 4A6 Canada

National Hydrology Research Centre
11 Innovation Boulevard
Saskatoon, Saskatchewan
S7N 3H5 Canada

St. Lawrence Centre
105 McGill Street
Montreal, Quebec
H2Y 2E7 Canada

Place Vincent Massey
351 St. Joseph Boulevard
Gatineau, Quebec
K1A 0H3 Canada

Centre canadien des eaux intérieures
Case postale 5050
867, chemin Lakeshore
Burlington (Ontario)
L7R 4A6 Canada

Centre national de recherche en hydrologie
11, boul. Innovation
Saskatoon (Saskatchewan)
S7N 3H5 Canada

Centre Saint-Laurent
105, rue McGill
Montréal (Québec)
H2Y 2E7 Canada

Place Vincent-Massey
351 boul. St-Joseph
Gatineau (Québec)
K1A 0H3 Canada