

Pesticides Use: Bylaw or Education Policy Research Review

November 2007¹

Authors:

Magda Montagnese, Research Analyst, Corporate Service

Catherine Bingle, Evaluation Specialist, Corporate Service

Simcoe Muskoka District Health Unit



¹For questions about this report contact:
Magda Montagnese at (705) 721-7520 ext. 7459

Table of Contents

1	Executive Summary.....	3
2	Purpose	4
3	Methods	4
4	Discussion	5
	4.1 History of Pesticide Use and Regulation	5
	4.2 Alternatives to Pesticides.....	7
	4.3 Effectiveness of Education vs. Bylaw	10
	4.4 Simcoe-Muskoka	14
	4.5 Elements Associated with a Pesticide Bylaw	17
5	Conclusions	19
	References	48

Table of Figures

Figure 1. Distribution of Principal Pesticide Regulation Responsibilities in Canada.....	6
--	---

List of Tables

Table 1. Short List of Alternatives for Fertilizers, Pesticides and Herbicides	9
Table 2. Summary Table – Nine Communities Studied in C2P2 Pesticide Reduction Review	13
Table 3. Summary Table – Municipalities’ Positions and Actions Regarding Non-Essential/ Cosmetic Pesticide Use	16
Table 4. Possible Costs Associated with Pesticide Bylaw	18

List of Appendixes

Appendix 1 : Literature Search Strategy	20
Appendix 2: Private Property Pesticide Bylaws in Canada	21
Appendix 3: Summary Table of different communities in Canada implementing education / outreach models and/or bylaws on pesticide use reduction	28
Appendix 4: Example of Toronto’s Protocol for response to Pesticide Complaints, Phase 1 and 2.	47

1 Executive Summary

There is evidence of human use of substances to control pests dating from the fifteenth century. Due to concerns about environmental and health effects of pesticides, several alternatives to pesticide use have been explored. Pesticide use reduction has been a public policy goal for more than a decade in many jurisdictions. Quebec was the first province in Canada where a municipality enacted a pesticide use reduction bylaw, and it is the first province to date to enact provincial legislation banning the non-essential use of pesticides in all municipalities.

Pesticide users seem to support pesticide restricting bylaws on private/residential property if they are provided with information on alternatives to chemical pesticides. This is suggested by results of several studies, including the preliminary findings of a study by researchers at the University of Western Ontario, and results from the Rapid Risk Factor Surveillance System (RRFSS). Residents' opinions on the desirability of restrictions appear to be based on the perception of negative effects of pesticides in the environment and on health.

A report prepared in 2004 by the Canadian Centre for Pollution Prevention (C2P2) and Cullbridge Marketing and Communications, summarizes interventions in residential outdoor pesticide use in Europe and North America. The report has been cited consistently by different authors around the world, due to its solid information and methodology. The authors selected nine communities based on pesticide use reduction, reliable data and replicable strategies. They concluded that only communities which had implemented a pesticide reduction bylaw experienced large reductions in pesticide use. However, the results of other studies suggest that educational programs are also useful especially when implemented in combination with the bylaw.

Some reviews on different approaches to residential pesticide use reduction have established that a successful model involves the introduction of a bylaw in conjunction with a comprehensive educational program. The few evaluations available on communities in Canada that implemented a 3-5 year period of education alone have shown a minimal reduction of pesticide use on residential property. Most of these communities have now implemented bylaws after the educational period. Other municipalities enacted a bylaw, and complemented it with an education program, through a transition period of several years before the bylaw was enforced. In these municipalities, pesticide use reduction was more substantial.

This policy research review provides an overview of significant literature published on pesticide use reduction strategies. It includes a brief history of pesticide use and regulation in North America. A table of municipal bylaws in Canada is included in the appendixes section. Cases from the C2P2 and Cullbridge report were updated where possible and some of them were selected to complement the experiences on Canada's municipalities. Evaluation work has been done on many of the municipalities, some of them still with preliminary results.

In summary, the information collected for this report suggests that in a typical jurisdiction residents will support a residential pesticide use reduction bylaw if education on alternatives is provided, and that this will result in reduced pesticide use. However, there is a need for an education/outreach program ahead, during and after the implementation of a bylaw.

2 Purpose

The purpose of this policy research review is to offer an overview regarding the relative effectiveness of pesticide use bylaw vs. education/outreach programs². The findings of this review helped to inform the health unit in the development of its position and strategies regarding the non-essential, residential use of pesticides in Simcoe and Muskoka. It may be a useful resource for municipalities considering the development of a non-essential, residential pesticide bylaw.

3 Methods

A search of scholarly articles and other sources (e.g. dissertations, conference proceedings) was conducted on electronic databases such as EBSCOHost, Proquest, and Google.com. The search was made using terms identified to be relevant to the pesticide use reduction issue. See Appendix I for a summary of the search. Few articles providing a description of a bylaw or education program on pesticide use reduction with evaluation of the impacts of these strategies were found via EbscoHost and Proquest sources.

In order to collect reports, evaluations, literature reviews or other information on what other health units have done regarding effective strategies, especially bylaw and education, key contacts from health units in Ontario were approached. Authors or available contacts of evaluations, articles and reports which did not appear to have published results or findings were contacted for an update on their projects. An extensive search of municipal council meetings and agendas was conducted, to retrieve general information on the bylaw enacting process and timelines.

In summary, the information search included:

- studies on pesticide use bylaw and education programs
- reports specifically on cosmetic/non-essential, residential pesticide use
- evaluation reports of the impact of pesticide reduction bylaws and/or education programs
- information on municipal bylaw history relative to pesticide reduction
- articles with specific technical definitions and historical components of pesticide use
- reports summarizing findings from population surveys that included questions on pesticide use

The search did not include the following information:

- agricultural and farming pesticides
- municipal/public and commercial use of pesticides
- bylaw drafting, approval and implementation processes
- chemical components, or specific biological health and environmental effects of pesticides
- evaluations of the effectiveness of pesticide alternatives

Due to the extensive range of information, relevant articles were summarized and classified into five topic groups: pesticide use history, alternatives to pesticides, education or bylaw, Simcoe-Muskoka information and other elements associated with pesticide bylaws. A full discussion of the findings of this review is provided in the following pages of this paper:

² *Outreach Programs*: Outreach is an effort by an organization or group to connect its ideas or practices to the efforts of other organizations or groups, specific audiences or the general public. Unlike marketing, outreach does not inherently revolve around a product or strategies to increase market share. Outreach often takes on an educational component (i.e., the dissemination of ideas), but it is increasingly common for organizations to conceive of their outreach strategy as a two-way street in which outreach is framed as engagement rather than solely dissemination or education. (Wikipedia. Retrieved November 15th, 2007)

4 Discussion

4.1 History of Pesticide Use and Regulation

There are many definitions of pesticide(1,2,3) but with overall agreement that a pesticide is any product, device, organism, substance or agent that is manufactured, represented, sold or used to kill or damage living organisms.(4) Pesticides include herbicides (for weeds), fungicides (for fungus), insecticides (for insects), and miticides (for mites), among others. Pesticides are used as a means of directly or indirectly controlling, destroying, preventing, mitigating, attracting or repelling any pest by interfering with their biological processes.(5,6,7,8)

The first generation of pesticides and repellents were developed in the fifteenth century, when non-degradable toxic metals such as arsenic, lead and mercury were applied to crops as insecticides. By the mid 1800s, several organic pesticides were commonly used. Some of these botanicals, such as nicotine (from tobacco leaves), pyrethrum (from chrysanthemum flowers) and rotenone (from the root of the derris plant), are still in use today. The second generation of pesticides was initiated in 1939, with DDT (Dichloro-Diphenyl-Trichloroethane)³, a synthetic (manufactured) organic chemical which was the first of many synthetic organic products to become a pesticide.(9)

Most of the pesticides used currently are second generation; some were developed during World War II (WWII). In the 1940s to 1960s, organophosphate (earlier, Organochlorine) and phenoxy herbicides-insecticides were used during the war to eradicate the Japanese rice crop, and later on to defoliate large areas in jungle warfare. After the war, these chemicals began to be used in agricultural production, sprayed in neighbourhoods for mosquito eradication, and for individual home and garden use.(10, 11)

In the 1960s and 1970s in the United States, there was an increased incidence of non-Hodgkin's Lymphoma⁴ in highly agricultural areas. This incidence was linked to the use of pesticides which had raised parallel to the increased lymphoma incidence.(12) This was the beginning of ongoing concern, study and efforts to control the use of pesticides in North America.

In Canada, lawn and garden pesticides have been widely used since the 1950s.(13) One of the phenoxy herbicides developed during WWII, 2,4-D⁵, still accounts for around one quarter of all pesticides used in the country.(14) Pesticides are registered in Canada based on the testing data supplied by the manufacturer. They are composed of "active ingredients" that kill the targeted organisms. They also have solvents or "formulants", which are other chemicals that act as dilutants. Only the active ingredients are tested since the solvents are considered to be a "trade secret" and are not required to be revealed.(15)

³ DDT (*Dichloro-Diphenyl-Trichloroethane*) is the first modern pesticide. It was developed early in World War II, and initially used with great effect to combat mosquitos spreading malaria, typhus and other insect-borne human diseases among both military and civilian populations, and as an agricultural insecticide. DDT is banned for agricultural use worldwide, but its use in disease vector control continues to this day in some parts of the world.

⁴ *Non-Hodgkin's Lymphoma* is a cancer arising from lymphocytes, a type of white blood cells. Lymphomas may develop in any organ associated with the lymphatic system (e.g. spleen, lymph nodes or tonsils).

⁵ *2,4-Dichlorophenoxyacetic acid (2,4-D)* is a common systemic herbicide used in the control of broadleaf weeds. It is the third-most widely used herbicide in North America and the most widely used herbicide in the world. 2,4-D is sold in various formulations under a wide variety of brand names. It continues to be used for its low cost, despite the availability of more selective, more effective and less toxic products. 2,4-D is a synthetic auxin, which is a class of plant growth regulators.

Pesticides are regulated by Health Canada under the Pest Management Regulatory Agency (PMRA). The transportation, sale, use, storage and disposal of pesticides are the responsibility of the provincial governments.(16) Figure 1 provides more detail regarding the distribution of principal responsibilities for the regulation of pesticides in Canada.

Figure 1. Distribution of Principal Pesticide Regulation Responsibilities in Canada

Distribution of principal responsibilities		
Federal (Pest Management Regulatory Agency of Health Canada)	Provincial/Territorial	Municipal
<ul style="list-style-type: none"> • <i>Pest Control Products Act</i> (PCP Act) and Regulations • Pesticide registration and re-evaluation • Human health and safety • Environmental impact • Value (including efficacy) assessment • Alternative strategies • Compliance and enforcement 	<ul style="list-style-type: none"> • Transportation, sale, use, storage and disposal • Training, certification and licensing of applicators and vendors • Spills and accidents • Permits and use restrictions • Compliance and enforcement 	<ul style="list-style-type: none"> • Bylaws for municipal (and, in some cases, private and residential) lands

Source: Pest Management Regulatory Agency (PMRA) [homepage on internet]. Fact sheet on the regulation of Pesticides in Canada. Canada; [cited 2001]. (17)

In 1990, the city of Hudson, Quebec, passed a bylaw restricting the use of cosmetic pesticides on public and private property. After a long debate between the government and the pesticide industry, the Supreme Court of Canada in 2001 upheld the municipality's right to pass the bylaw.(18,19) Since the 2001 Supreme Court decision, the landscape of pesticide policy has been changing. The Supreme Court judgement implied that the health effects of pesticides were an important factor in their decision. In 2004, the Ontario College of Family Physicians conducted a review(20) that detailed the health effects of pesticides. There are currently more than 135 municipal bylaws in place in Canada, of which only 31 are Ontario municipalities. An additional 15 pesticide bylaws in Canada are at the draft stage, pending approval and adoption.(21) See Appendix II for a complete list of all municipal bylaws in Canada.

4.2 Alternatives to Pesticides

Many organizations have been developing and promoting strategies to reduce pesticide use in agriculture, commercial and residential sectors. The agriculture sector is the main user of pesticides.(22) However, pesticides are extensively used in residential areas, either to eliminate cockroaches, mice, rats, ants, or to 'beautify' lawns and gardens by controlling plant diseases and repelling or destroying pests. Several studies report the implementation of an Integrated Pest Management Program (IPM)⁶ as an alternative to pesticides in the agriculture sector.(23) IPM manages crops by preventing pests, identifying potential pests, deciding whether treatment is needed and using biological, mechanical and behavioural control methods, as needed, to reduce pest populations to acceptable levels.(24) Other studies mention Plant Health Care (PHC)⁷ programs,(25,26,27) which refer to urban landscapes and turf.(28)

Several municipalities have implemented IPM-based approaches to control residential or domestic pesticide use.(29) In the United States, several US government and policy agencies have based their pesticide policy on IPM. For example, a model school IPM plan was developed working with schools across New York City.(30) In 1997 the city of Newton, Massachusetts, developed a community education program on pesticides and alternatives based on IPM. Newton's strategy continues to be considered a model for other communities. The city developed the program through a joint effort of different community and neighbourhood groups.(31) In Canada, several municipal bylaws have been implemented based on an IPM as well.(32) In 2002, the City of Brockville, Ontario, developed pesticide reduction guidelines with the local health unit and the pesticide industry based on IPM.(33) Another example is Caledon, Ontario, which passed a pesticide reduction bylaw in May 2003, with implementation in April 2004. Caledon's bylaw is based on IPM principles, and has served as a model for several communities.(34,35,36) Several other municipalities in Canada have adopted bylaws based on IPM strategies.(37)

In addition to the IPM approach, several studies and articles provide advice for pest control with safe alternatives to chemical pesticides.(38,39) Table 1 (at the end of this section) shows a short list of alternatives to pesticides in lawns and gardens.

Non-essential or cosmetic use of pesticides refers to the application of pesticide on lawn or gardens when the presence of pests is not at a sufficient level to cause unacceptable damage.(40) Non-essential use of pesticides refers to the use of pesticides for aesthetic reasons, primarily to maintain lawns and gardens. Essential use of pesticides refers to the use of pesticides to protect public health, protect forests against insect infestations or protect agricultural products from adverse impacts.(41) The use of pesticides in a residential area is considered essential in situations when public health or public safety could be adversely affected.(42)

Residential, non-essential use of pesticides is believed to be influenced by social factors including socioeconomic status, aesthetic beliefs, attitudes about neighbourhood citizenship or home

⁶ *Integrated Pest Management (IPM)* is a pest control strategy that uses an array of complementary methods: natural predators and parasites, pest-resistant varieties, cultural practices, biological controls, various physical techniques and pesticides as a last resort. It is an ecological approach that can significantly reduce or eliminate the use of pesticides. It involves the monitoring of pest populations, establishment of injury levels, modification of habitats (to eliminate sources of food, water, harbourage and entry), utilization of least-toxic controls, keeping of records and evaluation of performance on an ongoing basis. (New York Coalition for Alternatives to Pesticides. 2007)(Standing Committee on Environment and Sustainable Development. 2000)

⁷ *Plant Health Care programs (PHC)* are maintenance activities that are designed to promote healthy and vigorous plant growth while reducing the demand for pesticides. The objective of PHC is to maintain or improve the landscape's appearance, vitality and safety, using the most cost-effective and environmentally sensitive practices and treatments available. (City of Brockville. 2002)(International Society of Arboriculture. 2005)

values, and a desire to avoid conflict with neighbours.(43, 44, 45, 46, 47) Several studies that have evaluated homeowners' perceptions suggest that there is a narrow standard for acceptable lawn appearance amongst most North Americans. Some comments and opinions defined an acceptable lawn as one that is "clean, well manicured, pest free, lush lawn... which should look like a golf green, as a green carpet". (The Massachusetts Department of Environmental Protection, 2005)(48)

A study in progress by J. Baxter and R. Hirsch from the University of Western Ontario tries to understand some of these determinants in two cities in Canada: Calgary and Halifax. Some of their preliminary analyses suggest that one of the strongest determinants of pesticide use in residential areas is neighbourhood culture. The study reports that residents in Calgary place a higher value on seeing a weed-free lawn in their neighbourhoods than on reducing the use of pesticides. However, residents in Halifax have the opposite preference, showing more concern about pesticide use reduction than a 'beautiful' weed-free lawn.(49, 50)

Baxter and Hirsch's study is one of many examining residents' attitudes towards pesticide use reduction. The majority of strategies reporting a change in residents' pesticide use include strong community education models employing education during different phases of a bylaw campaign. There was often an initial phase promoting awareness of the health and environmental effects of pesticides,(51) followed by a phase of introduction and education to alternatives to the use of chemical pesticides. Many municipal governments reportedly implement a bylaw at community request to decrease pesticide use. Ongoing education to maintain awareness and offer alternatives to pesticide use typically continued after bylaw passage to reinforce learnings. Baxter and Hirsch's preliminary findings will be discussed in the next section.

Table 1. Short List of Alternatives for Fertilizers, Pesticides and Herbicides

Purpose	Alternative
Instead of fertilizers	<ul style="list-style-type: none"> ▪ Use finished compost, blood and fish meal and/or mulch from your leaf and yard waste ▪ Make a nutrient rich compost tea by soaking a cloth bag full of compost and/or manure in a watering can or rain barrel for a couple of days. Dilute the resulting solution to a weak tea colour.
General Pest Control	<ul style="list-style-type: none"> ▪ Native plants are more resistant to pests and diseases and attract birds and bugs that feed on pests
All Purpose Insect Spray Mix	<ul style="list-style-type: none"> ▪ Blend 1 garlic bulb, 1 onion, 1 tbsp of cayenne pepper and 4 cups of water. ▪ Let sediment settle, pour through a paper coffee filter then add 1 tbsp of liquid soap. Apply with a spray bottle.

To Control :

Moths	<ul style="list-style-type: none"> ▪ Enclose cedar chips in cotton sachets to repel
Slugs & Snails	<ul style="list-style-type: none"> ▪ Use onion & marigold plants to repel, place ½ grapefruit peel face down amongst plants to trap
Ants	<ul style="list-style-type: none"> ▪ Place chilli powder, dried peppermint leaves or cream of tartar at entry point to repel. To kill, mix equal parts of borax and icing sugar
Aphids, June Beetles, Black Spot and other Fungal Diseases	<ul style="list-style-type: none"> ▪ Steep 6 chopped rhubarb leaves in 2 – 3 quarts of boiling water. Strain and spray.
Fleas	<ul style="list-style-type: none"> ▪ Feed 1 tsp of yeast per pet, per meal. You can also make a solution (for fleas and odours) made out of Tea Tree oil or any of the following essential oils: Citronella or Lemon, Pennyroyal, Cedarwood and/or Eucalyptus – and water. The dilution should be one drop of oil to 2ml of water. Shake well in a spray bottle and apply to animal, careful not to spray their eyes, ears, mouth or nose.
Weeds	<ul style="list-style-type: none"> ▪ Mulch garden beds with leaves, hay or saw dust and/or other yard waste

Vinegar is a liquid derived from the fermentation of fruits or grains. Its acid content makes it useful for killing germs, cutting grease and dissolving mineral deposits.

Source: Sierra Club of Canada [homepage on the internet]. Safe Alternatives to Household Hazardous Products For your family, pets and environment! Ottawa: [retrieved 2007; March]. (52)

4.3 Effectiveness of Education vs. Bylaw

A report prepared in 2004 by the Canadian Centre for Pollution Prevention (C2P2) and Cullbridge Marketing and Communication, summarizes interventions in residential outdoor pesticide use in North America and Europe. The report focuses on the activities of selected communities in Canada (Hudson/St Lazare/Notre Dame, Quebec; Halifax, Nova Scotia; Hamilton, Ontario; and City and District of North Vancouver and District of West Vancouver, British Columbia), USA (Chesapeake Bay, Pennsylvania; Seattle and King County, Washington; and North Central Texas), Denmark (Frejlev) and Germany (Baden-Wuerttemberg). At the time of publishing only three of these nine communities (Quebec, Halifax and Baden-Wuerttemberg) had passed laws limiting or banning residential cosmetic pesticide use; the other six communities have been conducting educational and outreach campaigns.(53)

The selection of the nine communities was based on achievement of reduction in pesticide use, approaches easily replicated in other communities, and reliability of results. Quantitative and qualitative means were used to evaluate the impact of the practices through sales, registration data and surveys. Another eight municipalities were identified with the potential to be included in the report, but did not satisfy one of the previous criteria.(54)

Due to a scarcity of hard data, interviews took place in each of the nine communities. Retailers, government staff, journalists and experts on the topic were interviewed. Based on the evidence, the authors placed the communities into one of four categories based on their pesticide use reduction outcomes reported by the interviewees: high reduction (51-90% reduction), medium reduction (25-50% reduction), low reduction (10-24% reduction) and marginal reduction (<10% reduction). These categories were created by the authors to provide ranges and “avoid suggesting a greater level of precision than is warranted.”(C2P2 and Cullbridge, 2004) Only three communities (Hudson/St Lazare/Notre Dame, Quebec; Halifax Regional Municipality, NS; and Frejlev, Denmark) had achieved a high pesticide reduction at the time of the study. Two of them had adopted pesticide bylaws, while Frejlev had a community agreement with education and outreach campaign approach. The other communities had a low to marginal reduction, based on an education and/or outreach approach.(55) Table 2 (at the end of this section) summarizes some of the findings on the cities reviewed in the C2P2 study.

The success of the Denmark case was due to a countrywide pesticide reduction plan to prevent groundwater contamination, and meet European Union drinking water standards. The municipal government was very active, purchasing lands and making agreements with farmers to relocate outside the catchment areas. They also provided information and support to the residents of Frejlev such as free propane burners for weed control. The municipal government’s direct support in the form of education and equipment were the main factors that contributed to the 51-90% reduction of residential pesticide use.(56)

There has been additional evolution in pesticide reduction research and policy since the publication of this 2004 report. See Appendix III for a detailed comparison of several studies conducted in different cities with and without bylaws. Highlights are explained as follows.

A study on pesticide use in Hamilton, Ontario in 2006 revealed that despite a three year education/outreach program, decline in pesticide use was low (using the C2P2 review’s reduction categories), with only 17% of Hamiltonians having decreased their pesticide use. The study also showed that 78% of lawn pesticide users who maintained their own lawns and 36% of those who used lawn companies had been looking for alternatives to pesticides and would likely discontinue chemical pesticide use if there was more information provided on substitutes. Only 32% of those surveyed were aware of the steps involved in creating a pesticide-free lawn.(57, 58) The study concluded that the education/outreach program had been only marginally successful in that the intended information had not reached the targeted residents. Therefore, the City of Hamilton decided to adopt a pesticide ban bylaw which will be in effect on September 1, 2008. The grace period will be used to educate citizens. A second phase will begin in 2009 when fines will apply.(59, 60)

Many municipalities across Canada have been implementing outreach and education programs before enacting pesticide bylaws. As an example, the City of Waterloo carried out a preliminary pilot of a Community-Based Social Marketing (CBSM)⁸ plan in 2004, addressed to a selected residential area of the city. Focus group testing was also conducted to determine the barriers to adopting pesticide alternatives. The campaign included ads on radio, newspaper and workshops to emphasize seasonally important natural lawn care practices.(61) The evaluation of the campaign took place at the end of 2005 and consisted of three different methods:

- First: participants at workshops completed an evaluation of the presentation which included usefulness of the information and perception of the pesticide reduction lawn care methods discussed.
- Second: focus group discussions were held with team members who visited the neighbourhoods selected to obtain their views on public reaction to the campaign.
- Third: telephone surveys were used to evaluate the effectiveness of both the overall campaign and the neighbourhood selected.

The evaluation found that there was a larger increase in many of the pesticide education lawn care practices promoted in the campaign than there was in 2004 before the pilot. Most of these practices were promoted during the campaign. But, it was determined that the number of residents who stopped using chemical pesticides increased only slightly compared to the previous year. This meant that residents implemented alternatives, but continued using the chemical pesticides. The authors concluded that the campaign had a small impact on residents and that an additional year of the campaign would be beneficial for residents' understanding.(62) Nevertheless, a pesticide bylaw was drafted in 2006 and came into effect in January 2007.(63)

Many municipalities have conducted studies to try to understand residents' attitudes and potential behaviour relative to a pesticide reduction bylaw. Many sources concur that changing the behaviour of residents with respect to pesticide use requires providing necessary information and education to raise awareness and change attitudes.(64) In the previously mentioned University of Western Ontario study, Baxter and Hirsch have found large differences in communities' approaches and timelines for pesticide reduction. Calgary has been doing reviews on pest management practices since 1994, has developed a Pesticides Best Practices Committee (2000) and issued brochures ("A Healthy Yard"), but has not passed a bylaw. In contrast, Halifax, after the province granted enabling legislation in 2000, enacted a bylaw during a three year phase-in with the bylaw taking effect in 2003.(65)

In their evaluation, for which results are still preliminary, Baxter and Hirsch's findings "seem to support the idea that a bylaw in combination with education will (likely) work far better than education alone... a small but considerable portion of our sample who currently use pesticides, also support a bylaw that would force them to stop! That the majority still support the rather stringent bylaw years after it came into full force in Halifax." (Baxter, 2007)(66)

Vancouver's experience confirms Baxter and Hirsch's preliminary findings. In 2003, the North Shore Recycling Program (NSRP) worked with three communities to create a 5-year plan to reduce pesticide use through public education. They used a media campaign, website, information packages, signs and street cards. A baseline survey took place in spring 2003 and another in October 2003. The reduction in this short seasonal period was less than 10%. NSRP identified the need for an additional community opinion survey to be conducted in 2004, and recommended an extension of the education campaign to 2007.(67, 68) However, Vancouver City Council enacted a bylaw, which came into effect in January 2006, after collecting residents' opinions in open houses and focus groups (instead of via a second community opinion survey).(69)

⁸ *Community Based-Social Marketing (CBSM)*: Social marketing is a process for influencing human behaviour on a large scale, using marketing principles for the purpose of societal benefit rather than commercial profit. CBSM applies social marketing processes to influence a community.

Closer to Simcoe-Muskoka is the example of the City of Toronto. In a public opinion poll in 2002, it was found that 33% of Torontonians who had a lawn or garden reported using pesticides. Forty-six per cent (46%) used alternatives to pesticides, 30% of whom hired a company to apply lawn pesticides. Interestingly, 17% of those who used pesticide alternatives also used pesticides. Seventy-two per cent (72%) of all respondents in this survey supported a bylaw on private property.(70) At that time, an education/outreach program was implemented, and based on many of the residents' attitudes towards a bylaw, the City of Toronto decided to enact a Pesticide Bylaw which came into effect on April 2004 beginning a three-year phase-in. In April 2004, an education-based enforcement phase began, followed by a penalty-based enforcement phase for commercial pesticide users in September 2005. A last phase was implemented on September 1, 2007, when penalty-based enforcement began for residential users.(71)

To evaluate the bylaw's preliminary impacts, Toronto Public Health (TPH) collected and reviewed results of focus groups and surveys of Toronto residents that were conducted between 2003 and 2005. This information was combined with Toronto's city staff's statistics on bylaw compliance and pesticide use, and information about the experiences of commercial stakeholders and City staff. The purpose of the study was to evaluate the education-based enforcement impact of the bylaw, before penalties for commercial users came into effect. The results showed evidence of promising signs of behaviour change regarding the use of pesticides. A majority of Torontonians knew about the Pesticide Bylaw, and compliance was shown to be high. TPH is still collecting pesticide use data for the summer of 2006, which results have been delayed to Winter 2007 or Spring 2008.(72)

Reflecting on Toronto's experience, the evaluation report concluded that "it is essential that education, enforcement and evaluation activities continue in years ahead to fully implement the bylaw and assess its impacts". (McKeown, 2007)(73)

Table 2. Summary Table – Nine Communities Studied in C2P2 Pesticide Reduction Review

Community	Approach	Size (Population)	Program Maturity as of Oct 2007	Reduction Achieved	Updates (as of Oct 2007)
Canada					
Hudson / St. Lazare/ Notre Dame, QC	Bylaw supported by education	5,000-13,000	Over 14 years	High (51-90%)	N/A
Halifax Regional Municipality, ON	Bylaw supported by education	360,000	Over 6 years	High (51-90%)	N/A
Hamilton, ON	Education/Outreach	680,000	Over 4 years	Low (10-24%)	A bylaw has been drafted as of February 20, 2007
Greater Vancouver, BC	Education/Outreach	180,000	Over 4 years	Marginal (<10%)	As of October 1, 2007 the City of North Vancouver is the only one of the four Vancouver districts without a bylaw (although it is drafted). The other three districts have bylaws in place since 2006.
USA					
Chesapeake Bay, PN	Education/Outreach	450,000	Over 5 years	Medium (Low one year later)	N/A
Seattle and King County, WS	Education/Outreach	2.2 million	Over 13 years	Low (10-24%)	N/A
North Central Texas	Education/Outreach	5.7 million	Over 6 years	Marginal (<10%)	N/A
Europe					
Frejlev (Aalborg, Denmark)	Community agreement, Education/Outreach	2,000	Over 6 years	High	N/A
Germany/Baden-Wuerttemberg	National and State (Laender) Law	82.688 million	15 years	N/A	N/A

Source: Taken from C2P2 and Cullbridge article: The Impact of Bylaws and Public Education Programs on Reducing the Cosmetic / Non-Essential, Residential Use of Pesticides: A Best Practices Review, 2004. (74)

4.4 Simcoe-Muskoka

Recently, a number of well-known medical, public-health and environmental organizations have been lobbying the Ontario government asking for a province-wide ban on the aesthetic/non-essential use of pesticides. If the province agrees, Ontario would be the second province in Canada, along with Quebec, to take this action. According to Martin Mittlestaedt, a journalist from the Globe and Mail, in his article of February 26th 2007, these organizations commissioned a poll to help convince the government that the public supports this decision.(75) The survey was done in January 2007 to Ontario residents; results showed that 71% of respondents support a ban, while 22% are opposed.(76)

In Simcoe and Muskoka, many residents have been concerned about cosmetic/non-essential use of pesticides for years. Table 3 (at the end of this section) summarizes the positions and actions taken by each one of the municipalities in Simcoe and Muskoka. Several area municipalities in the District of Muskoka had held public information sessions highlighting advantages and disadvantages of pesticide use, where the public expressed concerns about the non-essential use of pesticides. In September 2003, based on these public information sessions, the District Municipality of Muskoka published a report prepared by the Municipal Working Group on Pesticides for the Planning and Economic Development Committee. The report was a review of the non-essential use of pesticides, and its purpose was to provide information and recommendations to the Planning and Economic Development Committee to address the application of chemical pesticides on public and private property for non-essential purposes. The review included literature on environmental and health effects, chemical pesticide alternatives, a summary of what was being done in other jurisdictions at the time, and a summary of how each of the municipalities in the district was handling pesticide use. All but one of the municipalities (Township of Lake Bays) in the district had a bylaw or ban on pesticides; however, each municipality followed the precautionary principle⁹ related to pesticide use in municipal/public property based on an informal understanding that pesticides are used only on cases of infestations, when dealing with noxious weeds under the Ontario Weed Control Act, or to maintain a sports field in a condition that would prevent injuries. The Township of Lake Bays is the only municipality in the Muskoka District with a formal policy regarding the use of herbicides in public lands. However, none of the municipalities have any policies to regulate the non-essential use of pesticides in private property. The Working Group provided a summary of recommendations for Muskoka District Council which included: to support the Association of Municipalities of Ontario to lobby the federal and provincial governments to regulate non-essential pesticide products and use; that Muskoka District Council adopt a policy on municipal pesticide use; and that the corresponding committee undertake board public consultations to discuss the adoption of a public education campaign and pesticide use bylaw.(77) No updates were found of this situation after the publication of this report.

In the City of Orillia, the Council requested a summary report on pesticide non-essential use activity in 2002, based on requests from Orillia residents. Based on this report, a forum was held in the Council Chambers at City Hall on June 12, 2003, to solicit public response regarding cosmetic pesticide use. The findings of this forum were presented at the October 2004 Council meeting, where recommendations were made as to how to implement a pesticide use bylaw for cosmetic purposes.(78) After a year of conversations, in the meeting of April 2006, the City Council directed an Environmental Advisory Committee following their recommendations of creating and delivering an education program regarding the use of pesticides; the City Council directed the committee to report back findings to Council one year later.(79) The Committee also recommended to move towards creating a bylaw to reduce the non-essential use of pesticides based on the IPM principles, which continues to be reviewed and assessed by the City Council.

⁹ *Precautionary Principle*: is a moral and political principle which states that if an action or policy might cause severe or irreversible harm to the public, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action.

On the other hand, the Town of Collingwood enacted a cosmetic pesticide use bylaw on March 12, 2007. It will be implemented in two phases to provide for a transition period and public education campaign. It began on April 22, 2007, and will come into full-force on January 1, 2008. The bylaw was drafted based on the Town of Caledon bylaw. After the draft was approved at the beginning of 2007, a public meeting took place at the end of January 2007, where none of the residents in attendance opposed the bylaw. The bylaw restricts the cosmetic/non-essential application or use of pesticides.(80)

The City of Barrie contracted with a consultant in 2001 to determine how pesticide use should be addressed by the City. A two-hour public consultation took place in early 2002 and draft recommendations on pesticides were presented at a public meeting one month later.(81) Based on the final report and policy recommendations, Barrie City Council decided in 2003 to implement a Pesticide Policy rather than a bylaw, directing the department of Parks, in the Leisure, Transit and Works Department to implement an education/outreach program. The goal of the program is to have 90% of private property owners not using chemical pest control products within three years.(82) The issue was to be reviewed in terms of the need to adopt a bylaw in 2006, but the decision has been delayed.

The Rapid Risk Factor Surveillance System (RRFSS) is an ongoing population health survey conducted by a consortium of public health units in Ontario to provide locally relevant community health status and health program planning data. Data collected from RRFSS in 2003 at 95% confidence interval showed that 87% (84%, 90%) of Simcoe County residents 18 years and older felt that even the manufacturer directed use of pesticides has a negative effect on the environment and 91% (88%, 94%) felt that they have a negative effect on human health. For the same surveying period, 48% (43%, 53%) of residents reported supporting a bylaw that bans the use of pesticides on private lawns and gardens.(83) The proportion of residents supporting a bylaw on private/residential property increased to 59% (56%, 62%) during the surveying period of January to December 2004. This was a 10% increase in support.(84) Questions on pesticide use were not included in RRFSS in 2005 and 2006. Questions were asked again in the first semester of 2007, where the proportion of residents supporting a bylaw banning the use of pesticides on private/residential property increased to 65% (62%, 69%) This is an increase of only 7% over a period of 3 years, but it is still an increase on the support reported by the residents of Simcoe County.(85)

Table 3. Summary Table – Municipalities’ Positions and Actions Regarding Non-Essential/ Cosmetic Pesticide Use

	Action/Position		On Municipal Property	On Private Property
Town of Bracebridge	Policy	Not to use cosmetic pesticides.	√	
Town of Collingwood	Bylaw	Restricts the cosmetic/non-essential application or use of pesticides. Full-force and effect on January 1, 2008.	√	√
Township of Georgian Bay	Bylaw	Banning all pesticide use, as well as products containing nitrates/nitrogen (including compost material) on waterfront properties.	√	√
Town of Gravenhurst	Adopted Guidelines	Restricting cosmetic use of pesticides.	√ (Except Sports Fields)	
Township of Lake of Bays	Policy	Non-use of pesticides –municipal property.	√	
Township of Muskoka Lakes	Policy	Pesticides not to be applied municipal property?	√ (Except where public health is at risk)	
Township of New Tecumseth	Policy	Reducing pesticide use and has plans for a public education campaign.		
Township of Springwater	Established an Ad Hoc committee to reduce the cosmetic use of pesticides through public education initiatives			
Township of Tiny	Bylaw	Banning the non-essential use of pesticides.	√ (with municipal water supply)	
City of Orillia	City continues to review and assess the need for a bylaw based on IPM principles, while delivering an education program.			
City of Barrie	Issue reviewed >3 years ago, adopted an educational and awareness approach. Issue to be reviewed in terms of the need to adopt a bylaw in 2006. Decision has been delayed.			
Muskoka Watershed Council	<ul style="list-style-type: none"> - Developed a booklet (Healthy Lawns & Gardens Naturally). - Worked in conjunction with local municipalities to hold workshops to promote healthy lawns & gardens. - Held a municipal IPM workshop in February 2005. 			

* **Note:** Most of the information on this table was collected through phone calls made by staff of the Simcoe Muskoka District Health Unit to each one of the municipalities’ offices in 2006, and updated to date where applicable.

4.5 Elements Associated with a Pesticide Bylaw

There is evidence that for a pesticide bylaw to be successful, enforcement activities should take place. Most of the municipal bylaws with effective results developed their strategy in more than one phase. These phases include education/outreach programs before the bylaw is enforced.

In the case of Toronto's Pesticide bylaw, a two-phase bylaw was enacted. The first phase was carried out by city staff who undertook proactive visits to increase awareness of the bylaw and to provide information about both IPM and pesticide-free property maintenance. They responded to complaints and visited bylaw violators with education materials and a warning letter. In the second phase, the same activities were carried out as in phase one, with the addition of a fine to those who repeated the violation. The city staff could issue a warrant to search for evidence, based on protocols which include soil sampling and other means of collecting information. After the bylaw is enforced, staff issue tickets rather than warning letters. Educational materials will continue to be available after the bylaw enforcement.(86) See Appendix IV for an example of the Toronto's Protocol for both phases of pesticide bylaw enforcement.

There are several elements to consider when enacting and implementing a bylaw combined with education programs. According to the C2P2 report, the cost to implement a bylaw appears to be in the order of \$0.50-\$1.00 per person per year.(87, 88) The cost to implement an outreach component alone appears to be in the order of \$0.13 to \$0.24 per person per year.(89) However, these costs are based on an average from the nine communities reviewed in the report. Costs vary depending on the population and the percentage of residential lawns and gardens in the municipality where the bylaw will be implemented. For example, while Collingwood (population 17,290(90)) budgeted around \$10,000 in 2007 for a public education plan and outreach program,(91) Vancouver (population 578,000)(92) budgeted \$94,000 for the first year of their phase-in bylaw in 2003.(93)

There is no amount set for financial implications of a bylaw enforcement, but several types of costs should be considered and estimated in planning a potential bylaw policy. See Table 4 (next page) for a list of associated costs.

Table 4. Possible Costs Associated with Pesticide Bylaw

(94, 95, 96, 97, 98, 99, 100)

Cost Element Description	Comments This is a summary of literature findings.
Public Education and Awareness	Production and design of education programs/outreach programs, conference/workshops, pamphlets, inspectors' visits. A plant health expert may be needed to help inspectors and the community with advice on alternatives to chemical pesticides and/or IPM/PHC procedures.
Communications Plan	Includes advertising, printing, promotion, postage.
Permit Review Process and Education Program	Permits or licenses may need to be developed, depending on the type of bylaw enacted (IPM, PHC or pesticide banning). Residents and lawn companies need to be educated on the permit process.
Administrative Support	Supplies and equipment, mileage.
Program Monitoring, Research and Evaluation	Municipalities with successful pesticide bylaws have been active in evaluating the impact of the bylaw. In Toronto, complaints information is captured in the THEIS (Toronto Healthy Environments Information System) and used for evaluation purposes.(101)
Bylaw Enforcement	Staff to enforce the bylaw, issue tickets and visit sites where complaints have been issued. Staff need to be involved in the education/outreach programs in initial phases of the bylaw. Notes: - Some municipalities have contracted a number of full-time staff as experts on pesticide bylaw, and an extra number of seasonal positions (clerk and helpline staff), which need extensive training.

5 Conclusions

Pesticides are chemicals manufactured to interfere with the biological process of any pest. Even though alternatives have been identified to prevent or destroy pests, humans have been using pesticides for several decades. Pesticides have been linked to negative effects in human health and in the environment. The majority of residents surveyed in the studies reviewed in this paper, were aware of the possibility of these negative effects.

Various sources suggest that there is a high potential for voluntary behaviour change on pesticide use if information is provided. However, voluntary reduction has not been successfully achieved in all municipalities in Canada. Government legislation and laws have been implemented to enforce the reduction of residential pesticide use. Hudson, Quebec, was the first city to enact a pesticide bylaw over a decade ago. Many communities followed Hudson's approach. Most preferred to begin with education and outreach programs before enacting a bylaw.

Several studies have reviewed the impact of education campaigns in their communities on pesticide reduction on residential properties and found a minimal reduction when education was implemented by itself. According to the reviews, providing information can affect pesticide users' knowledge, but education by itself is not effective in changing pesticide users' attitudes and behaviour. Some of these studies explored residents' attitudes towards enforcing a bylaw as an alternative, and have found that most pesticide users agreed they would stop using pesticides if a bylaw was enforced. Reports have concluded that residential pesticide use is not likely to change dramatically without further legislative support. Some reviews on different approaches to residential pesticide use reduction have established that the best method of ensuring compliance of a bylaw is educating residents on how to solve their problems by providing them with information on alternative methods.

Evaluation activities over a period of years are ideal to assess impacts and prepare and educate pesticide users to ease the transition to a full implementation of a bylaw. Results of evaluations on some communities, including the ones highlighted in the C2P2 and Cullbridge reports, identified a substantial reduction in residential pesticide use after a bylaw was enacted. Most communities in Canada have gone through a period of several years of education before enacting a bylaw. One hundred and twenty-six (126) municipal bylaws are currently in place in Canada.

In conclusion, community residents tend to acknowledge that pesticide use has negative effects on health and the environment, and they are open to a bylaw combined with education to help communities stop using non-essential pesticides. Several sources suggested that to achieve a comprehensive and successful educational program, several years of implementation are needed before a bylaw is enforced. Most municipalities in Canada have followed these guidelines and the few evaluations on pesticide reduction in these communities have provided positive results. Based on all the cases presented in this policy research review, municipalities are the leaders on implementing education/outreach programs and enacting pesticide use bylaws. Some of the municipalities in Ontario can be used as models to develop an education/outreach program followed by the implementation of a bylaw.

Appendix 1 : Literature Search Strategy

The following table outlines the keywords used to search for literature, and the databases and indexes where the searches were conducted. Searches were performed from February 23rd, 2007 to March 9th, 2007.

Keywords searched		
Pesticide	Programs	Bylaws
Pesticide Use	Campaigns	Community education
Pesticide Use Reduction	Initiatives	Community agreements
Fertilizer	Best Practices	Education
Fertilizer use	Practices	Public Health
Fertilizer Use Reduction	Study	
Weed killer	Evaluation	

Databases and Indexes																		
Google.com																		
EBSCO Host	Environment Index Environment Complete Health Source Consumer Academic Search Premier																	
PROQUEST	<table border="0"> <tr> <td>Multiple databases</td> <td rowspan="2">}</td> <td>CBCA Business</td> </tr> <tr> <td></td> <td>CBCA Reference</td> </tr> <tr> <td></td> <td></td> <td>Proquest Science Journals</td> </tr> <tr> <td></td> <td></td> <td>Criminal Justice Periodicals</td> </tr> <tr> <td></td> <td></td> <td>ProQuest Nursing & Allied Health Source</td> </tr> <tr> <td></td> <td></td> <td>Wilson Applied Science & Technology Abstracts</td> </tr> </table> <p>Some searches were with multiple databases, other were for each individual database.</p>	Multiple databases	}	CBCA Business		CBCA Reference			Proquest Science Journals			Criminal Justice Periodicals			ProQuest Nursing & Allied Health Source			Wilson Applied Science & Technology Abstracts
Multiple databases	}	CBCA Business																
		CBCA Reference																
		Proquest Science Journals																
		Criminal Justice Periodicals																
		ProQuest Nursing & Allied Health Source																
		Wilson Applied Science & Technology Abstracts																
AJPH																		
Some references were obtained from the websites of different City Council's meetings agendas and minutes.																		

Appendix 2: Private Property Pesticide Bylaws in Canada

From (102) <http://www.flora.org/healthyottawa/BylawList.pdf>

Private Property Pesticide Bylaws In Canada Population Statistics by Municipality

The lack of adequate protection from unwanted exposure to lawn pesticides at the federal and provincial level has fuelled a growing surge in municipal pesticide ordinances designed to enhance the protection of public health and the environment. **The aggregate number of municipal bylaws in Canada currently stands at 135.** An additional 11 pesticide bylaws are at the draft stage pending adoption.

Municipalities of all sizes have passed various forms of pesticide bylaws. The largest is the City of Toronto with a population of 2.5 million while some are as small as Sainte-Paule, Québec with a population of 229.

There are over 13.7 million Canadians, or 43.5% of Canada's total population (based on the 2006 Census), benefiting from enhanced protection from unwanted exposure to synthetic lawn and garden pesticides. This figure includes the gold standard province-wide protection provided under Québec's Pesticide Management Code. There are 1141 municipalities (cities, villages and townships) within Québec.

This summary report was prepared by Mike Christie (Ottawa, Ontario) based upon Statistics Canada's 2006 Community Profiles released on March 13, 2007 and available online at <http://tinyurl.com/2sd2ya>. Any errors or omissions should be addressed to mikechristie@rogers.com.

Updated October 1, 2007

Private Property Pesticide Bylaws In Canada Population Statistics by Municipality

Rank	Municipality	Prov.	Population	Bylaw Status
1	Toronto	ON	2 503 281	Pesticide Bylaw Adopted
2	Montréal	QC	1 620 693	Pesticide Bylaw Adopted
3	Calgary	AB	988 193	
4	Ottawa	ON	812 129	Bylaw Review Pending 2007
5	Edmonton	AB	730 372	
6	Mississauga	ON	668 549	Bylaw Review Pending 2007
7	Winnipeg	MB	633 451	Pesticide Bylaw Drafted (NR)
8	Vancouver	BC	578 041	Pesticide Bylaw Adopted
9	Hamilton	ON	504 559	Pesticide Bylaw Adopted
10	Québec City	QC	294 534	Pesticide Code (Province)
		Total	5 501 108	
			58,94%	

Rank	Municipality	Prov.	Population	Bylaw Status
1	Toronto	ON	2 503 281	Pesticide Bylaw Adopted
2	Montréal **	QC	1 620 693	Pesticide Bylaw Adopted
3	Vancouver	BC	578 041	Pesticide Bylaw Adopted
4	Hamilton	ON	504 559	Pesticide Bylaw Adopted
5	Waterloo (Region)	ON	478 121	Pesticide Bylaw Adopted (NR)
6	Halifax (Region)	NS	372 679	Pesticide Bylaw Adopted
7	London	ON	352 395	Pesticide Bylaw Adopted
8	Markham	ON	261 573	Pesticide Bylaw Adopted
9	Longueuil	QC	229 330	Pesticide Bylaw Adopted
10	Windsor	ON	216 473	Pesticide Bylaw Adopted (NR)
11	Oakville	ON	165 613	Pesticide Bylaw Adopted
12	Sherbrooke	QC	147 427	Pesticide Bylaw Adopted (NR)
13	St. Catharines	ON	131 989	Pesticide Bylaw Adopted
14	Guelph	ON	114 943	Pesticide Bylaw Adopted
15	Repentigny	QC	76 237	Pesticide Bylaw Adopted
16	Peterborough	ON	74 898	Pesticide Bylaw Adopted
17	Newmarket	ON	74 295	Pesticide Bylaw Adopted
18	Brossard	QC	71 154	Pesticide Bylaw Adopted
19	Maple Ridge (District)	BC	68 949	Pesticide Bylaw Adopted
20	Caledon	ON	57 050	Pesticide Bylaw Adopted (NR)
21	North Bay	ON	53 966	Pesticide Bylaw Adopted (NR)
22	Shawinigan	QC	51 904	Pesticide Bylaw Adopted
23	Dollard-des-Ormeaux	QC	48 930	Pesticide Bylaw Adopted (NR)
24	Blainville	QC	46 493	Pesticide Bylaw Adopted
25	North Vancouver (City)	BC	45 165	Pesticide Bylaw Adopted
26	Georgina	ON	42 346	Pesticide Bylaw Adopted (NR)
27	Rimouski	QC	42 240	Pesticide Bylaw Adopted
28	West Vancouver	BC	42 131	Pesticide Bylaw Adopted
29	Saint-Eustache	QC	42 062	Pesticide Bylaw Adopted (NR)
30	Brandon	MB	41 511	Pesticide Bylaw Adopted (NR)
31	Boucherville	QC	39 062	Pesticide Bylaw Adopted (NR)
32	Côte-Saint-Luc	QC	31 395	Pesticide Bylaw Adopted
33	Pointe-Claire	QC	30 161	Pesticide Bylaw Adopted (NR)
34	Port Moody	BC	27 512	Pesticide Bylaw Adopted
35	Orangeville	ON	26 925	Pesticide Bylaw Adopted (NR)
36	Boisbriand	QC	26 483	Pesticide Bylaw Adopted
37	Vaudreuil-Dorion	QC	25 789	Pesticide Bylaw Adopted
38	Sainte-Thérèse	QC	25 224	Pesticide Bylaw Adopted
39	Saint-Bruno-de-Montarville	QC	24 388	Pesticide Bylaw Adopted (NR)
40	Chambly	QC	22 608	Pesticide Bylaw Adopted (NR)
41	Courtenay	BC	21 940	Pesticide Bylaw Adopted
42	Saint-Lambert	QC	21 599	Pesticide Bylaw Adopted (NR)
43	Val-Bélair (Quebec City)	QC	21 332	Pesticide Bylaw Adopted (NR)
44	Varennes	QC	20 950	Pesticide Bylaw Adopted
45	Westmount	QC	20 494	Pesticide Bylaw Adopted
46	Kirkland	QC	20 491	Pesticide Bylaw Adopted (NR)
47	Beaconsfield	QC	19 194	Pesticide Bylaw Adopted
48	Mont-Royal	QC	18 933	Pesticide Bylaw Adopted
49	Beloeil	QC	18 927	Pesticide Bylaw Adopted (NR)
50	Thorold	ON	18 224	Pesticide Bylaw Adopted
51	Cobourg	ON	18 210	Pesticide Bylaw Adopted (NR)
52	Dorval	QC	18 088	Pesticide Bylaw Adopted (NR)
53	Smith-Ennismore-Lakefield	ON	17 413	Pesticide Bylaw Adopted
54	Deux-Montagnes	QC	17 402	Pesticide Bylaw Adopted
55	Collingwood	ON	17 290	Pesticide Bylaw Adopted
56	Saint-Lazare	QC	17 016	Pesticide Bylaw Adopted (NR)
57	Mont-Saint-Hilaire	QC	15 720	Pesticide Bylaw Adopted
58	Rosemère	QC	14 173	Pesticide Bylaw Adopted (NR)
59	Sainte-Anne-des-Plaines	QC	13 001	Pesticide Bylaw Adopted
60	Comox	BC	12 136	Pesticide Bylaw Adopted
61	Pincourt	QC	11 197	Pesticide Bylaw Adopted (NR)

Rank	Municipality	Prov	Population	Bylaw Status
62	Prévost	QC	10 132	Pesticide Bylaw Adopted (NR)
63	Notre Dame de l'Île Perrot	QC	9 885	Pesticide Bylaw Adopted
64	Brockton	ON	9 641	Pesticide Bylaw Adopted (NR)
65	Lorraine	QC	9 613	Pesticide Bylaw Adopted
66	Val-des-Monts	QC	9 539	Pesticide Bylaw Adopted
67	Saint-Raymond	QC	9 273	Pesticide Bylaw Adopted
68	Nelson	BC	9 258	Pesticide Bylaw Adopted
69	Saint-Sauveur	QC	9 191	Pesticide Bylaw Adopted
70	Mont-Tremblant	QC	8 892	Pesticide Bylaw Adopted
71	Otterburn Park	QC	8 464	Pesticide Bylaw Adopted (NR)
72	Bois-des-Filion	QC	8 383	Pesticide Bylaw Adopted
73	Nicolet	QC	7 827	Pesticide Bylaw Adopted
74	Saint-Hippolyte	QC	7 219	Pesticide Bylaw Adopted
75	Hampstead	QC	6 996	Pesticide Bylaw Adopted
76	Plessisville	QC	6 677	Pesticide Bylaw Adopted
77	Lac-Beauport	QC	6 081	Pesticide Bylaw Adopted
78	Chelsea	QC	6 036	Pesticide Bylaw Adopted
79	Lac-Mégantic	QC	5 967	Pesticide Bylaw Adopted
80	Perth	ON	5 907	Pesticide Bylaw Adopted
81	Les Cèdres	QC	5 732	Pesticide Bylaw Adopted
82	Lac-Brome	QC	5 629	Pesticide Bylaw Adopted
83	Shediac	NB	5 497	Pesticide Bylaw Adopted
84	Sackville	NB	5 411	Pesticide Bylaw Adopted
85	Gananoque	ON	5 285	Pesticide Bylaw Adopted
86	Sainte-Anne-de-Bellevue	QC	5 197	Pesticide Bylaw Adopted (NR)
87	Montréal-Ouest	QC	5 184	Pesticide Bylaw Adopted
88	Hudson	QC	5 088	Pesticide Bylaw Adopted
89	Saint-Donat	QC	4 297	Pesticide Bylaw Adopted
90	Sainte-Martine	QC	4 237	Pesticide Bylaw Adopted
91	Deep River	ON	4 216	Pesticide Bylaw Adopted (NR)
92	Gibsons	BC	4 182	Pesticide Bylaw Adopted
93	Caraquet	NB	4 156	Pesticide Bylaw Adopted
94	Baie-d'Urfé	QC	3 902	Pesticide Bylaw Adopted (NR)
95	Montréal-Est	QC	3 822	Pesticide Bylaw Adopted
96	Saint-Adolphe-d'Howard	QC	3 563	Pesticide Bylaw Adopted
97	Morin-Heights	QC	3 503	Pesticide Bylaw Adopted
98	East Angus	QC	3 357	Pesticide Bylaw Adopted
99	Napierville	QC	3 352	Pesticide Bylaw Adopted
100	Saint-Alphonse-Rodriguez	QC	3 152	Pesticide Bylaw Adopted
101	Saint-Denis-de-Brompton	QC	3 090	Pesticide Bylaw Adopted
102	Sainte-Anne-des-Lacs	QC	3 029	Pesticide Bylaw Adopted
103	Sainte-Faustin-Lac-Carré	QC	2 985	Pesticide Bylaw Adopted
104	Saint-Liboire	QC	2 895	Pesticide Bylaw Adopted
105	Cumberland	BC	2 762	Pesticide Bylaw Adopted
106	Adstock	QC	2 678	Pesticide Bylaw Adopted
107	Huntingdon	QC	2 587	Pesticide Bylaw Adopted
108	Disrali	QC	2 564	Pesticide Bylaw Adopted
109	Lacolle	QC	2 512	Pesticide Bylaw Adopted
110	Sainte-Marguerite-Estérel	QC	2 498	Pesticide Bylaw Adopted
111	Piedmont	QC	2 386	Pesticide Bylaw Adopted
112	Georgian Bay	ON	2 340	Pesticide Bylaw Adopted
113	Nominique	QC	2 317	Pesticide Bylaw Adopted
114	Saint-Marc-sur-Richelieu	QC	1 876	Pesticide Bylaw Adopted
115	Saint Andrews	NB	1 798	Pesticide Bylaw Adopted (NR)
116	Nipigon	ON	1 752	Pesticide Bylaw Adopted
117	Eastman	QC	1 585	Pesticide Bylaw Adopted
118	Sainte-Marcelline-de-Kildare	QC	1 423	Pesticide Bylaw Adopted
119	Austin	QC	1 401	Pesticide Bylaw Adopted
120	Wentworth-Nord	QC	1 353	Pesticide Bylaw Adopted
121	La Minerve	QC	1 295	Pesticide Bylaw Adopted
122	Vaudreuil-sur-le-Lac	QC	1 290	Pesticide Bylaw Adopted

Rank	Municipality	Prov	Population	Bylaw Status
123	Notre Dame-du-Portage	QC	1 262	Pesticide Bylaw Adopted
124	Cobalt	ON	1 229	Pesticide Bylaw Adopted
125	Ayer's Cliff	QC	1 096	Pesticide Bylaw Adopted
126	Senneville	QC	962	Pesticide Bylaw Adopted
127	Entrelacs	QC	952	Pesticide Bylaw Adopted (NR)
128	North Hatley	QC	722	Pesticide Bylaw Adopted
129	The Archipelago (Parry Sound)	ON	576	Pesticide Bylaw Adopted
130	Lac-Delage	QC	503	Pesticide Bylaw Adopted
131	Wentworth	QC	483	Pesticide Bylaw Adopted
132	Glenburnie-Birchy-Head-Shoal	BrookNF	275	Pesticide Bylaw Adopted
133	Lac-Saint-Joseph	QC	266	Pesticide Bylaw Adopted
134	Sainte-Paule	QC	229	Pesticide Bylaw Adopted
135	L'île-Dorval	QC	2	Pesticide Bylaw Adopted
		135 Total	9 510 441 Adopted	

British Columbia

1	Vancouver	BC	578 041	Pesticide Bylaw Adopted
2	Burnaby	BC	202 799	Pesticide Bylaw Drafted
3	North Vancouver (District)	BC	82 562	Pesticide Bylaw Drafted (NR)
4	Victoria	BC	78 057	Pesticide Bylaw Drafted (NR)
5	Maple Ridge (District)	BC	68 949	Pesticide Bylaw Adopted
6	New Westminster	BC	58 549	Pesticide Bylaw Drafted
7	North Vancouver (City)	BC	45 165	Pesticide Bylaw Adopted
8	West Vancouver	BC	42 131	Pesticide Bylaw Adopted
9	Port Moody	BC	27 512	Pesticide Bylaw Adopted
10	Courtenay	BC	21 940	Pesticide Bylaw Adopted
11	Salmon Arm	BC	16 012	Pesticide Bylaw Drafted
12	Comox	BC	12 136	Pesticide Bylaw Adopted
13	Nelson	BC	9 258	Pesticide Bylaw Adopted
14	Gibsons	BC	4 182	Pesticide Bylaw Adopted
15	Cumberland	BC	2 760	Pesticide Bylaw Adopted
		10 Total	812 074 Adopted	

Manitoba

1	Winnipeg	MB	633 451	Pesticide Bylaw Drafted (NR)
2	Brandon	MB	41 511	Pesticide Bylaw Adopted (NR)
		1 Total	41 511 Adopted	

Ontario

1	Toronto	ON	2 372	209 Pesticide Bylaw Adopted
2	Hamilton	ON	504 559	Pesticide Bylaw Adopted
3	Waterloo (Region)	ON	478 121	Pesticide Bylaw Adopted (NR)
4	London	ON	352 395	Pesticide Bylaw Adopted
5	Markham	ON	261 573	Pesticide Bylaw Adopted
6	Vaughan	ON	238 866	Pesticide Bylaw Drafted
7	Windsor	ON	216 473	Pesticide Bylaw Adopted (NR)
8	Oakville	ON	165 613	Pesticide Bylaw Adopted
9	Burlington	ON	164 415	Pesticide Bylaw Drafted
10	St. Catharines	ON	131 989	Pesticide Bylaw Adopted
11	Guelph	ON	114 943	Pesticide Bylaw Adopted
12	Pickering	ON	87 838	Pesticide Bylaw Drafted
13	Peterborough	ON	74 898	Pesticide Bylaw Adopted
14	Newmarket	ON	74 295	Pesticide Bylaw Adopted
15	Sarnia	ON	71 419	Pesticide Bylaw Drafted
16	Caledon	ON	57 050	Pesticide Bylaw Adopted (NR)
17	North Bay	ON	53 966	Pesticide Bylaw Adopted (NR)

Rank	Municipality	Prov	Population	Bylaw Status
18	Georgina	ON	42 346	Pesticide Bylaw Adopted (NR)
19	Orangeville	ON	26 925	Pesticide Bylaw Adopted (NR)
20	Thorold	ON	18 224	Pesticide Bylaw Adopted
21	Cobourg	ON	18 210	Pesticide Bylaw Adopted (NR)
22	Smith-Ennismore-Lakefield	ON	17 413	Pesticide Bylaw Adopted
23	Collingwood	ON	17 290	Pesticide Bylaw Adopted
24	Brockton	ON	9 641	Pesticide Bylaw Adopted (NR)
25	Perth	ON	5 907	Pesticide Bylaw Adopted
26	Gananoque	ON	5 284	Pesticide Bylaw Adopted
27	Deep River	ON	4 216	Pesticide Bylaw Adopted (NR)
28	Georgian Bay	ON	2 340	Pesticide Bylaw Adopted
29	Nipigon	ON	1 752	Pesticide Bylaw Adopted
30	Cobalt	ON	1 229	Pesticide Bylaw Adopted
31	The Archipelago (Parry Sound)	ON	576	Pesticide Bylaw Adopted
27 Total			5 034 039 Adopted	

Quebec

1	Montréal **	QC	1 620 693	Pesticide Bylaw Adopted
2	Longueuil	QC	229 330	Pesticide Bylaw Adopted
3	Sherbrooke	QC	147 427	Pesticide Bylaw Adopted (NR)
4	Saint-Laurent *(Montréal)	QC	77 391	Pesticide Bylaw Adopted
5	Repentigny	QC	76 237	Pesticide Bylaw Adopted
6	Saint-Hubert *(Longueuil)	QC	75 912	Pesticide Bylaw Adopted
7	Brossard	QC	71 154	Pesticide Bylaw Adopted
8	Verdun *(Montréal)	QC	60 564	Pesticide Bylaw Adopted (NR)
9	Pierrefonds *(Montréal)	QC	54 963	Pesticide Bylaw Adopted
10	Shawinigan	QC	51 904	Pesticide Bylaw Adopted
11	Dollard-des-Ormeaux	QC	48 930	Pesticide Bylaw Adopted (NR)
12	Blainville	QC	46 493	Pesticide Bylaw Adopted
13	Rimouski	QC	42 240	Pesticide Bylaw Adopted
14	Saint-Eustache	QC	42 062	Pesticide Bylaw Adopted (NR)
15	Boucherville	QC	39 062	Pesticide Bylaw Adopted (NR)
16	Anjou *(Montréal)	QC	38 015	Pesticide Bylaw Adopted (NR)
17	Côte-Saint-Luc	QC	31 392	Pesticide Bylaw Adopted
18	Pointe-Claire	QC	30 160	Pesticide Bylaw Adopted (NR)
19	Boisbriand	QC	26 480	Pesticide Bylaw Adopted
20	Vaudreuil-Dorion	QC	25 789	Pesticide Bylaw Adopted
21	Sainte-Thérèse	QC	25 224	Pesticide Bylaw Adopted
22	Saint-Bruno-de-Montarville	QC	24 388	Pesticide Bylaw Adopted (NR)
23	Chambly	QC	22 608	Pesticide Bylaw Adopted (NR)
24	Saint-Lambert	QC	21 596	Pesticide Bylaw Adopted (NR)
25	Val-Bélair *(Quebec City)	QC	21 332	Pesticide Bylaw Adopted (NR)
26	Varenes	QC	20 950	Pesticide Bylaw Adopted
27	Westmount	QC	20 492	Pesticide Bylaw Adopted
28	Kirkland	QC	20 488	Pesticide Bylaw Adopted (NR)
29	Beaconsfield	QC	19 192	Pesticide Bylaw Adopted
30	Mont-Royal	QC	18 932	Pesticide Bylaw Adopted
31	Beloil	QC	18 924	Pesticide Bylaw Adopted
32	Dorval	QC	18 088	Pesticide Bylaw Adopted (NR)
33	Deux-Montagnes	QC	17 400	Pesticide Bylaw Adopted (NR)
34	Saint-Lazare	QC	17 016	Pesticide Bylaw Adopted (NR)
35	Greenfield Park *(Longueuil)	QC	16 978	Pesticide Bylaw Adopted (NR)
36	Mont-Saint-Hilaire	QC	15 720	Pesticide Bylaw Adopted
37	Rosemère	QC	14 173	Pesticide Bylaw Adopted (NR)
38	L'Île-Bizard *(Montréal)	QC	13 861	Pesticide Bylaw Adopted (NR)
39	Sainte-Anne-des-Plaines	QC	13 001	Pesticide Bylaw Adopted
40	Pincourt	QC	11 197	Pesticide Bylaw Adopted (NR)
41	Prévost	QC	10 132	Pesticide Bylaw Adopted (NR)
42	Notre Dame de l'Île Perrot	QC	9 884	Pesticide Bylaw Adopted
43	Lorraine	QC	9 612	Pesticide Bylaw Adopted
44	Val-des-Monts	QC	9 539	Pesticide Bylaw Adopted

Rank	Municipality	Prov	Population	Bylaw Status
45	Saint-Raymond	QC	9 273	Pesticide Bylaw Adopted
46	Saint-Sauveur	QC	9 191	Pesticide Bylaw Adopted
47	Mont-Tremblant	QC	8 892	Pesticide Bylaw Adopted
48	Otterburn Park	QC	8 464	Pesticide Bylaw Adopted (NR)
49	Bois-des-Filion	QC	8 383	Pesticide Bylaw Adopted
50	Nicolet	QC	7 827	Pesticide Bylaw Adopted
51	Saint-Hippolyte	QC	7 219	Pesticide Bylaw Adopted
52	Hampstead	QC	6 996	Pesticide Bylaw Adopted
53	Plessisville	QC	6 677	Pesticide Bylaw Adopted
54	Lac-Beauport	QC	6 081	Pesticide Bylaw Adopted
55	Chelsea	QC	6 036	Pesticide Bylaw Adopted
56	Lac-Mégantic	QC	5 967	Pesticide Bylaw Adopted
57	Les Cèdres	QC	5 732	Pesticide Bylaw Adopted
58	Roxboro *(Montreal)	QC	5 642	Pesticide Bylaw Adopted (NR)
59	Lac-Brome	QC	5 629	Pesticide Bylaw Adopted
60	Sainte-Anne-de-Bellevue	QC	5 197	Pesticide Bylaw Adopted (NR)
61	Montréal-Ouest	QC	5 184	Pesticide Bylaw Adopted
62	Hudson	QC	5 088	Pesticide Bylaw Adopted
63	LeMoynes *(Longueuil)	QC	4 855	Pesticide Bylaw Adopted
64	Saint-Donat	QC	4 297	Pesticide Bylaw Adopted
65	Sainte-Martine	QC	4 237	Pesticide Bylaw Adopted (NR)
66	Baie-d'Urfé	QC	3 902	Pesticide Bylaw Adopted (NR)
67	Montréal-Est	QC	3 822	Pesticide Bylaw Adopted
68	Saint-Adolphe-d'Howard	QC	3 563	Pesticide Bylaw Adopted
69	Morin-Heights	QC	3 503	Pesticide Bylaw Adopted
70	East Angus	QC	3 357	Pesticide Bylaw Adopted
71	Napierville	QC	3 352	Pesticide Bylaw Adopted
72	Sainte Geneviève *(Montréal)	QC	3 278	Pesticide Bylaw Adopted (NR)
73	Saint-Alphonse-Rodriguez	QC	3 152	Pesticide Bylaw Adopted
74	Saint-Denis-de-Brompton	QC	3 090	Pesticide Bylaw Adopted
75	Sainte-Anne-des-Lacs	QC	3 029	Pesticide Bylaw Adopted
76	Sainte-Faustin-Lac-Carré	QC	2 985	Pesticide Bylaw Adopted
77	Saint-Liboire	QC	2 895	Pesticide Bylaw Adopted
78	Adstock	QC	2 678	Pesticide Bylaw Adopted
79	Huntingdon	QC	2 587	Pesticide Bylaw Adopted
80	Disrali	QC	2 564	Pesticide Bylaw Adopted
81	Lacolle	QC	2 512	Pesticide Bylaw Adopted
82	Sainte-Marguerite-Estérel	QC	2 498	Pesticide Bylaw Adopted
83	Piedmont	QC	2 386	Pesticide Bylaw Adopted
84	Nominique	QC	2 317	Pesticide Bylaw Adopted
85	Saint-Marc-sur-Richelieu	QC	1 876	Pesticide Bylaw Adopted
86	Eastman	QC	1 585	Pesticide Bylaw Adopted
87	Sainte-Marcelline-de-Kildare	QC	1 423	Pesticide Bylaw Adopted
88	Austin	QC	1 401	Pesticide Bylaw Adopted
89	Wentworth-Nord	QC	1 353	Pesticide Bylaw Adopted
90	La Minerve	QC	1 295	Pesticide Bylaw Adopted
91	Vaudreuil-sur-le-Lac	QC	1 290	Pesticide Bylaw Adopted
92	Notre Dame-du-Portage	QC	1 262	Pesticide Bylaw Adopted
93	Ayer's Cliff	QC	1 096	Pesticide Bylaw Adopted
94	Senneville	QC	962	Pesticide Bylaw Adopted
95	Entrelacs	QC	952	Pesticide Bylaw Adopted (NR)
96	North Hatley	QC	722	Pesticide Bylaw Adopted
97	Lac-Delage	QC	503	Pesticide Bylaw Adopted
98	Wentworth	QC	483	Pesticide Bylaw Adopted
99	Lac-Saint-Joseph	QC	266	Pesticide Bylaw Adopted
100	Sainte-Paule	QC	228	Pesticide Bylaw Adopted
101	L'Île-Dorval	QC	2	Pesticide Bylaw Adopted
	101 Sub-Total		3 457 961	Adopted
	10 Less		351 459	Former municipalities *
	91 Total		3 106 502	Adopted
	Province of Quebec 7 546 131 Pesticide Code in full force 2006			

* Former municipalities which previously adopted pesticide bylaws but are now boroughs of the amalgamated Ville de Montréal or Ville de Longueuil.
 ** 23 of 27 boroughs moved to implement the Montreal bylaw in 2004 and 4 in 2005. Then the demerger of Montreal resulted in 13 boroughs with previous pesticide bylaws added back to the list as full municipalities.

Rank	Municipality	Prov	Population	Bylaw Status
New Brunswick				
1	Saint John	NB	68 043	Pesticide Bylaw Drafted
2	Moncton	NB	64 128	Pesticide Bylaw Drafted
3	Shediac	NB	5 497	Pesticide Bylaw Adopted
4	Sackville	NB	5 408	Pesticide Bylaw Adopted
5	Caraquet	NB	4 156	Pesticide Bylaw Adopted
6	Saint Andrews	NB	1 798	Pesticide Bylaw Adopted (NR)
		4 Total	16 859 Adopted	
Nova Scotia				
1	Halifax (Region)	NS	307 143	Pesticide Bylaw Adopted
		1 Total	307 143 Adopted	
Newfoundland				
1	Glenburnie-Birchy-Head-Shoal Brook	NF	275	Pesticide Bylaw Adopted
		1 Total	275 Adopted	

Number	Province	Population	Percentage of municipalities with Bylaws
91	Quebec	7 546 131	100,00%
27	Ontario	5 034 039	41,40%
10	British Columbia	812 074	19,74%
4	New Brunswick	16 859	2,25%
1	Nova Scotia	307 143	33,62%
1	Manitoba	41 511	3,61%
1	Newfoundland	275	0,05%
135	Canada	13 758 032	43,52%

LR = Not recommended. Indicates an extremely weak pesticide bylaw or a bylaw formulated with pesticide industry bias, such as IPM [Integrated Pest Management] or PHC [Plant Health Care].

Related Bylaws (Topsoil)

1	Moncton	NB	64 128	Topsoil Bylaw Adopted
2	St. John's	NF	35 110	Topsoil Bylaw Adopted
3	Mount Pearl	NF	24 668	Topsoil Bylaw Adopted

Appendix 3: Summary Table of different communities in Canada implementing education / outreach models and/or bylaws on pesticide use reduction

Table also includes studies on behavioural/attitudes/awareness/opinions studies performed regarding the topic. (Sourced from different articles and studies.)

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Barrie, Ontario	Education		<ul style="list-style-type: none"> The City of Barrie contracted with a consultant in 2001 to determine how pesticide use should be addressed by the city. A two-hour public consultation took place in early 2002 and draft recommendations on pesticides were presented at a public meeting a month later.(103) Based on the final report and policy recommendations, the Barrie city council decided in 2003 to implement a Pesticide Policy rather than a bylaw, directing the department of Parks, in the Leisure, Transit and Works Department, to implement an education/outreach program. The goal of the program is to have 90% of property owners not using chemical pest control products within 3 years.(104) 	There is information on pesticides on City of Barrie website, but no information on further action was found.
Town of Caledon, Ontario	Pesticide Bylaw adopted (105) Bylaw was passed on May 2003 and began being implemented in April 2004	Public opinion poll (November 2000)	<ul style="list-style-type: none"> 44% of residents use pesticides (51% urban, 35% rural); 53% of those use a spray company. 53% of those who do not use pesticides report having used them in the past - 27% cite health concerns, 21% found alternatives, 10% cite environmental concerns as reasons for stopping the use of pesticides. 73% said they would stop using pesticides if they were shown an alternative. 83% agreed that pesticides posed environmental hazards. 59% support a total ban on pesticides; 75% support a restriction to certain days of week. 80% are more likely to support ban after reading about health concerns.(106) 	Survey conducted prior to high profile coverage of Supreme Court decision in Hudson, PQ.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Town of Collingwood, Ontario	Pesticide Bylaw drafted	Council meeting agenda and minutes. March 12, 2007	<ul style="list-style-type: none"> Town of Collingwood enacted a cosmetic pesticide use bylaw March 12, 2007. It would be implemented in two phases, to provide for a transition period and public education campaign. It will begin on April 22, 2007 and will come into full-force and effect on January 1, 2008. The bylaw was drafted based on the Town of Caledon bylaw. After the draft was approved at the beginning of 2007, a public meeting took place at the end of January 2007, where none of the residents that attended were opposed to the bylaw. The bylaw restricts the cosmetic/non-essential application or use of pesticides.(107) 	Draft passed on March 12, 2007. Phase-in approach with public education campaign to commence April 22, 2007, and come into full-force and effect on January 1, 2008.
Durham Region, Ontario	Fall 2006, a pesticide policy was enacted Pesticide Bylaw drafted in Pickering (February 2007)	It Ain't Easy Being Green... Durham Region Pesticide Use in 2003 (August 2004)	<ul style="list-style-type: none"> For 3 years, the Durham Region Health Department (DRHD) surveyed residents regarding their households' outdoor use of pesticides and their support for a bylaw banning pesticide use. RRFSS surveyed 370 residents 18 years and older during the 2003 season. About half of households applied pesticides themselves on their lawn during the 2003 season. Use of pesticides on gardens and hard surfaces was less frequent than on laws (17% +5 vs 21% +5, respectively). <p>Conclusions:</p> <ul style="list-style-type: none"> 61% (+5) of Durham Region households used home and garden pesticides in 2003, which was not different from last year but was lower than in 2001. Support for bylaws banning pesticide use did not change from 2002 to 2003; however, support for a ban on municipal properties and private properties was significantly lower than in 2001.(108) 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Edmonton, Alberta		Public opinion poll (September 2004)	<ul style="list-style-type: none"> • 26% of homeowners use pesticides. 54.0% of them stated that they would stop using them if given a way to have “a weed free lawn without cosmetic pesticides.” • 40.3% of those who do not use pesticides reported that they had used them in the past. • 75.4% support a phase-out of pesticides on private property. • 50.6% supported a bylaw to phase-out pesticides. 	
Halifax Regional Municipality, Nova Scotia	Pesticide Bylaw adopted in April 2003. It was phased in over two years between April 2001 and April 2003.	Omnibus poll Fall 2001 & Omnibus poll Fall 2002	<ul style="list-style-type: none"> • 90% aware/had some general knowledge of bylaw. • 82% using safer alternatives (61% using no pesticides, 23% using alternatives and some permitted pesticides). • 85% interested in learning more about alternatives.(109) • 7% still using pesticides as their main means of pest control 89% using safer alternatives (76% using no pesticides 13% using alternatives and some permitted pesticides).(110) 	<p>Bylaw passed in 2000, came into force in 2003. Public education began in 2000. Halifax Regional Municipality suggests that these comparison surveys provide evidence of the success of public education programs and a pending bylaw.</p> <p>Survey question introduced bylaw at the beginning - respondents may have been influenced by desire to appear law-abiding. Awkward wording may also confuse reporting.</p>

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Halifax Regional Municipality, Nova Scotia (continued)		The impact of bylaws and public education programs on reducing the cosmetic/non-essential, residential use of pesticides	<ul style="list-style-type: none"> • The region contracted Clean Nova Scotia to visit homes and process the applications for pesticide permits; this was implemented as educational one-on-one. • They used other educational approaches such as decals, signs, calendars, posters, seed packs, etc., as well as workshops and creation of a website. • There was a high level of reduction within a year of implementation. (2004)(114) 	Study in progress by J. Baxter and R. Hirsch from University of Western Ontario. Phase I interviews with policy makers in Calgary (no bylaw) and Halifax (bylaw). Phase II: survey to residents in both cities. Phase III: interviews with selected respondents. Both cities show different priorities, regardless of their perception of health risks: Calgary residents more concerned about a weed-free lawn than pesticides, while Halifax residents significantly more concerned about pesticides.(115)
Hamilton, Ontario	Pesticide Bylaw was passed by City Council. Will be in effect on September 1, 2008, with an education phase until then. A second phase with fines being applied will begin in 2009.	The impact of bylaws and public education programs on reducing the cosmetic/non-essential, residential use of pesticides	<ul style="list-style-type: none"> • In 2002, Green Venture and Hamilton's Coalition on Pesticides Issues began a two-year public awareness and information sharing campaign called Green Lawns, Healthy Kids.(Green Lawns, Healthy Kids) • Educational program consisted of 30 promotional events, traveling display booth, door hangers, pamphlets, and others. • There was a reduction of 10-24% in pesticide use.(116) 	A follow up survey was planned for February 2004.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Hamilton, Ontario (continued)		Pesticides- Health and Environment And Pesticide Bylaw RRFSS (February – July 2002)	<ul style="list-style-type: none"> • Almost 43% (42.6%) of Hamilton residents indicated that they feel pesticides have a negative effect on human health; 35% (35.3%) of residents indicated that they are not sure or don't know if pesticides have an effect on human health. • Almost 45% (44.6%) of Hamilton residents indicated that they feel pesticides have a negative effect on the environment, while thirty-six (35.6%) of residents indicated that they are not sure or don't know if pesticides have an effect on the environment. • 68.4% of Hamilton residents support banning pesticide use on municipal property. • Significantly more residents of Hamilton (61.6%) support banning pesticide use on commercial/industrial property. • Almost 57% (56.5%) of Hamilton residents support banning pesticide use on private/residential property.(117) 	
		RRFSS (May – Dec 2003)	<ul style="list-style-type: none"> • About 73% of residents were supportive of the use of pesticides to prevent the transmission of WNV to humans.(118) 	
		Results of a survey of Awareness, Uses and Attitudes Towards Lawn Pesticides and	<ul style="list-style-type: none"> • Purpose of this survey was to measure the effectiveness of the Green Lawns, Healthy Kids educational program for pesticide reduction in citizens of Hamilton. • 372 surveys were mailed out to a randomly selected sample group. 132 responses were received by June 2004 with a response rate of 37%. • Questionnaires were sent March 2004. All responses were recorded by the end of June 2004. 	

Jurisdiction	Bylaw or education	Studies		
		Findings	Comments	
Hamilton, Ontario (continued)		the Green Lawns, Healthy Kids Project (2004) (continued)	<p>Results</p> <ul style="list-style-type: none"> • A high percentage of both groups never used pesticides in the past year in the care of their lawn (72%). • Less than 8% of the survey respondents used pesticides for full coverage of lawn. • Over 29% of respondents in both groups decreased or eliminated their pesticide use in 2003. From this percentage 53% previously used pesticides as full coverage or as a spot treatment for lawn. • Over all respondents strongly agreed that pesticides are harmful to the environment and health: 81% and 82% respectively. • Over two-thirds of the respondents strongly agreed that pesticides concerned them and that pesticides should be eliminated from lawn and garden care practices.(119) 	
		Cosmetic Pesticides in Hamilton: Executive Summary Survey Report (July 2006)	<ul style="list-style-type: none"> • 27% of Hamilton residents currently use pesticides. • Pesticides use is declining: 17% of Hamiltonians at one time used these chemicals but have since discontinued their use, primarily because of health concerns. • Pesticide users are also looking for alternatives to using these products as a high of 78% of those that maintain their own lawns and 36% that use lawn companies stated that they would be likely to discontinue their use if provided with information on substitutes. Currently only 32% are aware of the steps involved in creating a pesticide free lawn. • Most residents agree that pesticides post health risks, especially to children and the environment as well as impacting on ground water. • Residents in the high usage cohorts need to be targeted with information on substitutes for pesticides focusing on the convenience of use, effectiveness and affordability of such products.(120) 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Hudson / St. Lazare / Notre Dame, Quebec	Pesticide Bylaw adopted in 2001	The impact of bylaws and public education programs on reducing the cosmetic/non-essential, residential use of pesticides	<ul style="list-style-type: none"> • They used a variety of techniques to help residents comply with their bylaws, with home patrols to answer questions and provide advice on alternatives. They emphasized their campaigns on sustainable horticulture, training and support. • Warning letters were sent to people who disobeyed the bylaw and were backed-up with threats of increasing fines. • They used information phone lines, talks and workshops, etc. • The industry players were partners on the development and implementation of the bylaw and education campaigns. The Coalition for Alternatives to Pesticides (CAP) helped building public support for reductions.(121) 	A new province-wide law was passed in July 2002. In 2006, a ban on sales of pesticides with certain ingredients was enforced.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Kamloops, British Columbia	Education – Outreach campaign	<p>A pesticide/ herbicide bylaw in Kamloops</p> <p>Final Report from Advisory Committee</p>	<ul style="list-style-type: none"> • In March 2006, City Council established the Pesticide Use Bylaw Advisory Committee. They invited public submissions, presentations, hosted an open house and undertook a survey to gather as much information from the public as possible.(122) • The committee did a public survey: 367 surveys completed: biased to the south shore residents (70%). 85% use chemical pesticides on their lawn and garden. They (49% - 61%) think all property types (residential, commercial, institutional, recreational and industrial) should be under different draft bylaw requirements. They preferred to have an education program implemented rather than a bylaw.(123) • The report suggested focusing on resources and committing to a public education program regarding the reduction of pesticide use, and that the city adopt a Pesticide Bylaw designed to reduce and eventually eliminate pesticide use in the City over a number of years. • This will involve increased education opportunities using an IPM approach. This will include: more comprehensive approach to resident education including proper landscape design, reduced irrigation needs, and the use of alternatives to pesticides. The program would include public open houses, presentations, handouts, surveys, etc. to reduce and eventually eliminate pesticide use in the City over a 3-5 year period.(124) • Bylaw proposal: it was recommended that a strong education program for pesticide use reduction should precede the implementation of a bylaw. If needed, the bylaw should be phased in over several years as: Phase 1 - Significant education campaign; Phase 2 - Bylaw implemented, no enforcement, continued education campaign and Phase 3 - Bylaw enforcement begins.(125) 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Middlesex-London Health Unit, Ontario	Pesticide Bylaw passed in June 2006 to take effect in September 2008(126)		<ul style="list-style-type: none"> Main objective of campaign was to increase awareness of plant health care and pest management while encouraging the use of pesticide alternatives, aiming for a reduction in the use of urban pesticides by 2007. In 2002, Middlesex London Health Unit collaborated with Stats Canada to conduct an adult door-to-door, household survey of 546 dwellings in the City of London.(127) 	City of London developed a 5-year "Community Plant Health Care / Integrated Pest Management Plan" (PHC/IPM).
		Door-to-door survey (April 2002)	<ul style="list-style-type: none"> 77% support a pesticide ban on private property.(128) 	Only City of London residents polled in door-to-door survey.
		RRFSS (May-December 2002)	<ul style="list-style-type: none"> 57.8% support a pesticide ban on private property.(129) 	Residents of London and Middlesex County polled.
		RRFSS (June 2003 – January 2004)	<ul style="list-style-type: none"> Of those properties with a lawn or garden (82.6%), 46.2% report using pesticides 19.7% of all households report hiring a pesticide company: 63.4% of companies used pesticides and 79.7% of companies provided info on how to reduce exposure to pesticides. 36.5% of companies offered pesticide-free programs. 35.4% of those with lawns reported using pesticides whether they hired a company or not; of these, 76.3% spot sprayed rather than treated the entire lawn. 57.2% of those with lawns reported using alternatives - not having information was given as the most common reason for not using alternatives. 43% said that pesticides have a negative effect even when used properly.(130, 131) 	City of London and Middlesex County polled. City of London began PHC/IPM public education program in 2003. 9.2% reported an awareness of this campaign.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Town of Newmarket, Ontario	Pesticide Bylaw passed in June 2006	News Release (June 2006)	<ul style="list-style-type: none"> • News release about Pesticide-free Newmarket. • On June 26, 2006, Newmarket became the first municipality in the GTA to pass a bylaw prohibiting the cosmetic use of pesticides on public and private property. • Bylaw will take effect on Sep 1, 2008. Leading up to that date, the Town will rollout a comprehensive public education program to inform residents and businesses on the safe use of pesticides and alternative means of controlling pests. • Complement to the news release: Newmarket's bylaw is modeled after Toronto's and bans most pesticide use within the Newmarket borders.(132) 	
Town of Oakville, Ontario	Pesticide Bylaw passed in February 12, 2007	Why we need a pesticide bylaw [Presentation to the Corporation of the Town of Oakville, February 2007]	<ul style="list-style-type: none"> • Presentation made to Town of Oakville about pesticides. • Summary of chemical pesticides, risks. Regulation and PMRA mandates. • Stats: Effective Jan 1, 2007, pesticide companies will be required to begin collecting pesticide sales data (Health Canada). • Lists organizations and professionals calling for a ban on the cosmetic use of pesticides. • Summary of pesticide resistance, ecosystem disruption. • 2006: Quebec's Pesticide Management Code came into force for Quebec's 1141 municipalities. • Refers to C2P2 study saying: "Only those communities that passed a bylaw and supported it with education or made a community agreement were successful in reducing the use of pesticides by a high degree (51-90%)." 	Bylaw includes education program and outreach program.

Jurisdiction	Bylaw or education	Studies		
			Findings	
			Comments	
Town of Oakville, Ontario (continued)			<ul style="list-style-type: none"> • On same note: "While voluntary compliance campaigns appear to be cost effective and politically less contentious than regulation, if they do not achieve the desired changes, legislation can, in the end, be the more effective strategy both in terms of cost and results" (Dr. Leslie Jermyn, 2005. Toronto Public Health). • Costs and Enforcement: The cost to implement a bylaw appears to be in the order of 0.50-\$1.00 per person per year (Cullbridge Marketing and Communications). The municipalities have been able to avoid court action. Compliance has been accomplished through education, mediation and fines.(133) 	
	Town passes Pesticide Bylaw. February 2007	<ul style="list-style-type: none"> • News release about the Town of Oakville Pesticide Bylaw. • The Town of Oakville passed a bylaw to regulate pesticide use in Oakville to take effect on January 1,2008. • Bylaw bans the use of pesticides within the town's boundaries, except on land used for the commercial production of food, and on golf courses accredited in IPM techniques. • Pesticides will still be allowed for the purposes of controlling pests. • Council has directed that a task force be formed to create and execute a public education plan to enhance the efforts already being undertaken by the Town and Halton Region. • Task force will also develop a strategy to encourage pesticide retailers to support and cooperate with the bylaw.(134) 		

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Orillia, Ontario	Education		<ul style="list-style-type: none"> The Council requested a summary report on pesticide use activity in 2002, based on requests from the Orillia residents. Based on this report, a forum was held in the Council Chambers at City Hall on June 12, 2003 to solicit public response regarding cosmetic pesticide use. The findings of this forum were presented at the October 2004 Council meeting, where recommendations were made as to how to implement a pesticide use bylaw for cosmetic purposes.(135) After a year of conversations, in the meeting of April 2006, the City Council directed an Environmental Advisory Committee to create and deliver an education program regarding the use of pesticides and report back findings to Council one year later.(136) 	
City of Ottawa, Ontario		Public opinion poll (April 20020)	<ul style="list-style-type: none"> 80% of residents have a lawn or garden; 48% of this group uses pesticides (1/2 of this group first reported not using pesticides, and then acknowledged some use of chemicals). 20% report hiring a company for all or part of the work. Pesticide use generally increases with those that do not consider them to be a hazard, place high value on appearance/a weed-free lawn, and/or hire a lawn care company. Use of alternatives (e.g. weeding) is strongly linked to those who do not use pesticides or place high value on a weed-free lawn. 7% of those familiar with non-chemical methods rate them as or more effective than chemical methods.(137) 	Poor understanding of term "pesticides" may underestimate actual use. As people become more familiar with term over time, numbers may actually increase, inflating reductions. Pesticide use strongly related to the value people place on the appearance of the property; alternative methods not recognized to be as effective, even among those who use alternatives.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
Peel Region, Ontario	Pesticide Bylaw adopted in Caledon only (considered to be weak due to industry bias)	RRFSS (January 2002 – January 2003)	<ul style="list-style-type: none"> 68.1% strongly or somewhat support a municipal ban, 61.9% for commercial properties and 59% strongly or somewhat support a ban on private property (for both, support declines from Caledon to Mississauga to Brampton).(138) 	Peel advises caution in interpreting results.
City of Peterborough, Ontario	Pesticide Bylaw adopted (May 2006)	Public opinion poll (September 2004)	<ul style="list-style-type: none"> 28.5% of homeowners use pesticides. 64.3% of them stated that they would stop using them if given a way to have “a weed free lawn without cosmetic pesticides.” 47% of those who do not use pesticides reported that they had used them in the past. 83.8% support a phase-out of pesticides on private property; 63.6% supported a bylaw to phase-out pesticides.(139) 	
Sault-Ste Marie, Ontario	Education/ Outreach Program	The impact of bylaws and public education programs on reducing the cosmetic/non-essential, residential use of pesticides	<ul style="list-style-type: none"> Clean North has been providing public education on reducing the residential use of pesticides. They provide visits to educate homeowners about lawn/garden chemical alternatives, hand out flyers and leaflets. In 2000, 57% of homes had converted to become pesticide free as part of the campaign. However, the campaign stopped since Naturally Green (Clean North) went out of business.(140) 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Toronto, Ontario	Pesticide by-law came into effect in April 2004 (applies to anyone using pesticides outdoors). Fines may be imposed for certain pesticide users as of September 1, 2005	Public opinion poll Fall 2002	<ul style="list-style-type: none"> 76% of respondents had a lawn or garden. Of this proportion: 33% reported using pesticides and 27% hired a company. 40% of those applying pesticides themselves also hired a company. 62% of those that hired a company reported the company using pesticides, 46% used alternatives and 30% of those that used alternatives also hired a company. 17% of those who used alternatives also used pesticides. 72% support a bylaw on private property (no difference whether they own a lawn or not).(141) 	Public opinion poll conducted following highly-publicized consultation process and Council debates, which may affect reporting.
	As of September 1, 2007, homeowners and renters must comply with the bylaw and may be fined if they do not comply	RRFSS (October 2003 – April 2004)	<ul style="list-style-type: none"> 54.8% of respondents had a lawn or garden. 36.6% used pesticides, 24% hired a company.(142) 	RRFSS data is not statistically significant (due to small sample size and apparent misunderstanding of the term “pesticides” and “pesticide-free methods”), but suggests an estimated 10% decrease in the use of pesticides and a 10% increase in the use of pesticide-free methods, by both individuals and lawn care companies.
		RRFSS (October 2004 – April 2005)	<ul style="list-style-type: none"> 47.5% of respondents had a lawn or garden. 30.1% used pesticides, 24% hired a company.(143) 	Data also suggests that more than half of lawn care companies used pesticides and less than half offered to use alternatives.

Jurisdiction	Bylaw or education	Studies		
		Findings	Comments	
City of Toronto, Ontario (continued)		Interim Evaluation Report on Toronto's Pesticide Bylaw (February 9 2007)	<ul style="list-style-type: none"> To evaluate the bylaw's preliminary impacts, Toronto Public Health collected and reviewed the results of focus groups and surveys of Toronto residents, Public Health Inspectors' stats on bylaw compliance and pesticide use, and information about the experiences of residents, commercial stakeholders and City staff. Data was primarily collected between 2003 and 2005, before penalties for commercial pesticide users came into effect. Toronto Public Health is currently collecting pesticide use data about the summer of 2006. These results are expected in early summer 2007. Early evidence shows promising signs of behaviour change regarding the use of pesticides in Toronto. A majority of Torontonians, particularly those with lawns or gardens, know about the Pesticide Bylaw, and compliance is high. It is essential that education, enforcement and evaluation activities continue in the years ahead to fully implement the bylaw and assess its impacts. 	
			<ul style="list-style-type: none"> The Bylaw: April 1, 2004 - Education-based enforcement begins. September 1, 2005 - Penalty-based enforcement begins for commercial pesticide users. September 1, 2007 Penalty-based enforcement begins for residential users. <p><u>Results</u></p> <ul style="list-style-type: none"> Fewer people report using pesticides in Toronto: the proportion of Toronto residents who report any pesticide use on their lawns decreased by 35%. Households also report that their lawn care companies have substantially reduced their use of pesticides from 60% + 11% to 36% + 7%. 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Toronto (continued)		Interim Evaluation Report on Toronto's Pesticide Bylaw (February 9 2007) (continued)	<ul style="list-style-type: none"> In households, the proportion who reported that someone in their household had used pesticides on their lawn decreased from 25% (+5%) to 18% (+3%). Reported use of natural alternatives is increasing: surveys indicate that use of alternatives is increasing in Toronto from 29% to 60% of all households. Most people are aware of the bylaw: awareness of the bylaw is high (~70%), particularly among those who have a lawn. Over 40% of Torontonians are aware of the educational campaign about the bylaw and natural lawn care alternatives. Bylaw compliance is high: Since 2004, Public Health Inspectors have responded to over 3,000 complaints of possible bylaw violations. These numbers have decreased substantially since then; inspectors laid only 3 charges and issued fewer than 28 warning letters to first offenders in 2005.(148) 	
Greater Vancouver, British Columbia	Pesticide Bylaw adopted in Vancouver, city of North Vancouver and district of West Vancouver. Pesticide Bylaw currently drafted (February 2007) in District of North Vancouver	The impact of bylaws and public education programs on reducing the cosmetic/non-essential, residential use of pesticides	<ul style="list-style-type: none"> In 2003, the North Shore Recycling Program (NSRP) worked with 3 communities to create a five-year plan to reduce pesticide use through public education. It had a Community Based Approach with "Healthy Community, Healthy Environment" workshops. They used media campaign, website, information packages, signs and street cards. A baseline survey took place in Spring 2003 and another in October 2003. There were marginal results with less than a 10% reduction in the first season of the campaign.(149) 	There was a reduction in pesticide use, but project was too young and short seasonal period, therefore a decrease on pesticide use could not be established. Needs for a 2004 Survey were presented with the recommendation of extending education to 2007.(150) However, in July 12, 2005 Vancouver City Council enacted a bylaw, which came into effect on January 2006.(151)

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Waterloo, Ontario	Pesticide Bylaw adopted; considered to be weak due to industry bias.(153)	Public opinion poll (February 2000)	<ul style="list-style-type: none"> The majority of respondents identified insects, rather than weeds, as the target for pesticides. 41% of respondents feel pesticides are somewhat necessary on lawns, 23% feel not at all important, 20% say very important. 41% of respondents are described as having “mixed feelings” about pesticides – they are not very concerned, and feel pesticides may be somewhat necessary. Only 16% are not concerned at all.(154) 	Survey conducted prior to high profile coverage of Supreme Court decision in Hudson, PQ.
		Waterloo Public Health (October 2005)(155)	<ul style="list-style-type: none"> 2004: a preliminary pilot of the Community-Based Social Marketing (CBSM) Plan was carried out in a selected residential area in the City of Waterloo, plus focus group testing was done to determine the barriers to adopting pesticide alternatives. Campaign used principles of CBSM and research findings from previous telephone surveys and focus group sessions. Also, ads on radio, newspaper, GRT bus shelters and GRT bus wraps were used. CBSM used an innovative approach to educate and motivate residents to reduce or eliminate their pesticide use. Neighbourhood canvassing teams went door-to-door in target neighbourhoods to speak to residents. Also, eight workshops were held throughout the region to emphasize seasonally important natural lawn care practices. <p>Evaluation: Used 3 different methods</p> <ul style="list-style-type: none"> <u>First</u>: participants in the natural lawn care workshops completed an evaluation of the presentation. They thought the information was useful and they would likely use the pesticide reduction lawn care methods discussed. The workshops were well received. 	Based on a pilot study done in 2005, budget support was requested budget to support another education campaign in the region of Waterloo. An evaluation demonstrated that the campaign had an impact, and staff recommends an additional year of the campaign.

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Waterloo (continued)			<ul style="list-style-type: none"> • <u>Second</u>: focus group discussion was held with the neighbourhood canvassing team members to obtain their views on public's reaction to the campaign information. They thought residents were generally receptive to the messages of the campaign and interested in receiving information about reducing pesticide use. • <u>Third</u>: telephone surveys were used to evaluate the effectiveness of both the overall campaign and the neighbourhood canvassing. (Sep 26-Oct 3/05). Random region-wide telephone survey which collected data about lawn care practices for the entire season. Results were compared to the baseline survey conducted in 2004 which contained identical questions. Telephone survey was conducted during the same time period to evaluate if the neighbourhood canvassing team had a positive effect on changing the lawn care methods of those contacted. <p>Results:</p> <ul style="list-style-type: none"> • Residents are using more of the pesticide education lawn care practices promoted during the campaign than they were in 2004, and there was further adoption of those practices in the canvassed neighbourhoods. Indicated large increases in many of the other pesticide reduction practices that were promoted by the campaign.(156) • Visit plus information package had a positive impact on the adoption of the desired lawn care methods. • Number of residents that did not use pesticides increased only slightly compared to previous year. Respondents in the canvassed neighbourhood sample have shifted slightly from using multiple pesticide application to one or two applications. <p>Summary:</p> <ul style="list-style-type: none"> • There was a significant increase on the use of pesticide reduction lawn care methods, while there was only a slight increase in residents that did not use any pesticides. 	

Jurisdiction	Bylaw or education	Studies		
			Findings	Comments
City of Waterloo (continued)			<ul style="list-style-type: none"> • There is a need for residents to better understand how the specified lawn care methods can improve the natural pest and weed resistance of lawns and therefore reduce the need for the same level of pesticide use. • It is recommended that any subsequent education campaigns emphasize the connection between using natural lawn care practices and the resulting reduced need for pesticide use.(157) 	
York Region, Ontario	Pesticide Bylaw adopted in Newmarket, Vaughan, Markham, Georgina	RRFSS (January - October 2002)	<ul style="list-style-type: none"> • 61% support for bylaw on private lands. 72% supported bylaws for municipal and 65% for commercial lands.(158) 	Decline in support for private and commercial bylaws between 2002 & 2003 not statistically significant.
		RRFSS (January – December 2003)	<ul style="list-style-type: none"> • 56% support for bylaw on private lands. 64% supported bylaws for municipal and 61% for commercial lands.(159) 	
Province of Ontario	Provincial government is being lobbied requesting a province wide ban of aesthetic use of pesticides (February 26, 2007)	Ontario Survey Report on Pesticide Use (January 2007)	<ul style="list-style-type: none"> • One thousand Ontario residents were randomly called and interviewed at the end of January 2007. • 71% supported a law which prohibits the use of most lawn and garden pesticides. 	

Appendix 4: Example of Toronto's Protocol for response to Pesticide Complaints, Phase 1 and 2.

Toronto's Pesticide Bylaw (160)

Figure 1: Public Health Inspection Protocol for Pesticide Complaints -- Phase I April 2004-August 2005

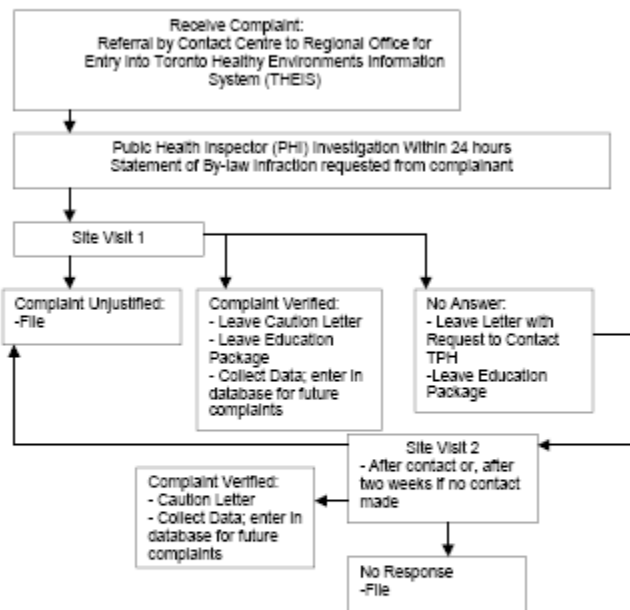
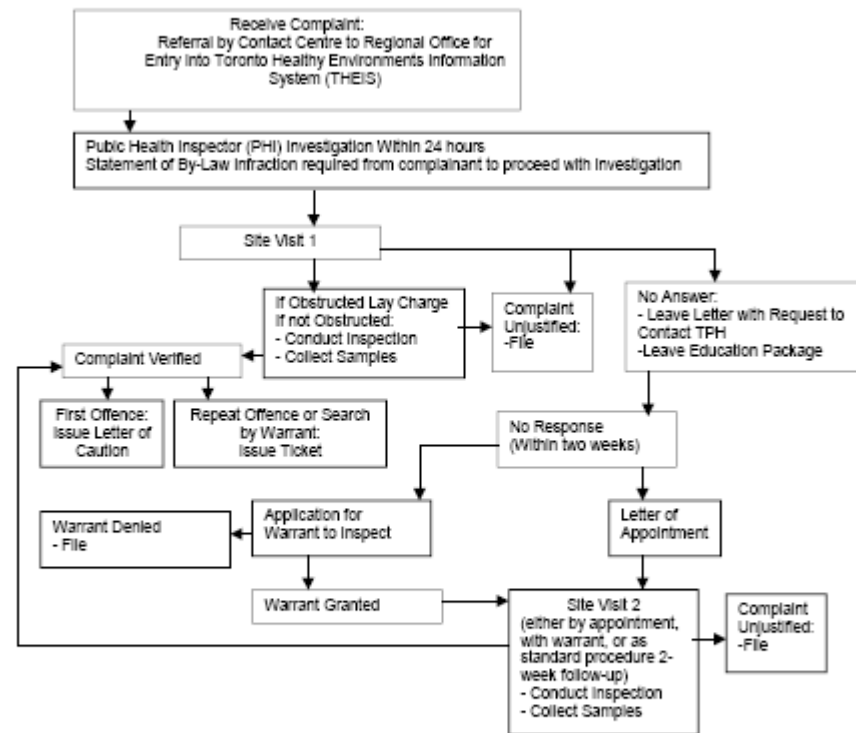


Figure 2: Public Health Inspection Protocol for Pesticide Complaints -- Phase II Commencing September 2005



References

- 1 City of Barrie [homepage on the internet]. Pesticide Reduction. Barrie: [updated 2007]. Available from <http://www.city.barrie.on.ca/Content.cfm?C=3344&SC=1&SCM=1&MI=1255&L1M=4>
- 2 McKeown D. Interim Evaluation of Toronto's Pesticide Bylaw [report on the internet]. Toronto Public Health. 2007; February. Available from http://www.toronto.ca/health/pesticides/pdf/interim_evaluation_report_02262007.pdf
- 3 City of Toronto [homepage on the internet]. Pesticide Bylaw: Q&A. Toronto: [updated 2007]. Available from http://www.toronto.ca/health/pesticides/bylaw_qa.htm
- 4 Scanell K for the Northwest Coalition for Alternatives to Pesticides [homepage on internet]. Oregon's New Pesticide Right-to-know Law and You. 2000; February. Available from <http://www.pesticide.org/OF1.pdf>
- 5 City of Brockville [homepage on the internet]. Pesticide Reduction Guidelines. Brockville: 2007; March 12. Available from <http://www.brockville.com/nodetails.cfm?IDno=14>
- 6 Middlesex-London Health Unit [homepage on the internet]. Residential Pesticide Use in London-Middlesex: Attitudes and Behaviours. 2004; April. Available from <http://www.healthunit.com/articlesPDF/10817.pdf>
- 7 Sierra Club of Canada [homepage on the internet]. Safe Alternatives to Household Hazardous Products For your family, pets and environment! Ottawa: [retrieved 2007; March]. Available from <http://www.sierraclub.ca/national/programs/health-environment/pesticides/alternative-household-prod.pdf>
- 8 Green Communities Canada [homepage on the internet]. What you should know about pesticides. Canada: 2005. Available from <http://www.gca.ca/indexcms/pdf/What%20you%20should%20know%20about%20pesticides.pdf>
- 9 Ibid N.8
- 10 Sanborn M, Cole D, Kerr K, Vakil C, Sanin LH, Bassil K. Pesticides Literature Review. Ontario College of Family Physicians [homepage on the internet]. Ontario: 2004; April. Available from <http://www.ocfp.on.ca/local/files/Communications/Current%20Issues/Pesticides/Final%20Paper%2023APR2004.pdf>
- 11 Standing Committee on Environment and Sustainable Development. Pesticides Making the Right Choice. Canada: 2000; May. Available from <http://cmte.parl.gc.ca/Content/HOC/committee/362/envi/reports/rp1031697/envi01/04-toc-e.html>
- 12 Ibid N.10
- 13 Ibid N.2
- 14 Ibid N. 11
- 15 Ibid N. 8
- 16 Pesticide Use Bylaw Advisory Committee for City of Kamloops. Final Report. 2006. Kamloops: 2006; December. Available from <http://www.kamloops.ca/pdfs/committeeMinutes/IPM-FinalReport.pdf>
- 17 Pest Management Regulatory Agency [homepage on the internet]. Fact Sheet on The Regulation of Pesticides in Canada. Canada: 2003. Available from http://www.pmr-arla.gc.ca/english/pdf/fact/fs_pestreg-e.pdf
- 18 Ibid N.10

-
- 19 Baxter J, Brown C, and Hirsch R. University of Western Ontario. Social determinants of Pesticide Bylaw Formation and Preference in Calgary and Halifax. London: 2005; September. Available from http://geography.ssc.uwo.ca/faculty/baxter/research/Ottawa_Informed_Decision-making_Baxter_Final_toshare.pdf
- 20 Ibid N.10
- 21 Christie M for Stats Canada. Private Property Pesticide Bylaw in Canada. Ottawa: 2007; February. Available from <http://www.flora.org/healthyottawa/BylawList.pdf>
- 22 Fenner-Crisp, P.A. office of Pesticide Programs, US Environmental Protection Agency. The future of Pesticide Regulations. Washington: Jul/Aug 1997. Vol. 47, Iss. 7; pg. 457, 3 pgs; ProQuest Science Journals.
- 23 Pest Management Regulatory Agency [homepage on the internet]. Fact Sheet on Integrated Pest Management Partnership Program. Canada: 1998. Available from http://www.pmr-arla.gc.ca/english/pdf/fact/fs_ipm-e.pdf
- 24 Ibid N. 23
- 25 McKeown D, Medical Office of Health from Toronto Public Health. Interim Evaluation Report on Toronto's Pesticide Bylaw. Toronto: 2007; February. Available from <http://www.toronto.ca/legdocs/mmis/2007/hl/bgrd/backgroundfile-1671.pdf>
- 26 Ibid N.6
- 27 Ibid N.1
- 28 Ibid N.5
- 29 Ibid N.21
- 30 New York Coalition for Alternatives to Pesticides. A Model Structural Integrated Pest Management Plan and Policy for Schools. New York: 2003; September. Available from <http://www.crisny.org/not-for-profit/nycap/modlplan.htm>
- 31 Bruyn L and Goldberg E for Newton Board of Health. Newton's Alternatives to Pesticides Education Program. Newton, MA: 1997. Available from <http://www1.turi.org/content/content/view/full/2888/>
- 32 Ibid N.21
- 33 Ibid N.5
- 34 Oracle Poll Research for The Caledon Countryside Alliance. Environmental Issues in Caledon: Survey Report. Caledon: 2004; January. Available from <http://www.caledoncountryside.org/EnvResidentSurvey-2004042201.pdf>
- 35 Kassirer J, Koswan S, Spence K, and Morphet S for Cullbridge Marketing and Communications; and Wolnik C, Goom S and Del Matto T for The Canadian Centre for Pollution Prevention (C2P2). The Impact of Bylaws and Public Education programs on Reducing the Cosmetic / Non-Essential, Residential Use of Pesticides: A Best Practices Review. Canada: 2004; March. Available from <http://www.c2p2online.com/documents/PesticidesBestPracticeReview-FINAL040324.pdf>
- 36 Town of Collingwood, [homepage on the internet] Council meeting minutes and agenda. Collingwood: 2007, March. Available from <http://www.town.collingwood.on.ca/uploaddocuments/Mar%2012-Council%20Agenda.pdf>
- 37 City of Cobourg [homepage on the internet]. Pesticide Reduction – Let's keep Cobourg Clean, Green and Natural. Cobourg; 2007. Available from <http://www.cobourg.ca/home.asp?PageID=923&sMenuID=931>
- 38 Green Communities Canada [homepage on the internet]. Controlling pests and diseases in your garden... Canada: 2005. Available from

<http://www.gca.ca/indexcms/pdf/Controlling%20pest%20and%20diseases%20in%20your%20garden...pdf>

39 Ibid N.7

40 Ibid N.5

41 Ontario Public Health Association. OPHA Resolution on the Non-Essential Use of Chemical Pesticides on Public and Private Lands. Toronto: 2001. Available from http://www.opha.on.ca/ppres/2001-02_res.pdf

42 Ibid N.5

43 Baxter J, Brown C, and Hirsch R. University of Western Ontario. Perception of Urban Pesticide Use Risk (PUrPUR): A comparison of Halifax, Calgary (and now) London. London: 2006. Available from <http://publish.uwo.ca/~jbaxter6/research.html>

44 Ibid N.19

45 The Ontario Trillium Foundation for Hamilton Coalition of Pesticide Issues and Green Lawns, Healthy Kids. Results of a Survey of Awareness, Uses and Attitudes Towards Lawn Pesticides and the Green Lawns, Healthy Kids Project. Hamilton: Green Venture 2004. Available from http://www.greenventure.ca/hcpi/GLHK_Survey_2004.pdf

46 Développement durable, Environnement et Parcs [homepage on internet]. The Pesticides Management Code and You. Quebec: 2006; July. Available from <http://www.mddep.gouv.qc.ca/pesticides/permis-en/code-geste-en/index.htm>

47 Environmental Health and Lifestyle Resources of Region of Waterloo Public Health [homepage on internet]. Non-Essential Pesticide Reduction Social Marketing Campaign. Waterloo: 2005; October. Available from [http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/0B6F74D028DBBF448525709A00495B2B/\\$file/PH-05-054.pdf?openelement](http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/0B6F74D028DBBF448525709A00495B2B/$file/PH-05-054.pdf?openelement)

48 The Massachusetts Department of Environmental Protection [homepage on the internet]. Reducing Pesticide Use in Lawn Care: Barriers and Opportunities. Massachusetts: 2005; October. Available from <http://www.mass.gov/dep/recycle/reduce/redpstlw.doc>

49 Ibid N.19

50 Gunn E for TURI – Toxics Use Reduction Institute. Working with communities to Promote Pesticide Use Reduction. Massachusetts: 2004. Available from www.turi.org/content/content/download/2963/27943/file/TURI_Pesticide%20Reduction%20Working.pdf

51 Jermyn L for Toronto Public Health. Lawn and Order: A review of Literature on Effective Strategies for Reducing Outdoor Residential Pesticide Use. Toronto: 2005; December. Available from http://www.pestinfo.ca/documents/PURE_Project_Literature_Rev.pdf

52 Ibid N.7

53 Ibid N.51

54 Ibid N.35

55 Ibid N.35

56 Ibid N.35

57 Oracle Poll Research for Naturally Hamilton [homepage on the internet]. Cosmetic Pesticides in Hamilton: Executive Summary Survey Report. Hamilton: 2006; July. Available from http://www.naturallyhamilton.ca/sites/naturallyhamilton.ca/files/Naturally%20Hamilton_%20Executive%20Summary%20Report_Sept06.doc

-
- 58 Lura Consulting [homepage on the internet]. A Pesticide Bylaw for Hamilton? Hamilton: 2005. Available from <http://www.lura.ca/hampestintro.htm>
- 59 City of Hamilton. Draft of Proposed Bylaw Limiting the use of Pesticides. Hamilton: 2007; September. Available from <http://www.myhamilton.ca/NR/rdonlyres/22B1855D-74B4-4254-AAEC-85E74C459B8B/0/DRAFTPesticideUseBylawJuly2307.pdf>
- 60 Naturally Hamilton. City of Hamilton becomes 129th Canadian Municipality to adopt a Pesticide Bylaw. Hamilton: 2007; September. Available from <http://naturallyhamilton.ca/node/71>
- 61 Ibid N.47
- 62 Ibid N.47
- 63 Waterloo Regional Council. A Bylaw to Reduce the Use of Pesticides in the Regional Municipality of Waterloo . Waterloo: 2006; May. Available from [http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/06175693979A892A85256C5D005576AE/\\$file/06-021.pdf?openelement](http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/06175693979A892A85256C5D005576AE/$file/06-021.pdf?openelement)
- 64 Ibid N.51.
- 65 Ibid N.19
- 66 Ibin N.19
- 67 Ibid N. 35
- 68 Schimpl H for North Shore Recycling Program. North Shore Pesticide Reduction Education Program: A Tri-Municipal Education Initiative - Final Report 2003. Vancouver: [cited 2004; February]. Available from <http://pestinfo.ca/documents/NorthShorereport.pdf>
- 69 City of Vancouver [homepage on the internet]. Pesticide Use Restriction Bylaw for 2006. Vancouver: 2006. Available from <http://vancouver.ca/engsvcs/solidwaste/grownatural/pesticideUseBylaw.htm>
- 70 Ibid N.51
- 71 Ibid N.25
- 72 Ibid N.25
- 73 Ibid N.25
- 74 Ibid N.35
- 75 Martin Mittelstaedt for the Globe and Mail. Coalition Seeks pesticide ban – Health groups want curb on spraying that’s used for purely cosmetic reasons. Ontario: 2007; February. Available from <http://www.agentorangealert.com/forum.html>
- 76 Oracle Poll Research for Pesticide Free Ontario & The Canadian Association of Physicians for the Environment. Survey Report. Ontario: 2007; February. Available from <http://www.flora.org/healthyottawa/PFO%20CAPE%20Ont%20Poll%202007.pdf>
- 77 Prepared by The Municipal Working Group on Pesticides for the Planning and Economic Development Committee for the District Municipality of Muskoka. A Review of the Non-essential Use of Pesticides. Muskoka: 2003; September. Available from <http://www.muskoka.on.ca/planningeconomic/Pesticides.pdf>
- 78 City of Orillia [homepage on the internet]. Findings from the Environmental Advisory Committee (EAC) Sub-committee. Orillia: 2005; May. Available from [http://www.city.orillia.on.ca/common/Documents/EAC/May30%20-%20EAC%20re%20Pesticides%20on%20Private%20Property%20\(Attach3\).pdf](http://www.city.orillia.on.ca/common/Documents/EAC/May30%20-%20EAC%20re%20Pesticides%20on%20Private%20Property%20(Attach3).pdf) and <http://www.city.orillia.on.ca/common/Documents/EAC/May30%20-%20EAC%20re%20Pesticides%20on%20Private%20Property.pdf>

-
- 79 City of Orillia [homepage on the internet]. Council Minutes. Orillia: 2006; April. Available from <http://www.city.orillia.on.ca/cityhall/Council%20Minutes/2006/060410%20-%20C.pdf>
- 80 Ibid N.75
- 81 Wobschall P for Green Venture. Pesticide Free Canada - Recent Initiatives to Reduce Cosmetic pesticide Use in Canadian Municipalities. Hamilton: 2002; April. Available from <http://www.econet.sk.ca/pdf/Initiatives.pdf>
- 82 Barrie City Council. Report No 19 of the General Committee [minutes on internet. Barrie: 2003; April. Available from <http://www.city.barrie.on.ca/CDocs/2003/GC19-030414.pdf> and <http://www.barrie.ca/CDocs/2007/ENG017-070226.pdf>
- 83 Rapid Risk Factor Surveillance System for Simcoe Muskoka District Health Unit [homepage on internet]. Support for Pesticide Bylaws. 2004; June. Retrieved on March 6th, 2007 from internal RRFSS access.
- 84 Rapid Risk Factor Surveillance System for Simcoe Muskoka District Health Unit [homepage on internet]. Pesticide Bylaw: Private, Municipal and Commercial Property. 2004; June. Retrieved on March 6th, 2007 from internatl RRFSS access.
- 85 Rapid Risk Factor Surveillance System for Simcoe Muskoka District Healht Unit [homepage on internet]. Pesticide Bylaw: Private/Residential Property. 2007: Jan – Jul. Retrieved on November 15th, 2007 from internal RRFSS access.
- 86 Dr. Sheela V. Basrur, Medical Officer of Health for City of Toronto, Board of Health. Implementation of the Pesticide Bylaw. Toronto: 2006; February. Available from <http://www.toronto.ca/legdocs/2004/agendas/committees/hl/hl040223/it006a.pdf>
- 87 Ibid N.35
- 88 Kavassalis Catherine for The Corporation of the Town of Oakville [homepage on internet]. Why we need a pesticide bylaw. Oakville: 2007; February. Available from http://www.town.oakville.on.ca/Media_Files/agendas-council-2007/07pesticidepreskavassalis.pdf
- 89 Ibid N.35
- 90 Ibid N.21
- 91 Ibid N.36
- 92 Ibid N.21
- 93 Rutgers, P. Vancouver City Council [homepage on internet]. Policy Report - Planning and Operations. Vancouver: 2003; October. Available from <http://www.city.vancouver.bc.ca/ctyclerk/cclerk/20040115/pe5.htm>
- 94 Smith L F for Noseworthy L, MOH Haliburton Kawartha Pine Ridge District Health Unit [homepage on internet]. Overview of Cosmetic Pesticide Use Bylaw Issues. Toronto: 2005; August. Available from <http://www.hkpr.on.ca/uploadedFiles/Cosmetic%20Pesticide%20Report%20to%20HKPR.pdf>
- 95 Ibid N.86
- 96 Ibid N.93
- 97 Ibid N.16
- 98 Ibid N.25
- 99 Ibid N.78
- 100 Ibid N.88
- 101 Ibid N.86

-
- 102 Ibid N.21
- 103 Ibid N.81
- 104 Ibid N.82
- 105 Ibid N.21
- 106 Ibid N.51
- 107 Ibid N.36
- 108 Rapid Risk Factor Surveillance System for Durham Region, Health Department. It Ain't Easy Being Green... Durham Region Pesticide Use in 2003. Durham: Aug 2004.
- 109 Ibid N.51
- 110 Ibid N.51
- 114 Ibid N.35
- 115 Ibid N.19
- 116 Ibid N.35
- 117 Rapid Risk Factor Surveillance System for City of Hamilton [homepage on the internet]. Pesticide Bylaw and Pesticides Health and Environment. Hamilton: [cited; 2006]. Available from <http://www.myhamilton.ca/myhamilton/CityandGovernment/HealthandSocialServices/Research/RRFSS.htm>
- 118 Ibid N.114
- 119 Ibid N.45
- 120 Ibid N.57
- 121 Ibid N.35
- 122 McCorkell J. Parks, Recreation and Cultural Services, City of Kamloops. A Pesticide/Herbicide Bylaw in Kamloops. Kamloops: [cited 2007; February]. Available from <http://www.kamloops.ca/pdfs/committeeMinutes/IPM-BylawReport.pdf>
- 123 Ibid N.16
- 124 Ibid N.119
- 125 Ibid N.16
- 126 Middlesex-London Health Unit [homepage on the internet]. City of London Pesticide Bylaw Update. London: [cited 2006; June]. Available from <http://www.healthunit.com/index.asp?mode=article&lang=english&articleID=12326&rank=192>
- 127 Ibid N.6
- 128 Ibid N.51
- 129 Ibid N.51
- 130 Ibid N.51
- 131 Ibid N.6
- 132 News Release by the Town of Newmarket [homepage on the internet]. Newmarket to be Pesticide Free. Newmarket: 2006; June. Available from http://www.newmarket.ca/userfiles/HTML/nts_1_3355_1.html
- 133 Ibid N.88

¹³⁴ News Release by the Corporation of the Town of Oakville [homepage on the internet]. Town Passes Pesticide Bylaw. Oakville: 2007; February. Available from <http://www.town.oakville.on.ca/nr-07feb14.htm>

¹³⁵ Ibid N.78

¹³⁶ Ibid N.79

¹³⁷ Ibid N.51

¹³⁸ Ibid N.51

¹³⁹ Ibid N.51

¹⁴⁰ Ibid N.35

¹⁴¹ Ibid N. 51

¹⁴² Ibid N.51

¹⁴³ Ibid N.51

¹⁴⁸ Ibid N.25

¹⁴⁹ Ibid N.35

¹⁵⁰ Ibid N.68

¹⁵¹ Ibid N.69

¹⁵³ Ibid N.21

¹⁵⁴ Ibid N.51

¹⁵⁵ Ibid N.47

¹⁵⁶ Ibid N.47

¹⁵⁷ Ibid N.47

¹⁵⁸ Ibid N.51

¹⁵⁹ Ibid N.51

¹⁶⁰ Ibid N.86