

Out of Sight, Out of Mind: **Private Water Well Stewardship in Ontario**

Summary of the Findings of the Ontario
Household Water Well Owner Survey 2008



Water
Policy and
Governance
Group

December, 2010

Preface

This document summarizes findings from a major survey of well stewardship in Ontario. The main report on which this summary draws is available at the web site of the Water Policy and Governance Group (www.wpgg.ca). The citation for the main report is as follows:

Kreutzwiser, R., de Loë, R.C. and Imgrund, K. 2010. *Out of Sight, Out of Mind: Private Water Well Stewardship in Ontario. Report on the Findings of the Ontario Household Water Well Owner Survey 2008*. Waterloo, ON: Water Policy and Governance Group, University of Waterloo.

The study was completed as part of the Canadian Water Network projects *Source Water Protection in Ontario* and *Governance for Watershed-Based Source Water Protection in Canada: A National Assessment*. The authors wish to thank the Canadian Water Network for financial support.

Thanks are due to our project partners for their advice and suggestions relating to survey design and analysis. In particular, we would like to thank Dr. Mary Jane Conboy (Well Wise Centre); Marisha Lamond and Heather Kirby (Well Aware); Hugh Simpson and Jim Myslik (Ontario Ministry of Agriculture, Food and Rural Affairs; Charley Worte, Jo-Anne Rzadki and Nicole Barbato (Conservation Ontario); Trevor Pawson, Haideh Mosavi-Khatibi, Eva Musso and Deborah Brooker (Ontario Ministry of the Environment); Wade Morrison (Agriculture and Agri-Food Canada); and Darrell Innes (Ausable Bayfield Conservation Authority). Dr. Ryan Plummer (Brock University), Dr. Sarah Michaels (University of Nebraska-Lincoln) and) Dr. Robert Summers (University of Alberta) provided valuable insight relating to survey design. Dr. Yolanda Martins (Inquirus Research Design and Statistics Consulting) provided invaluable assistance relating to the design and execution of the statistical analyses. Many members of the Water Policy and Governance Group also played important roles in the study relating to data collection and analysis and report preparation. The authors thank Becky Swainson, Jen Herne, Suzanne Smith, Liana Moraru, Deb Lightman and Dan Murray. Responsibility for errors and omissions rests with the authors.

This document should be cited as follows:

Kreutzwiser, R., de Loë, R.C. and Imgrund, K. 2010. *Out of Sight, Out of Mind: Private Water Well Stewardship in Ontario. Summary of the Findings of the Ontario Household Water Well Owner Survey 2008*. Waterloo, ON: Water Policy and Governance Group, University of Waterloo.

Copies of this document are available from the Water Policy and Governance Group's web site: www.wpgg.ca.

Photo credits:

Dr. Mary Jane Conboy, Well Wise

Well Aware

Krystian Imgrund, Water Policy and Governance Group

Michael Patterson (under Creative Commons License)

Dr. Reid Kreutzwiser, University of Guelph

Will Stewart, Kingston, Ontario

iStockphoto (covers)

1. Living Outside of Source Water Protection

There are over 3 million Ontarians who rely on private wells for their drinking water. Significant challenges to protecting this water are now facing these well owners. Studies done across Ontario have found that up to one-third of rural, private wells are polluted with bacteria and nitrate. High levels of these contaminants in private water supplies are known to lead to both illness and, in worst cases, disease outbreak. Public health concerns raise questions about what is being done to protect rural groundwater.

Major steps have been taken towards source water protection in urban communities with the creation of the *Safe Drinking Water Act* and *Clean Water Act*. In rural areas, private water wells are managed differently. The Wells Regulation (Reg. 903), under the *Ontario Water Resources Act*, enforces strict standards for the construction of private wells. But many wells have been constructed prior to the adoption of these regulations and standards for maintenance and decommissioning are not always enforced. So, beyond construction, well owners are responsible for managing their own drinking water.

Recognizing this, the provincial government supports a number of programs to encourage well stewardship. Well stewardship includes all voluntary actions that private well owners take to protect their water quality and quantity. A key program promoting stewardship is the Safe Water Program, offered by the Ministry of Health and Long-Term Care, which provides on-demand bacteria testing to well owners at no charge. Other provincially supported programs, such as Well Aware, Well Wise, and Clean Water programs offered by conservation authorities, also strongly promote drinking water protection among well owners.

But for these programs to work, and to know if they are enough to protect rural drinking water, questions about well stewardship still need to be answered. It is not known how many well owners take part in stewardship, or the types of actions they take to protect water quality. More importantly, motivations for, and barriers to, well stewardship are poorly understood. Without this information the security of rural drinking water remains at stake.



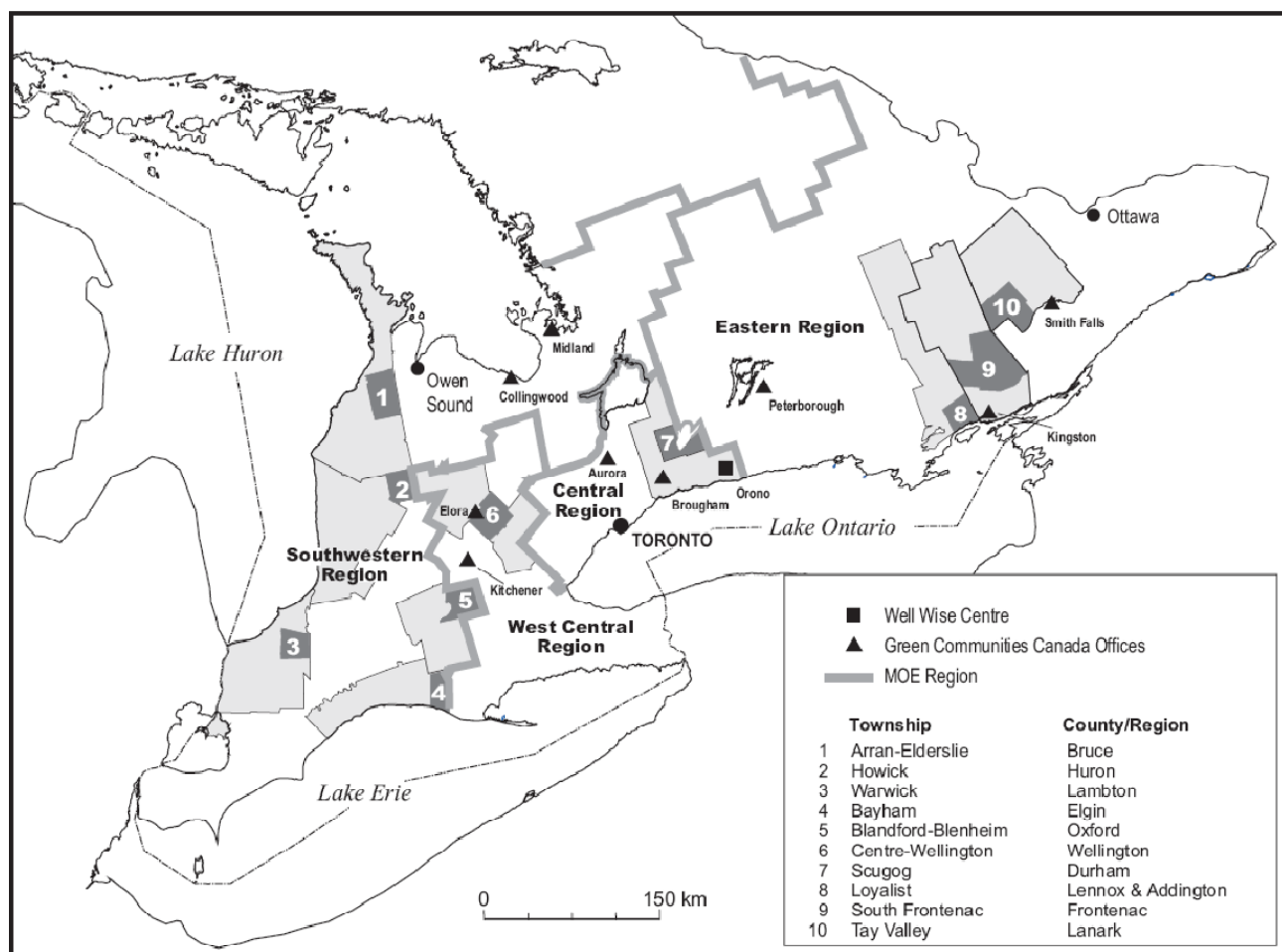
Over 3 million Ontarians are dependent on private water wells for drinking water. Contamination from bacteria and nitrates puts many well owners at risk.

Photo: Mary Jane Conboy

2. The Ontario Household Water Well Owner Survey

To answer these key questions about well stewardship, the Ontario Household Water Well Owner Survey 2008 (OHWWOS) was created by the Water Policy and Governance Group. This survey was part of a larger project on source water protection in Ontario supported by the Canadian Water Network. Questionnaires were distributed to 4,950 rural (farm and non-farm) well owners in 10 municipalities across Ontario in the fall of 2008. Over 1,500 well owners responded, making it the largest survey of its kind ever conducted in Canada.

Sample Municipalities, Well Stewardship Offices for Well Aware and Well Wise, and MOE Regions (at Time of Survey)



The purpose of this survey was to collect information on Ontario's rural well owners and their wells, to explore their attitudes, knowledge and behaviours, and to identify motivations and barriers to well stewardship. This report summarizes important findings of the OHWWOS and highlights key recommendations for improving the uptake of well stewardship by well owners.

3. What is Well Stewardship?

Private water well stewardship refers to the following voluntary actions taken by private water well owners to protect groundwater quality and quantity.

3.1. Proper Construction

All new wells should be drilled and built by provincially-certified well contractors, following the standards for well construction outlined in the Wells Regulation. Well owners should be aware of these standards. They should ensure that they are given copies of their well records; that they identify for well contractors the sources of contamination on their properties (e.g., septic systems); that well casings extend the required distance above ground; and, that well caps are secured and vented.

3.2. Water Testing

While not required by law, well owners are encouraged to test their water three times a year for bacteria (specifically *E. coli* and total coliform) and once a year for nitrate. Well owners should also consider more comprehensive tests for substances such as metals, fuels, pesticides, solvents, and salts at least once, or if they suspect a problem.

3.3. Routine Visual Examinations and Maintenance

The Wells Regulation requires that all well owners maintain their well to prevent contamination from surface materials, but this requirement is rarely enforced. Instead, it is recommended that well owners visually examine their well once a year to look for maintenance issues. If these problems are severe, a well should be upgraded. Less severe problems well owners can look for and fix include:

- Cracks or leaks in well casing or annular seal;
- Debris, insects, or vermin within well or well pit;
- Drainage towards well;
- Erosion of mounded earth away from the base of well;
- Unsecure, missing, or damaged cap or vent;
- Contamination after servicing;



Well owners are responsible for maintaining their wells to prevent the entry of surface water or other material. Annual maintenance and visual examinations should identify and fix problems such as sunken earth around the well and missing well caps.

Photo: Mary Jane Conboy

- Faulty or leaking piping or water system connections; and,
- Overgrowth of vegetation surrounding well.

3.4. Source Water Protection

Also not required by law, source water protection includes all actions well owners take to protect groundwater quality. These actions are recommended to ensure safe, clean drinking. They include:

- Maintaining septic systems;
- Limiting fuel storage or maintenance of fuel storage devices;
- Limiting use or proper disposal of hazardous household substances;
- Limiting pesticide and fertilizer use and providing proper storage for chemicals;
- Storing and using contaminants at a safe proximity from well;
- Maintaining and trimming shallow-rooted vegetation around the wellhead;
- Ensuring drainage away from the wellhead; and,
- Maintaining a 50-100ft contaminant-free buffer zone around well.

For farmers, source water protection actions may also include activities such as:

- Ensuring proper manure and nutrient management;
- Ensuring proper agricultural drainage; and,
- Using fencing to keep farm animals away from well.

3.5. Decommissioning unused wells

The Wells Regulation requires that all wells that are not in use, or maintained for use, be properly decommissioned by a provincially-certified well contractor. Well owners are responsible for identifying abandoned wells on their property and hiring a well contractor to properly upgrade or decommission these wells.



All wells that are not in use, or maintained for use, must be properly decommissioned. Well owners are responsible for hiring certified contractors to properly fill-in and seal their abandoned wells.

Photo: Mary Jane Conboy

4. The State of Private Wells and Well Water in Ontario

Most well owners describe their wells as being in “good” condition. But while this was true for some wells, not all of the wells described by respondents were up to provincial standards. Almost half (47%) of the wells reported were constructed prior to the creation of the Wells Regulation, almost half (48%) are dug, bored, or in a pit, and about 7% of wells are less than 20 feet deep. None of these wells meet current provincial guidelines. Unused wells were also reported on 14% of properties, although as many as 19% of well owners may actually have at least one abandoned well.

Despite these issues, only one in ten well owners felt that their wells had minor problems or were deteriorating. One of the reasons well owners did not realise the true condition their wells were in was because they were simply unaware:

- 2% did not know the locations of their wells;
- 4% were uncertain of the types of wells they owned;
- 4% were uncertain of what conditions their wells were in;
- 16% were uncertain of their wells’ ages;
- 19% were uncertain of their wells’ depths; and,
- 59% of well owners reported that they did not have a well record.

Without a well record, many of these important details about a well’s construction are not available. The fact that so many wells are substandard, and that well owners may not even be aware of this, highlights the importance of proactive well stewardship. Not surprisingly, neglected wells were associated with water quality problems, noted by a number of well owners:

- 31% had experiences with red-staining or biofouling;
- 14% had experiences with sulphur smells in their well water;



For many owners, the well is out of sight, out of mind. Some even prefer to hide the well, for aesthetic reasons. Many owners are also unclear about actions they can take to protect their well and water quality, including keeping contaminants away from the well.

Photo: Krystian Imgrund

- 9% had experiences with water shortages; and,
- 16% had experiences with well water contamination.

In worst case scenarios, five respondents reported that they found out about their contamination problems only after becoming ill. But even well owners who had experienced contamination did not always respond with stewardship; almost two thirds of the actions taken to address contaminated well water pertained exclusively to chlorinating water and installing treatment devices.

Well owners were also preoccupied with activities that were occurring in their communities, instead of what they were doing on their own land. When asked what could affect the quality of their well water, well owners most often suggested land use activities, such as agriculture and landfills, runoff, and natural conditions. Only 3% of responses pertained to the characteristics or condition of wells.

While many well owners expressed concerns about changes to groundwater quality, most were still very confident that their water quality was good. Eight out of ten liked the taste of their water and stated that they would allow infants to drink water from their wells. Upwards of 80% were knowledgeable of the interactions between land use practices and groundwater. While confidence and knowledge about groundwater run high, getting well owners to reflect on their own wells will be a challenge for stewardship.



Half of all well owners had visually examined their wells, but only a third of those who had done so had examined them within the last year. Many lacked confidence in their ability to perform this crucial annual maintenance task.

Photo: Mary Jane Conboy

5. The Extent of Well Stewardship in Ontario

Well owners have positive attitudes about protecting their wells and groundwater. For example, almost nine out of ten strongly agreed or agreed that unused wells should be properly decommissioned. A large majority stated that they have had their well water tested before, and most well owners even stated that they knew a poorly maintained well could harm their and their neighbours' water quality.

These attitudes are a start to good stewardship, but they do not always result in action. Partly this is because well owners are unknowledgeable of many stewardship behaviours. Half of all well owners were not confident in their abilities to examine their wells for problems. One-third did not know how often they should get their water tested

and 16% did not understand what their test results mean. Worse, many well owners who said they understood their water test results also thought, incorrectly, that Public Health units test for substances other than bacteria.

Attitudes and knowledge regarding wells and well stewardship are mixed. What is clear is that many well owners are not performing well stewardship:

- 96% of well owners had never participated in programs to upgrade or decommission their wells;
- 65% tested their water less than once a year, and very few had tested their water for substances other than bacteria;
- 54% reported that they had never received information regarding well maintenance and stewardship;
- 47% had never examined their well before, and only a third of those who did had done so within the last year;
- 46% took no actions to keep their wells in good working condition; and,
- 31% took no actions to protect their water quality.
- Some well owners do take many different actions to protect their wells and water, but this is uncommon. As many as 60% of well owners took two or fewer stewardship actions.
- One reason for this may be that over half (54%) have never received information about their wells or well water. Trusting information sources is also an issue. Well owners consistently identified well drillers as their most trusted sources of information on constructing, maintaining, upgrading, and decommissioning wells. For information on water testing, well owners trusted Public Health units the most. Information from other sources, including provincial government stewardship programs, may be met with some scepticism.
- Greater strides need to be taken to encourage more well owners to take up well stewardship. In order to do this, programs aimed at promoting stewardship need to address the barriers preventing well owners from safeguarding their wells and water.



Many well owners revealed misunderstandings, misconceptions, and a general lack of understanding about well stewardship. The survey revealed that educational efforts need to involve different kinds of media, and must be targeted to specific groups. This display targeted participants at a farm show.

Photo: Well Aware

6. Motivations and Barriers Influencing Stewardship

To encourage stewardship, motivations for protecting wells need to be reinforced and barriers removed. No single reason explains why some well owners take part in stewardship and others do not. Instead, a patchwork of motives and constraints influences well owners' behaviours.

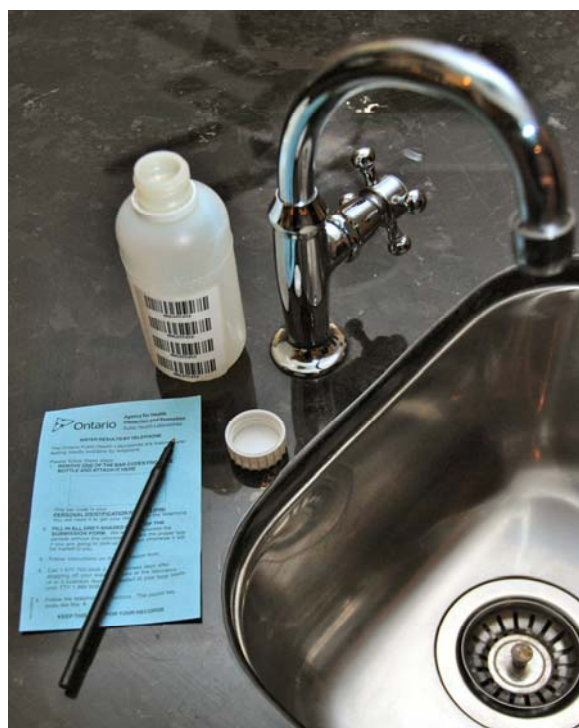
6.1. Water Testing

Knowledge and awareness about water testing are essential. Well owners who understood their test results and know how often they should test are more likely to take water samples to Public Health units each year. A common suggestion made by well owners to encourage annual testing is simply that reminders should be sent out by Public Health units or municipalities.

While important, knowing about testing is not the main reason why well owners test their water. More often than not, well owners are motivated to act only when they experience a problem or have health concerns. Those who experienced contamination before, or had problems with their well, were more likely to test. Well owners who wanted “peace of mind”, or reassurance that their water is safe to drink, were also more inclined to test.

As with visual examinations, those who have not experienced problems or are not as concerned about their health and contamination test less often. As one well owner stated, “we never worry about testing because we feel we have good water.” Often the only time such well owners tested was because of legal reasons, such as the requirement to test if the landowner is operating a foster home or dairy farm, or for real estate purposes.

Poor access to Public Health units also contributes to lacklustre testing rates. Many well owners feel that the distance to Public Health units, and their hours of operation, make it difficult to bring in water samples, especially for those who work. Those who felt they had the time to test their water were more likely to test regularly.



Well owners in Ontario can test their water free-of-charge for bacteria at local Public Health units. Tests for other contaminants, such as nitrates and metals, must be done at private labs.

Photo: Reid Kreutzwiser

6.2. Routine Visual Examination and Maintenance

Well owners are usually only inclined to look at their wells when something goes wrong, rather than being proactive to prevent problems before they occur. It was found that older, shallower wells typically drew more attention than newer, deeper wells. A comment echoed by a number of respondents was that, “if it ain’t broke, don’t fix it.” Many felt that if they have not noticed a problem, it’s not worth investing the time or money to inspect, fix, or maintain their wells.

Another key reason well owners are not more proactive is because they simply do not know how to be. Well owners who were more confident in their abilities to examine their wells were more likely to perform annual examinations and to look for more possible maintenance issues. But confidence is only one aspect; many well owners do not know what examinations are or are unconvinced that they can be useful. Not surprisingly, the number one suggestion made by well owners to encourage regular examinations is that more information, awareness, education, and guidance are needed.

6.3. Source Water Protection

Being knowledgeable about groundwater and stewardship is essential. Knowing that old or poorly maintained wells can harm groundwater quality was a key reason well owners took actions to protect their water quality. But even well owners who did recognize this often did not have a clear understanding of source water protection. This was made obvious when most well owners said they addressed contamination problems by installing treatment devices, instead of seeking out and addressing sources of the contamination.

Again, complacency and misunderstanding are barriers preventing proactive stewardship. While these could be alleviated by better education, even more comprehensive strategies could be considered. Encouraging well owners to conduct property-wide assessments, instead of just looking at their wells, is one option. Incorporating such assessments into municipal or regional source water protection plans is another approach that may move well owners closer to a broader understanding of source water protection at home.

6.4. Decommissioning Unused Wells

More often than not, well owners understand that unused and abandoned wells should be properly decommissioned. Importantly, many thought this way because they understood the negative impacts a poorly



Wells that have fallen into severe disrepair, or which have serious structural flaws, need to be properly upgraded by a certified well contractor.

Photo: Well Aware

maintained well could have on groundwater quality.

Still many had reservations about decommissioning their old wells. Cost is a primary deterrent. In Ontario, the cost of decommissioning a well averages as high as \$1,400-\$1,600. Well owners who thought a cost of \$1,000 is too high were more likely to think old wells do not need to be decommissioned. Creating or expanding cost-sharing programs is one means to address this issue, and is the most common suggestion well owners made to encourage proper decommissioning. But access to these programs is not the same for all well owners. Farmers and well owners in certain municipalities were more likely to take part in decommissioning programs.



Most well owners felt comfortable disclosing information about abandoned wells, but a notable minority had strong objections. Preserving well owners' anonymity is necessary for stewardship programs to have maximum effectiveness.

Photo: Will Stewart

Privacy is another real concern. Most well owners express open attitudes about providing information about their wells to government organizations, but a staunch minority do not. These well owners were concerned or angry about too much government interference, and did not want to participate in government operated programs. To recognize these concerns, and for decommissioning programs to be most effective, providing anonymity and amnesty to well owners will be crucial.

7. Moving Towards Rural Groundwater Security

Protection of rural drinking water supplies is moving forward, but more still needs to be done. One of the greatest challenges to well stewardship will be finding a balance between allowing well owners to realise their own responsibilities and identifying where government intervention may be required.

Well owners, for their part, must assume their responsibility to engage in routine stewardship to protect themselves and their communities. Some well owners have already recognised this responsibility, but constant encouragement is still needed for stewardship to remain a priority.

The provincial government needs to provide this encouragement using a multifaceted approach. Stewardship programs, operated both by government agencies and non-government organizations, will play a critical role in distributing information, engaging well owners, and promoting stewardship. Most importantly, government and stewardship programs need to:

- Improve the accessibility and consistency of services. The Safe Water Program offered by the Ontario Ministry of Health and Long-Term Care and programs aimed at providing information, cost-sharing, technical advice, and training to well owners are vital to ensuring well stewardship. These programs need to be made consistently available and consistently accessible to well owners across Ontario.

- Develop and distribute educational material for key stewardship behaviours. In particular, most well owners are unclear of what visual examinations or inspections and source water protection actually are, and of their utility. To push forward education, means of encouraging private water well stewardship should be incorporated into source protection planning at the municipal and watershed scale.

- Create and enforce stricter regulations for real estate transactions. One of the most efficient ways governments can ensure essential maintenance practices are performed is by requiring these through property transactions. One-time maintenance actions, such as proper well decommissioning, upgrading, and comprehensive water tests, should be required for the purchase and sale of homes.
- Strengthen partnerships among well stewardship programs. Multiple programs exist in Ontario for promoting and delivering well stewardship, each with its own strengths and weaknesses. These programs need to be coordinated so that well owners are provided with consistent messaging and resources.

There is no single solution to protecting rural drinking water. Multiple efforts, including better services and education, targeted regulations, and the realisation of personal responsibilities are all required. However, this study demonstrates that the actions of well owners themselves are also critical. Both government and owners of private wells have major roles to play in protecting rural drinking water quality.



Creating requirements for stewardship actions such as comprehensive water testing and well abandonment as part of the process of buying and selling rural properties would be an effective way of increasing drinking water safety and protecting groundwater quality.

Photo: Krystian Imgrund

Water Policy and Governance Group: About Us

The Water Policy and Governance Group (www.wpgg.ca) is a multi-university research collaborative. Our focus is water governance and water policy, primarily – but not exclusively – in Canada. Major themes in our research program include water security, source-water protection, water allocation, and adaptation to climate change. We conduct practical, policy-relevant research that contributes solutions to these problems.

Our success is grounded in our network of researchers and partners across Canada and around the world.

Graduate training is a central part of our mission. We accomplish our goals in large part because of the excellence of our graduate students, post-doctoral fellows, and research associates.

For more information about the WPGG, see www.wpgg.ca

