

Groundwater Program

Follow-up to VFM Section 3.05, *2004 Annual Report*

Background

Groundwater is defined as water located below the surface in soil, sand, and porous rock formations known as aquifers. Groundwater recharges watersheds, which are networks of rivers and streams that drain into larger bodies of water such as the Great Lakes. Groundwater is the primary source of drinking water for almost three million residents of Ontario. More than 200 municipalities have groundwater-based systems that provide water to residential users as well as for industrial, commercial, and institutional uses. In addition, approximately 500,000 private wells provide 90% of Ontario's rural population with water for drinking, irrigation, and other uses.

As Justice O'Connor notes in the report of the Walkerton Inquiry, the protection of source water is the first step in providing safe drinking water and, as such, is extremely important because "some contaminants are not effectively removed by using standard treatment methods" and some rural residents who do not have access to treated water rely on untreated water from wells for drinking.

The Ministry of the Environment's specific responsibilities relating to groundwater are to manage and protect the resource, as well as to promote the sustainable use of groundwater. The Ministry is also responsible for acting on the recommenda-

tions made by Justice O'Connor from the Walkerton Inquiry. This inquiry reported in 2002 and was prompted by the deaths and illnesses that resulted in May 2000 from the town of Walkerton's contaminated water supply. While groundwater expenditures are not separately reported by the Ministry, it was determined that approximately \$18 million was spent in this area in the 2003/04 fiscal year.

In our *2004 Annual Report*, we concluded that the Ministry lacked sufficient information to enable an overall understanding of the state of groundwater resources in the province. As a result, the Ministry could not determine its success in achieving the protection and long-term sustainability of Ontario's groundwater resources. Overall, the Ministry did not have adequate procedures in place to restore, protect, and enhance groundwater resources. Some of our more significant observations were as follows:

- While the Ministry had been carrying out watershed studies since the 1940s, it did not yet have watershed-management plans to ensure groundwater resources were protected. The Ministry estimated that its latest attempt to have conservation authorities develop watershed-based source protection plans would result in six of 36 plans being put in place by the 2007/08 fiscal year.
- In May 2000, rains washed animal waste from a nearby farm into a municipal drinking-water

well in Walkerton. The contaminated water claimed seven lives and caused thousands of illnesses. The farmers of Ontario's 1,200 largest farms were subsequently required to have plans in place for dealing with agricultural waste by July 1, 2005. For an additional 28,500 farms that produced enough waste to pose a potential problem, a process was to be developed by 2008 to phase in nutrient management planning.

- The Ministry had issued over 2,800 permits to take water for a total potential withdrawal of nine billion litres of groundwater a day. The Ministry's assessment and evaluation of applications for groundwater-taking permits were inadequate. In addition, the Ministry did not have sufficient information to evaluate the cumulative impact of water takings on the sustainability of groundwater.

We made a number of recommendations for improvement and received commitments from the Ministry that it would take action to address our concerns.

Current Status of Recommendations

According to information received from the Ministry of the Environment, some progress is being made in addressing the recommendations we made in our *2004 Annual Report*. However, due to the complexity of many of the issues and involvement of a multitude of stakeholders, full implementation of our recommendations in a number of instances will take three or more years to complete. The current status of action taken on each of our recommendations is as follows.

PLANNING FOR GROUNDWATER MANAGEMENT

Recommendation

To ensure that groundwater resources are protected from existing threats of contamination while new protection measures are put in place, the Ministry of the Environment should:

- review the existing source protection plans and any other measures in place at each conservation authority and consider developing an overall strategy for protecting the province's groundwater resources from current contamination threats;
- establish a clear timetable for the completion of all watershed-based source protection plans and for the implementation of any required protection measures;
- consolidate, in a medium such as the Ministry of Natural Resources' geographic information system, information from the groundwater management studies done by municipalities and verify the completeness of each study;
- incorporate into its information system and source protection plans the information generated by the Ministry of Northern Development and Mines with respect to its aquifer-mapping project;
- develop risk-based inspection procedures to ensure the compliance of farms required to complete a nutrient management plan by July 1, 2005, and consider monitoring farms that do not require a plan until after 2008; and
- identify groundwater pollution sources on a timely basis so that remedial action can be taken before serious contamination occurs.

Current Status

With respect to a groundwater protection strategy and source protection plans, in December 2005, the government introduced Bill 43, the proposed *Clean Water Act, 2005*, for first reading. This bill was tabled to help protect sources of drinking

water from significant threats. The regulations and ministry guidance materials will stipulate that municipalities and conservation authorities are to incorporate and build upon existing studies and strategies. In anticipation of the enactment of this legislation, the Ministry provided \$8.5 million in the 2005/06 fiscal year to municipalities and conservation authorities, in part to map key groundwater resources and to inventory threats to the quality of these water supplies. In addition, conservation authorities have been provided with funding to prepare watershed characterization reports that summarize previously funded groundwater studies and other available information.

If Bill 43 is passed, conservation authorities and municipalities will be required to prepare two significant documents. The first is a final watershed assessment report, which describes the watershed, identifies all existing and planned sources of municipal drinking water and their associated vulnerable areas, identifies all current and future threats and issues in those vulnerable areas, and carries out a risk assessment on those threats and issues. The second document will be a focused source protection plan, which will contain policies and programs designed to ensure that all identified significant risks in these groundwater areas are mitigated. As part of this process, all existing plans, programs, and measures in place will be assessed and incorporated into the source protection plans. It is anticipated that all regulations to the proposed *Clean Water Act, 2005* will be in place by March 2008 and that it will take up to six years to complete the entire process.

With respect to groundwater information systems, as of July 25, 2006, 88 of the 97 groundwater studies conducted by municipalities and conservation authorities and funded by the province had been submitted to the Ministry. Study data are being reviewed by the Ministry to ensure that they are complete and meet provincial data standards. The Ministry informed us that data from completed

groundwater studies were being transferred to the Ministry of Natural Resources to be incorporated into the Land Information Ontario system to make them accessible to water managers throughout Ontario.

With respect to the Ministry of Northern Development and Mines' (MNDM's) aquifer-mapping project, the Ministry was in the process of discussing with MNDM both how it can gain access to MNDM's aquifer-mapping information for use in its source-protection plans and how MNDM can incorporate the Ministry's source-protection-plan information into its aquifer maps. The Ministry noted that such source-protection-plan information includes two major reports it published in October 2004 on Ontario's hydrogeology—that is, on the occurrence, distribution, quantity, and quality of groundwater in Ontario. Due to both differences in the approaches to aquifer mapping and limitations in data availability and quality, it had not been determined at the time of our follow-up if all MNDM information should be incorporated into the source-protection-planning process.

With respect to farm nutrient management plans, a major review of the Nutrient Management Regulation of the *Nutrient Management Act, 2002* was conducted in March 2005. This review resulted in an amended regulation being issued in October 2005. The amendments included changing the date of compliance for the drafting of nutrient management plans for existing farms to December 31, 2005. We were informed that, based on the amended regulation, the Ministry was implementing a revised Nutrient Management Program that includes developing a risk-based inspection program. The risk-based approach provides for the province-wide hiring, in conjunction with a recruitment program, of 10 agricultural environmental officers in addition to the current six. Staff were to be trained over the summer, and risk-based inspections were projected to begin in fall 2006.

With respect to the identification of pollution sources, the source protection plans referred to above as the second key document required under Bill 43 will require that a range of land uses and activities be inventoried and investigated to understand the risk they pose to drinking-water sources, highly vulnerable aquifers, and significant recharge areas. Under a key feature of Bill 43, any imminent risk to drinking water identified is to be reported to the Ministry immediately. Further, the Ministry will be required to promptly decide how to address such imminent risks. If Bill 43 is passed, the *Clean Water Act, 2005* and its regulations may set dates for the identification of these threats and stipulate that source protection plans specify the risk management measures to be taken. We were informed that these plans are to be forwarded to the Minister for consideration by 2010, with implementation after this date.

MONITORING GROUNDWATER QUALITY

Recommendation

To ensure that Ontarians have a groundwater supply that is safe and clean to drink, the Ministry should:

- *verify that the persons installing new wells are licensed well contractors;*
- *randomly inspect new, existing, and abandoned wells to ensure that they are properly installed, maintained, and sealed in order to prevent contaminants from entering the water supply;*
- *consider expanding its monitoring program to include a sample of private wells in high-risk areas and inform potentially affected users in the area of any adverse raw-water test results; and*
- *review the concentrations of high-risk substances, such as E. coli and other fecal coliform bacteria, in raw water; determine the sources of the contamination, and develop remedial strategies to correct the problem.*

Current Status

With respect to well installation and inspection, the Ministry indicated that it was working with an industry association and a community college to help develop and fund training courses and workshops to ensure that individuals and businesses engaged in well construction understand their responsibilities under the *Ontario Water Resources Act*, including the requirement that wells be installed by licensed contractors. A plain-language, industry best-management-practices manual was planned to provide clarity for the well-construction industry.

In addition, the Ministry had initiated a comprehensive review of the wells program aimed at improving program delivery. The Ministry was also considering amendments to, or clarifications of, Regulation 903 under the *Ontario Water Resources Act* (the regulation dealing with the location, construction, maintenance, and decommissioning of wells) based on feedback from stakeholders. As local source protection plans are developed, the Ministry will work with municipalities and other stakeholders to identify the most efficient and effective means to ensure wells are properly maintained and decommissioned.

Notwithstanding the 63 incidents relating to well maintenance and abandonment that ministry staff were involved with in 2005, the Ministry's focus is on education and outreach rather than enforcement. In this regard, the Ministry's help desk fields inquiries and provides information to clients who have concerns about the quality of their drinking water. The Ministry was continuing to rely on complaints to identify well-water concerns and non-compliance with proper well procedures to trigger inspections.

The Ministry indicated that its Sector Compliance Branch began a province-wide, proactive water-well inspection sweep as of July 2006. These inspections focus on well contractors to ensure that they are in compliance with regulatory requirements

and are also to provide information to well owners on the importance of proper well maintenance. Complaint-driven inspections will continue to be addressed by the Ministry's field operations.

With respect to monitoring private wells, areas considered to be at risk from a groundwater point of view should be identified as source protection plans are developed. Education and outreach initiatives built into the source protection plans should help communicate this information to well owners, who would then be expected to take an active role in monitoring their water quality. In addition, the Ministry's Provincial Groundwater Monitoring Network, which monitors ambient groundwater conditions, can identify trends in water quality and groundwater levels on a regional scale. Thus, while this process does not monitor the water quality in individual private wells, it can result in the identification of areas where enhanced monitoring should be considered. Finally, the Ministry indicated that source protection planning might include the monitoring of private wells as a means of evaluating issues in vulnerable areas.

With respect to the monitoring of high-risk substances, the Groundwater Monitoring Network's water-quality program has undertaken the first round of comprehensive water-quality sampling in 429 of the currently operating 454 monitoring wells. The results of this sampling identified 65 wells having a chemical concentration for a particular health-related parameter (listed in Regulation 169 of the *Safe Drinking Water Act, 2002*) above the Ontario Drinking-Water Quality Standard. These findings were communicated to local conservation authorities and the local Medical Officers of Health. The Ministry indicated that it was continuing to work with local agencies to assess the significance of these findings. Where significant contamination issues are identified, the Ministry intends to take all necessary steps to ensure that the cause is identified and protective measures are taken.

MANAGING GROUNDWATER FOR SUSTAINABILITY

Recommendation

To help ensure the sustainable use of groundwater resources, the Ministry should:

- *enhance its assessment and evaluation process for applications for permits to take water by:

 - *ensuring that it receives and retains the required hydrogeologic studies for new permit applications;*
 - *evaluating the relevance of dated hydrogeologic studies for permit renewals; and*
 - *assessing the cumulative impact on the ecosystem that could result from the taking of groundwater by multiple users;**
- *monitor the actual amounts of water taken by permit holders to verify that permit holders are not extracting more water than they are entitled to;*
- *follow up on expired permits to take water to determine whether former permit holders are still extracting groundwater; and*
- *establish a province-wide framework for monitoring water takings so that continuously drawing down, or "mining," of aquifers is prevented.*

Current Status

The Water Taking and Transfer Regulation (O. Reg. 387/04) under the *Ontario Water Resources Act* took effect January 1, 2005. Under the regulation, the factors the Ministry must consider when assessing water-taking applications have been strengthened and include the protection of ecosystems, minimum stream flow, sustainable aquifer yield, and the cumulative impact of groundwater takings. If a water taking has a high risk of impact or interference, it is to receive a full scientific review by the Ministry, and the new permit-applicant's guide and the Permit To Take Water Manual clearly identify that technical studies must be submitted and reviewed before the Ministry issues permits

for high-risk water takings (takings with a lower risk will receive a “screening level” of review). The reviews of these technical studies are now structured in a document-management system that identifies the reports and technical issues that were considered. Technical reviewers go beyond the information submitted with a permit application and consult in-house resources, such as maps, well records, and air photos of land use. (Identifying other water users through this research is important for cumulative impact assessment, which in turn is necessary information for deciding how much water can be safely permitted for withdrawal.)

The new regulation also requires that permit holders collect and record data on the volume of water taken daily and report this information annually to the Ministry. The volume must either be measured using a flow meter or calculated using a method acceptable to the Ministry. The monitoring requirements are to be implemented in three phases over the period July 1, 2005 through January 1, 2007. By March 31, 2008, all permit holders are to be reporting their water-taking data to the Ministry. The Ministry developed an Internet-based Water Taking Reporting System that allows permit holders to report their water-taking data electronically.

A risk-based strategy to identify inspection targets for the Permit To Take Water Program was implemented in the 2005/06 fiscal year and has been enhanced for 2006/07. One risk factor considered in selecting inspection targets was permits that have expired within the previous two years for which no new permit has been issued. These inspections are to determine if the former permit holder is still taking water. Follow-up action is to compel the former permit holder to apply for a permit, where required.

The Ministry indicated that it began an inspections sweep of unpermitted takings in July 2006. The subjects of these inspections included former permit holders, permit applications that were with-

drawn, cancelled, or denied, and selected sites from industry or commercial lists where water taking is normally conducted.

There are three components to the Ministry’s overall process to guard against aquifer depletion:

- the Provincial Groundwater Monitoring Network, which collects baseline groundwater-level information;
- the Water Taking and Transfer Regulation, which is phasing in the requirement that permit holders report the volume of water taken daily for monitoring by the Ministry; and
- Bill 43, the proposed *Clean Water Act, 2005*, which, if passed, will ensure that communities have the authority to investigate and identify potential risks to their supply of drinking water and take action to reduce or eliminate these risks.

ENFORCING COMPLIANCE WITH LEGISLATION

Inspections

Recommendation

To more effectively identify incidents of non-compliance with environmental legislation and threats to human health and the environment, the Ministry should:

- *review the results of its proactive inspections to determine why they have not been as effective as inspections conducted by the “Environmental SWAT Team” in identifying threats to the environment and human health; and*
- *develop and implement a more effective risk-based model for its proactive inspection program to target areas that have the most potential for detrimental environmental impact if not corrected.*

Current Status

The Ministry indicated to us that, because proactive inspections are not limited to high-risk facilities

(as inspections conducted by the “Environmental SWAT Team”—now known as the Sector Compliance Branch—are), proactive inspections are not expected to identify as many threats to the environment and human health as the inspections targeting high-risk facilities do.

In 2004/05, a risk-based model was implemented to select priorities for the Ministry’s proactive inspections. For the purposes of inspection planning, facilities were grouped into three main risk categories: those with known impacts on human health or the natural environment; those with potential impacts; and those whose impact was not well known or unknown. The risk-ranking of a facility was conducted as part of the annual inspection-planning process and was based on criteria such as the informed judgment of district staff, the type and size of the facility, the type and quantity of material or processes on site, past compliance history, past or recent abatement activity, and frequency of environmental events such as pollution incident reports, unlawful discharges, and spills. The Ministry advised us that, in 2005/06, risk-rankings were improved with the introduction of a web-based tool that allows the Ministry to achieve more consistent risk-ranking results for similar facilities across the province. In addition to inspection results, the anticipated risk of a facility, based on the planning process, and the actual risk, based on the results of the inspection, are tracked in a document-management system and used to inform future planning cycles. Facilities that were deemed to be a risk to human health or the environment and then found to be non-compliant in 2004/05 were either re-inspected in 2005/06 or monitored for ongoing abatement activity (activity to diminish or eliminate non-compliance).

Investigations and Prosecutions

Recommendation

To help ensure the timely disposition of cases of serious environmental violations, the Ministry should:

- *review and, where necessary, adjust current procedures for sending referral reports to the Investigations and Enforcement Branch;*
- *take the necessary steps to lay charges and start proceedings within the two-year time frame required by legislation; and*
- *review the operations of its agency to determine the reasons for incidents of non-compliance and work with the agency to correct the situation.*

Current Status

We were informed that the Ministry’s Investigations and Enforcement Branch (Branch) completed a review of incident-referral procedures in January 2005. As a result, a new investigative intake process that identifies factors to be considered when evaluating the seriousness of a violation was implemented at the end of March 2005. This process is intended to support the timely assessment of whether to investigate, as well as timely assignment and prioritization of investigations. In addition, a risk-assessment methodology prioritizing cases was developed. This methodology was implemented in June 2005 for all referrals.

The Branch’s review of incident-referral procedures was undertaken in part to expedite the laying of charges for serious environmental offences. A focused investigation methodology for the most serious offences, based on the Major Case Management system used by Ontario’s police services, was developed and began to be implemented in March 2005. The Major Case Program Manual was finalized in June 2005. We were also informed that a process was implemented that requires that ministry managers identify investigations that are nearing two years of age and reassign resources if a significant file is at risk of being closed because of statute limitations.

The Ministry stated that it was continuing to assist the Ontario Clean Water Agency (Agency) in ensuring that it has the tools needed to be compliant. It also stated that, since 2003, the Agency has implemented refocused compliance strategies, such as hiring additional staff to meet the requirements of the *Safe Drinking Water Act, 2002*, implementing new compliance training, and enhancing facility audit programs. The Agency's business plan for 2006 to 2008 indicates that the number of compliance-related incidents in 2005 was significantly down from the number in 2004 and that the Agency is committed to continuous improvement of its compliance record.

MEASURING AND REPORTING ON PROGRAM EFFECTIVENESS

Recommendation

To help promote accountability, the Ministry should identify desired outcomes for its groundwater program and develop performance measures that would enable it to assess the extent to which program outcomes are being met and be more effective in ensuring the restoration, protection, and sustainability of groundwater resources.

Current Status

The Ministry indicated to us that it had developed a number of performance measures, including one

relating to source protection, that would help enable it to ensure the protection and sustainability of groundwater resources. The measure for source protection is the percentage of source protection "priority components" completed, and the expected result is for all source protection milestones to be achieved by the end of the 2007/08 fiscal year. The priority components include:

- the establishment of Watershed Planning Areas and Source Protection Planning Committees; and
- the submission by Watershed Planning Areas of the initial technical assessments required under source protection legislation (for example, water budgets and wellhead protection studies).

The Ministry also indicated that it had identified specific outputs aimed at ensuring the quality of groundwater. These outputs include:

- an improvement in public access to data from water-monitoring networks;
- the co-ordination of technical studies with conservation authorities;
- the development of a provincial source protection framework based on reports and recommendations from advisory committees;
- the approval of first-generation source protection plans; and
- the completion of legislation and regulations.