Ag-Water Forum II - Executive Summary

"Agricultural Perspectives on Source Water Protection"

February 13 & 14, 2007
Inn at the Forks Hotel
Winnipeg, Manitoba

Background:

As a major net consumer of water, agriculture has a significant presence on the landscape across Canada and is viewed as a major player in the protection of water quality and quantity. With more than 80% of Canada's population residing in agriculturally based watersheds the risk of agricultural influences on drinking water is a concern. Certainly, the interest in **source water protection** and the agricultural connection was elevated in the wake of deaths and waterborne related illnesses at Walkerton. Building on the success of Ag-Water Forum I which was held in Ottawa on April 12 and 13, 2005, this forum focussed on the single theme of emerging interest in most provinces - source water protection.

Agriculture & Agri-Food Canada (AAFC) is working on several strategies and initiatives related to source water protection in the context of agriculture. Many activities underway in the department require ongoing communications with partners and stakeholders over the next fiscal year and beyond. Ag-Water Forum II, provided a venue for AAFC to update provinces and territories on current **Agricultural Policy Framework (APF)** programs and strategies and to generate communication on strategic initiatives.

Provinces have the primary responsibility for the management of water resources within their jurisdictions and are supportive of watershed-based, multi-stakeholder approaches to water resource management. As one of the five primary federal departments with responsibility for water, AAFC can play a major enabling role in ensuring that agriculture is represented in **Integrated Water Resources Management (IWRM)** and ag-water related activities. By bringing together federal and provincial departments with responsibility for agriculture and water at this Ag-Water Forum, AAFC helped to facilitate better collaboration and networking between federal and provincial partners on matters related to ag-water and source water protection.

Objectives of Forum:

1. Share progress and improve understanding of federal and provincial activities in water policy, management, and planning related to source water protection and agriculture
2. Create networking opportunities between provinces and federal departments in ag-water and watershed related activities.
3. Serve as a mechanism for informal feedback into the next generation of agricultural policy and programming.

Participation:

A total of 104 participants representing federal, provincial, and industry interests in agriculture and water attended the event.

Speakers/panel members totalled 34 including nine provincial, and four industry representatives.

Themes:

The agenda and presentations at the Ag-Water Forum II were structured into the following theme areas:

1. Progress on addressing key agri-environmental issues affecting water (provincial and federal)
2. Governance - Integration and Partnerships in Source Water Protection
3. Knowledge, tools, applications, education and technical transfer
4. Linking science to action

The following pages describe the key messages which came out of each of the sessions.

KEY MESSAGES - Session 1 -Theme: Progress on Addressing Key Agri-environmental Issues Affecting Water

Keynote presentations

Past, present, future

- Water management is evolving from top-down to bottom-up approach
- IWRM is emerging as the new and desireable governance model in water management in Canada
- Water management and protection have become shared responsibilities
- Federal Water Policy is 20 years old
- Monitoring and data collection is required for building decision-making capacity

Keynote presentations were given by representatives of Pollution Probe and the Policy Research Initiative (Government of Canada). Both presentations reflected on the need to rethink and update the 1987 Federal Water Policy with consideration for: new approaches to water governance, management and protection; impacts of climate change; valuation of natural capital and resources; and, capacity building.

Although water management is the primary responsibility of provinces, the federal government still assumes national responsibility for the resource and establishes national policies regarding its use, management and protection. While much of the world has embraced the principles of Integrated Water Resources Management (IWRM), Canada and North America have been slow to adopt this approach for resource management.

We are still in the early stages of understanding how IWRM should be applied in Canada, and the federal government needs to clarify its roles and responsibilities and better co-ordinate efforts in supporting this movement across Canada. Perhaps a single federal institution (such as a Federal Watershed Agency) which could foster IWRM and promote collaboration of federal activities at the watershed level is required.

Research was felt to be an important tool for developing national policy on water but while Pollution Probe felt that federal government should have a strong research agenda to provide the science behind policy development, the Policy Research Initiative felt that we need to take a step back and look at what has already been done, find the gaps and then determine the best way to fill those gaps. We need to shift from a defensive approach to one of shared responsibility.

Provincial presentations

Key agricultural issues

- Nutrient (nitrogen and phosphorus) loading (from fertilizers, manure)
- Manure management practices
- Pesticides
- Bacteria
- Metals
- Erosion, sedimentation and turbidity
- Runoff and leaching

Water and source water protection is a priority for every province and concerns about agricultural contributions are common. The agricultural issues affecting source water quality were, not surprisingly, similar across Canada; however, emphasis on the issues varied, which likely reflect geographic differences in landscapes. For example, eastern provinces placed more emphasis on the **mechanism of transport** (such as runoff and leaching) of nutrients rather than the source of nutrients, while western provinces focussed more on the source and quantity of nutrients.

Instruments used

- Acts, regulations and guidelines
- Provincial strategies and action plans
- Financial incentive programs (National Farm Stewardship Program, provincial initiatives)
- Watershed or geographic based management
- Education and awareness
- Monitoring
- Environmental farm plans (EFP's)
- Tools (surveys, fact sheets, guides, self assessment, indicators)
- Capacity building
- Multi-barrier approach to source water protection

Provinces use a combination of regulatory, economic, social and voluntary instruments and approaches to address agricultural issues which can affect source water quality. Regulations have been developed under various environment, water, planning and agricultural acts in each province to address the wide number of issues affecting water quality. Regulations pertaining to nutrient management and manure management are typical across Canada but some such as the New Brunswick Wellfield and Watershed Protected Area Designation Orders under the Clean Water Act are unique in that they consider the mechanism of transport of nutrients, chemicals and bacteria and establish limitations for their use based on setbacks and travel times of contaminants.

Watershed-based approaches to source water protection have gained foothold in several provinces and these are at various stages of implementation. There was general agreement that watershed or geographically based planning and management of resources with stakeholder participation was desirable but it was not clear if federal departments were fully engaged in these processes.

Education and awareness activities were seen as valuable mechanisms for creating on-farm awareness of potential environmental risks and improving voluntary uptake of **beneficial management practices** (BMP's). **Environmental Farm Planning** (EFP) and equivalent group planning activities under the Agricultural Policy Framework have also been valuable in facilitating this education.

Producers rely on national funding programs like the National Farm Stewardship Program, Greencover Canada and the National Water Supply Expansion Program as well as provincial and other programs (e.g. Ducks Unlimited) which provide financial assistance for the implementation of BMP's on the landscape. There has been good uptake in this program across Canada, thus far, with active participation by the "early adopters". The momentum needs to continue, however, to encourage increased participation.

There was general agreement on the key challenges and barriers regarding source water protection in the context of agriculture, particularly related to Beneficial Management Practices (BMP's). Agricultural BMP's are heavily promoted across Canada but many of them are costly to implement and the net socio-economic and environmental impacts are neither clear nor easily measured. There were also regional disparities in the effectiveness of some beneficial management practices which are likely linked to geographical and climatic differences. For example, riparian management practices in eastern Canada (where slopes along water courses are steep and rainfall events can be severe) were seen to be beneficial whereas their impacts in western Canada (where banks along water courses are small and intense rainfall events are rare) were less evident.

Challenges and barriers

- Cost-benefits of beneficial management practices (BMP's)
- Socio-economic and environmental benefits of BMP's are not immediately evident
- Regional disparity in effectiveness of BMP's
- Climate impacts on agricultural practices and BMP's are not well understood
- Balancing science-based with precautionary-based approaches to source water protection
- Attitudinal changes in agriculture and society
- Transforming water quality into economic advantage

Programs like the National Farm Stewardship Program have been assisting producers to implement BMP's but there is a limit as to how much can be done within the financial capacity of the producer in order to achieve long term measurable improvements in water quality.

Source water protection is a balancing act for provinces. Societal pressures demand a precautionary approach to source water protection whereas agriculture seeks a balance with science and economics.

Progress

- Environmental farm planning in full swing
- Emphasis on multi-stakeholder involvement in source water protection plans
- Increased number of watershed-based source water protection plans
- On-farm action and implementation of BMP's
- New acts and regulations

Many of the provinces reported significant changes or additions to acts and regulations within the last five years to reflect the higher priority being placed on source water protection. For example, British Columbia passed the Drinking Water Protection Act in 2003, Manitoba passed the Water Protection Act in 2005, and Ontario passed the Clean Water Act in 2006. All of these acts have regulatory implications for agriculture.

While progress has been made to improve the regulatory framework in support of source water protection, provinces have also been emphasizing softer, voluntary approaches for changes in agricultural practices to reduce risks to water supplies. Environmental farm planning and equivalent group planning activities are well underway in all of the provinces under the National farm Stewardship Program and Greencover Canada as well as a variety of other provincial or non-government initiatives.

Federal presentations

Role of federal government

- National policy development
- Facilitation (governance, partnerships)
- Research, science and innovation
- Information and knowledge development
- Promotion of performance and stewardship
- Education and engagement
- Enforcement of federal regulations
- Capacity building, knowledge transfer

Federal perspectives on agriculture and source water protection were given by representatives from each of the five federal departments with major roles in water, namely, Environment Canada, Agriculture and Agri-Food Canada, Health Canada, Fisheries and Oceans Canada and Natural Resources Canada.

Although water **management** is the primary responsibility of provinces, **water** is a shared responsibility in Canada. Federal departments are responsible for navigation waters, water on federal land and interprovincial/international water.

Recently, water has moved to the forefront in the eyes of the Canadian public and the federal government. Agriculture needs to be proactive in addressing societal concerns. Federal departments have several important roles to play in assisting agriculture in addressing these concerns while also protecting the viability of the industry. In general, they must provide overall policy direction for water, enforce national regulations and build capacity (institutional, economic, supporting data and knowledge) in support of source water protection initiatives across Canada.

Federal programs & initiatives

AGRICULTURAL POLICY FRAMEWORK PROGRAMS

- National Farm Stewardship Program (NFSP)
- National Land and Water Information Service (NLWIS)
- National Agri-Environmental Standards Initiative (NAESI)
- National Agri-Environmental Health Analysis and Reporting Program (NAHARP)
- Watershed Evaluation of BMP's (WEB's)
- National Water Supply Expansion program (NWSEP)
- Greencover Canada

INITIATIVES

- Environmental Farm Planning
- Next Generation of Agriculture and Agri-Food Policy
- AAFC Science and Innovation Strategy
- AAFC Strategic Water Framework
- National Risk Assessment of Microbiological Contaminants in Agricultural Runoff
- Source and treated water quality indicators
- Groundwater mapping, aquifer delineation
- IWRM
- Research
- Monitoring

Agriculture and Agri-Food Canada is actively involved in the delivery of serval programs under the Agricultural Policy Framework which promote improvements in agricultural practices to reduce the risk of impacts on water quality.

Environment Canada has the primary Federal responsibility for water which does not fall under provincial jurisdiction. The departmental priorities are IWRM, research and tool development.

Health Canada is currently undertaking a national pilot project on the risk assessment of microbiological contaminants in agricultural run-off. In collaboration with a federal-provincial-territorial working group, they are also involved in the development of source and treated water quality indicators which will help track changes and identify trends in water quality.

Fisheries and Oceans Canada is responsible for enforcing the Fisheries Act and for protection of aquatic species at risk under the Species at Risk Act. They are currently modernizing their Habitat Management

Program which will allow them to become more engaged in integrated approaches to resource management.

Natural Resources Canada's primary mandate in relation to freshwater is to provide information and knowledge for informed decision-making through science and policy. They are currently actively involved in groundwater resource mapping and aquifer delineation initiatives which will characterize aquifer systems and their vulnerability to various land-use activities.

Federal departments have made important contributions towards source water protection. Programs under the Agricultural Policy Framework have increased producer awareness of water quality issues and facilitated the adoption of numerous beneficial management practices on farms.

There is on-going work in developing national inventories and databases related to water resources and water quality which will improve our knowledge and understanding of these resources and support scientific evaluation of the risks that agricultural activities can present.

Research into the effectiveness of BMP's and the improvement of the environmental performance of agricultural systems are key areas of work being undertaken by federal departments.

Progress in Canada

- 47,000 producers participated in EFP workshops
- 30,000 producers have completed environmental farm plans.
- 21% of agricultural landscape under an EFP
- $27.7 million paid on 8,800 BMP projects under NFSP
- Construction of an E.coli library
- Increased federal involvement in integrated resource planning and management
- National groundwater inventory
- National groundwater database
- 12 mapped aquifers
- On-going enforcement of Fisheries Act

KEY MESSAGES - Session 2 -Theme: Governance - Integration and Partnerships in Source Water Protection.

Keynote presentation

The Conference Board of Canada delivered the keynote presentation for this session which presented the findings and recommendations of a case study analysis of water resource governance and management in Canada. Partnerships are an important aspect for governance but good water governance structures must also be horizontal, respect provincial ownership and provide a mechanism for interprovincial sharing of information.

Recommendations

1. Clarify governance structures.
2. Encourage a nested approach to watershed governance.
3. Improve inter-agency co-ordination
4. Integrate ground and surface water management.
5. Prioritize and budget for adequate information.
6. Explore greater use of market-based instruments.

Presentations

Presentations which described the governance approaches used to deal with watershed level issues were given by representatives of three provinces.

Partnerships! Partnerships! Partnerships!

- Multi-stakeholder participation
- Multi-jurisdictional commitment

The Saskatchewan Watershed Authority is currently leading an initiative in Saskatchewan to build an integrated water management (IWM) governance structure which is intended to provide the framework for targeted delivery of government programs and improve dialogue between federal and provincial departments. Partnerships and co-operation amongst federal, provincial and local governments and stakeholders are integral to the success of the initiative. The proposed structure will include the establishment of a joint federal/provincial executive committee, a water partnership committee and working groups. The working groups will be formed to address specific water issues as they may arise from either the watershed level or the other two committees.

Under the Lake Winnipeg Stewardship Initiative, a Stewardship Board comprised of representatives from key stakeholder groups was established to assist in identifying actions which will contribute to the commitments outlined in the Lake Winnipeg Action Plan. Agriculture is represented on this Board. Senior government departments are not part of the board, however, they are part of a cross-government action committee which co-ordinate government efforts in support of the initiative and a science sub-committee which serves the scientific needs of the board and the action committee.

As part of their “Water for Life” strategy, Alberta considers partnerships important for sharing responsibility for identifying and developing solutions to water-related issues in Alberta. They have incorporated three three levels of governance into their water management structure. These include:

a. Alberta Water Council (provincial)
b. Watershed Planning and Advisory Councils (regional/watershed)
c. Watershed Stewardship Groups (local)

Each of these groups has knowledge of what is happening in the other groups and each share in the decision-making.

7 C's to overcome CHALLENGES

- Communication
- Collaboration
- Co-operation
- Coordination
- Commitment
- Consensus
- Capacity

The importance of good water governance can not be understated, but the process of making things happen on the landscape is not without challenges. Consensus building is a long but necessary process to get stakeholder buy-in and participation. While stakeholders expect immediate results they must be prepared to invest a lot of time and effort into the process before effective sustainable action takes place on the land.

Senior levels of government are placing more emphasis on watershed based management and have been supporting these efforts by providing knowledge and technical expertise for decision-making. This must be an on-going commitment to ensure that local level decisions are based on sound science and information.

KEY MESSAGES - Session 3 -Theme: Knowledge, Tools, Applications, Education and Technical Transfer

Presentations

This session highlighted the tools, knowledge and approaches that are being used to advance source water protection initiatives at the watershed and provincial level. Undeniably, all of these are required to some extent for progress to occur.

Knowledge development, technology transfer, and public outreach activities were considered to be key elements for **building capacity** and raising a heightened **awareness** of the watershed. Monitoring, although laborious, was seen to be an integral part of measuring trends and changes in water quality in response to source water protection activities.

Tools and knowledge

- Technical support from government agencies
- Programs to support to BMP implementation
- Environmental farm planning
- Research
- Watershed level programs
- Promoting education and stewardship
- Building capacity at watershed level
- Regulatory instruments
- GIS-based information systems
- Satellite imagery, remote sensing
- Watershed level atlases, indices and Indicators
- Monitoring and data collection

Economic and regulatory instruments are important for encouraging the **adoption** of BMP's.

Research and GIS based decision support systems provide the science in support of computer based tools development and **local decision-making**. There seems to be a wide range of activities in this areas which would benefit from some co-ordination across Canada in order to avoid duplicating effort.

Successes

- Increased interest in, and local knowledge of, the watershed
- Adoption of tools and technology
- Increased adoption of agricultural BMP's through programs
- Development of management tools in support of decision-making
- Use of satellite imagery to build precise flow models

Education and awareness activities which involved direct contact with producers are effective in encouraging the adoption of agricultural BMP's; however, tools are needed to support these activities. This is an area where federal and provincial departments can make significant contributions. Public servants are viewed as experts in many water-related areas and are expected to impart their knowledge to increase general awareness of a subject area and to build capacity in local organizations which will help them make better water-related decisions. Training, computer modelling and GIS based mapping tools related to nutrient runoff or leaching are examples of capacity-building activities which federal and provincial departments can support.

It was generally felt among the presenters that there is a lack of information about the environmental and economic effectiveness of some BMP's. This was thought to inhibit the adoption of better agricultural practices by producers. More work is warranted in this area.

Monitoring is an important component for measuring and assessing BMP effectiveness. In the early 1990's, fiscal restructuring forced the reduction of hydrometric monitoring stations across Canada. But now, with the trend towards delegation of water-management decisions down to watershed levels, it is becoming evident that this is an area which requires revitalization if the watershed authorities are to measure their successes.

Challenges, Gaps

- Applied research
- Ecological goods and services merits attention
- Recognition of positive contributions from agriculture
- Monitoring
- Measuring outputs and outcomes
- Funding for education and training (capacity building
- BMP promotion needs more resources
- Building a culture of knowledge awareness about the watershed
- Commitment to action
- Communicating successes

Presentations

The presentations in this session highlighted the importance of science in supporting national policy decisions and objectives regarding sustainability yet they also pointed out some of the risks and uncertainty that also come with this approach. For example, modelling is often used to predict future outcomes of impacts of agriculture or climate on the environment but, as many scientists can attest, the output is only as good as the data that goes into the model. "The idea that predictive science can simplify the decision-making process by creating a clearer picture of the future is deeply appealing in principle, but deeply problematic in practice." (Sarewitz et al., 2000)

Currently, work is being done on developing meaningful and measurable national environmental performance standards to monitor agriculture's progress in achieving departmental goals for the environment and understanding relationships between agriculture and the environment. The National Agri-Environmental Standards Initiative (NAESI) lead by Environment Canada, is expected to finalize standards for delivery to AAFC by March 31, 2008.

Progress

- 41 NAESI Ideal State standards developed
- progress on additional 89 Ideal State standards
- Research related programs:
- Gaps in Farming Systems Information (GAPS)
- National Agri-Environmental Analysis and Reporting Program (NAHARP)
- National Carbon and Greenhouse Gas Emission Accounting and Verification System (NCGAVS)
- National Land and Water Information Service (NLWIS)
- Prairie Shelterbelt Program
- Watershed Evaluation of Beneficial Management Practices (WEBs)
- Seven "living laboratories" across Canada
- Pilot testing of Groundwater Resource Risk Index
- Research on nitrate isotopes to assess seasonal nitrification in groundwater

Gaps

- Data collation
- Database co-ordination and management
- Effectiveness of BMP's under different conditions are not well understood
- Relationship between field and watershed level models
- Lack of replication of research in different Regional settings to fully understand geographical and climatic influences on water quality
- Long term or cumulative impacts of agriculture on watershed health are not well understood
- Impact of climate change on water availability, agricultural practices and ultimately water quality are not well understood

Natural Resources Canada is engaged in several groundwater related initiatives in Canada which will increase our understanding of the temporal and spatial relationship between agriculture and the environment. In partnership with the Prince Edward Island, they used nitrate isotopes to characterize sources of nitrates in groundwater supplies. In the two years of sampling undertaken in the Wilmot Aquifer, they found that nitrate concentrations were seasonally linked to agricultural activities and plant residue degradation; however the variance in concentrations within a season is likely influenced by local climatic conditions.

Natural Resources Canada is also developing a Groundwater Resource Risk Index which defines the risk of contamination based on the **hazards** and the aquifer **vulnerability.**

Additional research and applied science is needed to fully understand the risks to surface and groundwater from intensive agriculture and cropping systems. Of particular importance to water quality is the need to address concerns related to pathogens and phosphorus loadings.

At the same time, there is a need to understand the physical, economic and social limitations of what can be done on the landscape. This is where a holistic approach to watershed management can bring these elements together to come to some mutual agreement about making realistic improvements on the land that will benefit the water resource.

Opportunities for research and science

- Reducing nitrogen pool
- Understanding and managing large systems
- Defining limitations of conservation practices
- Measuring watershed level cumulative impacts
- Attitudinal changes in humans
- Continue watershed scale evaluation of BMPs
- Improve water management practices

KEY MESSAGES - Panel Discussion

The following is a summary of some of the key messages/recommendations which came from panel presenters representing agriculture and academia:

1. Improve public awareness of the agricultural contributions towards environmental sustainability. Nutrients are necessary agricultural inputs which only become contaminants if they are improperly managed.
2. Changes are required in producer attitudes towards environmental benefits.
3. Continue to provide economic instruments for producers supporting their efforts in environmental stewardship. Create a "market place" where the public is willing to pay for better environmental productivity.
4. Continue research in the environmental and economic effectiveness of agricultural BMPs.
5. Work towards achievable environmental goals and targets.
6. Integration and co-ordination of efforts at all levels of government and local watersheds is necessary to engage diversity of disciplines.

KEY MESSAGES From Participant Evaluation Forms

Participants were asked to indicate the key messages they heard at the forum that they wished to take back to their organization/departments. In summary, these were:

1. Effective partnerships and integrated approaches are vital for source water protection.
2. Good governance structures or models are essential for integrated management of resources.
3. Data, information and research gaps will always exist but efforts are underway to fill some of them.
4. Research, science and knowledge are essential for good policy and decision-making.
5. A seamless transition into the next agricultural policy is desirable.

SUMMARY AND RECOMMENDATIONS

The forum provided an excellent venue for participants to share and understand the level of progress being made in the area of source water protection from federal and provincial departments across Canada. The event also generated informal networking discussions across governmental, geographical and departmental jurisdictions on the area of ag-water, watershed related activities and future agricultural programming. Participants supported the need for more Ag-Water Forums to continue the dialogue on agriculture and water.