



MINUTES NATIONAL WORKSHOP ON GROUNDWATER

Hosted by Geological Survey of Canada- Quebec Division
Alfonso Rivera, Chief Hydrogeologist
June 15 and 16, 2000, Quebec City

APPENDIX 1

1. AGENDA

DAY 1: June 15, 2000 (08:30 – 17:00)

- | | | |
|---------------|--|---------------------|
| 8:30 - 9:00 | Registration | |
| 9:00 - 9:15 | Opening remarks
Richard Grieve and Alfonso Rivera | |
| 9:15 - 12:00 | Presentations | |
| | British Columbia | Alan Kohut |
| | Alberta | Nga de la Cruz |
| | Saskatchewan | Nolan Shaheen |
| | Ontario | Gayle SooChan |
| 10:30 – 11:00 | Coffee Break | |
| | Quebec | Michel Ouellet |
| | New Brunswick | Darryl Pupek |
| | Nova Scotia | Dave Briggins |
| | P.E.I. | George Somers |
| 12:10 – 13:00 | Lunch | |
| 13:00 - 14:10 | Presentations (continued) | |
| | Newfoundland | Keith Guzzwell |
| | Environment Canada | Allan Crowe |
| | AAFC | Christian de Kimpe |
| | INAC/Yukon | Richard Janowicz |
| 14:10 – 14:30 | Coffee Break | |
| | HEALTH | Louis Marie Poupart |
| | NRCan | Alfonso Rivera |
| 15:10 - 17:00 | Panel to identify common and/or specific groundwater-related problems in a general context | |

DAY 2: June 16, 2000 (09:00 – 16:00)

- 08:30 - 09:15 General Overview of discussions from the previous day

09:15 - 10:45 Break-out groups to identify groundwater issues (the topics of these groups were based on the presentation of the previous day)

Group A : Collaboration, Cooperation, Partnership

Group B1 : Aquifer systems mapping and data management

Group B2 : Aquifer knowledge and understanding

Group C : Aquifer (watershed) management and protection

10:45 - 11:00 Coffee break

11:00 - 12:30 Plenary – Reports from the Break-out Groups

Panelists:

Chair: Dr. Alfonso Rivera NRCan

Dr. Allan Crowe NWRI

Dr. George Somers, P.E.I. Water Resources Division

Mr. Maurice Lewis, DEO CGWA

Prof. Dave Rudolph, University of Waterloo

12:30 – 13:30 Lunch

13:30 – 16:00 Overall Wrap up session

Issues:

- Identify priorities on GW research at the national level and knowledge gaps
- Define a strategy
- List actions and responsibilities
- Elaborate a summary of key points for input to workshop proceedings

16:00 End of workshop

Bob Leech commented on the 1993 Canadian Geoscience Council report on “Groundwater Issues and research in Canada” (see reference list)

Harvey Thorleifson provided with a brief overview of Canadian groundwater maps

Workshop facilitator: Dan McGillivray - CRESTech

2. REPORTS FROM THE BREAK-OUT GROUPS

The following questionnaires were prepared for the breakout groups discussions.

Group A : Collaboration, Cooperation, Partnership

- A.1 What are the most important groundwater issues requiring cooperation at the national level ?
- A.2 What are the preferred modes of cooperation between the provincial and federal agencies interested by groundwater issues ?
- A.3 What are the most appropriate roles of the federal agencies, provincial agencies, utilities, universities and private organization relative to groundwater issues ?
- A.4 What are the most interesting opportunities for international cooperation on groundwater issues ?
- A.5 Is there a need for a Canadian coordination committee on groundwater issues? If yes, what would be its role and who should form the committee ?

Group B1 : Aquifer systems mapping and data management

- B1.1 What are the most important aquifers systems and aquifer types that need to be mapped across Canada? Are there important the trans-boundary aquifers requiring further studies?
- B1.2 What scales, types and levels of mapping, characterization and monitoring should be done on aquifers
- B1.3 What aspects of groundwater data base management need to be improved and how?
- B1.4 How can the knowledge about groundwater be transferred to the public?

Group B2 : Aquifer knowledge and understanding

- B2.1 What scientific research needs to be pursued to address important groundwater quality and quantity issues in Canada (set priorities among these needs)?
- B2.2 What technical and scientific tools (equipment methods models , ...) are needed to achieve a quantitative understanding of aquifer dynamics?
- B2.3 How can the scientific knowledge about groundwater be transferred to the industry, governments and the general public?

Group C : Watershed (aquifer) management and protection

- C1 What tools and knowledge are required for effective watershed (aquifer) management? (e.g.: well head protection areas, vulnerability maps, research on surface water and groundwater interaction,...)
- C2 What are the aquifer systems requiring management efforts in Canada?
- C3 a) What are the preferred approaches for groundwater management at the local and regional levels and b) are there good examples of aquifer management in Canada? (e.g., land use planning, land use conflict resolution,...)
- C4 What are the most important threats on groundwater quality and quantity in Canada?

- C5 Besides funding, what do you want/need from the federal government in support of aquifer management?
- C6 How can we promote such an approach to the public?

The following boxes present the results from the breakout groups in a condensed form.

Group A: Collaboration, cooperation, partnership

Moderators: Yves Michaud & Harvey Thorleifson

A.1 - Groundwater Issues:

- Collaboration – Partnership
- National Inventory
- Information management and exchange
- National /Regional /Topical research priorities
- Network on groundwater

A.2 - Modes of cooperation:

- Informal meetings
- Annual workshops
- Pooling resources
- Inter-agency cooperation
- Linkages to existing programs (e.g., Climate Change)

A.3 - Roles:

- Team work
- Problems of clarity (Federal)
- Evolving roles – not black & white
- Groundwater is a provincial responsibility

A.4 - Mechanisms:

- Policy linkages needed
- SCME task forces (water quality, water demand, hazards)
- Reactive groundwater steering committee
- Professional vs. Political

A.5 - Canadian coordination committee on groundwater issues

- “Think big” = National GW inventory
- National Program = “HYDROPROBE”
- Common themes: climate change (land use impact), Arsenic contamination, Saltwater intrusion

Group B1: Aquifer systems mapping and data management

Moderators: Marc Hinton, Miroslav Nastev & Dave Sharpe

B1.1 - Aquifer systems:

- Buried valleys (fills)
- Fractured rocks (e.g., Franklin, QC)
- Surficial -granular (e.g., Abbotsford, B.C.)
- Sedimentary basins (e.g., Judith River)
- Transfer methods and knowledge

B1.2 - Scales, types and levels:

- Scales: national (principal regions), regional 1:250'000; 1:100'000), watershed (basin, local)
- Types: Dictated by data and quality. Stratigraphic, hydrostratigraphic, 3D stratigraphic, water chemistry, derived maps (vulnerability, capture zones, recharge)
- Monitoring: Regional scale monitoring of ambient/background groundwater conditions. Regional water chemistry surveys

B1.3 - Data base management:

- Meta-data
- Minimum standards
- Tools, i.e. *HYDROLINK* (GSC development)
- Support provincial agencies

B1.4 - Knowledge transfer:

- “HYDROSCAPE”/Geoscape
- Specific to client groups (consulting companies, provincial)

Group B2: Aquifer knowledge and understanding

Moderators: René Lefebvre & David Rudolph

B2.1 - Scientific research needs:

- Focus on aquifer systems (general), role of aquitards (particular)
- Characterization geologically: quaternary specific, generic conceptual models; geological control on aqueous geochemistry, ex. As, U, Se
- Improved understanding of hydraulic parameters: fractured medium, scale, sensitivity of different parameters
- Fractured rock environments (little understanding in most areas)
- Aquifer protection: methods, validity, long-term data sets, vulnerability
- Recharge/discharge issues
- Investigate approaches to recharge estimation: processes from root zones to water table

B2.2 – Research Tools:

- Development of GW/SW modelling tools “integrated approach”
- Tools and approaches to estimate physical parameters: geostatistics, geophysics, specific sites studies that can be applied to other sites
- Investigation of sites with long term data sets
- Specific methods for characterization of fractured media: field characterization at small and regional scales
- Develop strategy to encourage government and industry to support fundamental research
- Switch emphasis from point source contamination/remediation to groundwater management at reasonable/regional scale: “A change in fundamental philosophy”

B2.3 –Knowledge transfer:

- Graduate students with “current knowledge”
- Promotion of research successes from the universities (open house)
- Promotion/education at the children level “children’s groundwater festival”
- GW industry “spokeperson”
- Development of promotional material
- Fed role – need to overcome the resistance to deal with water

**Group C : Aquifer (watershed)
management and protection :**

Moderators : Martine Savard & Richard Martel

C.1 – Tools and knowledge required:

- GW-SW interactions
- Delineation & characterization of aquifer systems- scale
- Impact of human activity (urbanization) on GW levels and quality
- Sustainable yield – recharge and discharge areas
- Climate data – effects on GW
- Chemistry – use in separating GW – SW systems
- Levels of knowledge vary largely from one Canadian are to another

TOOLS

- Aquifer maps
- Mapping methodologies
- Modelling – well head capture zones
- Relational data base management (space/time)
- Regulations – existing and revised
- Aquifer classification & inventory (vulnerability)
- Monitoring
- Tracer testing

C.2 – Aquifer systems requiring management efforts:

- Aquifer under stress (quality/quantity)
- Transboundary aquifers
- Provinces and local agencies in better position to prioritize the target aquifers

C.3 – Preferred approaches

- Stakeholder involvement
- Proactive – not reactive
- Monitoring – adaptive management
- Public consultation
- Understandable scientific proofs
- Take mass balance of water into account
- Recognize where decisions take place (planning)
- Good examples: Ontario and Quebec

C.4 - Most important threats on GW quality and quantity:

On quality:

- People
- Contamination
- Agriculture
- Rural and urban point sources and non-point sources
- Loss of wetlands
- Well construction

On quantity:

- People
- Overuse (aquifer over-exploitation)
- Lack of enforcement
- Lack of collaboration

3. PANELISTS COMMENTS

This section presents the comments of the panelists based on the reports from the break-out groups, as well as their own comments.

Maurice Lewis, DEO CGWA, Alberta

- Thread of commodity – working for the public good
- Public education & people in industry
- Collaboration – Cooperation
- More financing for research
- Need leadership at the federal level
- Quality issues
- Research, monitoring and data sharing required
- Request for a special adviser for GW (contact for education, public water well industry)
- Suggest education, certification, and licensing (e.g., water well drillers)
- Now is time for ACTION!

George Somers, Water Resources Division, P.E.I.

- Raise the awareness of groundwater on a national basis
- Better coordination
- Formal & informal mechanisms
 - Committees
 - Networking
- Need for clarification of roles between and within governments.
- Stratigraphic → hydrostratigraphic → maps → models → decisions systems
- Different scales of operation: local, regional, national
- Knowledge gaps:
 - Aquifer dynamics
 - Tool validation
 - Watershed approach
- Broader approach to watershed management, need consensus on management approach and tools

Allan Crowe, NWRI, Ontario

- Topics we know (agree)
 - Importance of groundwater- many issues which need to be addressed
 - Jurisdiction
 - Collaboration at the working level
 - Need support of senior management

- Groundwater recognition - have information on: public awareness, aquifer characterization, GW impacts, water withdrawals (land use)
- Topics we don't know (disagree)
 - Who has expertise- responsibility?
 - Where are the resources (\$)?
 - Means for collaboration on how to talk and how to collaborate
 - Future research : research vs. Application of existing knowledge ; better integrated models and methods for surface water and groundwater; link mapping to groundwater quality
 - How to integrate
 - People vs. environmental impacts

Dave Rudolph, University of Waterloo, Ontario

- Optimize and coordinate diverse groups and issues
- Academics – Networks of Centres of Excellence opportunities
 - Budget : 5 to 8 M\$ per year
 - Industry & government partnership for fundamental research
- Educate and promote. Need for a national program on groundwater? Is there room for a national groundwater advisory panel? Promote internally (short term return?). Demonstrate value of long term investments (wealth preservation).
- A long-term problem with short-term politicians
- Do not re-invent the wheel. Mapping tools (what is available?)
- Making research attractive to funding agencies
- Need tools to go from local scale to regional scale
- Need a protection approach (change of focus)
- Growing perception that we can solve groundwater problems with engineering. Takes away form fundamental science background. Engineering can fail
- Academics now must look for industrial/private funding. Hard to do fundamental research

Alfonso Rivera, NRCan, GSC, Quebec

- Need targeted, well defined, specific, timely actions now!
- Pooling resources (but how and who?)
- National inventory
- Good examples of data base management tools of federal/provincial cooperation are: Quebec, Ontario, Saskatchewan and 4 Maritimes provinces
- Mapping methodologies by federal agencies (GSC)
- Monitoring network (quantity and quality) with federal-provincial coordination
- Clearly define the roles of federal agencies
- Revise the 1993 committee on GW – CGC report

- Create a GW steering committee that will include federals, provinces and academics
- Cooperate by linking with current programs

4. REFERENCES

A few documents are in line with the nature and subject of this workshop; three of the most important are listed below for reference to the reader.

Groundwater Issues and Research in Canada, 1993. The Canadian Geoscience Council, edited by A.V. Morgan.

Background in a Canadian Groundwater Strategy, 1992. John Gilliland Environment Canada.

Report on the Governments Roundtable on Water, 2000. Environment Canada, The Governments Roundtable on Water was held in Ottawa, January 12 to 14, 2000. The summary report was issued on May 2000, and is available upon request on sharonlee.smith@ec.gc.ca.

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APPENDIX 2 Proceedings containing the presentation of each province, territory and federal agency