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ORGANIZATION OF AMERICAN STATES - OAS

**UNESCO/OAS ISARM Americas Programme
TRANSBOUNDARY AQUIFERS OF THE AMERICAS**

5th COORDINATION WORKSHOP

Montreal, Canada

September 17–21, 2007

FINAL REPORT

May 2008



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UNESCO/OAS ISARM AMERICAS PROGRAMME
(Transboundary Aquifers of the Americas)

5th COORDINATION WORKSHOP
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UNESCO/OAS ISARM AMERICAS PROGRAMME

5th COORDINATION WORKSHOP

Montreal, Canada, September 17-21, 2007

SUMMARY

Present at the meeting were representatives from seventeen countries of the Americas, as well as from France, Japan, Italy and The Netherlands. Over fifty water experts and policy-makers participated in the event. See list of participants in Annex 1. The agenda of the workshop is presented under Annex 2.

The Introductory Remarks of the workshop was presented by the Director General of the Geological Survey of Canada, Natural Resources Canada, Mr. David Boerner (see Annex 3).

An important highlight of the workshop was the presence of Ambassador Chusei Yamada, Special Rapporteur on Shared Natural Resources for the United Nations International Law Commission. Mr. Yamada gave a keynote speech on the “Codification of the law on transboundary aquifers by the UN International Law Commission” (refer to Annex 4). The draft articles and commentaries related to “shared natural resources” contained in the Chapter IV of the Commission’s Report for 2006 was made available to the participants in English, French and Spanish.

Present at the workshop was also the Commissioner for the International Boundary Water Commission United States and Mexico, Mr. Arturo Herrera Solis. In his presentation, Mr. Solis gave an extended overview of the UNESCO-OAS ISARM Americas Program progresses in the region highlighting its contribution to the identification and characterization of the aquifers systems of the Americas and to the establishment of a platform for information and knowledge sharing in the hemisphere.

Another special element of the workshop was the presentation of the publication “Transboundary Aquifers Systems in the Americas – Preliminary Assessment”. This book constitutes the first of a series of 3 volumes to be published prior to the next World Water Forum in 2009.

During the workshop the representatives of the Member States reviewed and discussed the contents of the second ISARM Americas publication dealing with “Institutional and Legal Aspects”. It was agreed that the publication will be ready for translation by mid 2008, and should be presented at the next coordination workshop. As for the third publication, it will also be published in both languages, English and Spanish.

In parallel to the completion of the third publication, which will provide a holistic overview of the state of transboundary water resources in the region, the Member States’ representatives agreed to establish a small working group that will start to shape a vision and strategy for transboundary water resources in the Americas. The composition of the group was to be defined before the end of the year 2007.

As part of the workshop, Natural Resources Canada (NRCan) and the United States geological Survey (USGS) organized a field trip to the Transboundary Châteauguay Aquifer System. The field trip included an extensive number of site-visits of particular technical interest both in Canada and the USA. The contents of the field trip documentation are in Annex 5.

The participants discussed the organization of the VI UNESCO-OAS ISARM Americas Coordination Workshop planned for late, 2008. Mrs. Maria Concepcion Donoso, UNESCO Regional Hydrologist, took the lead to contact the Dominican Republic to have confirmation of the offer to host the 2008 event. Argentina, Mexico and Guatemala kindly proposed their candidature as alternative hosting countries.

Following the 5th UNESCO/OAS ISARM Americas workshop, a two-day Technology Workshop (Annex 6) was organized by the Canadian and the US Geological Surveys, with ten instructors from Canada and the USA. All national coordinators participated in the workshop.

Acknowledgements

The UNESCO/OAS ISARM-Americas Steering Committee wishes to thank:

- The Geological Survey of Canada/Natural Resources Canada, in particular Mr. Alfonso Rivera, Chief Hydro geologist and Program Manager, for the invaluable support in hosting the Workshop;
- The USGS, for their contribution to the Field Trip and Technology Workshop;
- The ISARM-Americas National Coordinators for their essential contribution to accomplish the Program tasks and their enthusiasm;
- Ambassador Chusei Yamada, Special Rapporteur on Shared Natural Resources for the United Nations International Law Commission for his participation in the Workshop;
- The UNESCO Regional Office for Science for Latin America and the Caribbean in Uruguay for their support in organizing the event;
- Mrs. Lydia Ugas, DSD staff project technical assistant at the GS/OAS Headquarters-Washington D.C., for the support in divulgating information to the countries during the year, and help organizing the Workshop;
- Mrs. Alice Aureli, UNESCO/IHP and Mr. Jorge Rucks, DSD/OAS, for the continuous support of both Organizations.

BACKGROUND

The global “Internationally Shared Aquifer Resources Management - ISARM Programme” was launched at the 14th Session of UNESCO IHP Intergovernmental Council in June 2000, in cooperation with several other international organizations, notably the Food and Agriculture Organization (FAO), the United Nations Economic Commission for Europe (UNECE), the United Nations Economic and Social Commission for Western Asia (UNESCWA) and the International Association of Hydro geologists (IAH). It aims to promote the recognition and understanding of transboundary groundwater resources, and foster collaboration among the countries sharing the same resource to achieve consensus on legal, institutional, socio-economic, scientific, and environmental aspects. Another important objective of the ISARM Americas Programme is the identification of case-studies of particular interest.

The UNESCO/OAS ISARM-Americas Programme is the regional initiative for the American hemisphere and is jointly coordinated by the UNESCO International Hydrological Program (IHP) and the Department of Sustainable Development – previously known as Office for Sustainable Development and Environment - of the Organization of American States (DSD/OAS).

One of the most important objectives of the ISARM Americas Programme is to create a comprehensive Inventory of Transboundary Aquifers of the Americas, a collection of data regarding the hydro geological characteristics, the actual use of the shared groundwater and the legal and institutional aspects. According to the Inventory, up to January 2006, 68 transboundary aquifers were identified: 29 located in South America, 18 in Central America, 17 in North America, and 4 in the Caribbean.

From the start of the activities in 2003 up to September 2007, the Programme has assessed the prevalence of transboundary aquifers in the Western Hemisphere, with the contributions of a network of National Coordinators, which represent 25 countries of the American hemisphere. Four previous Coordination Workshops¹ have been held respectively in Montevideo, Uruguay, on September 24th-25th, 2003; in El Paso, USA, on November 10th-12th, 2004; in Sao Paulo, Brazil, on November 30th – December 2nd, 2005; and in San Salvador, El Salvador, on November 20th-22nd, 2006.

During the First Coordination Workshop in Montevideo, the countries proposed nine transboundary aquifers as possible case-studies for project implementation, using the ISARM approach. They are located in areas of particular concern in the Americas: arid and semi-arid regions; areas extremely vulnerable to natural hazards and to climatic variability due to climate change; areas with severe land/water degradation due to increased urbanization and industrialization, extensive agriculture and deforestation, which heavily impact entire ecosystems; and areas of potential water use conflict, with high levels of poverty and health risks.

In 2004, the ISARM-Americas Steering Committee² identified three priority case-studies of transboundary aquifers from the list: the Artibonito and Masacre aquifers in the Hispaniola Island (Haiti – Dominican Rep.) as an example of inter-mountainous and coastal transboundary aquifers in Small Islands Developing States (SIDS); the Yrenda-Toba-Tarijeno aquifer system in the Gran Chaco Americano (Argentina-Bolivia-Paraguay), representing transboundary aquifers in semi-arid zones of South America; and the Hueco Bolson aquifer (Mexico-USA), as a striking example of transboundary aquifer systems in urban areas.

To date, three other priority case-studies have been selected: the Pantanal transboundary aquifer system, shared by Bolivia, Brazil and Paraguay, the Ostua-Metapan between El Salvador and Guatemala and the Rio Negro transboundary aquifer system, between Honduras and Nicaragua.

¹ Workshop Reports of the three events are available in pdf. files at the OAS web-site: [HTTP://WWW.OAS.ORG/DSD/ISARM/ISARM_INDEX.HTM](http://www.oas.org/dsd/isarm/isarm_index.htm) and the UNESCO/IHP Virtual Library: <http://www.unesco.org/uy/phi>.

² The Steering Committee consists of UNESCO-IHP and OAS experts

1. OPENING CEREMONY

Initially, Mr. Alfonso Rivera, National Coordinator for Canada ISARM Americas Programme, Chief Hydrologist and Program Manager of Geological Survey Canada/Natural Resources Canada, and President of the Organizing Committee of the V Coordination Workshop of the UNESCO/OAS ISARM Americas, welcomed the participants to Montreal, presented the workshop objectives and invited distinguished guests to the head table: David Boerner, Maria Donoso, Chusei Yamada and Jorge Rucks.

Mr. David Boerner, Director General, Geological Survey of Canada, Natural Resources Canada, opened the workshop and welcomed the participants, explained the research on water resources carried out by different groups in Canada, the cooperation between Canada and USA on transboundary aquifers, and Canada's participation on the ISARM Americas Program. (Annex 3).

Mr. Fred Wrona, Branch Director Environment Canada and Chair of the Canadian National Committee for UNESCO IHP, referred to ongoing activities in the water sector taking place in Canada, highlighting some of the key issues being addressed by this Member State in relation to water resources.

Mrs. Maria Concepcion Donoso, regional hydrologist the UNESCO Regional Office for Science and Technology for Latin America and the Caribbean (UNESCO/ROSTLAC) thanked the Canadian authorities for the kind hospitality and excellent organization. She also congratulated the ISARM Groups for the results accomplished during the year 2007, for the effective inter-agency cooperation between UNESCO and OAS, and the enthusiastic participation of the countries.

Mr. Jorge Rucks, Chief Latin America Operations Area of the Department of Sustainable Development of the Organization of American States – DSD/OAS, thanked the government of Canada for kindly hosting the workshop. He highlighted the importance in the region of the ISARM Programme that, together with the experience of the Guarani Transboundary Aquifer Project, has brought groundwater issues to the attention of the governments of the American countries.

Mr. Nelson da Franca, the General-Coordinator of the UNESCO/OAS ISARM Americas Program, presented the Agenda (Annex 2), and provided a brief explanation on the main themes to be discussed during the workshop.

2. INVITED SPEAKERS AND LECTURE OF AMBASSADOR C. YAMADA

The second item of the Agenda was the presentation of the invited speakers Doug Alley, Arturo Herrera Solis, Jean-François Donzier and the lecture of Ambassador Chusei Yamada.

Mr. Doug Alley, Physical Sciences Officer of the International Joint Commission – Great Lakes Regional Office, Canada, provided an exhaustive presentation of the shared aquifers located between Canada and the U.S.A. He also discussed priority groundwater issues in the Great Lakes Basin related to pollution from persistent toxic substances (pesticides petroleum products, chlorinated organics, etc.), nutrients and pathogens.

Mr. Arturo Herrera Solis, Commissioner for the Commission of the International Boundary and Water Commission United States and Mexico – IBWC, Mexico side, gave an extended overview of the UNESCO-OEA ISARM Americas Program advance in the region highlighting its contribution to the identification and characterization of the aquifer systems of the Americas and to the establishment of a platform for information and knowledge sharing in the hemisphere. He also pointed out the urgent need to optimize the use of groundwater and to implement more efficient technologies to decrease the energy consume. He also brought the example of the Hueco Bolson aquifer, shared by Mexico and the USA, and the first module of the groundwater desalinization plant in El Paso.

Mr. Jean-François Donzier, Permanent Technical Secretary – International Network of Basin Organizations, thanked UNESCO and OAS for inviting him to the meeting and presented an overview of the activities being undertaken by INBO.

Ambassador Chusei Yamada, Special Rapporteur on Shared Natural Resources, UN International Law Commission, explained the codification of the law of transboundary aquifers by the UN International Law Commission and welcomed the continued assistance of UNESCO and groundwater experts in the Americas (Annex 4). Mr. Yamada made available to the participants the draft articles and commentaries related to “shared natural resources” contained in Chapter IV of the Report of the Commission for 2006.

3. PRESENTATION OF THE FIRST ISARM AMERICAS BOOK

Mr. Nelson da Franca, General Coordinator of the UNESCO/OAS ISARM Americas Programme presented the first book prepared by ISARM Americas Group: the Spanish edition of SISTEMAS ACUÍFEROS TRANSFRONTERIZOS DE LAS AMERICAS – Evaluación Preliminar (TRANSBOUNDARY AQUIFER SYSTEMS IN THE AMERICAS – Preliminary Assessment), and with the cooperation of Mrs. Donoso and Mrs. Miletto he invited each National Coordinator to the stage to receive a copy of the book.

The book – Volume 1 of ISARM Americas Series – was edited by Nelson da Franca, Michela Miletto, Maria Concepción Donoso, Alice Aureli, Shammy Puri, Jac Van der Gun, Ofélia Tujchneider and Alfonso Rivera with maps prepared by IGRAC and the information of each aquifer system prepared by the National Coordinators of the 25 participant countries of the region.

The book is the first inventory of transboundary aquifers of the Americas. It includes: a two-page summary of each transboundary aquifer highlighting main geological and hydro geological aspects; a location map of each transboundary aquifer with preliminary boundaries; a regional analysis, and recommendations for future actions. The list of national institutions and experts that kindly cooperated in this effort is provided at the end of the book.

A table with the list of transboundary aquifers - 29 located in South America; 18 in Central America; 17 in North America, and 4 in the Caribbean - and the map of aquifers’ location published in the book are shown in the following pages.

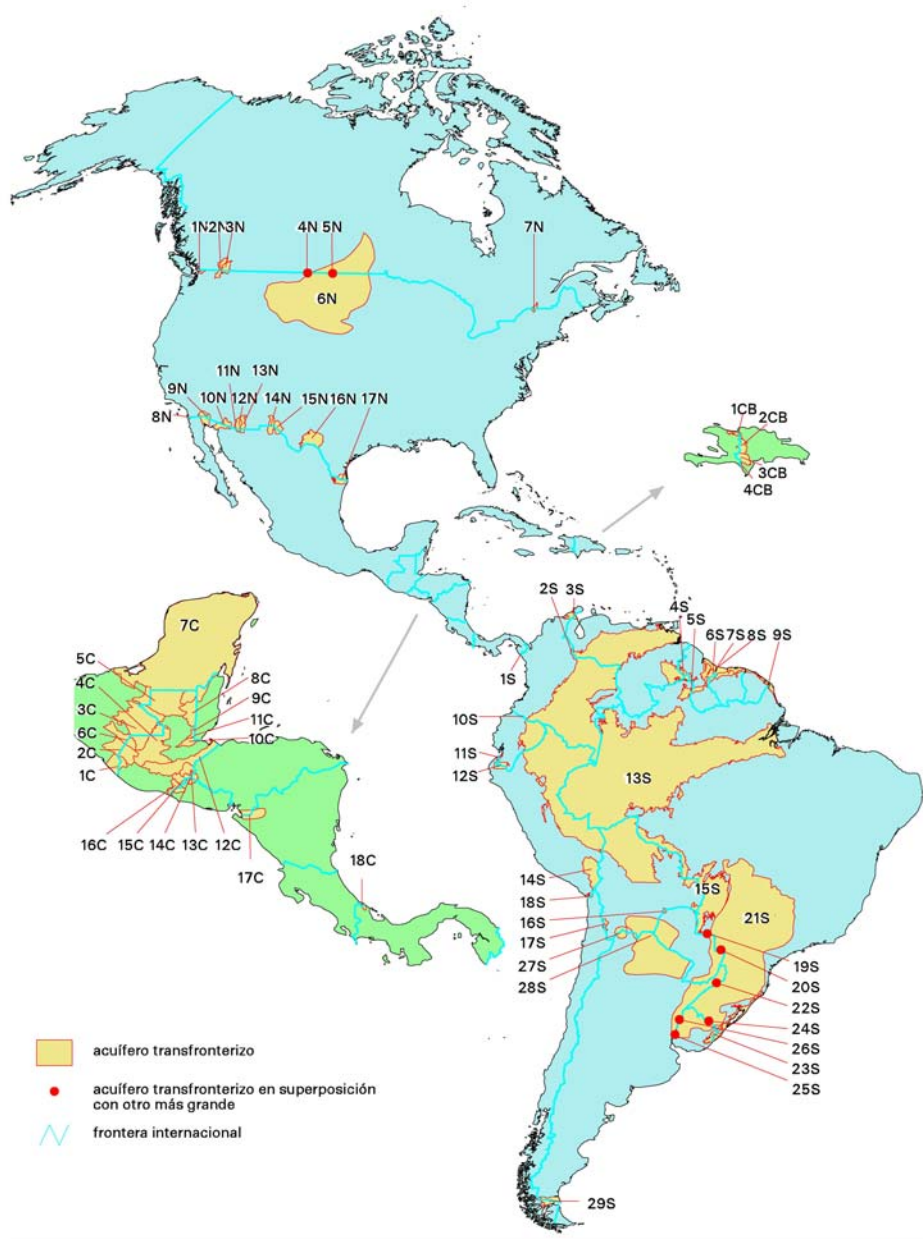
The participants of the 5th Coordination Workshop congratulated the publication of this book which constitutes a concrete product of the UNESCO/OAS ISARM Americas Program and stressed the need to encourage the cooperation among the participant countries of the region as well as the interest of each government in participating and contributing with technical information. They also requested UNESCO to translate the book into English in 2008.

Transboundary Aquifer Systems of the Américas - 2006

AMERICA DEL NORTE/NORTH AMERICA					
1N	Abbstford-Sumas	Canada-United States	9N	Cuenca Baja del Río Colorado	México-United States
2N	Okanagan-Osoyoos	Canada-United States	10N	Sonoyta-Pápagos	México -United States
3N	Grand Forks	Canada-United States	11N	Nogales	México -United States
4N	Poplar	Canada-United States	12N	Santa Cruz	México -United States
5N	Estevan	Canada-United States	13N	San Pedro	México -United States
6N	Northern Great Plains System	Canada-United States	14N	Conejos-Médanos-Bolsón de la Mesilla	México -United States
7N	Chateaugay	Canada-United States	15N	Bolsón del Hueco-Valle de Juárez	México -United States
8N	Tijuana-San Diego	México-United States	16N	Edwards-Trinity-El Burro	México -United States
			17N	Cuenca Baja del Río Bravo/Grande	México -United States
CARIBE/CARIBBEAN					
1CB	Masacre	Haiti-Rep. Dominicana	3CB	Los Lagos	Haiti-Rep. Dominicana
2CB	Artibonito	Haiti-Rep. Dominicana	4CB	Pedernales	Haiti-Rep. Dominicana
AMERICA CENTRAL/CENTRAL AMERICA					
1C	Soconusco-Suchiata-Coatan	Guatemala- México	10C	Sarstun	Guatemala-Belice
2C	Chicomuselo-Cuilco-Selegua	Guatemala- México	11C	Temash	Guatemala-Belice
3C	Ocosingo-Usamacinta-Pojom-Ixcan	Guatemala- México	12C	Motagua	Guatemala-Honduras
4C	Marques de Comillas-Chixoy-Xaclbal	Guatemala- México	13C	Chiquimula-Copan Ruinas	Guatemala-Honduras
5C	Boca del Cerro-San Pedro	Guatemala- México	14C	Esquipulas-Ocotepeque-Citala	Guatemala-Honduras-El Salvador
6C	La Trinitaria-Nenton	Guatemala- México	15C	Ostua-Metapan	El Salvador-Guatemala
7C	Península de Yucatan-Candelaria-Hondo	Guatemala- México – Belice	16C	Rio Paz	El Salvador-Guatemala
8C	Mopan-Belice	Guatemala-Belice	17C	Estero Real-Rio Negro	Honduras-Nicaragua
9C	Pucila-Moho	Guatemala-Belice	18C	Sixaola	Costa Rica-Panamá
AMERICA DEL SUR/SOUTH AMERICA					
1S	El Choco-Darién	Colombia-Panamá	16S	Agua Dulce	Bolivia-Paraguay
2S	Tachira-Pamplonita	Colombia-Venezuela	17S	Ollague-Pastos Grandes	Bolivia-Chile
3S	Guajira	Colombia-Venezuela	18S	Concordia – Escritos-Caplina	Chile-Perú
4S	Grupo Roraima	Brasil-Guyana-Venezuela	19S	Aquidauana-Aquidaban	Brasil-Paraguay
5S	Boa Vista-Serra do Tucano-North Savanna	Brasil-Guyana	20S	Caiua-Bauru-Acaray	Brasil-Paraguay
6S	Zanderji	Guyana-Surinam	21S	Guarani	Argentina-Brasil-Paraguay-Uruguay
7S	Coesewijne	Guyana-Surinam	22S	Serra Geral	Argentina-Brasil-Paraguay-Uruguay
8S	A-sand	Guyana-Surinam	23S	Litoraneo-Chuy	Brasil-Uruguay
9S	Costeiro	Brasil-Guyana Francesa	24S	Permo-carbonífero	Brasil-Uruguay
10S	Tulcan-Ipiales	Colombia-Ecuador	25S	Litoral-cretácico	Argentina-Uruguay
11S	Zarumilla	Ecuador-Perú	26S	Salto-Salto Chico	Argentina-Uruguay
12S	Puyango-Tumbes-Chira-Catamayo	Ecuador-Peru	27S	Puneños	Argentina-Bolivia
13S	Amazonas	Bolivia-Brasil-Colombia-Ecuador-Perú-Venezuela	28S	Yrenda-Toba –Tarijeno	Argentina-Bolivia-Paraguay
14S	Titicaca	Bolivia-Perú	29S	El Cóndor-Cañadon del Cóndor	Argentina-Chile
15S	Pantanal	Bolivia-Brasil-Paraguay			

Location of the Transboundary Aquifer Systems of the Americas – 2006

Acuíferos Transfronterizos de las Américas



4. PRESENTATION AND DISCUSSION OF THE STATUS OF PHASE II – LEGAL AND INSTITUTIONAL ASPECTS

Ms. Raya Marina Stephan, Water Law Specialist of UNESCO Paris, presented a synthesis of the main activities that took place in 2007 related to the preparation of the book on the Legal and Institutional Aspects of the Transboundary Aquifers Systems of the Americas. Based on the answers to the questionnaire circulated in 2006 to the National Coordinators, and following what was decided at the 4th ISARM Americas workshop in San Salvador, a template was prepared for each country and circulated to each National Coordinator for improvement and approval. At the workshop in Montreal, almost all these templates were ready, and had been reviewed and approved by the National Coordinators. Some work of harmonization, and update was needed in some cases, and it was agreed that Ms Stephan will coordinate with the National Coordinators for the completion of the book.

In agreement with the legal experts who have collaborated with the second phase of ISARM Americas, it was decided to provide a chapter on the evolution of international law related to transboundary aquifers, and a chapter of analysis of the situation in the region based on the information collected through the questionnaire and synthesized in the template. These two chapters (N° 2 and 4) had been circulated to the National Coordinators before the workshop in Montreal for their information. Mr Ariel Gonzáles explained orally the content of these two chapters, and insisted on the importance of the process that had been undertaken under the ISARM Americas project.

The participants discussed the existing material and the process to finalize the book which will have a table of contents with seven chapters, namely:

1. SISTEMAS ACUIFEROS TRANSFRONTERIZOS DE LAS AMERICAS
2. DERECHO INTERNACIONAL APLICABLE A LOS SISTEMAS ACUIFEROS TRANSFRONTERIZOS: UNA EVOLUCIÓN RAPIDA Y AUSPICIOSA
3. MARCO JURIDICO E INSTITUCIONAL DE LOS PAISES DE LAS AMERICAS DE INTERES PARA LOS SISTEMAS ACUIFEROS TRANSFRONTERIZOS
4. ANALISIS DE LAS LEGISLACIONES NACIONALES Y DE LOS ACUERDOS INTERNACIONALES SOBRE AGUAS SUBTERRANEAS EN LAS AMERICAS
5. CONCLUSIONES Y RECOMENDACIONES
6. COORDINADORES, COLABORADORES E INSTITUCIONES PARTICIPANTES
7. SIGLAS Y SITIOS WEB

The National Coordinators also agreed that the book should be completed by December 2007 and published by March 2008 in Spanish and later in English.

5. PRESENTATION AND DISCUSSION OF PHASE III

In June 2007, Questionnaire No. 3 on the Sustainable Socioeconomic and Environmental Aspects of Transboundary Aquifers was prepared by a group of experts supporting the ISARM Americas Steering Committee, and was circulated to the countries. A certain number of countries filled up the Questionnaire and sent it back to the ISARM Americas Secretariat before the Montreal event.

All National Coordinators who were attending the workshop (Argentina, Brazil, Bolivia, Canada Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Haiti, México, Panama, Paraguay, Uruguay, USA and Venezuela) made a presentation on the information gathered up to Sept 2007, regarding the socio-economic and environmental situation in the areas of their transboundary aquifers, and the current trends in sharing the transboundary resource.

Ms. Mantha Mehallis Director and Professor of the Environmental MBA Program, Florida Atlantic University, gave an overview of the intended work to be carried out during this phase of the program and explained specific issues related to the information to be provided for the third publication.

The participants discussed the several components of the questionnaire and expressed that it was more complex than the previous ones. They also highlighted that the amount of information and analysis required to complete this questionnaire involved the participation of a multidisciplinary team. It was agreed that the countries will complete the questionnaire by late May 2008.

The participants provided the following recommendations:

- The level of detail of the information should be better defined;
- The information of the countries sharing the same aquifer should be integrated and shown in one template, similarly to what was done in the first book;
- The third book should be translated and published in Spanish and in English, or a glossary should be included with the definitions in the two languages;
- A gap analysis of the information should be undertaken and included in the publication, and a periodical up-date be planned;
- The date of the survey (3rd Questionnaire) should be included in the template;

Concluding this item of the Agenda, the new Pilot Project on the Ostua-Metapan Transboundary Aquifer, San Salvador and Guatemala was presented to the participants by the National Coordinators of the two countries and Michela Miletto, who participated with Shammy Puri in a mission to prepare a preliminary diagnostic of the site and an evaluation of existing information for the preparation of the future project proposal preparation.

6. FUTURE ACTIVITIES

Several recommendations were offered by the National Coordinators on the UNESCO/OAS ISARM Americas Program work and its activities in the future:

- To translate into English during 2008 the two books on phase I and II, the Inventory of Transboundary Aquifer Systems of the Americas and the Legal and Institutional Aspects of the Transboundary Aquifers of the Region, respectively.

- To publish by March 2008 the Spanish version of the book on Legal and Institutional Aspects of the Transboundary Aquifers of the Region.
- To circulate the completed draft of the templates of the third Questionnaire of each transboundary aquifer system, among the countries by August 2008 for revision and validation.
- To present in the 6th Coordination Workshop to be held in late 2008, the second book published on the ISARM Americas Series on the Legal and Institutional Aspects of Transboundary Aquifers and the draft of the ISARM Americas third book on Sustainable Socioeconomic and Environmental Aspects of Transboundary Aquifers (with the material being prepared by the National Coordinators).
- To introduce at the 6th Coordination Workshop a topic on the definition of a regional vision for a sustainable management of the transboundary aquifer systems of the hemisphere which should be prepared by a Working Group with the Support of the ISARM Americas Steering Committee.
- To recommend UNESCO to organize an international meeting in Paris by 2009 with the participation of all ISARM countries of the Americas, Europe, Asia and Africa.
- To propose to the host institution of the next Coordination Workshop of ISARM Americas Program to organize a field trip related to a transboundary aquifer.

Offers from the National Coordinators of Dominican Republic, Mexico, Argentina and Guatemala to host the 2008 VI Coordination Workshop were submitted to Mrs. Donoso, UNESCO Regional Hydrologist, who will explore, evaluate and decide with the National Coordinators of those countries the chosen place of the 2008 Workshop.

Mrs. Donoso announced that the UNESCO-OAS ISARM Steering Committee plan to present the ISARM Americas Series (three volumes) at the V World Water Forum, which will be held in Istanbul (Turkey) in March, 2009.

7. CLOSURE OF THE MONTREAL COORDINATION WORKSHOP

The closure of the workshop took place at noon on the 20th of September. The organizers and the participants acknowledged the Canadian authorities for their support, the National Coordinators for the contributions to the meeting, the Organizing Committee, chaired by Alfonso Rivera and the Coordination Committee of the UNESCO/OAS ISARM Americas Programme for the excellent workshop.

The field trip on the Transboundary Châteauguay Aquifer System Canada-USA, was organized by the Geological Survey Canada, the Ministry of the Environment of Quebec and the USGS on the 18th of September and was guided by Alfonso Rivera, Charles Lamontagne and John H. Williams. The trip was very successful, and the itinerary included the visit to key sites both along the Canadian border and the USA border.

The field trip allowed the observation of several of the most important quaternary geological phenomena and a discussion of their relation with the regional hydrogeology was provided. Furthermore, most of the sites visited have been the subject of recent hydro geological studies.

The geology and hydrogeology of the region were discussed within the context of transboundary groundwater issues. (Annex 5)

The meeting ended with the invitation to attend the one and half day (September 20 and 21, 2007) Technology Workshop organized by the Geological Surveys of Canada (Geological Survey Canada) and of the USA (USGS).

The workshop (Annex 6) aimed to give an overview of the state of the art methodologies and new techniques applied to groundwater exploration, monitoring and management. Among the topics were: transboundary diagnostic analysis, geophysical tools for aquifer characterization, advances in groundwater modeling, real-time groundwater monitoring, advances in integrated data management and analysis and sustainable development of groundwater.

More than ten specialists from Canada and the USA made presentations and all National Coordinators of the ISARM Americas Programme, as well as Ambassador Yamada, enthusiastically participated in the workshop.

PROGRAMA UNESCO/OEA ISARM AMÉRICAS (Acuíferos Transfronterizos de las Américas)

UNESCO/OAS ISARM Americas (Transboundary Aquifers of the Americas)

5° TALLER DE COORDINACION/5° COORDINATION WORKSHOP

Montreal, Canada – Sep. 17, 21/Montreal, Canada – Sep.- 17, 21, 2007

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Programa hidrológico internacional



ORGANIZATION OF AMERICAN STATES - OAS

**UNESCO/OAS ISARM AMERICAS PROGRAMME
TRANSBOUNDARY AQUIFERS OF THE AMERICAS**

V COORDINATION WORKSHOP
DELTA HOTEL CENTRE-VILLE ON UNIVERSITY
MONTREAL, CANADA, SEPTEMBER 17-21 2007

AGENDA

MONDAY, SEPTEMBER 17 (ROOM CARTIER AB)	
09:00 - 10:00	OPENING CEREMONY - ALFONSO RIVERA, CHAIR, NRCAN, CANADA (5 MIN.) - DAVID BOERNER, DG, NRCAN, CANADA (10 MIN.) - FRED WRONA, DIRECTOR, EC, CANADA (15 MIN.) - MARIA DONOSO, UNESCO/IHP (10 MIN.) - JORGE RUCKS, CHIEF DIVISION II, DSD/OAS (10 MIN.) - JEAN-FRANÇOIS DOZIER, PERMANENT SECRETARY INBO, FRANCE (10 MIN.)
10:00 – 10:30	INVITED SPEAKERS - DOUG ALLEY, OFFICER, IJC - ARTURO HERRERA SOLIS, COMMISSIONER, IBWC
10:30 – 10:45	COFFEE-BREAK
10:45 – 11:25	LECTURE - AMBASSADOR C. YAMADA – UN INTERNATIONAL LAW COMMISSION
11:25 – 12:05	PRESENTATION OF THE FIRST BOOK - NELSON DA FRANCA
12:05 – 12:30	DISCUSSION
12:30 – 14:00	LUNCH - BISTRO CHEZ ANTOINE
14:00 – 14:30	PRESENTATION OF STATUS OF PHASE II (LEGAL AND INSTITUTIONAL ASPECTS) – RAYA STEPHAN
14:30 – 15:00	DISCUSSION OF LEGAL AND INSTITUTIONAL ASPECTS – RAYA STEPHAN
15:00 – 15:30	STATUS OF SECOND BOOK
15:30 – 16:00	COFFEE BREAK
16:00 – 17:30	CASE STUDIES
TUESDAY, SEPTEMBER 18	

09:00 – 18:00	FIELD TRIP CHATEAUGUAY AQUIFER SYSTEM: QUEBEC, CANADA – NEW YORK, USA
WEDNESDAY, SEPTEMBER 19 (ROOM VERRIÈRE AB)	
08:30 – 08:45	PHASE III –PRESENTATION
08:45 – 10:00	3RD QUESTIONNAIRE - COUNTRY PRESENTATIONS ON PHASE III
10:00 – 10:30	COFFEE-BREAK
10:30 – 11:45	COUNTRY PRESENTATIONS ON PHASE III (CONT.)
11:45 – 12:30	ANALYSIS AND DISCUSSION
12:30 – 14:00	LUNCH- BISTRO <i>CHEZ ANTOINE</i>
14:00 – 15:30	PROPOSAL AND DISCUSSION ON STRUCTURE OF THIRD BOOK
15:30 – 16:00	COFFEE-BREAK
16:00 – 17:30	SETTING A VISION FOR MANAGING TRANSBOUNDARY AQUIFERS
THURSDAY, SEPTEMBER 20 (ROOM VERRIÈRE AB)	
08:30 – 10:00	FUTURE ACTIVITIES / PROGRAMME PLANNING
10:00 – 10:30	COFFEE-BREAK
10:30 – 12:00	REVISION AND ADOPTION OF AGREEMENTS
12:00 – 12:30	CLOSING

DRAFT REPORTE MONTREAL

TRANSBOUNDARY AQUIFERS OF THE AMERICAS

5TH COORDINATION WORKSHOP

DELTA CENTRE VILLE HOTEL, MONTREAL, CANADA,

SEPTEMBER 17-21 2007

INTRODUCTORY REMARKS

DAVID BOERNER, DIRECTOR GENERAL, GEOLOGICAL SURVEY OF CANADA

EARTH SCIENCES SECTOR

NATURAL RESOURCES CANADA

GOOD MORNING LADIES AND GENTLEMEN. MUY BUENOS DIAS SEÑORAS Y SEÑORES
I WOULD LIKE TO WELCOME OUR COLLEAGUES FROM UNESCO AND THE ORGANIZATION OF
AMERICAN STATES, AND A SPECIAL WELCOME TO OUR VISITING COLLEAGUES FROM ACROSS THE
OCEAN, AS WELL AS OUR NEIGHBORS FROM THE UNITED STATES.

MY SPECIAL WELCOME GOES TO AMBASSADOR CHUSEI YAMADA FROM JAPAN.

I WOULD LIKE TO WARMLY WELCOME THE REPRESENTATIVES AND REGIONAL COORDINATORS
FROM COUNTRIES OF THE AMERICAN HEMISPHERE OF SOUTH AMERICA, CENTRAL AMERICA
AND NORTH AMERICA;

I WOULD LIKE TO ACKNOWLEDGE THE PRESENCE OF OUR CANADIAN COLLEAGUES AND
PARTNERS FROM ENVIRONMENT CANADA, THE DEPARTMENT OF FOREIGN AFFAIRES AND
INTERNATIONAL TRADE, AND THE COUNCIL OF CANADIAN ACADEMIES; AS WELL AS OUR
COLLEAGUES FROM THE US GEOLOGICAL SURVEY.

WELCOME TO THE 5TH COORDINATION WORKSHOP OF THE TRANSBOUNDARY AQUIFERS OF
THE AMERICAS!

THANK YOU FOR ACCEPTING TO ATTEND THIS EVENT AND FOR BEING HERE TODAY.

THE INTERNATIONAL COORDINATION WORKSHOP IS ONE IN A SERIES OF WORKSHOPS. IT IS A
UNESCO/OAS INITIATIVE PROVIDING A FORUM WHERE THE COUNTRIES OF THE AMERICAS
MEET TO COMPILE, ANALYZE AND SYNTHESIZE THE AQUIFERS CROSSING BOUNDARIES OF TWO
OR MORE COUNTRIES FROM ARGENTINA TO CANADA. THE MOST IMPORTANT OBJECTIVES OF
THIS INITIATIVE ARE TO CREATE A COMPREHENSIVE INVENTORY OF TRANSBOUNDARY AQUIFERS
OF THE AMERICAS - A COLLECTION OF DATA REGARDING THE HYDROGEOLOGICAL
CHARACTERISTICS, THE ACTUAL USE OF THE SHARED GROUNDWATER AND THE LEGAL AND
INSTITUTIONAL ASPECTS.

THE PAST FOUR WORKSHOPS OF THIS KIND HAVE BEEN HELD IN URUGUAY (2003); USA (2004);
BRAZIL (2005); AND EL SALVADOR (2006). THESE WORKSHOPS RESULTED IN SUBSTANTIAL
EFFORTS TO INVENTORY AND SYNTHESIZE DATA AND INFORMATION FROM 25 COUNTRIES OF THE
AMERICAS; AND LATER TODAY THE BOOK WITH THAT SYNTHESIS WILL BE OFFICIALLY RELEASED
DURING THIS MEETING

WE ARE VERY HAPPY TO HOST THE 5TH COORDINATION WORKSHOP, THIS TIME IN CANADA.

WATER SCARCITY IS AN IMPORTANT ISSUE FOR US ALL THAT CAN ARISE FROM THE PHYSICAL LACK OF WATER RESOURCES AS WELL AS FROM LIMITATIONS IN SCIENTIFIC, INSTITUTIONAL AND MANAGERIAL KNOWLEDGE AND CAPACITY.

AN ESPECIALLY CRITICAL ISSUE IS SHARED WATER RESOURCES WHERE SCARCITY INCREASES COMPETITION AMONG USERS AND CHALLENGES OUR ABILITIES TO WORK IN A MULTI-DISCIPLINARY FASHION, AND REQUIRES US TO RESOLVE DIFFERENCES IN POLITICAL, CULTURAL, ETHICAL AND SCIENTIFIC APPROACHES.

A PRE-REQUISITE FOR GOOD MANAGEMENT PRACTICES IS RELIABLE, ROBUST KNOWLEDGE. DATA AND INFORMATION ON GROUNDWATER ARE THE BACKBONE OF ANY MANAGEMENT PLAN. THE COMPILATION, ANALYSIS AND SYNTHESIS OF TRANSBOUNDARY AQUIFERS DONE BY THIS GROUP ARE A MAJOR STEP INTO AN INCREASED COLLABORATION AMONG THE COUNTRIES OF THE AMERICAS. OUR COLLABORATION ON ESTABLISHING A SOLID SCIENTIFIC KNOWLEDGE BASE IS ESSENTIAL IF WE ARE TO ACHIEVE CONSENSUS ON LEGAL, INSTITUTIONAL, SOCIO-ECONOMIC, SCIENTIFIC AND ENVIRONMENTAL ASPECTS TO COMPLY WITH THE UN INTERNATIONAL LAW COMMISSION ON SHARED RESOURCES.

THIS STEP WILL BE EXTREMELY USEFUL, I BELIEVE, FOR COUNTRIES HAVING SHARED TRANSBOUNDARY AQUIFERS OR AQUIFER SYSTEMS TO MANAGE THEM ACCORDING TO THE UN PRINCIPLE OF EQUITABLE AND REASONABLE UTILIZATION.

AS YOU KNOW, THIS IS AN EXCITING TIME FOR EARTH SCIENCES AS APPLIED TO GROUNDWATER RESEARCH, AS WE SEE THE FILE EVOLVING FROM CLASSICAL HYDROGEOLOGY TO BECOME MORE INTEGRATED WITH SOCIAL, POLITICAL, ECONOMICAL AND ENVIRONMENTAL ISSUES.

I AM VERY PROUD OF THE AQUIFER MAPPING CONTRIBUTIONS OF NATURAL RESOURCES CANADA, WITHIN OUR COUNTRY AND BETWEEN CANADA AND THE USA, WHICH ARE HELPING TO GUIDE BOTH COUNTRIES TO DISCOVER, DEVELOP, PROTECT AND MANAGE THESE PRECIOUS RESOURCES IN A FRIENDLY, PEACEFUL AND EQUITABLE MANNER. MANY OF YOU WILL HAVE AN OPPORTUNITY TOMORROW TO SEE FIRST HAND ONE OF THE TRANSBOUNDARY AQUIFERS SHARED BY THE USA AND CANADA.

I AM VERY PLEASED THAT CANADA HAS THE HONOR OF HOSTING THE MEETING THIS WEEK. GROUNDWATER IS A VERY IMPORTANT RESOURCE IN OUR COUNTRY WITH 30% OF CANADIANS RELYING ON ITS USE, BUT ALSO BECAUSE OF OUR SPECIAL INTERNATIONAL RESPONSIBILITIES. WE ARE BLESSED WITH A LARGE SHARE OF SURFACE WATER RESOURCES IN THE GREAT LAKES BASIN, THE LARGEST SYSTEM OF FRESH SURFACE WATER, REPRESENTING 18% OF WORLD'S SUPPLY WITH 41 MILLION INHABITANTS IN CANADA AND US LIVING WITHIN THIS WATERSHED AND SHARING THE SAME RESOURCE.

THIS WORKSHOP IS TIMELY AND IMPORTANT AND I AM CONFIDENT THAT YOUR DISCUSSIONS WILL BE FRUITFUL.

IN CLOSING, I WOULD, ONCE AGAIN, LIKE TO WELCOME YOU ALL TO MONTREAL AND WISH YOU A VERY SUCCESSFUL WORKSHOP.

MUCHAS GRACIAS
MERCİ BEAUCOUP

**5TH COORDINATION WORKSHOP ISARM OF THE AMERICAS
MONTREAL, CANADA
17-21 SEPTEMBER 2007**

AMBASSADOR CHUSEI YAMADA
SPECIAL RAPPORTEUR ON SHARED NATURAL RESOURCES
UN INTERNATIONAL LAW COMMISSION

SEPTEMBER 1, 2007

**CODIFICATION OF THE LAW OF TRANSBOUNDARY AQUIFERS
BY THE UN INTERNATIONAL LAW COMMISSION**

1. ONE OF THE IMPORTANT FUNCTIONS OF THE UNITED NATIONS IS TO PROMOTE PROGRESSIVE DEVELOPMENT OF INTERNATIONAL LAW AND ITS CODIFICATION AS STIPULATED IN ARTICLE 13 OF THE CHARTER OF THE UNITED NATIONS. THE INTERNATIONAL LAW COMMISSION WAS ESTABLISHED IN 1947 AS A SUBSIDIARY ORGAN OF THE UNITED NATIONS GENERAL ASSEMBLY. ITS MANDATE IS TO PREPARE FOR THE UN GENERAL ASSEMBLY MORE PRECISE FORMULATION AND SYSTEMATIZATION OF RULES OF INTERNATIONAL LAW IN FIELDS WHERE THERE ALREADY HAS BEEN EXTENSIVE STATE PRACTICE, PRECEDENT AND DOCTRINE. IN OTHER WORD, ITS WORK IS TO RESTATE IN THE FORM OF DRAFT ARTICLES WHAT IS EXISTING CUSTOMARY INTERNATIONAL LAW. DURING THE LAST 60 YEARS, THE COMMISSION HAS PRODUCED MORE THAN 20 DRAFT CONVENTIONS ON IMPORTANT SUBJECTS.
2. THE FIRST TIME THE COMMISSION DEALT WITH A SHARED NATURAL RESOURCE WAS WHEN IT TOOK UP INTERNATIONAL SURFACE WATERS AND FORMULATED DRAFT ARTICLES ON THE LAW OF NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES. THE FINAL DRAFT ARTICLES ADOPTED BY THE COMMISSION IN 1994 RESULTED IN THE 1997 UN CONVENTION ON THE LAW OF NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES. ARTICLE 2 OF THE CONVENTION DEFINES “WATERCOURSES” AS “A SYSTEM OF SURFACE WATERS AND GROUNDWATERS CONSTITUTING BY VIRTUE OF THEIR PHYSICAL RELATIONSHIP A UNITARY WHOLE AND NORMALLY FLOWING INTO A COMMON TERMINUS”. THUS, THE 1997 CONVENTION COVERS INTERNATIONAL SURFACE WATERS, WHICH ARE RIVERS AND LAKES, AND ONLY SUCH GROUNDWATERS THAT ARE HYDRAULICALLY LINKED TO INTERNATIONAL SURFACE WATERS. THE LAST SPECIAL RAPPOTREUR OF THE TOPIC, LATE ROBERT ROSENSTOCK OF THE UNITED STATES, WANTED TO HAVE THE CONVENTION ALSO COVER TRANSBOUNDARY GROUNDWATERS THAT ARE NOT LINKED TO SURFACE WATERS. HOWEVER, MOST OF THE MEMBERS OF THE COMMISSION THEN FELT THAT SUCH GROUNDWATERS ARE MORE AKIN TO OIL AND NATURAL GAS AND THAT SEPARATE STUDIES ARE REQUIRED FOR THEM. AT THE END, THE COMMISSION ADOPTED THE RESOLUTION RECOMMENDING THE UN GENERAL ASSEMBLY TO APPLY THE ARTICLES OF INTERNATIONAL WATERCOURSES *MUTATIS MUTANDIS* TO OTHER TRANSBOUNDRY GROUNDWATERS AND ALSO TO INITIATE STUDIES ON THEM.
3. THE ADOPTION OF THE NEW TOPIC OF “SHARED NATURAL RESOURCES” IN THE PROGRAMME OF WORK OF THE COMMISSION IN 2002 WAS, THEREFORE, THE FOLLOW-UP OF THIS RECOMMENDATION OF THE COMMISSION. IT IS GENERALLY PERCEIVED THAT THE TOPIC OF “SHARED NATURAL RESOURCES” COVERS THREE KINDS OF NATURAL RESOURCES;

GROUNDWATER, OIL AND NATURAL GAS. THE COMMISSION ACCEPTED MY SUGGESTION TO TAKE A STEP BY STEP APPROACH AND DECIDED TO FOCUS FIRST ON GROUNDWATERS. IT COMPLETED ITS FIRST-READING OF A SET OF 19 DRAFT ARTICLES ON THE LAW OF TRANSBOUNDARY AQUIFERS LAST YEAR. IT TRANSMITTED THESE DRAFT ARTICLES TOGETHER WITH THE COMMENTARIES THERETO TO THE UN GENERAL ASSEMBLY. THESE DRAFT ARTICLES AND THE COMMENTARIES ARE CONTAINED IN THE CHAPTER VI OF THE REPORT OF THE COMMISSION OF 2006 WHICH IS BEING MADE AVAILABLE TO THE PARTICIPANTS OF THIS WORK-SHOP EITHER IN ENGLISH, SPANISH OR FRENCH.

4. UNESCO HAS RENDERED VALUABLE ASSISTANCE TO ME AND TO THE COMMISSION FOR THE LAST FIVE YEARS AS THE COORDINATING AGENCY OF THE UN SYSTEM ON THE GLOBAL WATER ISSUE.
5. IN THE DISCUSSIONS HELD IN THE SIXTH COMMITTEE, WHICH IS IN CHARGE OF LEGAL MATTERS, OF THE UN GENERAL ASSEMBLY DURING ITS 61ST SESSION IN 2006, THE DELEGATIONS WELCOMED THE TIMELY COMPLETION OF THE FIRST-READING OF THE DRAFT ARTICLES AND EXPRESSED, IN GENERAL, FAVOURABLE RESPONSES TO THESE DRAFT ARTICLES. THE COMMISSION REQUESTED WRITTEN SUBMISSION OF COMMENTS AND OBSERVATIONS ON THE DRAFT ARTICLES FROM GOVERNMENTS BY JANUARY 1, 2008 SO THAT IT WILL BE ABLE TO PROCEED WITH THE SECOND-READING EXERCISE AT ITS SESSION IN 2008.
6. THERE WAS HOWEVER ONE ASPECT THAT THE COMMISSION WAS TO ADDRESS THIS YEAR. IT WAS THE ASPECT OF THE RELATIONSHIP BETWEEN THE WORK ON TRANSBOUNDARY AQUIFERS ON ONE HAND AND THE POSSIBLE FUTURE WORK ON OIL AND NATURAL GAS ON THE OTHER WITHIN THE FRAMEWORK OF THE TOPIC OF “SHARED NATURAL RESOURCES”. DURING THE FIRST-READING EXERCISE ON TRANSBOUNDRY AQUIFERS, THE QUESTION WAS OFTEN RAISED IN THE COMMISSION AS WELL AS IN THE SIXTH COMMITTEE ON THIS ASPECT BECAUSE THE PROPOSED MEASURES RELATING TO AQUIFERS MIGHT HAVE CERTAIN IMPLICATIONS FOR THE FUTURE WORK ON OIL AND NATURAL GAS AND, CONVERSELY, EXISTING STATE PRACTICE AND NORMS RELATING TO OIL AND NATURAL GAS MIGHT HAVE CERTAIN IMPLICATION ON THE CURRENT WORK ON TRANSBOUNDARY AQUIFERS.
7. THE 4TH REPORT WHICH I SUBMITTED THIS YEAR TO THE COMMISSION WAS ON THIS ASPECT. IT DESCRIBES ORIGIN, FORMATION AND EXPLOITATION OF OIL AND NATURAL GAS. IT ALSO DEALS WITH SIMILARITY AND DISSIMILARITY BETWEEN AQUIFER ON ONE HAND AND OIL AND NATURAL GAS ON THE OTHER NOT ONLY FROM THE POINT OF SCIENTIFIC AND TECHNICAL FEATURES BUT ALSO FROM THOSE OF POLITICAL, ECONOMIC AND ENVIRONMENTAL ASPECTS. TO SUMMARIZE, THERE EXISTS CLOSE SIMILARITY BETWEEN THE PHYSICAL FEATURE OF NON-RECHARGING AQUIFER AND THAT OF RESERVOIR ROCK OF OIL AND NATURAL GAS. THE SIMILARITY BETWEEN GROUNDWATERS ON ONE HAND AND OIL AND NATURAL GAS ON THE OTHER ENDS THERE. IN ALL OTHER ASPECTS, THEY ARE DIFFERENT. I AM ALSO WORRIED IF WE INITIATE OUR STUDIES ON OIL AND NATURAL GAS IN PARALLEL WITH GROUNDWATERS, IT WILL COMPLICATE THE WORK ON GROUNDWATERS AND UNDULY DELAY THE WORK ON GROUNDWATERS. MY RECOMMENDATION WAS, THEREFORE, THAT THE COMMISSION COULD AND SHOULD PROCEED WITH THE SECOND-READING OF THE DRAFT ARTICLES ON THE LAW OF TRANSBOUNDARY AQUIFERS NEXT YEAR AND SHOULD ENDEAVOUR TO COMPLETE THE SECOND-READING AS EXPEDITIOUSLY AS POSSIBLE. THE COMMISSION APPROVED MY RECOMMENDATION AND DECIDED TO PROCEED NEXT YEAR WITH THE SECOND-READING OF THE DRAFT ARTICLES ON THE LAW OF TRANSBOUNDARY AQUIFERS INDEPENDENTLY FROM

THE WORK ON OIL AND NATURAL GAS WHICH THE COMMISSION MIGHT BE TAKING UP IN THE FUTURE.

8. IT IS VITALLY IMPORTANT FOR THE COMMISSION TO RECEIVE COMMENTS AND OBSERVATIONS FROM AS MANY GOVERNMENTS AS POSSIBLE SO THAT IT WOULD BE ABLE TO REFLECT THE VIEWS OF GOVERNMENTS AND IMPROVE ITS TEXTS OF DRAFT ARTICLES IN SECOND-READING WHICH IS THE FINAL READING. I SINCERELY HOPE THAT YOU WOULD PROVIDE YOUR EXPERTISE ADVICE TO YOUR GOVERNMENTS AND ENCOURAGE THEM TO SUBMIT THE COMMENTS TO THE UNITED NATIONS IN TIME FOR THE DEADLINE OF JANUARY 1, 2008.
9. THE DRAFT ARTICLES IN THE FIRST-READING ARE FORMULATED AS LEGAL NORMS BUT ARE WITHOUT PREJUDICE TO THE FINAL FORM WHETHER IT SHOULD BE A CONVENTION OR GUIDELINES. THE COMMISSION WOULD ALSO LIKE TO HEAR THE GOVERNMENT VIEWS ON THE FINAL FORM AS THE DECISION ON IT WOULD AFFECT THE DRAFTING OF SECOND-READING TEXTS. IN ANY EVENT, WHAT THE COMMISSION PRODUCES IS A FRAMEWORK INSTRUMENT WHICH WOULD SERVE AS GUIDELINES TO BILATERAL OR REGIONAL AGREEMENTS ON SOME SPECIFIC AQUIFER SYSTEM TO BE NEGOTIATED BY THE STATES CONCERNED.
10. I AM HOPING THAT THE COMMISSION WILL BE ABLE TO COMPLETE THE SECOND-READING OF DRAFT ARTICLES NEXT YEAR AND RECOMMEND THEM TO THE UN GENERAL ASSEMBLY FOR ITS ADOPTION. FOR THIS, I NEED THE CONTINUED ASSISTANCE FROM UNESCO AND GROUNDWATER EXPERTS IN AMERICAS.

UNESCO/OAS ISARM AMERICAS PROGRAMME
TRANSBOUNDARY AQUIFERS OF THE AMERICAS

V COORDINATION WORKSHOP
DELTA HOTEL CENTRE-VILLE ON UNIVERSITY

MONTRÉAL, CANADA, SEPTEMBER 17-21 2007

FIELD TRIP

TRANSBOUNDARY CHÂTEAUGUAY AQUIFER SYSTEM

CANADA – USA

SEPTEMBER 18, 2007

GUIDES: ALFONSO RIVERA, CHARLES LAMONTAGNE AND JOHN H. WILLIAMS

**(PARTS OF THE INFORMATION ON THE GUIDE WAS KINDLY PROVIDED BY TREMBLAY ET AL,
2006)**

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3. Description of the stops – Itinerary on Google-Earth
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 - Stop 2: Pumping station of the “Labrador” bottled water
 - Stop 3: The Postdam Sandstone Springes of Châteauguay, New York
 - Stop 4: Recharge zones at Covey Hills. The Franklin case: GW controversy
 - Stop 5: Sands & littoral Gravels from the Champlain Sea, at Franklin
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References

Itinerary on Google-Map

**TECHNOLOGY WORKSHOP
DELTA HOTEL CENTRE-VILLE ON UNIVERSITY
MONTREAL, CANADA
SEPTEMBER 20 AND 21, 2007**

THURSDAY, SEPTEMBER 20 (ROOM VERRIÈRE AB)		
TIME	SESSION	INSTRUCTOR
14:30-16:00	APPROACHES TO TRANSBOUNDARY DIAGNOSTIC ANALYSIS	MICHELA MILETTO – OAS RUBEN CHAVEZ-GUILLEN, MEXICO
16:00-17:30	GEOPHYSICAL TOOLS FOR AQUIFER CHARACTERIZATION: AIRBORNE, SURFACE, BOREHOLE	VIC LABSON, JOHN LANE, AND WADE KRESS, USGS SUE PULLAN, GSC
FRIDAY, SEPTEMBER 21 (ROOM CARTIER B)		
08:30-09:30	ADVANCES IN GW MODELING : FLOW, TRANSPORT GROUNDWATER/SURFACE WATER INTERACTIONS	RANDALL T. HANSON, USGS CLAUDIO PANICONI, INRS
09:30-10:30	REAL-TIME GROUNDWATER MONITORING: WATER LEVEL/QUALITY; COLLECTION; TRANSMITTAL, PROCESSING	BRIAN D. REECE, USGS DAVID LEETH, USGS
10:30-11:00	COFFEE BREAK	
11:00-12:15	ADVANCES IN INTEGRATED DATA MANAGEMENT AND ANALYSIS (DATABASE STRUCTURE, ANALYSIS TOOLS E.G., GIS), SPATIAL DATA VISUALIZATION	BRIAN D. REECE, USGS HERYK JULIEN, GSC
12:15-13:00	SUSTAINABLE DEVELOPMENT OF GROUNDWATER RESOURCES: GW AVAILABILITY, SUSTAINABILITY, VULNERABILITY	ALFONSO RIVERA, GSC

TOTAL TIME: 7 HOURS: 3 HOURS ON THURSDAY AND 4 HOURS ON FRIDAY

NOTES

- SIMULTANEOUS TRANSLATION ENGLISH-SPANISH-ENGLISH WILL BE PROVIDED
- MATERIAL PREPARED IN ADVANCE WILL BE PROVIDED AS HARD COPY TO PARTICIPANTS AT THE MEETING AND WILL BE TRANSLATED IN SPANISH AT A LATER DATE BY OAS