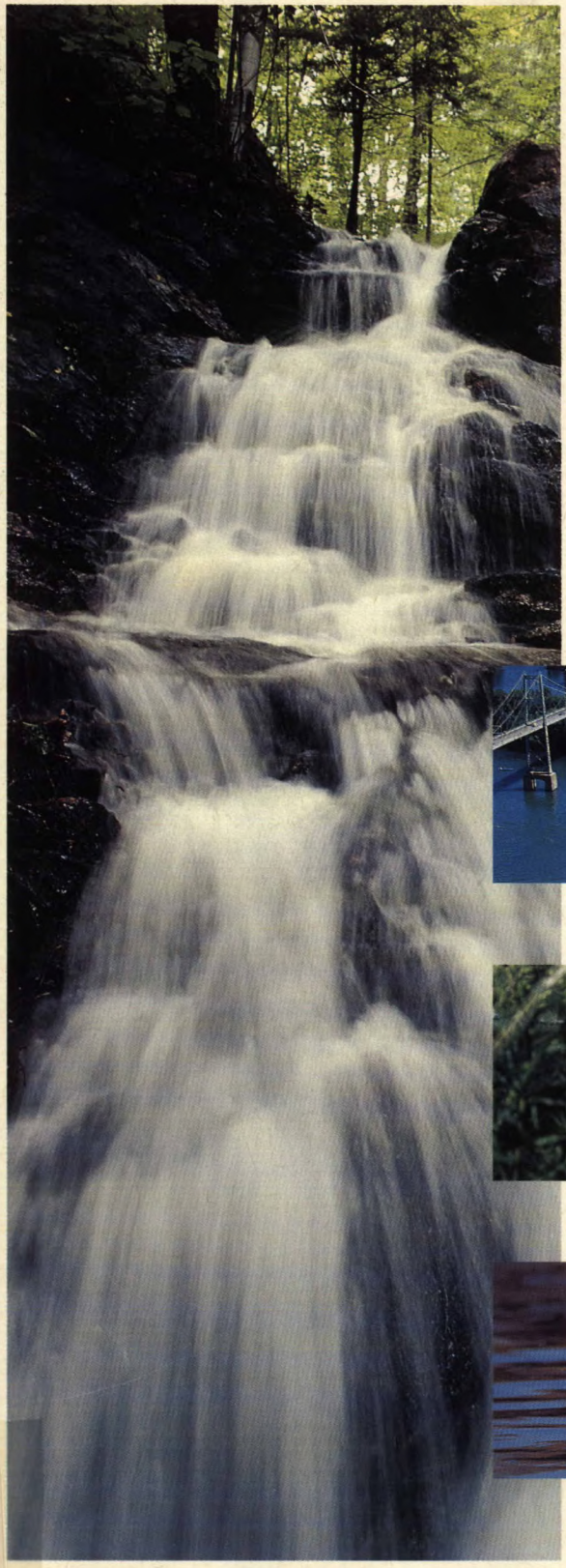
WATER RESOURCES BRANCH

DIRECTION DES RESSOURCES EN EAU

STRATEGY FOR INTERNATIONAL COOPERATION



T. Winkler 1991

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WATER RESOURCES BRANCH

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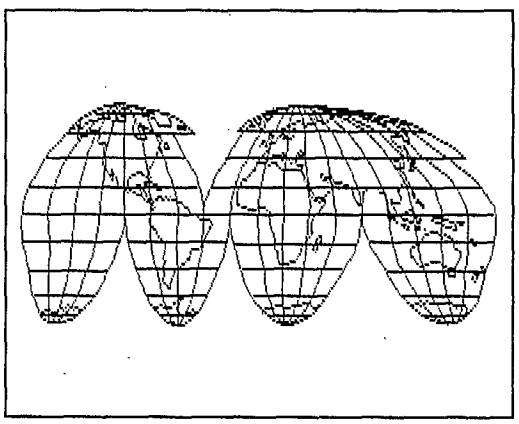

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1991

WATER RESOURCES BRANCH
STRATEGY FOR INTERNATIONAL COOPERATION
SUMMARY

WRB INTERNATIONAL ROLE

The international role of the Water Resources Branch (WRB) of the Inland Waters Directorate (IWD) is to lead Canada in the provision of expertise within the international community in water quantity and sediment information. This encompasses instrumentation, training, data collection, data control and interpretation, and network planning and evaluation.

The WRB role supports the work of the Program Analysis and Coordination Branch (PACB), which coordinates IWD international activity, the Policy Branch of Conservation and Protection (C & P), and the Corporate Policy Group (CPG), all of which participate in international affairs for Environment Canada.

WRB INTERNATIONAL OBJECTIVES

WRB's specific objectives for international involvement are:

- to provide expertise to and interact with other agencies and countries to improve the knowledge base for the management of our water resources, assist in resolving global environmental problems that pose a threat to Canada's water and water ecosystems, and promote Canadian water technology;
- to keep abreast of international developments, particularly standardization, that have implications to WRB work and which will assist in resolving global environmental problems;
- to help fulfill Canada's international obligations with the United States of America;
- to gain national and international recognition for work done;
- the professional development of WRB staff;
- to support federal and other agencies in the delivery of Canada's aid.

WRB INTERNATIONAL PRIORITIES

While there are numerous international programs which warrant the attention of WRB, human and financial resource limitations dictate that it establish priorities.

Regarding international organizations, WRB will concentrate its activities in the World Meteorological Organization (WMO), the International Organization for Standardization (ISO), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), respectively.

The WRB Regional Offices contribute a great deal to bilateral commitments with the United States of America. However, in order to draw on the wealth of expertise found in these offices, provide broader professional development of staff, and ease the demands of international activities on WRB Headquarters, the WRB Regional Offices are encouraged to be increasingly involved in WRB participation in international organizations.

World Meteorological Organization (WMO)

To further its work on hydrological network design, instrumentation, hydrometric methods, standards, technology exchange, and data control, as examples, for WMO WRB will:

- complete its outstanding commitment to the Commission for Hydrology (CHy) for the period 1984-1988 under the Rapporteur on Comparison of Hydrological Instruments;

- complete its ongoing commitments for the CHy period 1988-1992 under the Rapporteur on Design and Operation of Hydrological Networks;

- seek an appropriate rapporteurship from the CHy for the period 1992-1996;

- maintain support for the Hydrological Operational Multipurpose Subprogramme (HOMS) National Reference Centre for Canada and increase dissemination of information about HOMS;

- send appropriate WRB publications to WMO in support of CHy and ensure that Canadian material is incorporated in international work.

International Organization for Standardization (ISO)

In order to ensure Canadian hydrometric standards consider international standards, WRB will interact with other countries in the fields of hydrometric instrumentation and standardization, as well as promote the integration of Canadian technology in international standards. Specifically, in ISO, WRB will:

- renew participation in Technical Committee 113 (TC 113) on the Measurement of Liquid Flow in Open Channels during 1991/1992 in cooperation with the Standards Council of Canada, and

concentrate initial participation in the subcommittees on Velocity Area Methods (SC1), Glossary of Terms (SC3), Flow Measuring Instruments and Equipment (SC5), and Sediment Transport (SC6);

- conduct a workshop on hydrometric standards in 1992 to enunciate the importance of standards, demonstrate the latest software developments of WRB, and gather the important players throughout Canada involved in standards. Such a workshop will also demonstrate that WRB is the national leader of these standards and serious about this work;

- offer to host the regular meeting of TC 113 in 1995/1996 in Canada;

- involve the WRB Regional Offices in the work of TC 113;

- send appropriate WRB publications to ISO in support of TC 113 and ensure that Canadian material is incorporated in international work.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

In order to contribute to other countries in the areas of technician training, hydrometric methods, and research areas such as GIS and northern hydrology, WRB will concentrate its activity in UNESCO in the following ways:

- complete its outstanding commitment from the International Hydrological Programme (IHP) (IHP-III, 1984-1989) project 10.8, the preparation of guidelines to planners and decision-makers on sedimentation aspects of reservoir planning, design and operation;

- provide contact points to supply and disseminate information for IHP-IV (1990-1995) projects E.1.1 and M.2.3 on Educational Systems for Hydrological Technicians and the Use of Geographic Information Systems in Hydrological and Water Resources Studies;

- provide the Chairman of the IHP Northern Research Basin Task Force on Winter Discharge Measurement and Computation Techniques used under Ice Conditions;

- provide advice to a Canadian committee on the North American component of the Flow Regimes from International Experimental and Network Data Sets (FRIEND), under IHP-IV project H.5.5;

- send appropriate WRB publications to UNESCO in support of IHP and to ensure that Canadian material is incorporated in

international work.

General Bilateral/Multilateral Activities

Regarding bilateral/multilateral activities, WRB will concentrate on the United States of America where mutual objectives and interests exist, and follow such efforts as the integrated monitoring proposal of the Finnish Initiative. In recognition of the general importance of state-of-the-environment (SOE) reporting, integrated environmental monitoring, as well as having WRB stations and technical staff located in the North, WRB will maintain a watching brief on the Finnish Initiative. Furthermore, WRB will monitor activities involving Central and South America, in support of Government and C & P policy.

United States of America (USA)

WRB is satisfied with the current arrangements for interaction with agencies of the USA. Thus, WRB will continue:

- hydrometric monitoring at transboundary sites with the United States Geological Survey (USGS) in support of the Boundary Waters Treaty and a number of other treaties and agreements;
- to provide expertise to committees and control boards of the International Joint Commission (IJC);
- to provide representation on the Federal Interagency Sedimentation Project (FISP), more specifically the Sediment Action Committee and the Technical Subcommittee on Sedimentation;
- informal meetings and ad hoc arrangements with the USGS.

Conferences

Within the constraints of budgetary limitations, attendance of WRB staff at international conferences will continue for professional development, to exchange information, to increase technical knowledge, to build credibility, and to provide support to both international organizations in which WRB and IWD participate and Canadian efforts on the international scene. Priority will be given to those individuals making the largest contribution.

Training

When the timing of requests for training is beyond the control of WRB, since the training must be considered within the context of

demands on the Branch and in recognition of the desire to provide training to foreign nationals on a reasonable basis, WRB has no choice but to assess training requests when and as they arise.

Publications

As regards publications, WRB staff are encouraged to submit articles to refereed, international scientific journals. In addition, WMO, ISO, and UNESCO will be contacted to enquire if they would like to receive any of the currently available WRB publications and to determine their future interests.

Work Assignments

Work assignments, either of foreign nationals to WRB or WRB staff to other countries, will be considered on a case-by-case basis when benefits are clearly evident to WRB. Arrangements may be made to share costs (ie: WRB - salary; the employee - transport; and host institution - transport, accommodation).

When finalized, use could be made of the agreement for the IWD/CIDA Short-Term Exchange of Staff in Water Management. This would allow WRB personnel to work for less than six months on projects of the Canadian International Development Agency (CIDA), with costs absorbed by CIDA, and allow WRB to temporarily replace these staff while they are seconded.

Visits

Visits of foreign nationals will continue to be accommodated to the extent possible by WRB, consistent with IWD and Departmental policies and procedures.

Exchange of Information

Exchange of information with international partners will continue on an ad hoc basis.

MISCELLANEOUS

Links with international organizations, etc., will be made whenever possible to provide support to those agencies with which we participate, to promote our science, and to exert influence internationally.

Coordination of WRB international activities is to be through the WRB Headquarters Chiefs and Branch meetings.

Participation in international activities are to be incorporated into regular work plans to facilitate management consideration of the implications and resources relative to national workload and other priorities.

Other international activities not identified as priorities for the Branch at this time will be assessed on an ad hoc basis.

Finally, international activities of the Branch should be evaluated on a regular basis to ensure useful results. Since WRB has not been heavily involved in ISO in the recent past, for example, an assessment would be valuable for work done in cooperation with ISO.

WATER RESOURCES BRANCH
STRATEGY FOR INTERNATIONAL COOPERATION

1. PURPOSE

This paper provides a strategy for participation in the international forum by the Water Resources Branch (WRB) of the Inland Waters Directorate (IWD), Environment Canada. As the strategy was developed within WRB headquarters and reviewed by its regional offices, it represents consensus within the Branch on a national basis.

Since there are numerous vehicles through which the Branch can participate, and the resources of the Branch are finite, a need exists to establish priorities--a strategic approach to international activities will help ensure that the resources of the Branch are used efficiently. The timing is opportune with the release of the Green Plan and the Branch effort in formulating strategic directions for its work during the 1990s.

There are four other parts to this paper. Section 2 indicates the importance of international cooperation. Section 3 outlines WRB's role at this level. Section 4 discusses the international priorities for WRB. Appendix A provides information on some of the international programs considered and not identified as priorities at this time, but which may become so in the future.

2. IMPORTANCE OF INTERNATIONAL COOPERATION

The need for international cooperation is recognized internationally, within Canada, IWD, and WRB.

The World Commission on Environment and Development (1987) (Brundtland Report) recognized that "there are environmental trends that threaten to radically alter the planet, that threaten the lives of many species upon it, including the human species (desertification, acid precipitation, global warming)....Economic issues are no longer separable from environmental issues and given that poverty is a major cause and effect of global environmental problems, it would be futile to deal with environmental problems without a perspective that encompasses world poverty and international inequality." This report is an example of the recognition by countries throughout the world that they are affected by environmental conditions outside their boundaries, that they cannot work in isolation to solve mounting problems.

There are five principal governmental documents of the recent past which reflect the importance of international affairs to Canada, in some cases particularly to water management.

International water relations is one of 25 specific policy statements provided in the Federal Water Policy (1987). It states: "It is now recognized that Canada's water is an interdependent part of a finite global water system and consequently, the quality and quantity of Canada's water depend, to a considerable extent, upon international efforts to minimize environmental degradation....The federal government is committed to increased collaboration with other nations in freshwater research and management...."

The Task Force Report on Inland Waters and Lands International Activities (1988) expressed the benefits of international involvement as being: learning from the experience of others; demonstrating Canadian expertise; using international science to solve global environmental problems affecting Canada and to promote the Canadian point of view; assisting other countries and international institutions in their work; reinforcing federal leadership; helping meet the international objectives of the directorate, department, and federal government; increasing IWD and departmental prestige and staff morale; assisting government and industry to market Canadian expertise and products abroad; and contributing to the professional development of staff. The Task Force recommended a selective increase in international activities over a five-year period.

The C & P International Agenda (1989) for Conservation and Protection (C & P) states that "increased globalization and internationalization of environmental issues will characterize the next decade". A Vision statement given is that "Canada must exhibit leadership to become a senior partner in assisting to resolve international environmental issues which are seen now as world issues".

International cooperation is one of nine topics of the IWD Strategic Plan (1990). The plan recognizes that: "...Problems are much more complex and global than those of the past and to be resolved require that a world-wide effort be extended. In order to effectively advance sustainable development of water in Canada and globally, IWD must participate in international water management...."

The Green Plan (1990) for the federal government states: "Environmental problems have no respect for national boundaries. The increased prominence of regional and global environmental issues makes it imperative for Canadians to strengthen international cooperation and to forge new international partnerships--bilateral and multilateral--so that those issues can be addressed effectively....Indeed, finding lasting solutions to the increasing scope and complexity of environmental issues will demand greater international cooperation than ever before."

The importance of international activities to WRB is indicated in the discussion on WRB's role found in section 3.

3. THE ROLE OF WRB IN INTERNATIONAL AFFAIRS

There are several players in Environment Canada involved in international affairs. The Program Analysis and Coordination Branch (PACB) coordinates the international activities of IWD. The Policy Branch of C & P does international work at that level. The Corporate Policy Group (CPG) is an additional player.

WRB participation in international activities should be consistent with the objectives of the government, department, directorate, and branch. Five of the reports outlined in section 2 are also relevant to WRB objectives for international cooperation, while the interests and mandate for the Branch are articulated in memoranda on the subject and by the Branch's planning initiative "Directions for the 90s".

The Federal Water Policy (1987) provides three general objectives for international participation:

- to maximize potential economic benefit to Canadians;
- to provide humanitarian assistance in alleviating water problems;
- to encourage the reduction of environmental damage by man to the biosphere.

The Task Force Report on Inland Waters and Lands International Activities (1988) established four objectives for IWD for water resources management as regards international activity:

- to improve the knowledge, expertise, and authority required to provide national leadership in conservation of Canada's water resources and water ecosystems in an integrated and sustainable manner;
- to assist in resolving global environmental problems that pose a threat to Canada's water and water ecosystems;
- to support and encourage the Canadian environmental industry in marketing its products and expertise to other countries;
- to support federal and other agencies in the delivery of Canada's aid to developing countries in an environmentally sound manner.

Resource allocation among the objectives was recommended to be 60 to 70 percent, 10 to 20 percent, 10 to 20 percent, and 5 to 10 percent, respectively.

The objectives of the Task Force were adopted in the C & P International Agenda (1989).

The IWD Strategic Plan (1990) indicates that in order to

effectively advance sustainable development of water in Canada and globally, IWD must participate in international water management through a sharing of expertise and technology.

The Green Plan (1990) states that "a cornerstone of Canada's foreign policy will be to accelerate global cooperation, understanding and progress on environmental issues". While no guidance specific to water resources is given, six commitments are of note. First, to strengthen international institutions Canada will increase funding to key international environmental institutions such as the United Nations Environment Programme, the World Meteorological Organization, the International Union for Conservation of Nature and Natural Resources, and other programs such as the UNESCO World Heritage Committee and the International Maritime Organization. Second, Canada will advance international law. Third, Canada will strongly support the 1992 United Nations Conference on Environment and Development (Brazil, 1-12 June 1992). Fourth, to build international partnerships, Canada will undertake a number of demonstration projects to transfer Canadian expertise to other countries, particularly related to climate change, forest management and biodiversity. Fifth, the Globe '90 exhibition for environmental products, services, and technologies will be continued in Vancouver on a biennial basis. Sixth, Canada will develop stronger bilateral relations on environmental issues.

The Water Resources Branch is the national agency responsible for the collection, interpretation, and dissemination of standardized surface water quantity and sediment data and information in Canada. Its mission is "to contribute to the wise management of Canada's water resources, and the resolution of environmental issues, by providing a hydrologic service encompassing accurate, timely, and comprehensive hydrologic data, information, and advice on a national basis to a wide array of government, public, and professional groups". Activities of its Water Survey of Canada (WSC) Division include the collection, computation, and assessment of standardized water level, discharge, and sediment data, as well as instrumentation and data control. The Hydrology Division is responsible for analytical and interpretive work of operational hydrology such as network planning and evaluation, and data analysis and preparation of national overviews of the water resources of Canada.

The water quantity and sediment data, information, and other products of the Branch are important to both the management of water resources and the environment. The resolution of environmental issues such as acid precipitation and climate change cannot be achieved without information on water quantity and sediment. An ecosystem approach for comprehensive management of the environment requires this information, as does state-of-the-environment (SOE) reporting.

WRB's role in international activity was most recently reviewed in

1987 and 1988. A memorandum from the Director of WRB to the Director General of IWD (20 August 1987) states that because of WRB involvement in international activities "an important communication system has resulted, and among many countries the Branch enjoys a high respect for its equipment and development, procedures and staff", that the Branch "should continue to pursue a general strategy of supporting activities where objectives can be met". A need was expressed for development of a strategy for better marketing of Canadian technology and it was noted that WRB technology such as solar power systems, data collection platforms, reservoir survey equipment, and a complete data handling system are being used by other countries, but have not been marketed. WRB involvement in international activities also is outlined in a memorandum by J. Power (12 April 1988). These two memoranda reflect the work done in the past by the Branch to examine its international involvement.

Involvement in international activity is an indication that WRB is helping to fulfill the mandate of the department, IWD, etc. A balance must be reached between what the Branch could be doing to fulfill its own mandate and what it should be doing within the context of its role in IWD and Environment Canada.

On a more general level, international involvement can further all aspects of WRB's mandate: hydrologic instruments; networks; standards; technician training; computer models; transboundary matters; data control; etc. Examples include benefiting from American experience in conversion from analog to digital data collection over the 1970s and 1980s, use of specifications from data collection platforms (DCPs) of the United States, learning from the experience of the United Kingdom on in situ electromagnetic flow measurements through the International Organization for Standardization, and use of standard terminology of the International Organization for Standardization and the World Meteorological Organization. Examples of sales of Canadian goods and expertise overseas are the Acoustic Flow Meter for Remote Areas (AFFRA) and HYDAC, a system for measurement of flow from a moving boat. The HYDAC system has been sold to India as a result of training within WRB through UNESCO.

The international role of WRB is to lead Canada in the provision of expertise within the international community in water quantity and sediment information. This encompasses instrumentation, training, data collection, data control and interpretation, and network planning and evaluation.

WRB's specific objectives for international involvement are:

- **to provide expertise to and interact with other agencies and countries to improve the knowledge base for the management of our water resources, assist in resolving global environmental problems that pose a threat to**

Canada's water and water ecosystems, and promote Canadian water technology;
- to keep abreast of international developments, particularly standardization, that have implications to WRB work and which will assist in resolving global environmental problems;
- to help fulfill Canada's international obligations with the United States of America;
- to gain national and international recognition for work done;
- the professional development of WRB staff;
- to support federal and other agencies in the delivery of Canada's aid.

4. INTERNATIONAL PRIORITIES FOR THE WATER RESOURCES BRANCH

While the Federal Water Policy, etc., outline various mechanisms for international involvement, the relative merits of the vehicles are not articulated. Furthermore, while there are numerous international programs which warrant the attention of WRB, human and financial resource limitations dictate that it establish priorities.

The mechanisms and organizational vehicles in which WRB may participate in international activities include: international organizations; bilateral and multilateral agreements or memoranda of understanding; protocols, conventions, and accords; conferences and trade fairs; short courses and training; scientific journals; work assignments; visits; and exchange of information. While each of these was examined, most attention was focussed on international organizations and the agreements or memoranda of understanding. Of the options, these can present significant demand on resources, require cooperation with other players, and hence deserved particular attention. Plus, some mechanisms, like visits and exchange of information, will occur on an ad hoc basis regardless of any plan, and, are more direct forms of participation.

The priorities which were identified are discussed below, with information on other options found in Appendix A.

4.1 International Organizations

Regarding international organizations, WRB will concentrate its activities in the World Meteorological Organization, the International Organization for Standardization, and the United Nations Educational, Scientific and Cultural Organization, respectively. Each is discussed below.

The WRB Regional Offices contribute a great deal to bilateral commitments with the United States of America. However, in order

to draw on the wealth of expertise found in these offices, provide broader professional development of staff, and ease the demands of international activities on WRB Headquarters, the WRB Regional Offices are encouraged to be increasingly involved in WRB participation in international organizations.

4.1.1 World Meteorological Organization (WMO)

Background

WMO is not only a respected institution, but its Commission for Hydrology (CHy) is one of the principal water programs of the United Nations system.

Participation by IWD is direct since the Director General serves as Hydrological Advisor to Canada's Permanent Representative to WMO. While IWD and WRB contribute a great deal to WMO, they also benefit through access to worldwide experience and trends in operational hydrology such as water data and information needs, and technological advancement. The Hydrological Operational Multipurpose Subprogramme (HOMS) provides the opportunity for promotion of WRB and Canadian hydrological methodology. IWD currently supplies the only two Canadian rapporteurs or experts of CHy, on design and operation of hydrological networks and on water quality monitoring (A. Perks, WRB, and A. Demayo, Water Quality Branch or WQB).

Of all the IWD branches, participation by WRB in WMO is the most appropriate, due to the compatibility of the work. Both the Hydrology and WSC Divisions of WRB provide expertise to WMO activities and the developing world, involving hydrological network design, instrumentation, hydrometric methods, standards (technical regulations), and data control, as examples. The relevance of these WMO programs to WRB, including HOMS, is elaborated in a memorandum dated 20 August 1987 from the Director of WRB to the Director General of IWD. It noted that WMO's water program has proven particularly relevant to the Branch's role and activities. The HOMS National Reference Centre for Canada is housed in WRB and the memorandum further stated that Canada's commitment to HOMS should continue.

WRB Contribution

WRB's participation in CHy in the recent past includes: provision of the Rapporteur on Comparison of Hydrological Instruments (K. Wiebe, Head of the Hydrometric Methods Section, WSC) for the period 1984-1988; coordination and writing of a report on Real-Time Intercomparison of Hydrological Models, from 1986-1990 (P. Pilon, Hydrology Division); provision of the Rapporteur on Design and Operation of Hydrological Networks (A. Perks, Chief of the

Hydrology Division) for the period 1988-1992; help in revisions to the Guide to Hydrological Practices and a report on implementation of the Mar del Plata Action Plan (A. Perks, Chief of the Hydrology Division); and operation of the HOMS National Reference Centre for Canada since 1980 (P. Pilon and A. Perks, Hydrology Division), including supply of Canadian components to the program and response to international requests.

Outstanding work to be completed in the near future is: the report on intercomparison of hydrological instruments; and the ongoing work of the Rapporteur on Design and Operation of Hydrological Networks. The Branch continues to house the HOMS National Reference Centre for Canada.

WRB Direction

CHy activities for the period 1992-1996 will be finalized by the next CHy session in October/November 1992, the timing of which allows WRB to be strategic in future participation.

To further its work on hydrological network design, instrumentation, hydrometric methods, standards (WMO technical regulations), technology exchange, and data control, as examples, for WMO WRB will:

- complete its outstanding commitment to CHy for the period 1984-1988 under the Rapporteur on Comparison of Hydrological Instruments;
- complete its ongoing commitments for the CHy period 1988-1992 under the Rapporteur on Design and Operation of Hydrological Networks;
- seek an appropriate rapporteurship from the CHy for the period 1992-1996;
- maintain support for the HOMS National Reference Centre for Canada and increase dissemination of information about HOMS;
- send appropriate WRB publications to WMO in support of CHy and ensure that Canadian material is incorporated in international work.

4.1.2 International Organization for Standardization (ISO)

Background

ISO, particularly its Technical Committee 113 (TC 113) on the Measurement of Liquid Flow in Open Channels, provides WRB, and WSC in particular, the opportunity to interact with other countries in the field of instrumentation and standardization. It further provides the opportunity to promote Canadian and WRB technology and their integration in international standards. These points are

noted in J. Power's memorandum of 12 April 1988 concerning WRB's international activities. Furthermore, since standards are to be used nationally, it is important to have the participation of all key players, these being WSC, the provinces, and the Standards Council of Canada. The Council is the ISO member for Canada. The Canadian National Committee on the ISO is responsible to the Council for the general supervision and direction of Canadian participation in the work of ISO and any participation in ISO is through the Canadian National Committee.

While Canada remains an observer on TC 113, because Canada's status was changed in 1990 from observing member to full participating member for all the subcommittees of TC 113 there is now an opportunity for WRB to rejuvenate its participation in the ISO program. Completion of outstanding work for WMO and UNESCO by WSC will free resources for this renewed effort by WSC.

The use of subcommittees of the technical committees of ISO allows WRB to be selective in its participation. The subcommittees (SC) of TC 113 are: SC1 on velocity area methods; SC2 on notches, weirs and flumes; SC3 on a glossary of terms; SC4 on dilution methods; SC5 on flow measuring instruments and equipment; SC6 on sediment transport; and SC7 on special problems and methods of measurement. Since work for some of these may be considered complete or of low priority, participation in the following subcommittees would be most productive: SC1; SC3; SC5; and SC6.

WRB Contribution

Past participation by WRB in ISO has been significant and included: active participation in TC 113 until the late 1980s; head of the Canadian delegation; and four staff as representatives on the Canadian Advisory Committee to TC 113 and its subcommittees. More specifically, the head delegate and chairman of the Canadian Advisory Committee to TC 113 was the Chief of WSC (P. Campbell). The Head of the Hydrometric Methods Section of WSC (K. Wiebe) was a member of SC1 and SC5, M. Spitzer (Calgary) was a member of SC2, and the Head of the Sediment Survey Section of WSC (T. Day) was a member for SC6.

There is no outstanding work to be completed by WRB for ISO.

Current WRB commitments to TC 113 are low and involve only representation on the Canadian Advisory Committee to TC 113 and its subcommittees. M. Quast (Headquarters) serves as the head of the Canadian Advisory Committee to TC 113, and as a member of all subcommittees. The Head of the Hydrometric Methods Section of WSC (K. Wiebe) is a second member of SC1 and SC5. The Head of the Sediment Survey Section of WSC (formerly T. Day) is a second member of SC6.

WRB Direction

WRB has decided to rejuvenate its efforts in ISO by 1992.

In order to ensure Canadian hydrometric standards consider international standards, WRB will interact with other countries in the fields of hydrometric instrumentation and standardization, as well as promote the integration of Canadian technology in international standards. Specifically, in ISO, WRB will:

- renew participation in TC 113 on the Measurement of Liquid Flow in Open Channels during 1991/1992 in cooperation with the Standards Council of Canada, and concentrate initial participation in the subcommittees on Velocity Area Methods (SC1), Glossary of Terms (SC3), Flow Measuring Instruments and Equipment (SC5), and Sediment Transport (SC6);
- conduct a workshop on hydrometric standards in 1992 to enunciate the importance of standards, demonstrate the latest software developments of WRB, and gather the important players throughout Canada involved in standards. Such a workshop will also demonstrate that WRB is the national leader of these standards and serious about this work;
- offer to host the regular meeting of TC 113 in 1995/1996 in Canada;
- involve the WRB Regional Offices in the work of TC 113;
- send appropriate WRB publications to ISO in support of TC 113 and ensure that Canadian material is incorporated in international work.

4.1.3 United Nations Educational, Scientific and Cultural Organization (UNESCO)

Background

Notwithstanding the frequent financial and other difficulties of UNESCO, its International Hydrological Programme (IHP) remains one of the principal water programs of the United Nations system. Water topics are wide-ranging, from education and training, to scientific matters.

Canada plays a strong role and has made commitments to IHP-IV for the period 1990-1995. Canada has the lead for one project, that is, Project H.1.2 on erosion, river bed deformation and sediment transport by M. Yalin of Queen's University. Canada also has two working group participants, these being C. Gray of IWD's National Water Research Institute (NWRI) for Project H.3.2 on contaminant transformation and transport in river and lake systems, and S. Simonovic of the University of Manitoba for Project M.4.3 on experiences with modern water resources planning and management

taking into account risk factors. Canadian participation is coordinated by the Canadian National Committee for IHP, overseen by the Associate Committee on Hydrology (ACH), the secretariat for which is provided by PACB.

WRB Contribution

Past involvement by WRB in UNESCO includes: working group participant of IHP-III Project 10.8 on Integrated Aspects of Reservoir Management (T. Day, Head of Sediment Survey Section of WSC), and participation in the IHP Northern Research Basins project during the 1980s regarding measurements of flow under ice (K. Wiebe, Head of Hydrometric Methods Section of WSC, and formerly P. Pelletier of WRB in Manitoba).

Outstanding work which must be completed by T. Day (Winnipeg) for UNESCO are guidelines to planners and decision-makers on sedimentation aspects of reservoir planning, design and operation, for IHP III Project 10.8.

Current WRB commitments for IHP-IV (1990-1995) are: to provide contact points for Project E.1.1 on Educational Systems for Hydrological Technicians (D. Kimmett, WRB) and for Project M.2.3 on the Use of Geographic Information Systems (GIS) in Hydrological and Water Resources Studies (J. Power, Hydrology Division). A regional staff member (M. Kowalchuk, Winnipeg) is a Canadian committee member regarding a North American component in the Flow Regimes from International Experimental and Network Data Sets (FRIEND), under IHP-IV Project H.5.5. In addition, in 1990, the Head of the Hydrometric Methods Section of WSC (K. Wiebe) became Chairman of the IHP Northern Research Basin Task Force on Winter Discharge Measurement and Computation Techniques used under Ice Conditions. IWD's National Hydrology Research Institute (NHRI) will host the next symposium/workshop in 1992.

WRB Direction

In order to contribute to other countries in the areas of technician training, hydrometric methods, and research areas such as GIS and northern hydrology, WRB will concentrate its activity in UNESCO in the following ways:

- **complete its outstanding commitment from IHP-III (1984-1989) project 10.8, the preparation of guidelines to planners and decision-makers on sedimentation aspects of reservoir planning, design and operation;**
- **provide contact points to supply and disseminate information for IHP-IV (1990-1995) projects E.1.1 and M.2.3 on Educational Systems for Hydrological Technicians and the Use of Geographic Information Systems in**

Hydrological and Water Resources Studies;
- provide the Chairman of the IHP Northern Research Basin Task Force on Winter Discharge Measurement and Computation Techniques used under Ice Conditions;
- provide advice to a Canadian committee on the North American component of the Flow Regimes from International Experimental and Network Data Sets (FRIEND), under IHP-IV project H.5.5;
- send appropriate WRB publications to UNESCO in support of IHP and to ensure that Canadian material is incorporated in international work.

4.2 Bilateral/Multilateral Agreements or Memoranda of Understanding (MOU)

Numerous agreements and MOU exist between Canada and other countries, only a few of which are specific to water resources (Table 1 in Appendix A). With the exception of transboundary work with the United States, the IWD branches or institutes with significant participation in any of the agreements or MOU are NWRI and NHRI. Recent action and policy by the Canadian Government and C & P indicate increased cooperation with Central and South America (as examples, Mexico, Brazil -- see Appendix A).

Three points should be raised regarding participation in bilateral agreements. First, like involvement in international organizations, costs are often absorbed by the participating agency. In the past, for development of agreements, little or no resources have been provided up-front to agencies, creating strains on their financial and human resources. Any funding provided is usually given retroactively and in small amounts. Involvement in an agreement in the recent past has been an "add on" to existing programs. However, some progress is being made in this regard. External Affairs Canada has a program called "Going Global" to encourage scientific and technical cooperation between Canada and western Europe. External Affairs Canada will fund up to 50 percent of costs for Canadian missions going to Europe (air fare, hotel expenses) or sponsor visiting missions coming to Canada for science and technology workshops. The program, being open to both government and non-government initiatives, is competitive. Requests from Environment Canada are channelled through the Corporate Policy Group, which submits only those proposals of greatest priority to the department.

Second, the question of the importance of agreements vis-a-vis participation in international organizations is a pertinent one, but also difficult to assess. It is unclear that one is superior to another as a means of participating in international activities. WRB participation in international organizations already occurs and the opportunity exists for WRB to build on this involvement. Any attempt to become involved in agreements would require working

through the various layers of government bureaucracy and significant start-up effort since WRB is not involved in many now.

Third, commitment from management is sometimes difficult to obtain. Furthermore, IWD researchers who have contact with foreign nationals are sometimes unsure if their joint projects fall within agreements, if and when money will become available, or about the agreements themselves.

For the reasons outlined above, in summary, **regarding bilateral/multilateral activities, WRB will concentrate on the United States of America where mutual objectives and interests exist, and follow such efforts as the integrated monitoring proposal of the Finnish Initiative. Furthermore, WRB will monitor activities involving Central and South America, in support of Government and C & P policy.** Bi/multilateral activities with the United States and the Finnish Initiative are discussed below.

4.2.1 United States of America (USA)

Background

Interaction with the USA is warranted because of mutual water interests, physical proximity and common technical interests, etc. In addition to the examples provided in section 3 on digital data collection and specifications for DCPs, another example of the benefit derived from interaction with the US agencies is the use of their sediment equipment, which is used around the world, and the subsequent improvements made by WRB and adaption to Canadian conditions. On the other hand, the Canadian moving boat method perfected by WRB is a prime example of the kind of improvement made by WRB and recognized internationally.

WRB Contribution

Two types of arrangements with the USA can be identified, those being formal and informal. Under formal arrangements, WRB activities are extensive in support of the Boundary Waters Treaty (and hence, the International Joint Commission, or IJC) and the Great Lakes Water Quality Agreement. Several WRB staff provide expertise on committees and control boards. The International Lake of the Woods Control Board Secretariat is devoted to this task for Canada and is housed in IWD. The Director of WRB is the member for Canada. Transboundary work with the USA is an international activity where the WRB regional offices contribute a great deal. Examples are involvement in the Niagara River Board of Control, the International Niagara Working Committee, an International Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data, and several similar boards in western and eastern Canada, etc. Hydrometric measurements are taken by regional WRB

staff at about 95 "international gauging stations".

On a less formal level, visits are arranged on an ad hoc basis with the United States Geological Survey (USGS). Several WRB staff may travel to USGS offices to meet with experts and exchange ideas on each others' practices. Or, a USGS staff member may be invited to attend a workshop or conference organized by WRB, as was the case in 1990 for a Network Evaluation and Planning workshop held in Toronto.

WRB Direction

WRB is satisfied with the current arrangements for interaction with agencies of the United States of America. Thus, WRB will continue:

- **hydrometric monitoring at transboundary sites with the USGS in support of the Boundary Waters Treaty and a number of other treaties and agreements;**
- **to provide expertise to committees and control boards of the IJC;**
- **to provide representation on the Federal Interagency Sedimentation Project (FISP), more specifically the Sediment Action Committee and the Technical Subcommittee on Sedimentation;**
- **informal meetings and ad hoc arrangements with the USGS.**

4.2.2 Finnish Initiative

Background

The Finnish Initiative is an international effort among the eight circumpolar countries on the protection of the Arctic environment. Areas of study are: organic contaminants; heavy metals; noise; radioactivity; acidification; oil pollution; flora and fauna conservation; marine protection; emergency prevention, preparedness and response; and systematic monitoring. The work may be categorized into three areas: SOE reports and monitoring activities; legal instruments for the protection of the Arctic environment; and environmental protection (ie: sustainable development). The Finnish Initiative is ongoing and has yet to result in specific agreements or projects. Major meetings were held in September 1989 in Rovaniemi, Finland, in April 1990 in Yellowknife, January 1991 in Sweden, and will be followed by a ministerial meeting in Rovaniemi in the spring of 1991.

The Norwegians have proposed an integrated environmental monitoring program for the Arctic, to which the IWD response was that such a program is needed for the Arctic, but that it is doubted that resources are available.

The importance of the North is recognized in the Green Plan, as described in an Arctic Environmental Strategy. Major elements deal with Arctic contaminants, waste clean-up and management, water quality and quantity, and research. A regular watch on progress made on the Norwegian proposal is warranted.

WRB Contribution

In November 1990, WRB provided the representative for C & P for a meeting in Norway to discuss the integrated monitoring program of the Finnish Initiative (D. Harvey, Hydrology Division).

WRB Direction

In recognition of the general importance of SOE reporting, integrated environmental monitoring, as well as having WRB stations and technical staff located in the North, WRB will maintain a watching brief on the Finnish Initiative.

4.3 Conferences

It has been established that conferences provide active WRB participants with contacts, motivation, and exchange of ideas. Almost all requests for active participation by WRB Headquarters staff in recent years have been approved.

Within the constraints of budgetary limitations, attendance of WRB staff at international conferences will continue for professional development, to exchange information, to increase technical knowledge, to build credibility, and to provide support to both international organizations in which WRB and IWD participate and Canadian efforts on the international scene. Priority will be given to those individuals making the largest contribution.

4.4 Short Courses and Training

In the memorandum of 12 April 1988 by J. Power, two reasons are given as to why foreign nationals request training in Canada. First, Canadian expertise is acknowledged to be of high quality. Second, Canada is perceived as more politically neutral than, for example, the United States.

WRB provides training of foreign nationals about once a year, recent examples being those from China and India. On occasion, requests for such training are more than the Branch can realistically accommodate. While WRB has a choice to accept or refuse requests for training, some external pressure exists. Requests are sometimes driven by other Canadian agencies--the

services of WRB may be volunteered without prior consultation with WRB management, creating pressure on the Branch to deliver on the request. The natural tendency will be to deny future demands. In the recent past, a few WRB staff have travelled abroad to give training courses, one example being for moving boat methods for WMO (E. Fast, WSC Division).

Consideration of attendance at short courses or to receive training in other countries by WRB staff is similar to that for conference attendance--both the needs of the employee and the program must be considered.

When the timing of requests for training is beyond the control of WRB, since the training must be considered within the context of demands on the Branch and in recognition of the desire to provide training to foreign nationals on a reasonable basis, WRB has no choice but to assess training requests when and as they arise.

4.5 Scientific Journals

Publication in scientific journals, outside of IWD publications, can be beneficial to the individual and the institution. Submission of articles in or participation as reviewer or editor for a scientific journal develops credibility of the individual, Branch, IWD, etc. Similar participation on the international level can increase recognition to the individual, organization, and country. Such activity by the Branch could be focussed in the areas or organizations in which it participates internationally to reinforce this participation. Therefore, in addition to submission to Canadian publications, staff are encouraged to submit articles to international journals.

Technical publications produced by WRB Divisions, such as the series produced by the Sediment Survey Section of WSC, should be reviewed to determine their utility to international organizations like WMO, ISO, and UNESCO. WMO and UNESCO stated in 1990 that they appreciate receiving the scientific material of IWD. The effect is to demonstrate that Canada supports the organization and help to ensure that Canadian developments are included in international efforts; Canada's reputation is further enhanced. It is recommended that the distribution list be included in the approval process for publications.

As regards publications, WRB staff are encouraged to submit articles to refereed, international scientific journals. In addition, WMO, ISO, and UNESCO will be contacted to enquire if they would like to receive any of the currently available WRB publications and to determine their future interests.

4.6 Work Assignments

Work assignments means staff working overseas and foreign nationals working within the Branch. Recent examples are the researchers from China (1989-90) and the Federal Republic of Germany (1989). The Chief of the Hydrometric Methods Section of WSC (K. Wiebe) also undertook an assignment in Morocco (1990).

While work assignments can be an effective mechanism to build morale, increase awareness of approaches used in the regional offices, to aid other offices, and to build employee expertise, such exchanges on the international level are complicated by increased costs. An additional drawback is that the exchange would have to be of an effective length (ie: a few months) in order for substantive work to be accomplished. Such exchanges involving IWD are infrequent; NWRI sometimes makes arrangements to receive scientific staff. Since some costs are absorbed by the host institution, financial realities create constraints.

Work assignments, either of a foreign national to WRB or WRB staff to other countries, will be considered on a case-by-case basis when benefits are clearly evident to WRB. Arrangements may be made to share costs (ie: WRB - salary; the employee - transport; and host institution - transport, accommodation).

When finalized, use could be made of the agreement for the IWD/CIDA Short-Term Exchange of Staff in Water Management. This would allow WRB personnel to work for less than six months on projects of the Canadian International Development Agency (CIDA), with costs absorbed by CIDA, and allow WRB to temporarily replace these staff while they are seconded.

4.7 Visits

Visits here refers to tours of visitors from other countries or WRB staff visiting water personnel in other countries, but not training. Visits can include those to or from Canada; WRB receives six to 10 visits per year. WRB usually is obliged by external agencies to receive foreign visitors. Whenever possible, required visits should be planned to coincide with trips to conferences, etc. **Visits of foreign nationals will continue to be accommodated to the extent possible by WRB, consistent with IWD and Departmental policies and procedures.**

4.8 Exchange of Information

The exchange of information with foreign individuals, etc., may be done as a result of an individual's contacts or may be a random letter in which information on a particular subject is requested. It provides the opportunity to promote WRB, etc. Such requests

also result from WRB participation in HOMS. Aside from more detailed requests within HOMS, in total they are few enough that they are not a strain on WRB resources. Like visits, the exchange of information will occur regardless of any strategy which may be devised and is usually done on an ad hoc basis. Exchange of information with international partners will continue on an ad hoc basis.

4.9 Miscellaneous

Links with international organizations, etc., will be made whenever possible to provide support to those agencies with which we participate, to promote our science, and to exert influence internationally.

To draw on the wealth of expertise found in the WRB Regional Offices, to provide broader professional development of staff, and to ease the demands of international activities on WRB Headquarters, the WRB Regional Offices are encouraged to be increasingly involved in international activities.

Coordination of WRB international activities is to be through the WRB Headquarters Chiefs and Branch meetings.

Participation in international activities are to be incorporated into regular work plans to facilitate management consideration of the implications and resources relative to national workload and other priorities.

International activities not identified as priorities for the Branch at this time will be assessed on an ad hoc basis.

Finally, international activities of the Branch should be evaluated on a regular basis to ensure useful results. Since WRB has not been heavily involved in ISO in the recent past, for example, an assessment would be valuable for work done in cooperation with ISO.

T. Winkler WRB IWD (819)997-1185 March 1991

APPENDIX A

The most important international activities which were examined for potential participation, but which were determined to be of low priority for WRB at this time are discussed below. These are grouped under international organizations, bilateral and multilateral agreements or MOU, protocols/conventions/accords, and trade fairs. **Other international activities not identified as priorities for the Branch at this time will be assessed on an ad hoc basis.**

A.1 International Organizations

International Association of Hydrological Sciences (IAHS) - IAHS is a respected, dynamic, scientific organization, outside the United Nations system, from which IWD technical staff benefit most. IWD participation for the period 1987-1991 was strong--President of IAHS for the first time (NHRI), two-vice presidents or officers of commissions (NWRI, NHRI). WRB, however, had no involvement during the period. Nominees for Canadian participation as officers for the period 1991-1995 were sought in 1990 for the following areas of study: surface water; groundwater; continental erosion; snow and ice; water quality; water resources systems; remote sensing and data transmission; tracer hydrology; and vegetation-soil-atmosphere interaction. ACH is responsible for finalizing the proposed Canadian participation. Opportunities exist for WRB to: participate on the IAHS Commissions and Committees; participate at IAHS Scientific Assemblies, next in 1993 in Japan; and display its technology at the scientific and industrial exhibitions to be held in conjunction with the IAHS General Assembly, next in August 1991 in Vienna. The Sediment Survey Section of WRB intends to send staff to the IAHS-sponsored International Symposium on Erosion and Sediment Transport Monitoring Programs in River Basins (Oslo, 24-28 August 1992).

International Institute for Applied Systems Analysis (IIASA) - IIASA has membership from 14 west and east European countries, the United States of America, and Canada. IIASA has a distinct water component, its programs are flexible, and include scientific and policy matters. The current program studies the impact of climate change and other environmental factors on water resources availability and management. Examples of work done in the past pertaining to water resources include: real-time forecasting and control of water resources systems; mathematical modelling of water quality; modelling of water demands; interactive water quality simulation in a regional framework; water policies for regions with intense agriculture; decision support systems for the analysis of regional water policies; and international rivers. IWD participation in IIASA has been sporadic; the possibility exists

for IWD to become more formally and substantially involved. Since the next General Assembly of IAHS will be held in Vienna in August 1991, any staff attending the meeting may wish to take advantage of the proximity of IIASA in Laxenburg for an exploratory visit. Further to any involvement, secondment of IWD staff would be appropriate for professional development.

International Atomic Energy Agency (IAEA) - IAEA is an organization of the United Nations. It does work concerning isotope hydrology, with isotopes being used as tracers to identify water movement and related characteristics in various phases of the hydrological cycle, such as the source of sub-surface water, occurrence of recent recharge from rain and surface water, and age of groundwater. Participation by IWD has been ad hoc, primarily by NWRI. WRB may wish to explore the field of isotope hydrology and could do so in consultation with Atomic Energy Canada Limited and the Atomic Energy Control Board. In addition, since the next General Assembly of IAHS will be held in Vienna in August 1991, staff attending the meeting may wish to take advantage of the proximity of the IAEA Secretariat in Vienna for an exploratory visit. The next IAEA International Symposium of Isotope Techniques in Water Resources Assessment will be held in Vienna in March 1991.

International Decade for Natural Disaster Reduction (IDNDR) - The Decade spans the 1990s and has been designated by the United Nations. It provides IWD a mechanism to help developing countries, a vehicle to highlight the importance of water resources management, and the opportunity to learn from other countries with well-developed disaster reduction programs. Canada has yet to devise a strategy or program for participation and will likely do so in 1991, providing IWD and WRB the possibility to be strategic in approach. WRB can contribute in the following areas: hydrometric technology, both in the field and office, especially telemetry and new flow meters; hydrologic methods and standards relating to flood flows, low flows, hydrologic modelling, and GIS applications; and training programs, seminars, and workshops relevant to hydrometric and hydrologic methods.

Economic and Social Council (ECOSOC) - ECOSOC has a Committee for Natural Resources (CNR) which discusses water approximately every three years. Given that ECOSOC is one of five organs of the United Nations, as opposed to an affiliated organization, failure on the part of Canada to provide strong representation at these sessions could be interpreted as lack of support to the discipline. IWD is the most appropriate agency to provide this expertise and could work with Canadian representatives to this end. The Mar del Plata Action Plan, which provides the overall framework for the water resources programs of the United Nations, is part of the Committee's tasks. A WRB staff could attend the next water session

of CNR, possibly in March/April 1991, since it has been involved in providing input to the Mar del Plata Action Plan, and more specifically an assessment of progress since 1977 and input to a strategy for the 1990s.

Other international organizations considered for the discussion paper for this strategy were: the Economic Commission for Europe (ECE); International Council of Scientific Unions (ICSU); International Lake Environment Committee Foundation (ILEC); International Union for Conservation of Nature and Natural Resources (IUCN); Organisation for Economic Co-operation and Development (OECD); United Nations Environment Programme (UNEP); and the World Health Organization (WHO). Any IWD involvement in these organizations is through other branches, etc.

A.2 Bilateral/Multilateral Agreements or Memoranda of Understanding (MOU)

Table 1 indicates the international agreements and Memoranda of Understanding (MOU) relevant to water resources and IWD involvement. For the purpose of this report no distinction is made between an agreement and an MOU.

While these agreements exist or are anticipated to be signed, some are more appropriate for WRB involvement than others. These are outlined below.

Brazil - Current IWD involvement with Brazil falls under the technical agreement signed with the water pollution control agency of the State of Sao Paulo (CETESB), being pursued by NWRI. Topics included are: monitoring technologies (air, water, soil, fuel emissions); pollution control technologies (clean technology; oil from sludge and waste management; spill management); and others (expert systems and modelling; forest fire management; ecozone issues - definition, management; and state-of-the-environment indicators).

France - An MOU on the environment is expected to be signed in 1991. Topics are to include: ecotoxicology/ecology; groundwater; river basin management (mainly pollution control); treatment technology; economics and sustainable development. While NWRI, the Water Planning and Management Branch (WPMB), and NHRI have been involved in visits by the French, NWRI has been leading IWD participation to date. Negotiations for projects are ongoing under the framework of a "Commission Mixte" regardless that the agreement has not yet been formally signed. WRB could work with C & P and NWRI to be involved.

TABLE 1 – INTERNATIONAL AGREEMENTS AND MOU RELEVANT TO WATER

Country	Date	Areas of Cooperation	IWD Involvement?*
Belgium	1971, 1976	science, industry, technology	no
Brazil	1985	science and technology	no
CETESB	1989	technology	NWRI–in progress
China	1986	meteorology	no
Denmark	1983	marine environment	no
European Communities	1975	environmental matters	no
	1983	wastewater treatment	no
Finnish Initiative	in progress	arctic environment	all–in progress
France**	1973	science and technology	
	1991 exp	environment	NWRI, WPMB, NHRI–in progress
Germany	1971, 1976, 1987	science and technology	NWRI
Italy	1990	water pollution research	NWRI
Japan	1986	science and technology	no
Mexico	1990	environment	NWRI
Netherlands	1988	environment	NWRI?
Norway	1986	science and technology	NWRI?
Soviet Union	1989	environment	no
		– atmospheric	no
		environmental programs	
		– water	NWRI, WQB
	198?	Arctic Science Exchange Program	NHRI
United Kingdom	1983	science and technology	no
United States	1909	boundary waters	all
	1978, 1987	Great Lakes water quality	NWRI, WQB, WRB
Yugoslavia	1971	science and technology	no

* indicates known involvement--omissions are possible. Also, collaboration exists between the national water authority of Hungary (VITUKI) and NWRI, but no agreement has been signed. Such collaboration likely exists with other countries as well.

** an MOU exists between WSC and the Centre nationale d'études spatiales of Toulouse (date unknown) for relay of hydrometric data collected by WSC on an operational basis from data collection platforms (DCPs) located at selected (remote) sites in Canada. However, there is no current activity under this MOU.

Germany – The agreement with the former Federal Republic of Germany is a successful one because of its longevity and general satisfaction with projects executed. There is an environment sector for the agreement. To date, 10 consultative meetings have been arranged between Canada and Germany. NWRI is an active participant. Projects undertaken in the past of relevance to IWD include: aquatic environmental radioactivity (NWRI); risk analysis

for chemicals (NWRI); hydrology (University of Waterloo); hypereutrophic lakes (NWRI); and groundwater pollution (NWRI). In 1990, Germany asked for information on (ie: expressed an interest in): policy concerning waste water abatement and waste water treatment; guidelines on water quality; and general trends of water pollution. As work under this agreement is ongoing, WRB participation is possible.

Japan - Project planning for this agreement is ongoing and hence, it may be possible for WRB to arrange exchanges in the future. External Affairs Canada leads on this MOU, with the lead for Environment Canada located in the Pacific and Yukon Region. For 1991 and 1992 C & P proposed collaboration with Japan to include: specific research activities particularly in the areas of environmental standards and aquatic biotechnology; exchanges of professional staff with Japanese universities and environmental research centres and develop joint scientific training; visits to and from Japan of senior managers to improve our understanding of environmental issues and management; two to four research projects to deal with standards, particularly methods to develop standards and the development of these standards in the field of marine discharges; at least two scientific missions with emphasis on marine pollution and biotechnology; and personnel exchange in three fields in which the Japanese are advanced, these being aquatic biotechnology, environmental instrumentation, and marine pollution. Two areas in which IWD has expressed interest should funding become available are: development of environmental remediation technologies (NWRI); and focus on water issues of global significance and strategic importance to Canada (toxic rain, climate change, acidification, Arctic research).

Currently there are three fellowships available to Canadians who would like to conduct research in a Japanese research centre. These are the Science and Technology Agency Fellowships, the JSPS Postdoctoral Fellowships for Foreign Researchers, and the AIST Foreign Researcher Invitation Program for use at one of the research institutes belonging to the Japanese Agency of Industrial Science and Technology.

Italy - A MOU on scientific cooperation in the area of water pollution research was signed in November 1990 between NWRI and the Environmental Protection Services Department of the Region of Emilia Romagna, Italy. (An Italian Region is equivalent to a Canadian Province.) Inland-based water pollution causes extensive marine pollution long the Adriatic coast in Italy. Aside from environment ramifications, there are beach closures and an approximate loss of $200 million in tourism (1989). Areas of interest for the two parties therefore are freshwater and marine eutrophication, water quality, river basin management, and nutrient control strategies and technology.

Mexico - An environmental agreement was signed with Mexico in March 1990 during a trip by the Prime Minister to Mexico. Thirteen topics are included in the agreement, including: protection of marine and freshwater ecosystems; prevention of surface and groundwater pollution; environmental monitoring and methods for the assessment and environmental quality; environmental training and education. A Mexican mission came to Canada in November 1990 to help define projects which might be undertaken under this agreement. The Mexicans were to travel to NHRI, NWRI, and headquarters (IWD, C & P). Although unrelated to the agreement, the International Seminar on Efficient Water Use to be held in Mexico City, 21-25 October 1991, in cooperation with the International Water Resources Association (IWRA), would provide the opportunity to establish contacts.

Netherlands - Areas of study which can be pursued under this MOU are: atmospheric pollution, including acid rain and climate change; protection of soils, groundwater and surface water contamination, contaminated sediments; environmental management; promotion of the application of clean technology.

Soviet Union - There are two MOU under the framework of the agreement on environmental cooperation with the USSR, which deal with atmospheric environmental programs and water research. All were signed in late 1989 during a trip by the Prime Minister to the Soviet Union. NWRI has been assigned responsibility for this MOU for Canada. Negotiations are taking place to define projects to be executed under this agreement. Projects in which Canada has expressed an interest and for which negotiations are ongoing are: limnology of large lakes with emphasis on the diagnosis and control of pollution (NWRI); fate and effects of chemicals in large rivers, their estuaries and nearshore areas of seas (NWRI); impacts of atmospheric toxic chemicals pollution in lakes and wetlands (NWRI); fate and effects of toxic chemicals introduced into lakes and rivers by pulp and paper mills (WPMB); remote sensing of water quality of large lakes using spectral imagery (NWRI); development of methods for the detection and analysis of contaminants in the environment (NWRI); and development of criteria for assessing water quality, standards of water quality and classification of water pollution (WQB). Most of these projects will be limited to an exchange of information; while some research efforts have been proposed, none are major. WRB would have the opportunity to participate in the projects outlined in cooperation with NWRI and WQB. In addition to the MOU on water research, NHRI is involved in an Arctic Science Exchange Program.

A.3 Protocols, Conventions, and Accords

Relevant protocols, conventions, and accords include the Boundary Waters Treaty with the United States, the Montreal Protocol on Substances that Deplete the Ozone Layer, and initiatives within ECE (considered under international organizations).

Several protocols, etc., exist under the Boundary Water Treaty, examples being the Convention, Protocol and Agreement to Regulate the Level of the Lake of the Woods, the Rainy Lake Convention, the Treaty Concerning the Diversion of the Niagara River, and the Columbia River Treaty. WRB participation is extensive and already incorporated into the structure of the Branch (ie: may be considered part of regular program activities).

Conventions developed or being developed by the ECE are the Convention on Long Range Transboundary Air Pollution and its Protocol (1985) for sulphur reductions, a set of principles regarding cooperation in the field of transboundary water (1988), a charter on groundwater management (1989), a code of conduct on accidental pollution of transboundary waters, transboundary industrial accidents, and an agreement on environmental impact assessment in a transboundary context.

Aside from commitments to transboundary matters with the United States, it is unclear that WRB action is necessary or where opportunities exist concerning protocols, conventions, and accords.

A.4 Trade Fairs

Trade fairs, or scientific exhibitions, are often held in conjunction with conferences. Benefits include promotion of IWD/Environment Canada/Canada and of WRB technology. On the international scene, opportunities exist for WRB at the following events: the scientific exhibition to be held in conjunction with the World Meteorological Congress (WMO) in May 1991 (Geneva) (Environment Canada had an exhibition at the last Congress in 1987); and the scientific and industrial exhibition to be held in conjunction with the IAHS General Assembly in August 1991 (Vienna). WRB could use these occasions for marketing purposes, both of its methods and technology. The WATERSCAPES '91 International Conference on Water Management for a Sustainable Environment (Saskatoon, 3-7 June 1991) will also have an international exposition. This conference is being organized by WATERSCAPES Inc., a non-profit organization, and the Canadian Water Resources Association.

The Water Resources Branch is the national agency responsible for the collection, interpretation, and dissemination of standardized surface water quantity data and information in Canada. Streamflows, water levels and sediment concentrations are measured across the country and interpreted as required. The data and information are made available in a variety of printed and computer compatible formats, including historical records, current year, and real-time. The national data base, HYDAT, is the primary source of surface water quantity information for water resource and environmental management in Canada. Each year HYDAT and related products are distributed to a wide array of users: federal and provincial government agencies, utilities, environmental organizations, consultancies, and the general public.

For further information, please contact:

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La Direction des ressources en eau s'avère l'organisme national chargé de la collecte, de l'interprétation et de la diffusion de données et d'informations normalisées portant sur la quantité des eaux de surface au Canada. Les débits, les niveaux d'eau et les concentrations des sédiments sont relevés à la grandeur du pays, et les données et informations en découlant, dont des enregistrements historiques, des données pour l'année en cours et d'autres en temps réel, sont mises à la disposition des utilisateurs sous diverses présentations imprimées ou lisibles par ordinateur. La base nationale de données HYDAT constitue la principale source de renseignements au sujet de la quantité des eaux superficielles qui servent à la gestion de l'environnement et des ressources hydriques au Canada. Chaque année, les produits de HYDAT et les produits connexes sont distribués à une diversité d'utilisateurs : organismes fédéraux et provinciaux, services d'utilité publique, organisations vouées à la défense de l'environnement, experts-conseils, et grand public.

Pour de plus amples renseignements sur ce qui précède, veuillez communiquer avec la :

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