TASK FORCE REPORT ON INLAND WATER AND LANDS

INTERNATIONAL ACTIVITIES

VOLUME 2

APPENDICES

1512m

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Table 1A
Summary of IWL International Participation in 1986/87 (in person-days)

	Intergovt. Org.	Nongovt. Org.	Bilateral Act.	Foreign Aid	Intnl. Journals	Intnl. Conf.	Program, Personal Contacts & Other Act.	Total PDs	Total %
IWL-DG	2	1	1	-	-	1	1	6	0.2
RCPE - Director	23.5	-	-	1	-	5*	-	29.5	
Senior Staff	10	20	-	-	-	5*	-	35	
Other Staff	261	-	-	-	-	5*	-	266	
Total	294.5	20	-	1	-	15	-	330.5	12.3
WPM - Director	-	-	-	1	-	-	-	1	
Senior Staff	47	134	-	17	35	-	60	293	
Other Staff	-	20	-	-	-	-	-	20	
Total	47	154	-	18	35	-	60	314	11.7
WQ - Director	-	13	-	-	-	-	-	13	
Senior Staff	46	39	-	-	-	-	-	85	
Other Staff	32	-	-	-	-	-	-	32	
Total	78	52	-	-	-	-	-	130	4.9
WR - Director	-	-	-	-	-	-	-	-	
Senior Staff	86	20	-	-	-	-	-	106	
Other Staff	34	65	-	-	-	-	-	99	
Total	120	85	-	-	-	-	-	205	7.7
Lands - Director	-	-	17	-	-	7	-	24	
Senior Staff	87	10	-	-	5	5*	-	107	
Other Staff	-	-	-	-	-	5*	-	5	
Total	87	10	17	-	5	17	-	136	5.1
NHRI - Director	-	2	-	-	-	-	-	2	
Senior Staff	5	32	-	-	-	-	-	37	
Other Staff	-	-	43	-	5	-	-	48	
Total	5	34	43	-	5	-	-	87	3.2
NWRI - Director	-	-	-	-	2	5*	15*	22	
Senior Staff	270	70	12	-	33	25*	85*	495	
Other Staff	385	162	22	26	87	70*	200*	952	
Total	655	232	34	26	122	100	300	1469	54.9
Total - DG	2	1	1	-	-	1	1	6	
Directors	23.5	15	17	2	2	17	15	91.5	
Senior Staff	551	325	12	17	73	35	145	1158	
Other Staff	712	247	65	26	92	80	200	1422	
Total PDs	1288.5	588	95	45	167	133	361	2677.5	100.0
Total %	48.1	22.0	3.5	1.7	6.2	5.0	13.5	100.0	

* Estimated

Table 1B
Participation in Intergovernmental Organizations (in person-days)

	WMO	Unesco IHP&MAB	UNEP/WHO GEMS	FAO	UNDP	OECD	ECE	IAEA	Other UN	Total
IWL - DG	1	-	-	-	-	-	-	-	1	2
RCPE - Director	23.5	-	-	-	-	-	-	-	-	23.5
Senior Staff	-	10	-	-	-	-	-	-	-	10
Other Staff	-	18	-	-	-	-	-	-	243	261
Total	23.5	28	-	-	-	-	-	-	243	294.5
WPM - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	30	7	-	10	47
Other Staff	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	30	7	-	10	47
WQB - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	26	-	20	-	-	-	-	-	-	46
Other Staff	-	-	32	-	-	-	-	-	-	32
Total	26	-	52	-	-	-	-	-	-	78
WRB - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	86	-	-	-	-	-	-	-	-	86
Other Staff	-	13	-	-	21	-	-	-	-	34
Total	86	13	-	-	21	-	-	-	-	120
Lands - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	43	22	-	22	-	-	-	87
Other Staff	-	-	-	-	-	-	-	-	-	-
Total	-	-	43	22	-	22	-	-	-	87
NHRI - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	5	-	-	-	-	-	-	-	-	5
Other Staff	-	-	-	-	-	-	-	-	-	-
Total	5	-	-	-	-	-	-	-	-	5
NWRI - Director	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	26	244	-	-	-	-	-	-	270
Other Staff	-	4	360	3	-	13	-	5	-	385
Total	-	30	604	3	-	13	-	5	-	655
Total	141.5	71	699	25	21	65	7	5	254	1288.5

Table 1C
Participation in Nongovernmental Organizations (in person-days)

	World Climate Program	ICSU/ WDDB	ICSU/ IAHS	ICSU/ IUGS	ICSU/ FAGS	ICSU/ IGS	ICSU/ IAWPR	ICSU/ SCOPE	IASWS	IAHR IWRA AWWA	ICSI, ICID& ICOLD	ISO	IUCN IIASA	SCOR	SWS Plant APS IPS	ILEC IBS IOLM	European WAM ISEM	ASCE	ASTM Toxicity Testing Committee	IAGLR	IAGC	Other	Total
IWL - DG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
RCPE - Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	20	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	20
WPM - Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	130	4	-	-	-	-	-	-	-	-	-	-	-	134
Other Staff	-	-	-	-	-	-	-	-	-	-	20	-		-	-	-	-	-	-	-	-	-	20
Total	-	-	-	-	-	-	-	-	-	130	24	-	-	-	-	-	-	-	-	-	-	-	154
WQB - Director	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	13
Senior Staff	-	-	-	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-	-	-	-	-	39
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	52
WRB - Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
Senior Staff	-	-	-	-	-	-	-	-	-	-	-	20*	-	-	-	-	-	-	-	-	-	-	65
Other Staff	-	-	-	-	-	-	-	-	-	-	-	65*	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-	-	-	-	-	85
Lands - Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
NHRI - Director	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2
Senior Staff	-	-	-	5	5	10	-	-	-	-	2	-	5	-	-	-	-	-	-	-	-	5	32
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	5	5	10	-	-	-	2	2	-	5	-	-	-	-	-	-	-	-	5	34
NWRI - Director	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	5	-	-	-	5	-	5	16	-	26		-	-	10	-	-	3	-	-	-	70
Other Staff	13	-	-	5	-	-	6	3	-	-	-	8	3	10	21	18	18	5	8	39	5	-	162
Total	13	-	5	5	-	-	11	3	5	16	-	34	3	10	21	28	18	5	11	39	5	-	232
Total	13	10	25	10	5	10	11	3	5	148	26	171	8	10	21	28	18	5	11	39	5	6	588

* Estimated

Table 10

Participation in Foreign Aid, Bilateral International Activities, International Conferences, Program Travel, Personal Contacts and Other International Activities (in person-days)

	Foreign Aid		Bilateral Activities						International Conferences	Program Travel, Personal Contacts and Other Activities	Total
	CIDA	IDRC	France	West Germany	Norway	China	Sweden	Netherlands			
IWL - DG	1	-	-	-	-	-	-	-	1	1	3
RCPE - Director	1	-	-	-	-	-	-	-	5	-	6
Senior Staff	-	-		-	-	-	-	-	5	-	5
Other Staff	-	-		-	-	-	-	-	5	-	5
Total	1	-	-	-	-	-	-	-	15	-	16
WPM - Director	1	-	-	-	-	-	-	-	-	-	1
Senior Staff	17	-	-	-	-	-	-	-	-	60	77
Other Staff	-	-	-	-	-	-	-	-	-	-	-
Total	18	-	-	-	-	-	-	-	-	60	78
WQB - Director	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	-
Other Staff	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
WRB - Director	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	
Other Staff	-	-	-	-	-	-	-	-	-	-	
Total	-	-	-	-	-	-	-	-	-	-	-
Lands - Director	-	-	7*	-	-	-	5*	5*	7	-	24
Senior Staff	-	-	-	-	-	-	-	-	5*	-	5
Other Staff	-	-	-	-	-	-	-	-	5*	-	5
Total	-	-	7	-	-	-	5	5	17	-	34
MWRI - Director	-	-	-	-	-	-	-	-	5*	15*	20
Senior Staff	-	-	-	-	4	8	-	-	25*	85*	122
Other Staff	-	26	-	13	9	-	-	-	70*	200*	318
Total	-	26	-	13	13	8	-	-	100	300	460
NHRI - Director	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	-
Other Staff	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
Total	20	26	7	13	13	8	5	5	133	361	591

* Estimated

Table 11
Participation in International Journals (Editors) (in person-days)

	Water Resources Management	J. Hydrology	Hydrological Sciences J.	Atm. Ocean	Arctic J.	Intern. J. Geo. Info. Syst.	Various	IAGLR	JOAC	HR Chromat	WQ Bull	Total
IWL - DG	-	-	-	-	-	-	-	-	-	-	-	-
RCPE- Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	-	-
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
WPM - Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	35	-	-	-	-	35
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	35	-	-	-	-	35
WQB - Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	-	-
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
WRB - Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	-	-	-	-	-	-	-
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
Lands - Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	-	-	-	-	-	5	-	-	-	-	-	5
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	5	-	-	-	-	-	5
NWRI - Director	-	-	-	-	-	-	-	-	-	-	2	2
Senior Staff	-	-	-	-	-	-	-	10	13	-	10	33
Other Staff	-	-	-	-	-	-	41	20	-	13	13	87
Total	-	-	-	-	-	-	41	30	13	13	25	122
NHRI - Director	-	-	-	-	-	-	-	-	-	-	-	-
Senior Staff	5	5	5	5	5	-	-	-	-	-	-	25
Other Staff	-	-	-	-	-	-	-	-	-	-	-	-
Total	5	5	5	5	5	-	-	-	-	-	-	25
Total	5	5	5	5	5	5	76	30	13	13	25	187

Appendix 2

IWL International Activities by Branch and Institute in 1986/87

This appendix identifies, within each Branch and Institute of IWL:

1. the known ties with each international organization,
2. the benefits to IWL,
3. the costs in time (person-days) and O&M dollars, and
4. any external subsidies that are received.

WATER QUALITY BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
International Standards Organization (ISO)				
(a) Convenor, Working Group on Precipitation Sampling (WG-8)	Participant: V.E. Niemela (Assisted by staff) -Improvement and harmonization of environmental measurements. -Improved quality assurance and reliability of measurements.	26	2000	3000
(b) Members, Technical Committee #147 on harmonization of methods for sampling, analysis and data storage	Participant: B.K. Afghan -Potential economic benefits to Canadian companies in the environmental measurements field. -Promote IWL interests. -Direct relevance to WQB activities.	26	5000	-
WMO WGH, Regional Association IV Rapporteur, Water Quality for Region IV (North America and Caribbean)	Participant: A. Demayo -Facilitate international exchange on methods, technology, and expertise. -Support for departmental goals and global environmental protection)	26	2000	2000
WHO Short-term consulting	as above	52	1000	5000
International Commission on Water Quality (ICWQ)	Participant: V. Niemela	?	?	?
TOTAL		130	10 000	10 000

NATIONAL HYDROLOGICAL RESEARCH INSTITUTE (NHRI)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
IAHR (International Association of Hydraulic Research)	Participant: T.M. Dick -Improves international relations and prestige to the Institute. -Provides opportunities for more Canadian researchers and engineers to attend important international conferences. -As a result of exposure to international contacts develops in-house expertise. -Contributes, on behalf of IWL, to improving departmental prestige and improving international relations. -Is an opportunity to make NHRI (and therefore Canadian) expertise visible -Can result in economic benefit. -Contributes to world knowledge. -Indirectly it results in both professional development and a boost to staff and institute morale.	2	-	5000
ICSU/FAGS (Federation of Astronomical and Geophysical Permant Services)	Participant: C.S.L. Omanney -Is an opportunity to report on glaciers, to exchange information with other countries, and to add prestige to the Institute. -Helps to identify world permanent snow and glacier resources and how they affect the well-being of Canadians. -Indirectly assists in improved personal visibility and professional development.	5	-	-
International Glacier Society Publications Committee	Participant: C.S.L. Omnaney -International contribution and exchange of information on snow and ice. -Prestige to the Institute in being selected for the appointment. -Opportunity to direct policy to best serve the interests of Canada and Canadians. -Sharing of technical expertise. -Professional development.	5	-	-

NATIONAL HYDROLOGICAL RESEARCH INSTITUTE (NHRI)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
ICSI (International Commission on Snow and Ice)	Participant: C.S.L. Ommaney -Prestige to NHRI in being selected for the appointment and as focus for Canadian snow and ice research both nationally and internationally. -International contribution and exchange of information on snow and ice (glaciology). -Development of contacts with world snow and ice scientists as a resource for dealing with Canadian problems. -Opportunity to direct policy to best serve the interests of Canada and Canadians. -Sharing of Canadian expertise. -Improved NHRI and personal visibility. -Professional development.	2	-	-
Water Resources Management Journal, Journal of Hydrology, Hydrological Sciences Journal, Atmosphere Ocean, (Member of editorial boards)	Participant: V. Klemes -International contribution and ideas. -Prestige to the Institute in being represented on the Board. -Sharing of technical expertise. -Professional development.	20	-	-
IIASA/IUGS Large International Rivers Committee	Participant: V. Klemes -International contribution and exchange of information and ideas. -Prestige to the Institute. -Testing and evaluation of models for management of rivers systems. -Professional development.	5	-	3000
IUGS Global Climate Change Committee	Participant: V. Klemes -International contribution and exchange of information and ideas on climate exchange and its impact on water resources. -Prestige to the Institute. -Professional development.	5	-	3000

NATIONAL HYDROLOGICAL RESEARCH INSTITUTE (NHRI)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
WMO-WCP-Water Ad Hoc Planning Committee	Participant: V. Klemes -International sharing of information and ideas on climate change and its impact on hydrology. -Prestige to the Institute. -Professional development.	5	-	3000
International Glaciological Society Executive Council	Participant: R. Perla -International sharing of information and ideas on glaciological research. -Prestige to the Institute. -Professional development.	5	-	-
Bilateral Cooperation with France (D.Raynaud, (Laboratoire de Glaciologie, CNRS, Grenoble). Climate related study/ analysis of air bubbles in ice cores to confirm increases in CO_2 levels over the last 200 years.	Participant: G. Holdsworth -International sharing of information and ideas on glacier research. -Verify increases in CO_2 in the last 200 years. -Contribution to knowledge on glaciers and climate change. -Prestige to the Institute. -Professional development.	50	3000	15 000 Estimated salary plus travel costs
Arctic Journal Editorial Board	Participant: G. Holdsworth	5	-	-
TOTAL		109	3000	29 000

RESEARCH COORDINATION & PROGRAM EVALUATION (RCPE)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
WMO CHy (Commission for Hydrology) Geneva, Switzerland. One two-week meeting every four years. An annual week meeting on information preparation and exchange. The objectives of WMO CHy are to promote activities in operational hydrology and to further close cooperation between meteorological and hydrological services.	Participant: J.E.Slater -Provides for technical and scientific information exchange on management techniques. -Is an opportunity to present papers at this world forum.	9.5	3000	3000
WMO CHy RA IV WGH (Regional Association IV for North America and Caribbean Countries)Two weeks per year for a four year term. The objectives are to consider hydrological problems of regional interest; e.g. coordination of automatic data collection systems formats for data exchange, implementation of relevant decisions of WMO within the region.	Participant: J.E. Slater -Scientific and technical information exchange and in charge of management techniques.	14	3000	3000
UNESCO IHP IHP fosters world-wide research in water sciences in 130 countries. It contributes to understanding the processes of the water cycle; assessment of surface and ground water resources; and adaption of more national attitudes to water use. IHP promotes national and international education and training programs in hydrology, and in water planning and management.	Participants: G. Young, R. Bill, J.E. Slater - Linkage of the federal government, Department and Directorate objectives and activities to to IHP activities.	10	2000	-

RESEARCH COORDINATION & PROGRAM EVALUATION (RCPE)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
UNESCO MAB (Man and the Bioshpere) Promoting multidisciplinary co-operation in environmental management, education, research, conservation and information exchange. This is an opportunity to maintain contact at the national level with another UNESCO science program on behalf of the national IPH organization.	Participant: R. Bill Maintain links and promote cooperation in water-related activities associated with biosphere reserves - stable long-term ecological areas, where human activity is carefully managed. Maintain links between the UNESCO IHP Northern Research Basins and MAB Northern Science Network at both the international and national levels.	18	1000	1000 (1986/87)
Other UN Organizations		243	?	?
ICSU/IUGS/IAHS To promote the study of hydrology and the provision of means for discussion, comparison and publication of results of research; the initiation and coordination of research that require international cooperation. Meets once every two years; meetings in 1987 in Vancouver. In addition, there are annual meetings of the Canadian National Committee of the IUGG.	Participant: G. Young Provides a linkage on behalf of the federal government and Canada with IAHS. IWL provides a member of the national committee and has helped to co-ordinate the IAHS activities in Vancouver in August 1987. Encourages and promotes Canadian scientific communities participation in IAHS activities	20	3000	-
International Conferences				
Ramsar Convention for the protection of Wetlands of International Importance. The meeting of the States Parties to the Convention in Regina, Saskatchewan, 26 May to 5 June 1987, was an occasion to demonstrate support for the CWS (national representatives to the convention) as the conference organizers.	Maintaining communications with CWS in the research and management of wetlands, particularly in developing selection criteria, assisting in hydrology research and in linkages with Unesco MAB and the biosphere reserve network Benefiting from international expertise present at the meeting in determining the values and the management of wetlands.	8	2000	-

RESEARCH COORDINATION & PROGRAM EVALUATION (RCPE)

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
CIDA, IDRC		1	-	-
Other		?	?	-
TOTAL		330.5	14 000	7000

LANDS

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
UNEP-GEMS-Nairobi GRID Project Activities for 1987/88 is digitizings some of their maps and to provide technical advice for their committee.	Participant: I. Crain -Ensuring the global system of data base formats will be compatible with DOE data bases and hence reduced costs of later compatibility. -Ensuring free access to global data banks. -Enhancement of DOE Canadian prestige through the implementation of IWL technology. -Experience in the use of various high technology geographic information systems.	43	-	(In 1986/87 75 000 for a seconded Lands staff member)
FAO -Rome Committee on Geographic Information Systems.	Participants: I. Crain, M. Comeau (Costs are recovered from FAO for computer services and travel, etc.) Benefits as above.	22	-	30 000
ICSU World Digital Data Base for Environmental Sciences Technical advice on the use and structure of large resource data bases, including participation in a working group in London, U.K.	as above	10	1000	1000
International Conferences An average of 2 per year in the area of data systems and integrated land resource analysis.	-Receiving information on methodologies and software of concrete value to IWL; thus there is a real cost/benefit in saving time and expense by avoiding development of the the same methodology and software in Canada.	10	4000	-
OECD Ad Hoc Group on Agriculture and Environment To advise the Environment Committee on major problems and issues on policy options and to recommend national and international actions to integrate policies.	Participant: L. Munn -strengthening cooperation with Agriculture Canada. -encourages international research in Canada's priority issues. -promote Canadian resource planning and environmental expertise.	22	6000	-

LANDS

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
International Journal of Geographic Information Systems Editorial Board	Participant: I. Crain -promotes results of Canadian and DOE research -enhances IWL prestige -creates professional contacts -international information exchange	5	-	-
Workshop organized by EUROSTAT of the European Community dealing with land use statistics for policy development (Luxembourg) August 1986 The participant presented a paper on methodologies for land use change monitoring in Canada using remote sensing and statistical approaches. The workshop dealt with the effectiveness of these methods and their impact on policy development. This workshop provided a state of the art overview of the situation in Europe and provided valuable lessons for Canadian programs.	Participant: J. Thie	7	-	All costs paid by EUROSTAT Estimated 2500.
To develop a practical approach to national land resource modelling and scenario development by consultation with national physical planning bodies in 3 countries (Sweden, Netherlands and France) June 1986. The long-term plan for the Lands Directorate requires the development of national models on the application to major issues such as land degradation, northern development and climatic change. Three countries more advanced than Canada were visited as sources for advice and technology for the Canadian approach.	Participant: J. Thie	17	4800	-
TOTAL		136	15 800	108 500

WATER PLANNING AND MANAGEMENT BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
OECD Close cooperation since 1968. Current projects with Group on Natural Resources Management. Projects through 1990 under title "Policies to Improve the Management of Surface and Ground Water Resources." Budget limits one trip to Paris meeting 5-6 May, 1987, October 1987 meeting will not be attended. Possibility of 2 or 3 Canadian papers to be produced this fiscal year.	Participant: F. Quinn The work is of current interest to IWL programs involving water demand, water and water policy. It is part of the Department's commitment and priorities to support the work of OECD and direct effort to water resource activities.	30	3000	-
ECE Close cooperation since 1968. Current projects with Committee on Water Problems and Expert Group on Aspects of Water Quality and Water Quantity. Budget limits one trip to Committee meeting in Geneva, 9-12 February 1988. Meetings of Expert Group in Madrid and Geneva, 19-23 October 1987, will not be attended.	Participants: P.J. Reynolds and H. Foerstel Participation is essential for presenting the Canadian View on important issues and influencing the direction on recommendations to be made to member governments Most topics are of similar and signifigent interest to IWL. Resulting Canadian monographs are of benefit to IWL Programs and (other) ECE countries.	7	3500	-
CIDA Sporadic cooperation over the years. Recently invited to participate in a CIDA tender review committee for a $5 million technical assistance project for Sri Lanka. CIDA refers Canadian consultants to IWL on an average of 3 times per year to review Canadian-designed software for possible application on overseas projects. Currently providing advice on proposed projects in China and South East Asia.	Provides IWL with an experience of the needs of other countries, a comparison with the work of IWL and an opportunity to learn from these needs. It is often a mirror image of IWL problems, and an opportunity for professional development.	18	-	-

WATER PLANNING AND MANAGEMENT BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
U.N. Agencies (i.e., UNEP UNESCO, UNIDO) Average 4 or 5 requests per year for information, reports or names of Canadian experts. Completion of survey questionnaires. Review of UNEP work programme.	Having an input into the selection of water issues for study that are of interest and the results of which will be of value to Canada.	10	500	-
ICOLD Since 1968, occasional technical inputs to ICOLD are provided through the Canadian National Committee (CANCOLD). Annual general meeting is attended and professional support in the form of technical reports, reviews and comments are provided to Hydrology, Environmental and Dam Safety Committees. These activities contribute to the departmental objectives to employ instruments of the international system to fulfill its mandate in water resources planning and management.	Participant: E. Park Contacts, together with other Canadian Federal and Provincial agencies, with similar international activities in, for example, dam safety.	20	1000	-
ICID Since 1968, occasional technical inputs to ICID are provided through the Canadian National Committee (CANCID). CANCID now amalgamated with CWRA. Annual general meeting is attended and paid for by branch representative as branch lacks travel funds. Assistance is being provided by organization for June 1989 Ottawa conference.	Participant: P.J. Reynolds Establishment of foreign export contracts with Canadian industry and provincial agencies.	4	250	-
IWRA Closely associated with IWRA since 1972, Branch member Chairman of Canadian Committee from 1975. Now International President 1986-88. Member of programme committee for average of 4 or 5 conferences worldwide involving other associations.	Participant: P.J. Reynolds Provides an opportunity to establish links with world-class experts, leading to mutual benefits. Information is provided on Canadian expertise to work on overseas projects, providing benefits to developing countries. Promotion of the research work of Canadian scientists.	130	1500	?

WATER PLANNING AND MANAGEMENT BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
Production and presentation of 2 or 3 papers at about four conferences overseas each year at member's expense. Production of association newsletter 3 times per year. Currently chairing organizing Committee for VIth IWRA World Congress on Water Resources, Ottawa, 29 May-3 June 1988, co-sponsored by DOE.	Visibility provided for IWL experience and expertise.	-	-	-
Visiting Foreign Delegates The Branch receives on average 4 foreign tours visiting HQ. In addition, 6 or 8 individuals visit each year. Mostly photocopying or microfiche production is involved for supplying documentation.	These activities contribute to the departmental objectives of international economic relations and foreign aid. The foreign delegates, after their visit to Canada, are better able to specify Canadian products and expertise in the future.	25	2000	-
Spontaneous and Informal Contacts. Techniques and modelling strategy are compared on a frequent basis with various organizations. About 14 requests per year are received from foreign sources on a variety of topics including programs such as FDR, or about our operations, research methodologies and preferences. There are probably at least a dozen special invitations to sit on international panels, deliver lectures at world universities or international organizations, but little hope of acceptance unless one has the time, money and approval.		35	1000	-

WATER PLANNING AND MANAGEMENT BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
Some recent invitations that were accepted e.g., International Round Table Discussion on Water Resources Systems Analysis sponsored by the University of Manitoba; International Panel on Future Research Needs in Systems Analysis and its Application to Water Resources Management, Italian University for Foreigners, Pergui, Italy; Inaugural Ceremony Diamond Jubilee Celebrations of Central Board of Irrigation and Power, New Delhi, India; invited lectures at Wuhan University, Ministry of Water and Power, and Chinese Hydrological Society, Beijing, China.				
Journals The Branch provides contributions to international publications, including editing, writing reviews, members to Editorial Boards. Some examples would be:	Provides vehicles for promotion of the results of Canadian research	35	1000	-
Contribution to writing of a chapter "The Influence of Man on Hydrologic Systems" for the DNAG publication with the U.S. Geological Survey.				
Coordination of six articles for the December 1987 issue of Water International Journal.	Participants: P. Reynolds and D. Tate			
Editorial Board of the International Journal of Water Resources Development including material for News and Reviews Section.	Participant: P. Reynolds			
Editorial Board of the International Journal on Regulated Rivers - Research and Management.	Participant: P. Reynolds			
Review of IAHS publication No. 153, Scientific Basis for Water Resources Management (M. Diskin, Ed.) for American Meteorological Society.				
TOTAL		314	13 750	-

WATER RESOURCES BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
WMO, CHy, HOMS - Steering Committee & National Reference Centre for Canada	Participants: M. Quast, A. Perks - increased access to international technology - contact with world hydrological specialists - improves collection and dissemination of reliable data and information on Canada's surface waters - promotes Canadian hydrologic technology to interested parties around the world - professional development	65	2500	-
ISO - Canadian Advisory Committee to TC113, Subcommittees of TC113	Participants: P.I. Campbell, K. Wiebe T.J. Day, M. Spitzer - direct contact with world experts on water resources monitoring - ensures compatibility of international and Canadian standards - Canada respected internationally as contributor to hydrometric technology - ensures Canadian manufactured hydrometric equipment suitable for overseas applications	85	9000	3000 (from Standards Council of Canada)
WMO, CHy - Rapporteur on Comparison of Hydrological Instruments	Participant: K. Wiebe - increased access to international hydrological instrumentation - improved efficiency of environmental data acquisition network - provides outlet for information on Canadian hydrometric instrumentation	21	2500	-
UNESCO, IHP - Project 10.8 Integrated Aspects of Reservoir Management	Participant: T.J. Day - ability to draw upon international expertise on reservoirs - opportunity to publicize Canadian expertise and technology abroad	13	1500	2000

WATER RESOURCES BRANCH

Activity	Benefit to IWL	Person-days	Costs $	Subsidies
UN Fellows - for demonstration	Participant: T.J. Day - contributes to DOE strategic objectives on intergovernmental relations at the international level - India is purchasing automated hydrographic system from Canada and IWL is providing software for data analysis - staff exposure to overseas problems	21	1500	UN - travel and living expenses
TOTAL		205	17 000	5000+

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
MULTILATERAL ACTIVITIES				
1. Intergovernmental Organizations				
A) United Nations Organizations				
International Atomic Energy Agency				
Working Group on Coastal Modelling Prepare state-of-the-art report on coastal modelling of contaminant transport.	Participant: D.C. Lam - global environmental protection - a vehicle for international information exchange	5	-	3000
Food and Agriculture Organization				
Aquatic Sciences and Marine Pollution Provide scientific/technical advice on marine biochemistry, mechanism of anti-fouling agents, oil pollution, and effect of dispersant on biota.	Participant: D.L. Liu - supports UN activity in global environmental protection - promotes Canadian research and perspective internationally	3	-	-
U.N. Educational, Scientific and Cultural Organization				
International Hydrological Program (IHP)				
IHP III Project 10.5 - Integrated Water Management in Urban Areas Organize an international symposium on Urban Water Resources in 1988; prepare a report on integrated water management in urban areas.	Participant: J. Marsalek (Co-rapporteur) - an opportunity to promote Canadian research and influence international research directions	8	-	3000
IHP II Working Group on Urban Hydrology Project A.2.9 Disseminate information on hydrological processes in urban areas; planning for implementation of two manuals on drainage of urban areas.	Participant: J. Marsalek -promotes Canadian expertise and technology particularly to Third World -of potential economic benefit to environmental industry	16	-	2000

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
Senior Scientific Advisory Panel on Eutrophication	Participant: R.A. Vollenweider (Chm)	2	-	4000
International Hydrological Course (Moscow)	Participant: C.R. Murthy - enhances prestige of IWL/DOE - promotes results of Canadian research - provides learning advice to Third World	1	-	4000 (C.R. Murthy has been invited 2 times in 10 years.)
Working Group on Sediment Sampling Procedures Provide documentation for the protocol and techniques for sediment sampling in Third World.	Participant: P.G. Sly - promotes results of Canadian research - provides advice to the Third World	3	1000	2000
World Health Organization				
WHO International Collaborating Centre on Surface and Groundwater Coordinates, on behalf of WHO, international cooperation in all aspects of water quality management; initiates, organizes and facilitates scientific and technological exchanges among the member states of the United Nations; organizes symposia, workshops and training programs; and publishes international quarterly journal Water Quality Bulletin in separate English and French editions.	Participant: S. Barabas (Manager and Principal Investigator) and staff	392	25 000	25 000

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
UNEP/WHO/UNESCO/Water Data Evaluation Review Board GEMS/Water Project WHO/CC plays the coordinating role in this United Nations project in which presently 62 countries participate. Water quality data obtained at approximately 450 monitoring sites on the world's major rivers, lakes and aquifers are communicated to WHO/CC for interpretation and storage. Representatives of the six world region participate in the data evaluation. Monographs on monitoring ("Operational Guides"), summaries with statistical analysis, and data evaluation are published periodically and distributed to all cooperating countries.	Participant: S. Barabas (Chm)	209	18 000	-
WHO/PEPAS (Programme of environmental and applied studies.) Provide technical advice on water quality environmental health monitoring	Participant: D.L.S. Liu (Consultant) - promotes Canadian technology and goodwill by improving water quality in Third World	3	-	-
B) Organization for Economic Cooperation and Development (OECD)				
Expert Group on Good Laboratory Practice. Maintain awareness of the resources and instruments of OECD in the areas of QA/QC; consider these in the synthesis of knowledge to support water management decisions in Canada.	Participant: A.S.Y. Chau - improved QA - promote results of Canadian research - enhance prestige/credibility - promote Canadian technology elsewhere - harmonize Canadian and international standards	13	2000	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
2. Nongovernmental Organizations				
International Union for the Conservation of Nature (IUCN) Species Survival Commission Promote the conservation of rare species and their habitat throughout the world.	Participant: L.D. Delorme - global environmental protection	3	-	-
International Association for Great Lakes Research Provide advice and recommendations to IAGLR to improve the Association's response to public issues. Ensure NWRI issues are considered by association.	Participant: M.N. Charlton (Board Member) F.M. Boyce (Chm. Tech Adv. Comm.) K. Kaiser (President) - promotes results of Canadian research - enhances IWL/DOE prestige - international information exchange - influences direction/ recommendations of international bodies - develops credibility and authority of DOE researchers	10 13 16	500 600 700	- - -
International Association for Hydraulic Research (IAHR) Working Group on River Ice Hydraulics Promote research on river ice hydraulics and dissemination of knowledge via preparation of state-of-the-art reports, assessment of research needs and hosting of workshops.	Participant: S. Beltaos - international information exchange among Canadian and other world-class experts - influences directions of an international body	13	300	-
International Council of Scientific Unions (ICSU) and Affiliates International Association of Hydrological Sciences (IAHS) - Ground Water (ICGW) Advancement of science with respect to ground-water systems, resources and management.	Participant: R.E. Jackson (Vice-President 3) - allows Canadians to communicate with other world-class experts, to influence international research directions and promote Canadian research	5	1000	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
SCOPE Committee on Metal Cycling	Participant: J.O. Nriagu - information exchange among world-class experts that influence international decisions	3	-	-
International Association on Water Pollution Research and Control (IAWPRC) Specialist Technical Group on Systems. Analysis in Water Quality Management Promotion and enhancement of water quality Management analysis methodologies.	Participant: D.C.L. Lam - gives DOE researchers an opportunity to exchange research results and influence international community	3	-	-
Canadian Association on Water Pollution Research and Control (CAWPRC); affiliated with IAWPRC Promote research and application of research and application of research to pollution effects and control of pollution; publish Water Research journal.	Participant: R.J. Allan (Vice-President) - influencing directions/ recommendations of international bodies - enhances IWL/DOE prestige credibility - harmonizes Canadian/International environmental standards	5	-	-
IAWPRC Specialist Group on Tastes and Odours Standardize odour characterization.	Participant: B. Brownlee (Corres. member) - a vehicle of international information exchange among world-class experts	3	-	-
International Association for Sediment-Water Science (IASWS)	Participant: E.D. Ongley - international information exchange that promotes Canadian research and professional development	5	2000	-
International Biodeterioration Society Dedicated to basic and applied research in the field of biodegradation and biodeterioration for the well-being of human life.	Participant: D.L.S. Liu (Reg. Sec. East. Canada) - a forum for information exchange that enhances DOE credibility and morale - results in improved measurements assurance	5	-	-
International Lake Environment Committee	Participant: R.A. Vollenweider	10	3000	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
International Organization of Legal Metrology - Measurement of Pollution, PS-17 - Reporting Secretariats 2 and 4	Participant: J. Lawrence - Employ the resources and instruments of international legal metrology in national pollution research programs	13	2500	-
International Union of Geological Sciences (IUGS)				
- Committee on Sedimentology Provide guidance on techniques, equipment and to set standards for accurate size analysis for use in sedimentological research.	Participant: J.P. Coakley - improves Canadian data collection - promotes results of Canadian research - potential economic benefit to environmental industries - provides advice to third world	5	2000	-
IAGC Working Group on Geochemistry and Health and-Disease Popularize the study of geochemistry; organize workshops.	Participant: J.O. Nriagu - international information exchange on priority issues	5	-	-
International Society of Ecological Modelling (ISEM) Further use of mathematical modelling simulations and methodologies; analyse the behavior of ecological systems.	Participant: E. Halfon (V.P. for North America) - establishes links with experts - promotes results of Canadian research - international information exchange	5	-	-
International Organization for Standardization (ISO) Technical Committee 147 on Water Quality Advise the Canada Standard Council on the work and relevance of the TC147 on WQ; suggest new directions and promote ISO methods.	Participant: B.J. Dutka (International Chairman) - improves Canadian and international measurements and standards - an opportunity to influence directions of an international body	5	-	-
SC3 Radiological Methods Develop standards to assess radiology standards for drinking water; standardize analytical techniques for radionuclides in water.	Participant: S.R. Joshi - harmonizes Canadian and international environmental standards - improved methods, quality assurance - influencing directions/ recommendations of international bodies - promotes Canadian expertise	5	-	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
SC4 Microbiology Responsible for developing internationally acceptable methods for enumerating a variety of bacterial populations used in international water quality studies.	Participant: B.J. Dutka (Can. Chm.) - improves Canadian and international measurements and standards - promotes global water quality and health protection	3	-	-
SC4WG9 Membrane Filters Responsible for developing methods of tests to standardize membrane filters; responsible for the standardization of all microbiological media used in water quality studies.	Participant: B.J. Dutka (Cdn. Chm) - improves Canadian and international measurements and standards - professional development	5	400	750
SC5WG4 Biodegradation Review, assess and evaluate biodegradation tests for their suitability in Canada.	Participant: D.L.S. Liu (Cdn. Chm.) - improves Canadian and international measurements and standards - promotes Canadian technology, goodwill	3	-	-
(ISO) QA/QC Group Harmonize Canadian practices with respect to QA/QC with international recommendations.	Participant: A.S.Y. Chau - harmonize international standards - enhance prestige/credibility - promote Canadian technology - promote results of Canadian research - improve quality assurance	13	2000	-
Scientific Committee on Oceanic Research (SCOR) Working Group 83 (Wave Modelling) and Canadian National Committee Meet Canada's commitment to participate effectively as a partner in international oceanic research.	Participant: M.A. Donelan - influences direction/recommendation of international body	10	7500	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
Joint Scientific Committee of the World Climate Research Programme and Committee on Climate Changes and the Ocean Identify recent advances in air/sea fluxes; identify and manage global climatic problems which impact on the quality of life and economic well-being of Canadians.	Participant: M.A. Donelan - influences direction/recommendation of international body - establish links with world-class experts	13	-	5000
Aquatic Plant Management Society Provide a forum for discussion of aquatic plant management strategies; publish a journal for research results.	Participant: S. Painter (Director) - International information exchange - develops authority and credibility of DOE researchers	13	1000	-
European Wave Modelling Group (WAM) Employ the advances made in the European research community in the resolution of national and international water management issues.	Participant: M.A. Donelan - establish links with world-class experts - also reduces costs to Canada by importing expertise - promotes results of Canadian research	13	1300	1300
International Peat Society Promote research into peat formation, peat land ecology and economic uses of peat.	Participant: W.A. Glooschenko (Nominated for Chm. of Comm. on Ecology and Conservation) - international information exchange - develops authority and credibility of DOE researchers - global environmental protection	5	-	-
Society of Wetland Scientists To promote wetland research.	Participant: W.A. Glooschenko (Cdn. Rep.) - international information exchange - develops authority and credibility of DOE research	3	-	-
Toxicity Testing Symposium Committee Plan, organize and hold the International Symposium on Testing Using Microbial Systems biennially. The symposia provide a forum to evaluate toxicity assessment using microorganisms and to stimulate communication and co-operation between international researchers.	Participants: B.J. Dutka, D.L.S. Liu (Co-Chm.) - promotes Canadian technology world-wide - international information exchange that improves measurements of potential economic benefit to environmental industry	8	700	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
International Society for Theoretical and Applied Limnology (ISTAL)	Participant: M. Bothwell - international contribution and exchange of information - prestige to the Institute - professional development	-	-	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
BILATERAL ACTIVITIES				
IDRC (International Development Research Centre) The IDRC stimulates research in developing countries, so these countries can help themselves. Consultant helped in Thailand, Malaysia, Singapore, Chile, Peru, Brazil, Egypt and Morocco to develop simple inexpensive microbiological techniques to classify water sources and evaluate the safety of their drinking water.	Participant: B.J. Dutka (Consultant) - training and advice to Third World countries that result in improved drinking water standards and promotes Canadian goodwill and research	5	-	1800
IDRC International Development Research Centre (International Bilateral Agreement) Canada-Malaysia This is a co-operative project under IDRC to modify the RAISON microcomputer system developed in Canada for analysis and management of acid rain data into a general application computer package for use in Malaysia and other developing countries for water quality data management. It also supports Environment Canada's project on water quality monitoring/modelling.	Participant: D.C.L. Lam (Co-Project Leader, Canada) - promotes Canadian technology and research advances while improving resource development in a Third World country	21	12 000	32 000
Canada-Norway Project RAIN (Recovery of Acidification in Norway) A jointly sponsored and funded project to measure the responses of small catchments to both acidification and de-acidification. Research is carried out by Norwegian Institute for Water Research, Oslo, Norway.	Participants: D.C.L. Lam and F.E. Elder - an opportunity to exchange information on a priority issue - working with other world-class researchers promotes major advancements in global environment protection	8	-	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
Canada-Norway Northern Hydrology Problems associated with ice in northern rivers are to be considered through collaboration with the Working Group on Northern Research Basins which meets every two years. Benefits to the flood damage reduction program and to field operations efficiency are expected.	Participant: S. Beltaos - international information and technology exchange - improves Canadian data collection techniques and professional development	5	-	-
Canada-West Germany Exchange Agreement Dr. E. Hollan, Lakes and Fisheries Research Institute of EPS' Baden-Wurtemberg visited NWRI, 12/86. One-week trip to West Germany in 6/87.	Participant: P. Hamblin - promote results of Canadian research - professional development - international information exchange - reduce costs to Canada by importing expertise	5	3000	-
Canada-West Germany Collaboration on radionuclide research in freshwater.	Participant: S.R. Joshi - same as above	8	3500	-
International Advisory Panel, Chinese University Development Program Giving lectures and consultation to Chinese universities on aquatic metals chemistry in aquatic systems.	Participant: Y.K. Chau (Visiting professor to China) - promotes environmental education and provides goodwill for Canada - establishes links with world-class experts and promotes Canadian research	8	-	3500

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
JOURNAL EDITORIAL BOARDS				
Acta Hydrochimica et Hydrobiologia Journal Publishes articles in three languages on scientific fundamentals of water quality and in treatment.	Participant: K.L. Kaiser (Co-editor) - establish links with experts - international information exchange - enhances IWL/DOE prestige - promote results of Canadian research - professional development	3	-	-
Advances in Environmental Science and Technology	Participant: J.O. Nriagu (Editor) - international information and technology exchange among world-class experts	3	-	-
Association of Official Analytical Chemists (AOAC) Publishes advances in analytical chemistry.	Participant: A.S.Y. Chau - promote results of Canadian research - links with world-class experts - technical transfer	13	-	-
High Resolution Chromatograph & Chromatography Communications Journal Publishes recent advances.	Participant: F.I. Onuska (Advisory Board) - improved measurements - influence international bodies - import new techniques	13	1600	-
Hydrological Sciences Journal	Participant: M.E. Thompson (Associate Editor)	3	-	-
International Association for Great Lakes Research Publishes research studies dealing with the great lakes of the world.	Participants: M.M. Charlton	5	-	-
	K.L.E. Kaiser (Assoc. Ed.)	5	-	-
	P. Hamblin (Assoc. Ed.) - promotes results of Canadian research - enhances IWL/DOE prestige - international information exchange - professional development - establishes links with experts	5	-	-
	R.J. Maguire (Assoc. Ed.)	5	-	-
	Y.K. Chau (Assoc. Ed.)	5	-	-
	B.J. Dutka (Assoc. Ed.) - information exchange on priority issues that improves professional development	5	-	-
International Journal of Advances in Water Resources Publishes advanced methodologies for solving water resources research problems.	Participant: D.C.L. Lam - a vehicle for international information/technology exchange that helps promote DOE research expertise	3	-	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
International Journal of Applied Organometallic Chemistry	Participant: Y.K. Chau - international information exchange - promotes Canadian research and enables Canadians to influence international research community	5	-	-
International Journal of Ecological Modelling	Participant: E. Halfon (Ed. Board) - promotes results of Canadian research - enhances IWL/DOE prestige - professional development - international information exchange	5	-	-
Science of the Total Environment	Participant: J.O. Nriagu (Assoc. Ed.) - international information and technology transfer among world experts that promotes environmental protection	3	-	-
Tellus, Editorial Board	Participant: J.O. Nriagu - same as above	3	-	-
Toxicity Assessment. An International Quarterly designed for the rapid publication of refereed original communications in the field of "Toxicity Assessment" with emphasis on the use of microbial systems.	Participants: B.J. Dutka (Co-Ed) D.L.S. Liu (Co-Ed) - rapid method of exchanging technological advances - advances and promotes DOE research	10	-	-
World Health Organization (WHO) - WQ Bulletin Editorial Board International review journal, published in English and French, provides international forum on pressing problems in water quality management.	Participants: S. Barabas (Ed.) R.A. Vollenweider R.J. Allan J. Barica B.K. Afgan B.G. Goulden D.L. Egar L. Janus J.H. Carey B.J. Dutka F.C. Elder Y.L. Lau G.K. Rodgers B.K. Burnison R.P. Bukata J. Lawrence B.E. Jank M.G. Skafel	25	-	-

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Activity	Benefit to IWL	Person-days	Costs $	Subsidies
OTHER ACTIVITIES				
Conferences				
15-35 overseas	Acquisition of state-of-art knowledge; intelligence on new issues, new research directions; information on research failures and reduced time lags in new results; confirmation and acceptance of NWRI research results; contacts for future collaboration thereby broadening "surrogate" research and access to specialized facilities in support of DOE issues; conferring of international authority for DOE positions on world water issues; foreign aid assistance; promoting Canadian environmental industry.	100	25 000	-
Overseas Program Travel				
10-20 overseas trips to discuss research one on one, participate in informal work groups, give invited lectures and to show the Institute and DOE flag to to world research institutes.	Most of benefits described above, but a greater specificity.	150	30 000	8 000
Informal/Ad Hoc Activities				
Normal scientific correspondence between researchers; manuscript reviews for international journals; tours and lectures by foreign dignitaries and scientists at NWRI.	Facilitates NWRI research in general; improves visibility of Institute, and credibility and authority of our scientists.	150	3000	-
TOTAL		1466	142 100	93 350

Appendix 3

International Organizations and Activities and IWL Involvement

This appendix briefly describes those organizations in which IWL is involved and some which have potential value to IWL. It identifies the purpose and/or activity, the benefit to IWL, the costs incurred by IWL and any subsidies received from other organizations to permit IWL staff to participate.

International water resource activities of IWL have been divided into the following groups:

I. Intergovernmental Collaboration

1. United Nations Organizations with Water Resource Interests
2. NATO
3. OECD

II. International Scientific and Other Organizations

III. Bilateral Activities

IV. Other International Activities

1. Journal Editorial Boards
2. Conferences
3. Program, Personal and Other Activities

I. INTERGOVERNMENTAL COLLABORATION

1. United Nations Organizations with Water Resource Interests

The UN family is very complex, with seven main committees and 59 subsidiary and ad hoc bodies. Each of these have a complex organization and many have interests related to water resources. The main bodies that have areas of water interest are described on the next pages. They are ESOSOC (CNR and ECE), WMO, Unesco, WHO, FAO, IAEA, UNEP and UNDP. Summary tables of all UN activities in the water sector are to be found in Appendix 4.

ECOSOC Economic and Social Council

It has a broad coordinating role and the other UN family agencies report through it to the UN General Assembly. ECOSOC's main sub-units with water programs are:

- ACC (Administrative Committee on Coordination) and its Sub-committee on Water, which coordinates water responsibilities within the UN family;
- CNR (Committee on Natural Resources) - assigned the lead role in organizing the 1977 UN World Water Conference in Argentina and its follow-up;
- ECLA (Economic Commission for Latin America) - a commission which occasionally supports ECOSOC energy and water projects and studies in Latin America.
- ECE (Economic Commission for Europe) - an intergovernmental organization of UN founded in 1947. Aims at generating and improving economic relations among member states and with other countries of the world, particularly in trade, science and technology, environmental protection, and policy making. DOE is involved in the Executive Body, Aquatics Monitoring Program, Committee on Water Problems, Senior Advisors on Environmental Problems, as well as other groups concerned with pollutants and impact assessment. Areas of involvement in water include water pollution from animal production, methods for defining water quality standards, drought and flood management, purification of industrial and municipal sewage effluents, conventions and international agreements in the ECE region, and water use and supply.

The work activity of the ECE in the field of water is organized under the Committee on Water Problems and working groups reporting to the Committee, namely the Group of Experts on Aspects of Water Quality and Quantity and the International Cooperative Program on Assessment and Monitoring of Acidification of Rivers and Lakes. The program for future work includes: economic instruments for the rational use of water in irrigation; reports on quality monitoring of surface waters; report on monitoring and evaluation of transboundary water pollution; ECE standard international classification of water use and quality statistics; implementation of the ECE Declaration of Policy on prevention and control of water pollution, including transboundary pollution; principles of groundwater management; investment policies in the field of drinking water supply, waste-water treatment and effluent disposal; implementation of recommendations from the seminar on the rational use of water in industrial processes (Paris, October 1985); Seminar on Water Management Systems (Bratislava, September 1986); and Seminar on Protection of Soil and Aquifers against Non-point Source Pollution (Madrid, October 1987). Furthermore, about twelve smaller projects are planned, including an ecosystems approach to water management proposed by Norway and Canada.

Committee Member: H. Foerstel
Group Chairman: P.J. Reynolds

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPMB				
ECE. Close cooperation since 1968. Current projects with Committee on Water Problems and Expert Group on Aspects of Water Quality and Water Quantity. Budget limits one trip to Committee meeting in Geneva 9-12 February 1988. Meetings of Expert Group in Madrid and Geneva 19-23 October 1987 will not be attended.	Participants: P.J. Reynolds and H. Foerstel Participation is essential for presenting the Canadian view on important issues and influencing the direction on recommendations to be made to member governments Most topics are of similar and signifigent interest to IWL. Resulting Canadian monographs are of benefit to IWL Programs and (other) ECE countries.	7	-	3500

WMO World Meteorological Organization

An intergovernmental organization of UN founded in 1951, it is concerned primarily with the coordination of operational meteorological techniques and systems on a global scale. The World Weather Watch (WWW) and the World Climate Program (WCP) (conducted jointly with the International Council of Scientific Unions) are two of the high priority programs of WMO. This agency is organized geographically and by scientific subdiscipline into six Regional Associations, one of which is North and Central America; and eight Technical Commissions, including the Commission for Hydrology (CHy). The other Commissions cover such areas as marine, aeronautical, agricultural and climatological aspects, as well as research in atmospheric sciences and establishment of standards for instruments and basic systems.

Canada plays a prominent role at each level of WMO, with the head of its Atmospheric Environment Service serving as the WMO Permanent Representative for Canada and as an elected member of the Executive Committee. Of the eight Technical Commissions, Canadians have recently served as Presidents on five, including the President of the Commission for Hydrology.

Canadian Permanent
Representative to WMO: H.L. Ferguson
Assistant Deputy Minister
Atmospheric Environment Service
Environment Canada
Ottawa, Ontario
K1A 0H3

Hydrological Advisor to Canadian
Permanent Representative
to WMO: D.A. Davis
Inland Waters and Lands Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

The World Weather Watch (WWW) - is a system coordinated by WMO which enables the world's meteorological services to exchange observations and forecasts around the world on a six-hourly basis in order to predict the weather into the near future.

Commission for Hydrology (CHy) - IWL's involvement is related to the CHy. The commission is responsible for matters relating to activities in operational hydrology and the application of meteorology and hydrology to water resources problems. In addition, IWL supports the activities of CHy in RA IV.

IWL Member: J.E. Slater
Inland Waters and Lands Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

The CHy shall be responsible for matters relating to:

a) Activities in operational hydrology and the applications of meteorology and hydrology to water resources problems;

b) International standardization of methods, procedures, techniques and terminology for:

   i) Studies of the water balance, the global hydrological cycle and hydrological forecasting;

   ii) Meteorological and hydrological aspects of design of systems for water management and control;

c) International exchange of experience and a framework for the organized transfer of hydrological knowledge and methodology used operationally, as well as action to meet the needs of national Hydrological Services or other national organizations fulfilling the functions of such services concerned mainly with operational activities in hydrology;

d) Formulation of observational requirements for hydrological purposes;

e) Co-ordination of international requirements and assistance in the arrangements for international exchange and dissemination of hydrological analyses, forecasts, warnings and relevant data, and assisting appropriate WMO bodies in problems of international exchange of data where necessary;

f) Reliability and homogeneity of hydrological and related meteorological observations;

g) Standardization of the form for recording and establishing requirements for the exchange of hydrological observations and for their processing;

h) Standardization of methods of computation of hydrological data for research and publication (means, ranges, frequencies, etc.);

i) Specification of requirements for meteorological instrumentation and desired methods of observation in its field of responsibility, and bringing these to the attention of the relevant Technical Commissions;

j) Development and use of specialized instruments and methods of observation of particular interest to the CHy, for which co-ordination with other Commissions is not necessary;

k) Measurement of basic hydrological elements from networks of meteorological and hydrological stations: collection, transmission, processing, storage, retrieval and publication of basic hydrological data;

l) Hydrological forecasting;

m) Development and improvement of relevant methods, procedures and techniques in:

   i) Network design;
   ii) Specification of instruments;
   iii) Standardization of instruments and methods of observation;
   iv) Data transmission and processing;
   v) Supply of meteorological and hydrological data for design purposes;
   vi) Hydrological forecasting.

CHy Working Group on Comparison of Hydrological Instruments

Rapporteur: K. Wiebe, WRB

Region IV Association Working Group for Hydrology:

Chairman: J.E. Slater, RCPE

Rapporteur on Water Quality: A. Demayo, WQB

The Hydrological Operational Multipurpose Subprogram (HOMS) is a WMO CHy mechanism for institutionalized transfer of hydrological technology, operational techniques and knowledge between countries on a world scale. Responsibility lies with National Reference Centres. The Canadian HOMS National Reference Centre (CHNRC) is IWL. In 1981, the first HOMS Reference Manual contained over 300 descriptions of documents, operational procedures, techniques, instruments, etc. with their applicability and availability.

HOMS Canadian Reference Centre: A.R. Perks
Inland Waters and Lands Directoraate
Environment Canada
Ottawa, Ontario
K1A 0H3

World Climate Program (WCP) has as objective to determine the effect of climate change on hydrology.

Participant: V. Klemes, NHRI

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
IWL				
WMO	D.A. Davis - hydrologic advisor to Canada's permanent representative in WMO	1	-	-
RCPE				
WMO CHy (Commission for Hydrology) Geneva, Switzerland. One two-week meeting every four years. An annual week meeting on information preparation and exchange. The objectives of WMO CHy are to promote activities in operational hydrology and to further close cooperation between meteorological and hydrological services.	Participant: J.E. Slater - provides for technical and scientific information exchange on management techniques - is an opportunity to present papers at this world forum	9.5	3000	3000

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WMO CHy RA IV WGH (Regional Association IV for North America and Caribbean countries). Two weeks per year for a four-year term. The objectives are to consider hydrological problems of regional interest; e.g. coordination of automatic data collection systems formats for data exchange, implementation of relevant decisions of WMO within the region	Participant: J.E. Slater - Scientific and technical information exchange and in charge of management techniques	14	3000	3000
WQB				
WMO WGH, Regional Association IV Rapporteur, Water Quality for Region IV (North America and Caribbean).	Participant: A. Demayo - Facilitate international exchange on methods, technology, and expertise. - Support for departmental goals and global environmental protection)	26	2000	2000
WRB				
WMO, CHy - Rapporteur on Comparison of Hydrological Instruments.	Participant: K. Wiebe - increased access to international hydrological instrumentation - improved efficiency of environmental data acquisition network - provides outlet for information on Canadian hydrometric instrumentation	21	2500	-
WMO, CHy, HOMS - Steering Committee & National Reference Centre for Canada	Participants: M. Quast and A. Perks - increased access to international technology - contact with world hydrological specialists - improves collection and dissemination of reliable data and information on Canada's surface waters - promotes Canadian hydrologic technology to interested parties around the world - professional development	65	2500	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
WMO-WCP-Water Ad Hoc Planning Committee	Participant: V. Klemes - International sharing of information and ideas on climate change and its impact on hydrology. - Prestige to the Institute. - Professional development.	5	0	3000
TOTAL		141.5	13 000	11 000

Unesco United Nations Educational, Scientific and Cultural Organization (Paris, France)

An intergovernmental organization of UN founded in 1945. Like other specialized agencies of the UN, Unesco contributes to the application of science and technology to development, and to the strengthening of research and the training of scientific and technological personnel. Unesco promotes scientific and technological development in developing countries, and assists in the training of specialized personnel. In addition, Unesco helps establish and operate institutions engaged in higher education, research and the provision of services in science and technology, promotes the formulation of national science policies and encourages public understanding of the impact on society of scientific and technological advances.

A special kind of international activity is carried out within Unesco by two intergovernmental programmes - the IHP and MAB - that are of direct interest to IWL.

The International Hydrological Programme (IHP) developed in 1975 from the highly successful International Hydrological Decade, which promoted world-wide research in water sciences from 1965-1974 and constituted a remarkable example of international co-operation. It now involves more than 130 Member States in its activities. Through its networks of national, regional and global research teams, it has made a significant contribution to the understanding of the processes that occur in the water cycle, assessment of surface and ground-water resources, and adoption of a more rational attitude to water use. It has also promoted national and international education and training programmes in hydrology and water resources planning and management.

The IHP focal point in Canada is the National Research Council's Associate Committee on Hydrology.

Executive Secretary: Inland Waters and Lands Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

Subcommittee on International Affairs

Chairman: B.E. Goodison (AES)
Members: M. Woo
J. Kirch
W.F.G. Cardy
P.Y. Ko
A.R. Perks (IWL)

IHP Intergovernmental Council Members for 1985-87 in Electoral Regional Group I - Western Countries

Region I - Western Countries
Australia
Canada
Federal Republic of Germany
Netherlands
Norway
Spain
UK

Unesco Headquarters provides the Secretariat for the IHP. The principal role in the detailed programming of IHP and its periodic evaluation belongs to the Intergovernmental Council of the IHP. The responsibilities of the Council are defined by its Statutes in the following way:

a) the Council shall be responsible...for guiding and supervising, from the scientific and from the organizational point of view, the implementation of the programme;

b) studying proposals concerning developments and modifications of the programme and also plans for its implementation;

c) recommending scientific projects of interest to Member States and assessing priorities among such projects;

d) coordinating international cooperation of Member States in the framework of the programme;

e) making any necessary proposals for coordinating the programme with those conducted by all the international organizations concerned;

f) assisting in the development of national and regional projects related to the programme;

g) taking any practical or scientific measures that may be required for the successful implementation of the programme.

Membership of the Intergovernmental Council of IHP is composed of 30 Member States of Unesco elected by the General Conference at its ordinary sessions, taking due account of the need to ensure equitable geographical distribution. In 1986 Canada was elected membership on the Council. The Chairman of the Associate Committee on Hydrology acts as Canada's representative.

The third phase of the IHP or IHP-III (1984-1989), the title of which is "Hydrology and the scientific bases for the rational management of water resources for economic and social development," is oriented towards the application of scientific methodologies for the evaluation and rational management of water resources, and the application of scientific knowledge to overcoming problems related to the conservation and development of water resources, in particular in developing countries.

The plan for IHP-III identifies eighteen themes in the following fields: hydrological processes and parameters for water projects; the influence of man on the hydrological cycle; rational water resources assessment and management; education and training, public information and scientific information systems.

Theme 1: Investigation of elements of the hydrological cycle and determination of water balances.

Theme 2: Methods for the investigation of surface and groundwater regimes and for the determination of hydrological parameters for water projects.

Theme 3: Interaction between climatic variability and change and hydrological processes.

Theme 4: Hydrology of particular regions and land areas.

Theme 5: Application of special technologies for the study of water resources.

Theme 6: Methods for assessing the changes in the hydrological regime due to man's influence.

Theme 7: Environmental impact studies of water projects.

Theme 8: Specific influences of man on the hydrological regime.

Theme 9: Methodologies for water resources assessment.

Theme 10: Methodologies for integrated planning and management of water resources.

Theme 11: Systems management for reduction of negative side-effects of water resources developments.

Theme 12: Development and presentation of information for planners and decision-makers concerning the implications of modern water resources planning and management approaches.

Theme 13: Promotion of formal education and training in the field of water resources.

Theme 14: Preparation of guidance material to be used for the establishment of training courses in hydrology and water resources management, addressed to various categories of personnel.

Theme 15: Improvement of teaching methods in hydrology and water resources management.

Theme 16: Comparative methodologies for public information and the promotion of public participation in the proper utilization, protection and conservation of water resources.

Theme 17: Scientific information systems: to facilitate the flow and utilization of scientific and technical information in the field of water resources.

Theme 18: Methods for the effective transfer of knowledge and technology related to water resources, and for the evaluation of their impacts in developing countries.

The Canadian National Committee for IHP had the following experts selected to Working Groups or to be Rapporteurs.

Membership on Working Groups:

Project 2.1 (c)	Mr. Hugh MacKay, PFRA, Winnipeg
Project 7.1	Dr. D. Rosenberg, FWI, Winnipeg
Project 10.8	Dr. T.J. Day, WRB
Project 13.1	Prof. Robert Farvolden, University of Waterloo

Rapporteurs:

Project 3.2 (d)	Prof. Marie Sanderson, University of Windsor (Principal Rapporteur)
Project 9.2	Mr. Bruce Godwin, PPWB, Regina (Principal Rapporteur)
Project 10.5 (b)	Mr. Jiri Marsalek, NWRI, Burlington (Co-Rapporteur)

The Unesco Man and the Biosphere (MAB) international Programme has been in operation since 1971. Its principal aim is to develop the basis, within the natural and social sciences, for the rational use and conservation of the living resources of the earth. It involves scientists from more than 100 countries working on more than 1,000 collaborative projects aimed at finding practical solutions for concrete problems of management of land resources and human communities. Among other accomplishments, it has resulted in the establishment of 266 biosphere reserves in 70 different countries. These are protected areas for the conservation of ecosystems and the plant and animal resources they contain.

Canada is a member of the Intergovernmental Coordinating Council of Unesco MAB.

Contact: Canadian MAB Administrative Officer:
Canadian Commission for Unesco
99 Metcalfe Street
Ottawa, Ontario, K1P 5V8

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
RCPE				
Unesco IHP IHP fosters and world-wide research in water sciences in 130 countries. It contributes to the understanding the processes of the water cycle; assessment of surface and ground water resources; and adaption of more national attitudes to water use. IHP promotes national and international education and training programs in hydrology, and in water planning and management.	Participants: R. Bill, J.E. Slater - Linkage of the federal government, Department and Directorate objectives and activities to IHP activities	10	2000	-
UNESCO MAB (Man and the Biosphere) Promoting multidisciplinary co-operation in environmental management, education, research, conservation and information exchange. This is an opportunity to maintain contact at the national level with another UNESCO science program on behalf of the National IPH organization.	Participant: R. Bill as member of National Committee. Maintain links and promote cooperation in environmental activities associated with biosphere reserves - stable long-term ecological areas, where human activity is carefully managed. Maintain links between the UNESCO IHP Northern Research Basins and MAB Northern Science Network at both the international and national levels.	18	1000	1000 (1986/87)
WRB				
Unesco, IHP - Project 10.8 Integrated Aspects of Reservoir Management	Participant: T.J. Day - ability to draw upon international expertise on reservoirs - opportunity to publicize Canadian expertise and technology abroad	13	1500	2000

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
IHP III Project 10.5 - Integrated Water Management in Urban Areas Organize an international symposium on Urban Water Resources in 1988; prepare a report on integrated water management in urban areas.	J. Marsalek (Co-rapporteur) - an opportunity to promote Canadian research and influence interational research directions	8	-	3000
IHP II Working Group on Urban Hydrology Project A.2.9 Disseminate information on hydrological processes in urban areas; planning for implementation of two manuals on drainage of urban areas.	J. Marsalek - promotes Canadian expertise and technology particularly to Third World. - of potential economic benefit to environmental industry	16	-	2000
Senior Scientific Advisory Panel on Eutrophication	R.A. Vollenweider (Chm)	2	-	4000
Working Group on Sediment Sampling Procedures Provide documentation for the protocol and techniques for sediment sampling in Third World.	P.G. Sly - promotes results of Canadian research - provides advice to the Third World	3	1000	2000
International Hydrological Course (Moscow)	C.R. Murthy - enhances prestige of IWL/DOE - promotes results of Canadian research - provides learning advice to Third World	1	-	4000
TOTAL		71	5500	18 000

WHO World Health Organization

An intergovernmental organization of UN founded in 1948. WHO's interest in hydrological data is that of a user rather than a gatherer of information. It is interested in hydrological standardization to the extent that the reliability and comparability of available data are thereby improved, since these hydrological data form the foundation of much of the Organization's work in the field of community water supply, waste disposal and prevention of pollution.

In particular, WHO is concerned with aspects of water quality which relate to subsequent use of the water for community needs.

DOE involvement with WHO is mainly in water-related issues as part of the UNEP GEMS data gathering and storage.

In 1974, the Canada Centre for Inland Waters was designated by the WHO as its Collaborating Centre on Surface and Ground Water Quality. The main function of the Centre is to coordinate activities aimed at establishing (1) uniform or compatible methods of measuring and monitoring surface and ground water quality as a basis for public health action, (2) uniform or compatible instrumentation or measurement, and (3) uniform or compatible data storage and retrieval systems.

Since 1977, the WHO/CC has assumed the responsibility for coordinating the establishment of a worldwide network of water quality monitoring stations on major rivers, lakes and aquifers. The network is an integral component of the United Nations Environment Program's Global Environmental Monitoring System (GEMS), whose main objective is to monitor the long-term trends in environmental pollution.

Canadian Representative: S. Barabas
National Water Research Institute
Inland Waters and Lands Directorate
Environment Canada
Burlington, Ontario
L7R 4A6

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
WHO International Collaborating Centre on Surface and groundwater Coordinates, on behalf of WHO, international cooperation in all aspects of water quality management; initiates, organizes and facilitates scientific and technological exchanges among the member states of the United Nations; organizes symposia, workshops and training programs; and publishes international quarterly journal Water Quality Bulletin in separate English and French editions.	S. Barabas (Manager and Principal Investigator) - IWL is the recipient of advanced information from over 100 countries - IWL scientists are called on to review the information and so benefit from this	392	25 000	25 000

Activity	Benefit to IWL	Person Days	Cost $	Subsidies
WHO/PEPAS (Programme of environmental and applied studies.) Technical advice on water quality and environmental health monitoring.	D.L.S. Liu (Consultant) - promotes Canadian technology and goodwill by improving water quality in Third World	3	-	-
WQB				
World Health Organization/Pan American Health Organization. Short-term consultancies on environmental information systems and water quality. The length and the frequency of assignment vary but the most common are of 1-2 week duration and an average of one assignment per year.	A. Demayo, A. Lumb - Facilitates international exchange on methods, technology, and expertise - Supports for Departmental goals and global environmental protection	52	1000	5000
TOTAL		447	26 000	30 000

FAO Food and Agriculture Organization

- a specialized intergovernmental organization of UN founded in 1945. Promotes and recommends national and international action on scientific, technological, social and economic research and the conservation of natural resources. It deals with water as it affects agriculture, particularly irrigation, forestry and fisheries.

- hydrology to FAO is one of a number of essential tools in the promotion of food production and the conservation of the environment from which food comes. Therefore FAO's activities and interests in standardization in hydrology are not in the preparation of absolute standards as such but in the use of standardization to improve the quality and comparability of hydrological data and in the development of water resources for agriculture.

- FAO programmes include hydrology as a part of environmental studies such as forest influences and watershed management, erosion control, range management, dry farming and phytohydrology.

Committee on Geographic Information Systems

To provide technical advice and assistance on defining needs and implementation of systems for integrated land/water resource assessment. This has also included the building of a continent-wide African vegetation data base for a FAO African irrigation capability study and for a full colour vegetation map of Africa.

As with UNEP, FAO are seeking the experience and unique capaiblities of CLDS/CGIS to deal with extremely large geo-referenced data banks and state-of-the-environment modelling.

Current and future activities are likely to be of the same nature. Currently a similar vegetation data base for Asia is being built on a cost-recovery basis.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
Committee on Geographic Information Systems.	Participants: I. Crain, M. Comeau - Ensuring the global system of data base formats will be compatible with DOE data bases and hence reduced costs of later compatibility. - Enhancement of DOE Canadian prestige through the implementation of IWL technology. - Experience in the use of various high technology geographic information systems. Costs are recovered from FAO for computer services and travel, etc.	22	-	30 000

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Aquatic Sciences and Marine Pollution				
Provide scientific/technical advice on marine biochemistry, mechanism of anti-fouling agents, oil pollution, and effect of dispersant on biota.	Participant: D.L. Liu - supports UN activity in global environmental protection - promotes Canadian research and perspective internationally	3	-	-
Total		25	-	30 000

IAEA International Atomic Energy Agency

- An intergovernmental agency of UN founded in 1956. It aims at accelerating and enlarging the peaceful uses of atomic energy.

- Nuclear techniques have been employed in hydrology only for a relatively short time, and by a relatively limited number of scientists and technicians, generally highly qualified. But interest in the application of isotope techniques to hydrological problems is rapidly increasing, as is shown, among other things, by the increase of participants and contributions to the symposia and panels on isotope hydrology organized by the IAEA in the last few years. Therefore, efforts in defining and standardizing the techniques and methods of investigation have appeared necessary, especially bearing in mind the relatively few manuals and textbooks in the field.

Contact: R. Osborne
Chalk River Nuclear Laboratories
Chalk River, Ontario

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Working Group on Coastal Modelling Prepare state-of-the-art report on contaminants transportation in coastal waters.	Participant: D.C. Lam - global environmental protection - a vehicle for international information exchange	5	-	3000

UNEP United Nations Environmental Program

An intergovernmental program of UN founded in 1972.

Coordinates, advises on and proposes policies and plans for environmental programs within the UN family. Where possible operates by getting specialized agencies to do the work and only takes on work others cannot do. Provides some funding of cooperative projects.

The Global Environmental Monitoring System (GEMS) keeps track of trends, predicts events and provides information for sound environmental action plans. GEMS has provided some financial support to a health-related global water quality monitoring project executed by WHO. CCIW acts as the world Collaborating Centre for GEMS water quality data. (This is reported under WHO in this report.)

Canadian Representative: N. Jasmin
External Relations Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
UNEP-GEMS-Nairobi GRID Project. Activities for 1987/88 is digitizing some of their maps and to provide technical advice for their committee	Participant: I. Crain Ensuring the global system of data base formats will be compatible with DOE data bases and hence reduced - Ensuring free access to global data banks. - Enhancement of DOE Canadian prestige through the implementation of IWL technology. - Experience in the use to various high technology geographic information systems.	43	-	(In 1986/87 75 000 for a seconded Lands staff member) 3000

Global Environmental Monitoring Systems (GEMS)
Global Resource Information Data Base Project (GRID)

The GRID project is a global scale geographic information system designed to integrate land, water, atmosphere and socio-economic data for global, continental and regional resource assessment and planning. They have requested the assistance of the Canada Land Data Systems (CLDS) as it is the most advanced geographic information system in the world and has the most experience with integrated continental scale resource data bases. Previous activity has been the secondment at UNEP expense of Dr. Ian Crain to GRID for the calendar year 1986. Continued activity is to take the form of digitizing and data base building services for specific national scale state-of-the-environment projects (e.g. Uganda and Kenya), technical advice on system development and application. Requests for further secondments are likely for both short and long periods.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
UNEP-GEMS/WATER The WHO-Collaborating Centre at NWRI plays the coordinating role in this United Nations project in which presently 62 countries participate. Water quality data obtained at approximately 450 monitoring sites on the world's major rivers, lakes and aquifers are communicated to WHO/CC for interpretation and storage. Representatives of the six world regions participate in the data evaluation. Monographs on monitoring ("Operational Guides"), summaries with statistical analysis, and data evaluation are published periodically and distributed to all cooperating countries.	Participant: S. Barabas (Chm)	209	18 000	-
TOTAL		252	18 000	75 000

UNDP The United Nations Development Program

An intergovernmental program of UN founded in 1965.

The world's largest channel for multilateral technical and pre-investment cooperation. UNDP-supported projects currently under way aim at helping the developing countries make better use of their vast assets and expand productivity. The UNDP also acts as a mechanism for funding, coordinating and administering the training of foreign Fellows from developing countries through voluntary contributions from members. IWL regularly provides field training of UNDP fellows in hydrometric and sediment surveys and data computation techniques.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WRB				
UN Fellows - demonstration of IWL techniques and programs	Participant: T.J. Day - contributes to DOE strategic objectives on intergovernmental relations at the international level - India is purchasing automated hydrographic system from Canada and IWL is providing software for data analysis - staff exposure to overseas problems	21	1500	UN - travel and living expenses

UN General Activities

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
UN Agencies (i.e., UNEP Unesco, UNIDO) Average 4 or 5 requests per year for information, reports or names of Canadian experts. Completion of survey questionnaires. Review of UNEP work programme.	Having an input into the selection of water issues for study that are of interest and the results of which will be of value to Canada.	10	500	-

2. NATO North Atlantic Treaty Organization.

Founded in 1949 to promote stability and well-being in the North Atlantic area. DOE is involved in some activities of the Committee on Challenges of Modern Society, and the Scientific Committee. IWL is not involved.

3. OECD Organization for Economic Cooperation and Development

OECD is an intergovernmental organization founded in 1960. It promotes coordinated and social welfare policies between member states and stimulates their aid for developing countries. DOE is actively involved in the Environment Committee and its working groups. IWL is involved in the Group on Natural Resources Management (Water) and the Ad Hoc Group on Agriculture and Environment. Under its Environment Committee the OECD has conducted a number of studies on eutrophication and the control of sources of water pollution. It also examines the economics of water resource management and conservation, stressing future forecasts of the demand and supply of water and the role of water pricing in demand management.

OECD has a large number of policy working groups in the water quality area covering transfrontier pollution, mercury, waste management, toxic chemicals, PCB's, and the pulp and paper industry.

Group on Natural Resources Management established in September 1986 with the overall aim of examining the environmental and economic implications of current water resource-management policies in order to develop guidelines for enhancing the net economic, environmental and social benefits of water resources use and conservation. Group Work Plan through 1990 includes specific projects, i.e., i) Improve Integration of Water and Other Government Policies, ii) Water Demand Management, iii) Improved Protection of Water Resources from Long-Term and Cumulative Pollutants, and iv) Preparatory Work on Wetlands Management Policies.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
OECD. Close cooperation since 1968. Current projects with Group on Natural Resources Management. Projects through 1990 under title "Policies to Improve the Management of Surface and Ground Water Resources. Budget limits one trip to Paris meeting 5-6 May 1987, October 1987 meeting will not be attended. Possibility of 2 or 3 Canadian papers to be produced this fiscal year	Participant: F. Quinn The work is of current interest to IWL programs involving water demand, water and water policy. It is part of the Department's committee and priorities to support the work of OECD and direct effort to water resource activities	30	3000	-
NWRI				
Expert Group on Good Laboratory Practice. Maintain awareness of the resources and instruments of OECD in the areas of QA/QC; consider these in the synthesis of knowledge to support water management decisions in Canada.	Participant: A.S.Y. Chau - improved QA - promote results of Canadian research - enhance prestige/credibility - promote Canadian technology elsewhere - harmonize Canadian and international standards	13	2000	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
Ad Hoc Group on Agriculture and Environment To advise the Environment Committee on major problems and issues on policy options and to recommend national and international actions to integrate policies.	Participant: L. Munn - strengthening cooperation with Agriculture Canada - encourages international in Canada's priority issues - promote Canadian resource planning and environmental expertise	22	6000	-
TOTAL		65	11 000	-

II. INTERNATIONAL SCIENTIFIC AND OTHER ORGANIZATIONS

No single list of all these organizations has been found. A summary table of the known organizations is to be found in Appendix 5, Table 5A.

THE ICSU FAMILY

ICSU International Council of Scientific Unions

- an international nongovernmental organization set up in 1931, whose membership is drawn from 20 recognized scientific unions to encourage international scientific activity for the benefit of mankind. Canada is represented on most of ICSU's major unions and committees which have an interest in freshwater activities - five of the more important being the International Geographical Union, the International Union of Geological Sciences,the International Union of Geodesy and Geophysics, the International Union of Pure and Applied Physics and the International Union of Biological Sciences. ICSU meets once every two years in general assembly to conduct its scientific and business activities.

Committees of ICSU

IUGG International Union of Geodesy and Geophysics

- IUGG, which was set up in 1919 to promote and coordinate physical, chemical and mathematical studies of the earth and its immediate spatial environment, meets in general assembly once every four years. It is composed of seven associations:

  International Association of Hydrological Sciences (IAHS)
  International Association of Geodesy (IAG)
  International Association of Seismology and Physics of the Earth's Interior (IASPEI)
  International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)
  International Association of Geomagnetism and Aeronomy (IAGA)
  International Association of Meteorology and Atmospheric Physics (IAMAP)
  International Association of Physical Sciences of the Ocean (IAPSO)

IAHS - The International Association of Hydrological Sciences is the oldest and foremost of the international nongovernmental organizations dealing with hydrology and water resources including glaciology. It was established in 1922, incorporating the International Commission of Glaciers which had been set up in 1894, to bring together individual hydrologists to promote the science that involves them.

IWL Representative: President, 1987-91, Dr. V. Klemes, NHRI
Inland Waters and Lands Directorate

	Person-days	Cost $	Subsidies
Estimated costs for 1988	92	10 000	20 000

Activity	Benefit to IWL	Person Days	Cost $	Subsidies
NWRI				
International Association of Hydrological Sciences (IAHS) - Ground Water (ICGW)	Participant: R.E. Jackson (Vice-President 3)	5	1000	-
Advancement of science with respect to ground-water systems, resources and management.	- allows Canadians to communicate with other world-class experts, to influence international research directions and promote Canadian research			
SCOPE Committee on Metal Cycling	Participant: J.O. Nriagu - information exchange among world-class experts that influence international decisions	3	-	-
RCPE				
ICSU/IUGG/IAHS To promote the study of hydrology and the provision of means for discussion, comparison and publication of results of research; the initiation and coordination of research that requires international cooperation. Meets once every two years; met in 1987 in Vancouver. In addition, there are annual meetings of the Canadian National Committee of the IUGG.	Participant: G. Young Provides a linkage on behalf of the federal government and Canada with IAHS. IWL provides a member of the national committee and has helped to co-ordinate the IAHS activities in Vancouver in August 1987. Encourages and promotes Canadian scientific communities participation in IAHS activities.	20	3000	-

- The aims of IAHS include the promotion of the study of hydrology, the provision of means for discussion, comparison and publication of results of research, and the initiation and coordination of research that requires international cooperation. To fulfill these aims the Association organizes general assemblies, symposia and workshops in various parts of the world, publishes the proceedings of these meetings, special monographs and a quarterly scientific journal, contributes to a wide range of international initiatives such as the annual awarding of a medal and prize to outstanding hydrologists, and generally fosters activities and collaboration in hydrology and water resources.

  There are six scientific commissions and one committee within the Association, each dealing with a specific area in hydrology including glaciology, and in addition one specialist committee. These are:

International Commission on Surface Water (ICSW)
International Commission on Groundwater (ICGW)
International Commission on Continental Erosion (ICCE)
International Commission on Snow and Ice (ICSI)
International Commission on Water Quality (ICWQ)
International Commission on Water Resources Systems (ICWRS)
International Committee on Remote Sensing and Data Transmission (ICRSDT)

International Commission on Surface Water (ICSW)

The Commission on Surface Water is concerned with the promotion of the science as a whole and with surface water hydrology in particular. It is involved in the expansion of a scientific basis for utilizing surface water and in the extension of this knowledge to assist the practitioner, especially in developing countries. ICSW undertakes its activities in the knowledge that surface water interacts with the interests of the other Commissions and therefore it aims at a coordinated approach both inside and outside the Association.

International Commission on Groundwater (ICGW)

This Commission is responsible for advancement of the science with respect to groundwater systems, groundwater resources and groundwater management. It is also responsible for bridging the gap between science and practice and for the problems of the transfer of knowledge in the field of groundwater. It discharges its responsibilities by cooperation both inside and outside the Association, the latter particularly by collaboration with the Internationl Association of Hydrogeologists (IAH). During the last 4 years there has been increasing emphasis on the interactions of groundwater and surface water and on groundwater quality. There has also been increasing involvement in IHP projects and the publication of reports of these projects.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
	Participant: R.E. Jackson Vice-President 3	5	1000	-

International Commission on Continental Erosion (ICCE)

The field of interest of this Commission may be broadly defined as including the erosion, transport and deposition of sediment. It is principally concerned with promoting improved understanding of erosion and sedimentation processes, primarily as they relate to hydrology and fluvial geomorphology, and including both mechanical and chemical denudation. It also focuses its attention on the study of global patterns of erosion and sediment yield and their controls and is increasingly concerned with the problems of bridging the gap between research and practice through technology transfer to developing countries.
Vice-President 2: Dr. E.D. Ongley, NWRI

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
	Forecast costs	5	-	-

International Commission on Snow and Ice (ICSI)

The International Commission on Snow and Ice deals with the study of snow and ice in all its naturally occurring forms: with ice in the atmosphere, the several kinds of deposited snow, and the several kinds of glacier ice. It also deals with sea, lake and river ice and ice in frozen ground and in caves.

Canadian Representative: C.S.L Ommanney
Head, Cold Regions Section
National Hydrology Research Institute
Environment Canada
Saskatoon, Saskatchewan
S7N 2X8

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
	Forecast costs			
	Prestige to NHRI in being selected for the appointment and as a focus for Canadian snow and ice research both nationally and internationally	2	-	-
	- International contribution and exchange of information on snow and ice (glaciology) - Development of contacts with world snow and ice scientists as a resource for dealing with Canadian problems - Opportunity to direct policy to best serve the interests of Canada and Canadians - Sharing of Canadian expertise - Improved NHRI and personal visibility - Professional development			

International Commission on Water Quality (ICWQ)

Although water quality has been a concern of IAHS for a considerable time, ICWQ is a relatively young commission within the Association. Its role is to promote interest in the water quality of hydrological research and to liaise with other bodies involved in the same field of endeavour, both inside and outside the Association. The Commission is active in a number of projects within the IHP and has been cooperating with the International Institute for Applied Systems Analysis such as in the organization of the International Symposium on Modelling the Water Quality of the Hydrological Cycle, held in Baden in 1978.

Canadian Representative: V. Niemela
Director, Water Quality Branch
Environment Canada
Ottawa, Ontario
K1A 0H3

International Commission on Water Resource Systems (ICWRS)

This Commission is responsible for advancing the science of hydrology in the planning, design and operation of water resource systems. It gives particular attention to linking science to practice and to the problems of transfer of knowledge in its field. Its activities also take account of the interactions which exist between man and his use of water resources.

Vice-President 2:
Canadian Representative: Prof. T.E. Unny, U. of Waterloo
At present there is no
IWL direct involvement

International Committee on Remote Sensing and Data Transmission (ICRSDT)

The objectives of the Committee are to promote interest in research and applications of remote sensing and remote data transmission for hydrological purposes.

Secretary: Dr. B.E. Goodison, AES

Other ICSU Activities

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
ICSU World Digital Data Base for Environmental Services (WDDES). Technical advice on the use and structure of large resource data bases, including participation in a working group in London, U.K.		10	-	1000

IUGS International Union of Geological Sciences (1961)

The IUGS encourages and promotes the study of geological problems of a fundamental or applied character where the data contribute to an increasing understanding of the earth.

Meeting on Global Change (IUGS) Committee
Planning discussions are under way to develop program of research on "Global Change".
The objective of the committee includes determining the effect of climate change on water resources.
Three sub-programs are under consideration in Canada: Arctic, Terrestrial, and Oceans.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
IUGS Global Climate Change Committee	Participant: V. Klemes - International contribution and exchange of information and ideas on climate exchange and its impact on water resources. - Prestige to the Institute. - Professional development.	5	-	3000
NWRI				
Committee on Sedimentology Provide guidance on techniques, equipment and to set standards for accurate size analysis for use in sedimentological research.	Participant: J.P. Coakley - improves Canadian data collection - promotes results of Canadian research - potential economic benefit to environmental industries - provides advice to Third World	5	2000	-

AGID Association of Geoscientists for International Development

AGID is an international non-governmental organization which started in 1974 as an organization affiliated with the IUGS. It has members from 123 countries, and its activities are concerned with mineral exploration, small-scale mining, hydrology, engineering geology and geological education. AGID provides a channel for communications for geoscientists from different countries, stresses the practical approach to the application of geosciences to development, promotes efforts to familiarize non-geoscientists in decision-making positions with the importance of geoscientific investigations in such fields as geotechnics and environment and strives to improve basic education in earth sciences.

IAH International Association of Hydrogeologists

The IAH, founded in 1956, is another affiliate of the IUGS. It promotes cooperation between geologists and specialists of all disciplines whose particular interest is the study of subterranean water, its origin, research and exploitation. IAH holds General Assemblies every four years and functions through eight commissions:

i) Commission on Groundwater Protection (1979);
ii) Commission for Hydrogeological Maps (1959);
iii) Commission for Hydrogeology of Karst (1968);
iv) Commission on Hydrogeology of Volcanic Terrains (1977);
v) Commission for Mineral and Thermal Waters (1968);
vi) Commission on Hydrogeology of Mining Areas (1982);
vii) Commission on Remote Sensing (1981);
viii) Commission on Hydrogeology of Coastal Areas (1963).

FAGS Federation of Astronomical and Geophysical Services

- a nongovernmental agency of ICSU, founded in 1956.

- facilitates and promotes the observations, information and statistics in the field of astronomical and geophysical sciences, and the analysis, collation and publication of these data.

- its activities comprise eleven different services or groups, the one of interest to hydrologists being the Permanent Service on Fluctuation of Glaciers. Data on glacier variations, mass balance, volumetric change and hydrometeorology are collected for publication every 4 years, from all glacierized countries carrying out such measurements.

In the past year the Permanent Service on the Fluctuations of Glaciers has been merged with the Temporary Technical Secretariat for the World Glacier Inventory to create a new body known as the World Glacier Monitoring Service (GMS).

The Canadian Correspondent, within Environment Canada was appointed by the International Commission on Snow and Ice.

Canadian Correspondent: C.S.L. Ommanney
Head, Cold Regions Section
National Hydrology Research Institute

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
ICSU/FAGS (Federation of Astronomical and Geophysical Permanent Services)	Participant: C.S.L. Ommanney - Is an opportunity to report on glaciers, to exchange information with other countries, and to add prestige to the Institute. - Helps to identify, world permanent snow and glacier resources and how they affect the well being of Canadians. - Indirectly assists in improved personal visibility and professional development.	5	-	-

IGS International Glaciological Society

A nongovernmental society founded in 1936 to stimulate interest in and encourage research into the scientific and technical problems of snow and ice in all countries, to facilitate and increase the flow of glaciological ideas and information.

The editor of the News Bulletin of the IGS, ICE was appointed by the Council of the IGS. This involves collecting, summarizing and publishing reports on recent glaciological research from around the world as part of an international information exchange.

Publications Committee Member: C.S.L. Ommanney
Head, Cold Regions Section
National Hydrology Research Institute

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
International Glaciological Society Executive Council	Participant: R. Perla - International sharing of information and ideas on glacier. research. - Prestige to the Institute. - Professional development.	5	-	-
International Glacier Society Publications Committee (Also mentioned under International Journals Section of this report.)	Participant: C.S.L. Ommaney - International contribution and exchange of information on glaciers. - Prestige to the Institute in being represented. - Sharing of technical expertise. - Professional development.	5	-	-

IAWPR International Association for Water Pollution Research (1965)

The aims of the Association are to form an international body for the study of reservoir pollution; to contribute to the most effective development of biological, chemical and engineering research in the field of control and reduction of reservoir pollution; to ensure coordination of efforts and a maximum exchange of information on methods of protecting reservoirs against pollution, to maintain ties assuring better understanding among scientists and engineers dealing with problems of reservoir pollution, to organize and subsidize international meetings and conferences called to discuss reports on important problems of water pollution, to publish scientific papers and inform about the activity of the Association. Over the years the Association objectives have gone beyond pollution of reservoirs to cover most aspects of water pollution research.

IAWPRC - Canadian National Committee Representative:

H.R. Eisenhauer
Director, Toxic Chemicals Program
Environment Canada
Ottawa, Ontario
K1A OH3

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Canadian Assoc. on Water Pollution Research and Control (CAWPRC); affiliated with IAWPRC Promote research and application of research and application of research to pollution effects and control of pollution; publish Water Research Journal	Participant: R.J. Allan (Vice-President) - influencing directions/ recommendations of international bodies - enhances IWL/DOE prestige credibility - harmonizes Canadian/International environmental standards	5	-	-
IAWPRC Specialist Technical Group on Systems. Analysis in Water Quality Management	Participant: D.C.L. Lam - gives DOE researchers an opportunity to exchange research results and influence	3	-	-
IAWPRC Specialist Group on Tastes and Odours Standardize odour characterization	Participant: B. Brownlee (Corres. member) - a vehicle of international information exchange among world-class experts	3	-	-

- IAWPR International Panel of Referees:

B.K. Afghan and Y.K. Chau
National Water Research Institute
Environment Canada
Burlington, Ontario
L7R 4A6

CODATA Committee on Data for Science and Technology (1966)

COWAR Committee on Water Research (1964)

SCAR Scientific Committee on Antarctic Research (1958)

SCOPE Scientific Committee on Problems of the Environment (1969)

- Society of Wetland Scientists
  Canadian Representative: W.A. Glooschenko (NWRI)

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Society of Wetland Scientists To promote wetland research.	Participant: W.A. Glooschenko (Cdn. Rep.) - international information exchange - develops authority and credibility of DOE research	3	-	-
SCOPE Committee on Metal Cycling	Participant: J.O. Nriagu - information exchange among world-class experts that influence international decisions	3	-	-

IASWS International Association for Sediment Water Science

The International Association for Sediment Water Science was formed by the collective will of a large number of scientists. The Association was formally constituted in 1984 on the occasion of the Third International Symposium on the Interactions Between Sediments and Water.

OBJECTIVES

- to promote, and encourage excellence in Scientific Research related to sediments and their interactions with water and biota in fluvial, lacustrine, estuarine and marine systems with particular reference to problems of environmental concern.

- to bring together and foster collaborative research and dialogue between earth scientists, biologists and chemists whose interests pertain to recent aquatic systems.

In addition, the Association has the following five sub-objectives:

1. To provide continuity in the holding of regular conferences on the subject matter.

2. To provide a financial base for underwriting regular conferences.

3. To provide an international organization as the basis for conference hosts to apply for financial support in the host country.

4. To compile an informative newsletter relevant to the organization and associated activity for the information of the members.

5. To provide editorial and support base for the production of the Conference Proceedings.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Secretary Treasurer	Participant: E.D. Ongley - international information exchange that promotes Canadian research and professional development	5	2000	-

IAHR International Association for Hydraulic Research

The International Association for Hydraulic Research was founded in 1935 as a worldwide independent organization for engineers and scientists with interests in the field of hydraulic research and practice. Its purpose is to stimulate and promote both basic and applied research in engineering hydraulics and to bring current science and technology to bear on solving the world's water problems.

IAHR's task is to generalize world experience in hydraulic research, both fundamental and applied, in the field of hydraulics, hydrostructures, turbines, pumps and gates, river bed processes and modeling theory.

A Working Group on Ice Jams was founded in 1975 by the IAHR Committee on Ice Problems. A definition of the term "ice jams" has been accepted and a report prepared classifying ice jams and recommending directions for future research.

Member: S. Beltaos
National Water Research Institute
Environment Canada
Burlington, Ontario
L7R 4A6

- Council Member and co-chairman of the 23rd Ottawa 1989 International Congress: T.M. Dick
- Working Group on Ice Jams: S. Beltaos
- Section on Water Management Practice:
  P.J. Reynolds, WPMB,
  Inland Waters and Lands Directorate

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
	Participant: T.M. Dick - Improves international relations and prestige to the Institute. - Provides opportunities for more Canadian researchers and engineers to attend important international conferences. - As a result of exposure to international contacts develops in-house expertise. - Contributes, on behalf of IWL, to improving departmental prestige and improving international relations. - Is an opportunity to make NHRI (and therefore Canadian) expertise visible. - Can result in economic benefit. - Contributes to world knowledge. - Indirectly it results in both professional development and a boost to staff and Institute morale.	2	-	5000

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Working Group on River Ice Hydraulics Promote research on river ice hydraulics and dissemination of knowledge via preparation of state-of-the-art reports, assessment of research needs and hosting of workshops.	S. Beltaos - international information exchange among Canadian and other world-class experts - influences directions of an international body	13	300	-

IBSRAM International Board for Soil Research and Management

Established in 1983, aims at bridging the gap between crop research conducted in international agricultural research centres and soil research undertaken mainly by national research organizations. It aims also at establishing a bridge between basic research and extension work by promoting adaptive soil management research programs in developing countries.

The overall goal is to promote improved and sustainable soil management technologies in order to remove or reduce soil constraints to food and other agricultural production in developing countries.

The objectives of IBSRAM are:

By the network approach, to validate or test existing knowledge of soil management and to promote applied soil management research by national agronomic institutions.

To disseminate widely information about validated technologies - through newsletters, other publications, training courses, computerized data bases, and workshops.

The Canadian member of the Board of Trustees is: Dr. C.F. Bently, Chairman
131066-66 Avenue
Edmonton, Alberta
T6H 1Y6

ICID International Commission on Irrigation and Drainage

An agency founded in 1951. The Commission has 78 member nations and organizes an International Congress every three years.

The objectives of the Canadian National Committee on Irrigation and Drainage (CANCID) are:

- to stimulate research, development, and the application of the technology of irrigation, drainage and flood control within Canada and among member countries of the Commission;
- to disseminate news and technical information among members of CANCID and ICID;
- to provide a national and international forum on the subjects of interest to the organization;
- to represent Canada in liaison with ICID and other National Committees.

There is also a comprehensive technical library at ICID headquarters in New Delhi, India, from which members can draw, without charge, upon request to the CANCID Secretary.

Note: The Executive of the Canadian National Committee for Irrigation and Drainage (CANCID) have reached an agreement with the Canadian Water Resources Association to amalgamate and take effect upon ratification by members in June 1987.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
ICID. Since 1968, occasional technical inputs to ICID are provided through the Canadian National Committee (CANCID). (Now amalgamated with CWRA.) Annual general meeting is attended and paid for by branch representative as branch lacks travel funds. Assistance is being provided by organization for June 1989 Ottawa conference.	Participant: P.J. Reynolds	4	250	-

ICOLD International Commission on Large Dams

A nongovernemental agency founded in Paris in 1928. The Commission is composed of the National Committees of 74 member countries. The objective of the Commission is to promote progress in the establishment of designs, construction, maintenance and exploitation of large dams, by the collection and study of relevant data and questions. As a non-profit-making organization, the Commission accomplishes its mission through the exchange of information between National Committees, by holding Executive Meetings and International Congresses and by the formation of Technical Committees of experts who organize and coordinate studies and tests. Congresses are held every three years.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
ICOLD. Since 1968, occasional technical inputs to ICOLD are provided through the Canadian National Committee (CANCOLD). Annual general meeting is attended and professional support in the form of technical reports, reviews and comments are provided to Hydrology, Environmental and Dam Safety Committees. These activities contribute to the departmental objectives to employ instruments of the international system to fulfill its mandate in water resources planning and management.	Participants: E. Park Contacts, together with other Canadian Federal and Provincial agencies, with similar international activities in, for example, dam safety.	20	1000	-

ISO International Standardization Organization

A nongovernmental organization founded in 1972.

- ISO is the international agency for standardization, at present comprising the national standards bodies of 89 countries. The object of ISO is to promote the development of standardization and related activities in the world to facilitate the international exchange of goods and services and to develop cooperation in the sphere of intellectual, scientific, technological and economic activity. The results of ISO technical work are published as International Standards. Some 5000 ISO standards are in print.

- The technical work of ISO is carried out through technical committees (TC). The technical committees, in turn, may establish subcommittees (SC) and working groups (WG). At present there are about 163 technical committees, 612 subcommittees and 1331 working groups in operation. The work of two technical committees is of interest to the hydrologic community. These are TC 113, Measurement of Liquid Flow in Open Channels, and TC 147, Water Quality.

- The preparation of an international standard follows a number of distinct steps. First, a proposal for a new work item is made by one of the countries that participates in the Technical Committee. If a majority of participating members vote in favour of taking up the subject, a draft proposal is prepared for study by the appropriate subcommittee. After a number of drafts, a document emerges as a draft international standard. At this point, it is circulated to member countries for voting and must receive a 75% favourable vote to be accepted as an International Standard. In essence, an International Standard is the result of an agreement between the member bodies of ISO.

Technical Committee 113; Measurement of Liquid Flow in Open Channels

Chairman, Canadian Advisory Committee: P.I. Campbell, WRB

Canadian participants in Subcommittees of TC 113:

SC1	Velocity Area Methods		K. Wiebe
SC2	Notches, Weirs and Flumes		M.O. Spitzer
SC3	Glossary of Terms	Int. Chairman:	-
SC4	Dilution Methods		-
SC5	Flow Measuring Instruments and Equipment		K. Wiebe
SC6	Sediment Transport		T.J. Day
SC7	Methods for Difficult Conditions		-

- Technical Committee 147; Water Quality

Chairman, Canadian Advisory Committee: B.J. Dutka

Subcommittees of TC 147:

SC2		Chairman:	B.K. Afghan
SC3	Radiological Methods		S.R. Joshi
SC4	Microbiology	Chairman:	B.J. Dutka
SC4	WG20	Chairman:	B.K. Afghan
SC5	WG 7 Mutagen Tests	Chairman:	B.J. Dutka
SC6	Sampling Methologies		F.J. Philbert
			B.K. Afghan
			P. Brooksbank

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WQB				
International Standards Organization(ISO) (a) Convenor, Working Group on Precipitation Sampling(WG-8)	Participant: V.E. Niemala - Improvement and harmonization of environmental measurements - Improved quality assurance and reliability of measurments	26	2000	3000
(b) Members, Technical Committee #147 on harmonization of methods for sampling, analysis and data storage	Participant: B.K. Afghan - Potential economic benefits to Canadian companies in the environmental measurements field - promoting IWL interests - direct relevance to the activities of WQB	26	5000	-
WRB				
ISO - Canadian Advisory Committee to TC113, Subcommittees of TC113	Participants: P.I. Campbell, K. Wiebe, T.J. Day, M. Spitzer - direct contact with world experts on water resources monitoring - ensures compatibility of international and Canadian standards - Canada respected internationally as contributor to hydrometric technology - ensures Canadian manufactured hydrometric equipment suitable for overseas applications	85	9000	3000 (from Standards Council of Canada)
NWRI				
Technical Committee 147 on Water Quality. Advise the Canada Standard Council on the work and relevance of the TC147 on WQ; suggest new directions and promote ISO methods.	Participant: B.J. Dutka (International Chairman) - improves Canadian and international measurements and standards - an opportunity to influence directions of an international body	5	-	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
SC3 Radiological Methods Develop standards to assess radiology standards for drinking water; standardize analytical techniques for radionuclides in water.	Participant: S.R. Joshi - harmonizes Canadian and International environmental standards - improved methods, quality assurance - influencing directions/recommendations of international bodies - promotes Canadian expertise	5	-	-
SC4 Microbiology Responsible for developing internationally acceptable methods for enumerating a variety of bacterial populations used in international water quality studies.	Participant: B.J. Dutka (Can Chm) - improves Canadian and international measurements and standards - promotes global water quality and health protection	3	-	-
SC4WG9 Membrane Filters Responsible for developing methods of tests to standardize membrane filters; responsible for the standardization of all microbiological media used in water quality studies.	Participant: B.J. Dutka (Cdn. Chm.) - improves Canadian and international measurements and standards - professional development	5	400	750
SC5WG4 Biodegradation Review, assess and evaluate biodegradation tests for their suitability to be used in Canada.	Participant: D.L.S. Liu (Cdn. Chm.) - improves Canadian and international measurements and standards - promotes Canadian technology, goodwill	3	-	-
(ISO) QA/QC Group Harmonize Canadian practices with respect to QA/QC with international recommendations.	Participant: A.S.Y. Chau - harmonize international standards - enhance prestige/credibility - promote Canadian technology - promote results of Canadian research - improve quality assurance	13	2000	-
TOTAL		137	18 480	6750

IWRA International Water Resources Association

A nongovernmental association founded in 1972.

The principal objectives of the International Water Resources Association are:

- To advance water resources planning, development, management, administration, science, technology, research and education on an international level.

- To establish an international forum for planners, administrators, managers, scientists, engineers, educators and others concerned with water resources.

- To encourage coordination and support of international programs in the field of water resources, including cooperation with the United Nations and its agencies and other international and national organizations in activities of common interest.

President: P.J. Reynolds (1986-88)
Inland Waters and Lands Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

- Canadian National Committee/Executive Council Members

- President: Dr. O.T. Sigvaldason
Vice-President
Water Resources Planning Division
Acres International Ltd.
Niagara Falls, Ontario
L2E 6W1

IWL Member: Dr. Kersi S. Davar, University of New Brunswick
Dr. Donald M. Tate, Environment Canada
Dr. Donald Waller, Technical University of Nova Scotia

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
	Participant: P.J. Reynolds* Provides an opportunity to establish links with world-class experts, leading to mutual benefits. Information is provided on Canadian expertise to work on overseas project providing benefits to developing countries. *(Closely associated with IWRA since 1972, Branch member Chairman of Canadian Committee from 1975. Now International President 1986-88. Member of programme committee for average of 4 or 5 conferences world-wide involving other associations. Chairing organizing committee for VIth IWRA World Congress Ottawa, 1988, co-sponsored by DOE.)	130	1500	-

IIASA International Institute for Applied Systems Analysis

A nongovernmental research institution, bringing together scientists from around the world on problems of common concern.

Situated in Laxenburg, Austria, IIASA was founded in October 1972 by the academies of science and equivalent organizations of twelve countries. Its founders gave IIASA a unique position outside national, disciplinary, and institutional boundaries so that it might take the broadest possible view in pursuing its objectives:

- to promote international cooperation in solving problems arising from social, economic, technological, and environmental change
- to create a network of institutions in the national member organization countries and elsewhere for joint scientific research
- to develop and formalize systems analysis and the sciences contributing to it, and promote the use of analytical techniques needed to evaluate and address complex problems
- to inform policy advisors and decision makers about the potential application of the Institute's work to such problems

The Institute now has national member organizations in 16 countries, including Canada.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NHRI				
IIASA/IUGS Large International Rivers Committee	Participant: V. Klemes - International contribution and exchange of information and ideas. - Prestige to the Institute. - Testing and evaluation of models for management of rivers systems. - Professional development.	5	-	3

IUCN International Union for the Conservation of Nature and Natural Resources

Founded in 1948. The principal objective is to maintain genetic diversity, ensure sustainable use of renewable resources, and maintain essential ecological processes. IUCN continuously reviews and assesses world environmental problems and promotes research relating to their solution. Maintains close working relations with the UN system and other intergovernmental and nongovernmental bodies. Closely affiliated with the World Wildlife Fund. It operates Commissions on Ecology Policy, Law and Administration; National Parks and Protected Areas; and Species Survival. Also acts as the Secretariat for the Ramsar Convention for the Protection of Wetlands of International Importance.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
RCPE				
Ramsar Convention Promote the multiple values of wetlands, including their hydrological values. CWS is the lead agency in Canada.	Participant: R. Bill - maintain close contact with activities in area of wetland conservation, research and management. - assist CWS as required. (see also Conferences)	8	2000	-
NWRI				
Species Survival Commission Promote the conservation of species and their habitat throughout the world.	Participant: L.D. Delorme - global environmental protection	3	-	-
TOTAL		11	2000	-

Other International Organizations

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Scientific Committee on Oceanic Research (SCOR) Working Group 83 (Wave Modelling) and Canadian National Committee. Meet Canada's commitment to participate effectively as a partner in international oceanic research.	Participant: M.A. Donelan - influences direction/recommendation of international body	10	7500	-
Joint Scientific Committee of the World Climate Research Programme and Committee on Climate Changes and the Ocean Identify recent advances in air/sea fluxes; identify and manage global climatic problems which impact on the quality of life and economic well-being of Canadians.	Participant: M.A. Donelan - influences direction/recommendation of international body - establish links with world-class experts	13	-	5000
Aquatic Plant Management Society Provide a forum for discussion of aquatic plant management strategies; publish a journal for research results.	Participant: S. Painter (Director) - International information exchange - develops authority and credibility of DOE researchers	13	1000	-
International Biodeterioration Society Dedicated to basic and applied research in the field of biodegradation and biodeterioration for the well-being of human life.	Participant: D.L.S. Liu (Reg. Sec. East. Canada) - a forum for information exchange that enhances DOE credibility and morale - results in improved measurements assurance	5	-	-
International Lake Environment Committee	Participant: R.A. Vollenweider	10	3000	-
International Organization of Legal Metrology - Measurement of Pollution, PS-17 Reporting Secretariats 2 and 4	Participant: J. Lawrence Employ the resources and instruments of international legal metrology in national pollution research programs	13	2500	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
European Wave Modelling Group (WAM) Employ the advances made in the European research community in the resolution of national and international water management issues.	Participant: M.A. Donelan - establish links with world class experts - also reduces costs to Canada by importing expertise - promotes results of Canadian research	13	1300	1300
International Peat Society (IPS) Promote research into peat formation, peat land ecology and economic uses of peat.	Participant: W.A. Glooschenko (Nominated for Chm. of Comm. on Ecology and Conservation) - international information exchange - develops authority and credibility of DOE researchers - global environmental protection	5	-	-
Toxicity Testing Symposium Committee Plan, organize and hold the International Symposium on Testing Using Microbial Systems biennially. The symposia provide a forum to evaluate toxicity assessment using microorganisms and to stimulate communication and co-operation between international researchers.	Participants: B.J. Dutka D.L.S. Liu (Co-Chm.) - promotes Canadian technology world-wide - international information exchange that improves measurements of potential economic benefit to environmental industry	8	700	-
International Association for Great Lakes Research Provide advice and recommendations to IAGLR to improve the Association's response to public issues. Ensure NWRI issues are considered by association.	Participants: M.N. Charlton (Board Member) F.M. Boyce (Chm. Tech. Adv. Comm.) K. Kaiser (President) - promotes results of Canadian research - enhances IWL/DOE prestige - international information exchange - influences direction/ recommendations of international bodies - develops credibility and authority of DOE researchers	10 13 16	500 600 700	- - -

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
International Association of Geochemistry (IAGC) Working Group on Geochemistry and Health and Disease Popularize the study of geochemistry; organize workshops.	Participant: J.O. Nriagu - international information exchange on priority issues	5	-	-
International Society of Ecological Modelling (ISEM) Further use of mathematical modelling simulations and methodologies; analyse the behaviour of ecological system.	Participant: E. Halfon (V.P. for North America) - establishes links with experts - promotes results of Canadian - international information exchange	5	-	-
International Society for Theoretical and Applied Limnology (ISTAL)	Participant: M. Bothwell - international contribution and exchange of information - prestige to the Institute - professional development	-	-	-
TOTAL		137	17 800	6300

III. BILATERAL ACTIVITIES

This section lists the bilateral activities to which IWL either contributes or has the potential to contribute. This includes assistance to CIDA and IDRC.

Bilateral Agreements

The bilateral agreements which are in force at this time, or are planned for the near future, and which have elements which involve land- and water-related aspects are as follows:

BELGIUM
An agreement exists, signed in 1971 and renewed in 1976, for scientific, industrial and technological cooperation. It is not active in areas that are of interest to this Department.

BRAZIL
Memorandum of Understanding on bilateral cooperation in science and technology, March 1985, is the basis of ongoing discussions that include WQB.

PEOPLES REPUBLIC OF CHINA
A Memorandum of Understanding in the field of meteorology was signed June 9, 1986. It incorporates elements which have the potential for IWL involvement.

COMMISSION OF THE EUROPEAN COMMUNITIES
An MOU in the field of wastewater treatment was signed March 16, 1983. Purpose is cooperation in wastewater management, in areas of pollution abatement and treatment; wastewater residues; clean technologies; clean-up of specific pollutants; and analysis, toxicity and ecological effects of toxicity and ecological effects of water pollutants. There is the potential for peripheral IWL involvement.

Exchange of letters on November 6, 1975. The purpose is cooperation in environmental matters, mainly in climatology, wastewater, atmospheric pollution, oil spill and toxic substances. Again, there is potential for peripheral IWL involvement.

DENMARK
Agreement signed in August 1983 for cooperation in the field of the marine environment. There is the potential for IWL involvement in estuarine waters.

FEDERAL REPUBLIC OF GERMANY
Agreement signed in 1971, renewed in 1976, and again in 1987, in the field of cooperation in science and technology. IWL is involved in ground-water pollution, climatology, transport and deposition of acidifying pollutants.

FRANCE
Exchange of letters in 1973 in the area of scientific and technological cooperation. Discussions that are expected to get under way in the fall of 1987 offer the potential for IWL involvement.

An MOU between the Water Survey of Canada (WSC) and the Centre nationale d'études spatiales of Toulouse (undated) exists to relay hydrometric data collected by WSC on an operational basis from Data Collection Platforms (DCPs) located at selected (remote) sites in Canada.

JAPAN
Informal consultations since 1972 and an Agreement signed May 7, 1986, to review relations in science and technology. The activities include climatic variability and change, atmospheric pollution, eutrophication, satellite meteorology, and wastewater treatment.

NORWAY

A Canada-Norway exchange of letters was made in December 1986. The exchange established a framework for enhanced science and technology cooperation, and concluded 3 year of consultations. It will remain in effect for 5 years and is open to renewal. The letters facilitate and encourage scientific and technical information and personnel exchange. Environmental issues in the two countries have much in common due to similar climatic, geological and latitudinal settings and suffer the influence of deposition of airborne industrial pollutants. Norway is seeking some more formal level of technical exchange. Lands, RCPE, NWRI and WQB have made proposals and some contacts have been made with Norwegian institutions and individuals. Two established activities are Project RAIN and the ECE Cooperative Monitoring of Aquatic Effects.

UNION OF SOVIET SOCIALIST REPUBLICS

Protocol of consultations on the development of scientific and technical cooperation in the Arctic and the North, signed April 16, 1984. The activities at this time include climate modelling, atmospheric modelling, air pollution, pollution control of arctic oil and gas, environmental legislation, northern lands conservation, integrated resource planning, reindeer and caribou. This has the potential for, but does not include, water activities per se.

UNITED KINGDOM

Exchange of letters in 1983 with the purpose of cooperation in science and technology. Although there have been no activities in the environmental field, topics for future involvement include acid rain, abatement of air pollutants, methodologies for environmental assessment, land use classification, impacts of climatic warming on the environment and human activity, climatic impacts on silviculture, offshore applied climate research, and polar research.

WORLD HEALTH ORGANIZATION

Signed in 1974, this designates CCIW as the WHO Collaborating Centre on Surface and Groundwater to provide the coordination role in the GEMS/WATER Program. NWRI acts on behalf of WHO in maintaining Canada's commitment to the project. The agreement was renewed in 1986, subject to an internal review by IWL as to the value of the Centre and its work.

EUROPEAN SPACE AGENCY

A Memorandum of Understanding, signed in 1976, exists with CCRS on cooperation in remote sensing. The Department is not involved at this time.

YUGOSLAVIA

Exchange of letters, in 1971, encouraged contact and exchange in science and technology, and their industrial application. The Department is not involved at this time.

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Canada-Norway Project RAIN (Recovery of Acidification in Norway) A jointly sponsored and funded project to measure the responses of small catchments to both acidification and de-acidification. Research is carried out by the Norwegian Institute for Water Research, Oslo, Norway.	Participants: D.C.L. Lam and F.E. Elder - an opportunity to exchange information on a priority issue - Working with other world class researchers promotes major advancements in global environmental protection	8	-	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Canada-Norway Northern Hydrology Problems associated with ice in northern rivers are to be considered through collaboration with the Working Group on Northern Research Basins which meets every two years. Benefits to the flood damage reduction program and to field operations efficiency are expected.	Participant: S. Beltaos - international information and technology exchange - improves Canadian data collection techniques and professional development	5	-	-
Canada-West Germany Exchange Agreement Dr. E. Hollan, Lakes and Fisheries Research Institute of EPS' Baden-Wurtemberg visited NWRI, 12/86. One-week trip to West Germany in 6/87.	Participant: P. Hamblin - promote results of Canadian research - professional development - international information exchange - reduces costs to Canada by importing expertise	5	3000	-
Canada-West Germany Collaboration on radionuclide research in freshwater.	Participant: S.R. Joshi - same as above	8	3500	-
International Advisory Panel, Chinese University Development Program Giving lectures and consultation to Chinese universities on metals chemistry in aquatic systems.	Participant: Y.K. Chau (Visiting professor to China) - promotes environmental education and provides goodwill for Canada - establishes links with world class experts and promotes Canadian research	8	-	3500
NHRI				
Bilateral Cooperation with France (D. Raymond, Laboratoire de Glaciologic, CNRS, Grenoble). Climate-related study/analysis of air bubbles in ice cores to confirm increases in CO^2 levels over the last 200 years.	Participant: G. Holdsworth, NHRI - international sharing of information and ideas on glacier research - verify increases in CO^2 in the last 200 years - contribution to knowledge on glaciers and climate change - prestige to the Institute - professional development	50	3000	15 000 estimated salary plus travel costs)
TOTAL		84	9500	18 500

Cooperation with Other Federal International Activities

External Affairs
CIDA
DRIE

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
Sporadic cooperation over the years depending on the personalities in CIDA management. Recently invited to participate in CIDA tender review committee for a $5 million technical assistance project for Sri Lanka CIDA refers Canadian consultants to the Branch on an average of 3 times per year to review our Canadian designed software for possible application on overseas projects. Currently providing advice on proposed projects in China and South East Asia.	Provides IWL with an experience of the needs of other countries, a comparison with the work of IWL and an opportunity to learn from these needs. It is often a mirror image of IWL problems, and an opportunity for professional development	18	2000	-
NWRI				
IDRC (International Development Research Centre) The IDRC stimulates research in developing countries, so these countries can help themselves. Consultant helped in Thailand, Malaysia, Singapore, Chile, Peru, Brazil, Egypt and Morocco to develop simple, inexpensive micro-biological techniques to classify water sources and evaluate safety of their drinking water.	Participant: B.J. Dutka (Consultant) - training and advice to Third World countries that results in improved drinking water standards and promotes Canadian goodwill and research	5	-	1800

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
IDRC International Development Research Centre (International Bilateral Agreement) Canada-Malaysia This is a co-operative project under IDRC to modify the RAISON microcomputer system developed in Canada for analysis and management of acid rain data into a general application computer package for use in Malaysia and other developing countries for water quality data management. It also supports Environment Canada's project on water quality monitoring/modelling.	Participant: D.C.L. Lam (Co-Project Leader, Canada) - promotes Canadian technology and research advances while improving resource development in a Third World country	21	1200	32 000
TOTAL		44	3200	33 800

IV. OTHER INTERNATIONAL ACTIVITIES

This section lists the activities of IWL which relate to journal editorial boards, conferences, and program, personal and other activities.

1. Journal Editorial Boards

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
International Journal of Geographic Information Systems Editorial Board	Participant: I. Crain (Ed. Board) - promotes results of Canadian and DOE research - enhances IWL prestige - creates professional contacts - international information exchange	5	-	-
NWRI				
Acta Hydrochimica et Hydrobiologia Journal Publish articles in three languages on scientific fundamentals of water quality and in treatment.	Participant: K.L. Kaiser (Co-editor) - establish links with experts - international information exchange - enhance IWL/DOE prestige - promote results of Canadian research - professional development	3	-	-
Advances in Environmental Science and Technology	Participant: J.O. Nriagu (Editor) - international information and technology exchange among world-class experts	3	-	-
Association of Official Analytical Chemists (AOAC) Publishes advances in analytical chemistry.	Participant: A.S.Y. Chau - promote results of Canadian research - links with world-class experts - technical transfer	13	-	-
High Resolution Chromatograph & Chromatography Communications Journal Publishes recent advances.	Participant: F.I. Onuska (Advisory Board) - improved measurements - influence international bodies - import new techniques	13	1600	-
Hydrological Sciences Journal	Participant: M.E. Thompson (Associate Editor)	3	-	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
International Association for Great Lakes Research Publishes research studies dealing with the great lakes of the world.	Participants: M.M. Charlton (Assoc. Ed.) K.L.E. Kaiser (Assoc. Ed.) P. Hamblin (Assoc. Ed.) - promotes results of Canadian research - enhances IWL/DOE prestige - international information exchange - professional development - establishes links with experts R.J. Maguire (Assoc. Ed.) Y.K. Chau (Assoc. Ed.) B.J. Dutka (Assoc. Ed.) - information exchange on priority issues that improves professional development	5 5 5 5 5 5	- - - - - -	- - - - - -
International Journal of Advances in Water Resources Publishes advanced methodologies for solving water resources research problems.	Participant: D.C.L. Lam - a vehicle for international information/technology exchange that helps promote DOE research expertise	3	-	-
International Journal of Applied Organometallic Chemistry	Participant: Y.K. Chau - international information exchange - promotes Canadian research and enables Canadians to influence international research community	5	-	-
International Journal of Ecological Modelling	Participant: E. Halfon (Ed. Board) - promotes results of Canadian research - enhances IWL/DOE prestige - professional development - international information exchange	5	-	-
Science of the Total Environment	Participant: J.O. Nriagu (Assoc. Ed.) - international information and technology transfer among world experts that promotes environmental protection	3	-	-
Tellus, Editorial Board	Participant: J.O. Nriagu (Editorial Board) - same as above	3	-	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Toxicity Assessment. An International Quarterly designed for the rapid publication of refereed original communications in the field of "Toxicity Assessment" with emphasis on the use of microbial systems.	Participants: B.J. Dutka (Co-Ed.) D.L.S. Liu (Co-Ed.) - rapid method of exchanging technological advances - advances and promotes DOE research	10	-	-
World Health Organization (WHO) - WQ Bulletin Editorial Board International review journal, published in English and French provides international forum on pressing problems in water quality management.	Participants: S. Barabas (Ed.) R.A. Vollenweider R.J. Allan J. Barica B.K. Afgan B.G. Goulden D.L. Egar L. Janus J.H. Carey B.J. Dutka F.C. Elder Y.L. Lau G.K. Rodgers B.K. Burnison R.P. Bukata J. Lawrence B.E. Jank M.G. Skafel	25	-	-
Water Resources Management Journal	Participant: V. Klemes - International contribution and ideas. - Prestige to the Institute in being represented on the Board. - Sharing of technical expertise. - Professional development.	20	-	-
Journal of Hydrology, Atmosphere Ocean Editorial Board	Participant: V. Klemes (as above)			
Hydrological Sciences Journal (Member of editorial boards)	Participant: V. Klemes (Associate Editor)			
International Glacier Society Publications Committee	Participant: C.S.L. Ommaney - International contribution and exchange of information on glaciers - Prestige to the Institute in being represented. - Sharing of technical expertise. - Professional development.	5	-	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
WPM				
The Branch provides contributions to international publications, including editing, writing reviews, members to Editorial Boards. Some examples would be:	Provides vehicles for promotion of the results of Canadian research			
Contribution to writing a chapter "The Influence of Man on Hydrologic Systems" for the DNAG publication with the U.S. Geological Survey.				
Coordination of six articles for the December 1987 issue of Water.	Participants: P. Reynolds and D. Tate	-	-	-
Editorial Board of the International Journal of Water Resources Development including material for News and Reviews Section.	Participant: P. Reynolds	-	-	-
Editorial Board of the International Journal on Regulated Rivers - Research and Management.	Participant: P. Reynolds	-	-	-
Review of IAHS publication No. 153, Scientific Basis for Water Resources Management (M. Diskin, Ed) for American Meteorological Society.	Participant: P. Reynolds	35	1000	-

2. Conferences

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
15-35 overseas	Acquisition of state-of-art knowledge; intelligence on new issues, new research directions; information on research failures and reduced time lags in new results; confirmation and acceptance of NWRI research results; contacts for future collaboration thereby broadening "surrogate" research and access to specialized facilities in support of DOE issues; conferring of international authority for DOE positions on world water issues; foreign aid assistance; promoting Canadian environmental industry.	100	25 000	-
Lands				
An average of 2 per year in the area of data systems and integrated land resources analysis.	- receiving information on methodologies and software of concrete value to IWL; thus there is a real cost/benefit in saving time and expense by avoiding development of the same information in Canada	10	4000	-
Workshop organized by EUROSTAT of the European Community dealing with land use statistics for policy development (Luxembourg) August 1986 The participant presented a paper on methodologies for land use change monitoring in Canada using remote sensing and statistical approaches. The workshop dealt with the effectiveness of these methods and their impact on policy development. This workshop provided a state-of-the-art overview of the situation in Europe and provided valuable lessons for Canadian programs.	Participant: J. Thie	-	-	All costs paid by Eurostat (Estimated 2500)

Activity	Benefit to IWL	Person Days	Cost $	Subsidies
RCPE				
Ramsar Convention for the protection of Wetlands of International Importance. The meeting of the States Parties to the Convention in Regina, Saskatchewan, 26 May to 5 June 1987, was an occasion to demonstrate support for the CWS (national representatives to the convention) as the conference organizers.	Maintaining communications with CWS in the research and management of wetlands, particularly in developing selection criteria, assisting in hydrology research and in linkages with Unesco MAB and the biosphere reserve network. Benefiting from international expertise present at the meeting in determining the values and the management of wetlands.	8	2000	-
WPM				
Production and presentation of papers at about four conferences overseas each year at member's expense. Production of association newsletter 3 times per year. Currently chairing organizing Committee for VIth IWRA World Congress on Water Resources, Ottawa, 29 May-3 June 1988, co-sponsored by DOE.		130	1500	-

3. Program, Personal and Other Activities

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
NWRI				
Informal/Ad Hoc Activities Normal scientific correspondence between researchers; manuscript reviews for international journals; tours and lectures by foreign dignitaries and scientists at NWRI.	Facilitates NWRI research in general; improves visibility of Institute and credibility and authority of our scientists	150	3000	-
10-20 overseas trips to discuss research one on one, participate in informal work groups, give invited lectures and to show the Institute and DOE flag to world research institutes.	Acquisition of state-of-the-art knowledge; intelligence on new issues, new research directions; information on research failures and reduced time lags in new results; confirmation and acceptance of NWRI research results; contacts for future collaboration thereby broadening "surrogate" research and access to specialized facilities in support of DOE issues; conferring on international authority for DOE positions on world water issues; foreign aid assistance; promoting Canadian environmental industry.	150	30 000	8000
Informal/Ad Hoc Activities Normal scientific correspondence between researches; manuscript reviews for international journals; tours and lectures by foreign dignitaries and scientists at NWRI.	Facilitates NWRI research in general; improves visibility of the Institute, and credibility and authority of our scientists.	150	3000	-
WPM				
Visiting Foreign Delegates The Branch receives an average of 4 foreign tours visiting HQ each year. In addition, 6 or 8 individuals visit each year. Mostly photocopying or microfiche production is involved for supplying documentation. These activities contribute to the departmental objectives of international economic relations and foreign aid.		25	2000	-

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Spontaneous and Informal Contacts. Techniques and modelling strategy are compared on a frequent basis with various organizations.				
International Panel on Future Research Needs in Systems Analysis and its Application to Water Resources Management. Italian University for Foreigners, Pergui, Italy.		-	-	-
Inaugural Ceremony Diamond Jubilee Celebrations of Central Board of Irrigation and Power, New Delhi, India. Invited lectures at Wuhan University, Ministry of Water and Power, and Chinese Hydrological Society, Beijing, China.		35	1000	-
About 14 requests per year are received from foreign sources on a variety of topics including programs such as FDR, or about our operations research methodologies and preferences. There are probably at least a dozen special invitations to sit on international panels, deliver lectures at world universities or international organizations, but little hope of acceptance unless one has the time, money and approval.				
A recent invitation that was accepted: International Round Table Discussion on Water Resources Systems Analysis sponsored by the University of Manitoba.				

Activity	Benefit to IWL	Person-days	Cost $	Subsidies
Lands				
To develop a practical approach to national land resource modelling and scenario development by consultation with national physical planning bodies in 3 countries (Sweden, Netherlands and France) June 1986	Participant: J. Thie	17	4800	-
The long-term plan for the Lands Directorate requires the development of national models on the application to major issues such as land degradation northern development and climatic change. Three countries more advanced than Canada were visited as sources for advice and technology for the Canadian approach.				

Appendix 4

Intergovernmental Organizations with Land and Water Interests

Intergovernmental organizations are those organizations established by agreements to which two or more states are party. Such organizations may be global or regional. Co-ordination of the activities in hydrology and water resources of the organizations within the United Nations system is achieved through the Inter-Secretariat Group for Water Resources of the Administrative Committee on Co-ordination (ACC). Involvement of these organizations in hydrology and water resources development is delineated in a general way in the following tables.

Reference: UN, 1982, The United Nations Organizations and Water, 82-00237, New York.

Table 4A. List of Intergovernmental Organizations Active in the Water and Land Resources Fields

Table 4B. Type of Involvement of the Organizations of the United Nations System in the Water and Land Resources Fields.

Table 4C. Activities of the Organizations of the United Nations System in the Water and Land Resources Fields

Table 4A

International Governmental Organizations Active
in the Water and Land Resources Fields

Name	Abbreviation	Address
United Nations		
United Nations	UN	Division for Natural Resources and Energy United Nations New York, 10017, USA
Administrative Committee on Coordination	ACC	United Nations New York, 10017, USA
Economic and Social Council	ECOSOC	United Nations New York, 10017, USA
Office of the United Nations Disaster Relief Co-ordinator	UNDRO	United Nations Palais des Nations CH-1211 Geneva 10, Switzerland
United Nations Industrial Development Organization	UNIDO	P.O. Box 300 A-1400 Vienna, Austria
United Nations Environment Programme	UNEP	P.O. Box 30552 Nairobi, Kenya
United Nations Centre for Human Settlements	UNCHS	P.O. Box 30030 Nairobi, Kenya
United Nations Children's Fund	UNICEF	United Nations New York, 10017, USA
United Nations Development Programme	UNDP	United Nations New York, 10017, USA
World Food Programme	WFP	FAO Via delle Terme di Caracalla 00100 Rome, Italy
Specialized Agencies and other Organizations		
International Labour Office	ILO	4 Route des Morillons CH-1211 Geneva, Switzerland
Food and Agricultural Organization of the United Nations	FAO	Via delle Terme di Caracalla Rome, Italy

Table 4a. Continued

Name	Abbreviation	Address
United Nations Educational, Scientific, and Cultural Organization	UNESCO	7 Place de Fontenoy 75700 Paris, France
World Health Organization	WHO	20 Avenue App 1211 Geneva 27, Switzerland
World Meteorological Organization	WMO	P.O. Box 5 1211 Geneva 20, Switzerland
International Bank for Reconstruction and Development (World Bank)	IBRD (WB)	1818 H Street N.W. Washington, D.C., 20433, USA
International Fund for Agricultural Development	IFAD	Via del Serafico 107 00142 Rome, Italy
International Atomic Energy Agency	IAEA	P.O. Box 100 A-1400, Vienna, Austria
International Hydrographic Organization	IHO	BP 345, Av. President J.F. Kennedy Monte Carlo MC 9800, Monaco
Organs of the United Nations		
Economic Commission for Africa	ECA	P.O. Box 3001 Addis Ababa, Ethiopia
Economic Commission for Europe	ECE	United Nations Palais des Nations CH-1211 Geneva 10, Switzerland
Economic Commission for Latin America and the Caribbean	ECLAC	Casilla 179-D Santiago, Chile
Economic & Social Commission for Western Asia	ESCWA	P.O. Box 27 Baghdad, Iraq
Economic and Social Commission for Asia and the Pacific	ESCAP	Sala Santitham, Rajadamnern Ave. Bangkok 2, Thailand
United Nations Sudano-Sahelian Office	UNSO	United Nations New York, 10017, USA
Regional Commission on Land and Water Use in the Near East (FAO)		See FAO

Table 4a. Continued

Name	Abbreviation	Address
Others		
Arab Center for the Studies of Arid Zones and Drylands	ACSAD	P.O. Box 2440 Damascus, Syria
Caribbean Meteorological Organization	CMO	P.O. Box 461 Port of Spain, Trinidad
Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel	CILSS	BP 7049 Ougadougou, Burkina Faso
Comité Régional de Recursos Hydraulicos	CRRH	c/o ICE P.O. Box 10032 San Jose, Costa Rica
Commission of the European Communities	CEC	200 rue de la Loi Brussels 1040, Belgium
Council of Europe	CE	Avenue de l'Europe 67 Strasbourg, France
Council for Mutual Economic Assistance	CMEA	Prospekt Kalinina 56 Moscow G-205, USSR
Energy Organization of the Great Lakes Countries	CEPGL	BP 58 Gisenyi, Rwanda
European Space Agency	ESA	8-10 rue Mario Nikis 75738 Paris, CEDEX 15, France
Inter-african Committee for Hydraulic Studies	CIEH	BP 369 Ouagadougou, Burkina Faso
Nordic Council	NC	Gamla Rigsdagshuset Stockholm, Sweden
Organization of African Unity	OAU	P.O. Box 3243 Addis Ababa, Ethiopia
Organization of American States	OAS	Pan American Union Building Washington, D.C., USA
Organization for Economic Co-operation and Development	OECD	Château de la Muette 2 rue André Pascal Paris, France

Table 4B

Type of Involvement of the Organizations of the United Nations System in Water and Land Resources Fields

Use and management areas	Areas of interest to IWL	Organizations with main concern in area	Organizations with applied interests in area*
A. Common Management Functions			
1. Planning, policy, legislation and administration (including river basin development planning)	Yes	UN/DTCD, FAO†, UNDP, WB, ECA, ECE, ECLAC, ESCWA, ESCAP	UNESCO†, WMO†, WHO†, UNEP† UNICEF, UNIDO, ILO, IAEA
2. Resources assessment (collection, processing, storage and dissemination of atmospheric, surface and ground-water data), including application of remote sensing and isotope techniques	Yes	WMO†, UNESCO†, IAEA, FAO†	UN/DTCD, WHO, UNDP, WB, ECA, ECE†, ECLAC, ESCWA, ESCAP, UNEP†
3. Education and training (institutions and curricula)	Yes	UNESCO†, ILO	All others
4. Water, land and human environment (quality management and pollution control)	Yes	UNEP†	All others
5. Flood control (flood loss management)	Yes	UNDRO, WMO†, ESCAP	UNDP, WB, FAO†, UNESCO†, UN/DTCD, ECE, ECE†, ECLAC, ESCWA
6. Drought management and desertification control	Yes		UN/DTCD,ECA, ECE†, ECLAC, ESCWA, ESCAP WMO†, UNDP†, WB, WFP, IFAD, UNDRO
7. Technical cooperation among developing countries		UNDP	All others

* This column indicates those organizations participating in a given area in the applied sense, such as in the context of comprehensive development planning and/or co-operation with other organizations.

† Indicates some ties between IWL and the organization.

Table 4B. Continued

Use and management areas	Areas of interest to IWL	Organizations with main concern in area	Organizations with applied interests in area*
B. Development and use for sectoral purposes			
1. Agriculture and fisheries (irrigation and drainage; rainfed agriculture; freshwater fisheries; aquaculture)		FAO, WB, WFP, IFAD	UNEP, UNESCO, WMO, ILO, UNDP, ECA, ECE, ECLAC, ESCWA, ESCAP, IAEA
2. Community water supply and sanitation		WHO, WB, UNICEF, UNDP	FAO, UN/DTCD, ECA, ECE, ELAC, ESCWA, ESCAP, UNEP, UNESCO, WMO ILO, UNCHS,
3 Ground water resources development (including exploration and well drilling)	Yes	DTCD, UNICEF, FAO†, WHO, WB	ECA, ECE†, ECLAC, ESCWA, ESCAP, UNESCO† WMO†, IAEA, UNCHS
4. Industrial water use	Yes	UNIDO	WB, UN/DTCD, FAO, UNDP, ILO, ESCWA, ECE
5. Inland navigation		ECE, ESCAP, ECLAC, ECA, ESCWA, UN/DTCD	WB, UNDP, ILO
6. Hydropower		WB, UNDP, UN/DTCD	FAO†, WMO†, UN/DTCD, ESCAP, ESCWA, ECLAC ECA, UNIDO

Table 4C
Activities of the Organizations of the United Nations System
in the Water and Land Resources Fields

Use and Management Areas	Technical Cooperation Activities			Resources Transfers Funding (loans/grants)*	Supporting Measures		
	Project Execution	Technical Advisory Services	Training		Studies and Publications	Research	Meetings, Conferences Seminars, Symposia, Workshops
1	2	3	4	5	6	7	8
A. COMMON MANAGEMENT FUNCTIONS							
1. Planning, policy, legislation and administration (including river basin development planning)	UN/DTCD, FAO, UNDP, UNESCO	UN/DTCD, FAO, ESCAP, ECLAC	UN/DTCD, FAO, UNDP, ESCAP, ECLAC, UNEP, UNESCO	WB, UNDP	UN/DTCD, ECA, ECE, ECLAC, ESCAP, ESCWA, FAO	UN/DTCD, FAO, WB, ECA, ECE, ECLAC, ESCWA, ESCAP, UNESCO	UN/DTCD, FAO, WB, ECA, ECE, ECLAC, ESCWA, ESCAP, UNESCO
2. Resources assessment (collection, processing, storage and dissemination of atmospheric, surface and groundwater data), including application of remote sensing and isotope techniques	WMO, UNESCO, IAEA, FAO	WMO, UNESCO, IAEA, UN/DTCD, FAO, ESCAP, ECLAC	UNESCO, WMO, WB, IAEA	WB, UNDP	UNESCO, WMO, ESCAP, ECLAC, IAEA	UNESCO, WMO, ESCAP, ECLAC, IAEA, UN/DTCD	UNESCO, WMO, ECE, ECLAC, ECWA, ESCAP, IAEA, UN/DTCD
3. Education and training (institutions and curricula)	UNESCO, ILO	UNESCO, ILO	UNESCO, ILO	WB, UNDP	UNESCO, FAO, ILO, WMO	UNESCO, ILO	UNESCO, WB, UN/DTCD, ESCAP, UNCHS, FAO, WMO
4. Water, land and human environment (quality management and pollution control)	UNEP in cooperation with other organizations & governments	UNEP, ESCAP, FAO, WB, WHO, UNIDO	UNEP, ECLAC, ESCAP, ILO, WHO, UNIDO	UNEP, UNDP, UNICEF, WB	UNEP, UNESCO, FAO, WMO, ECE, WHO, UNIDO	UNEP, UNESCO, FAO, IAEA, WHO	UNEP, UNESCO, FAO, WMO, WB, UNICEF, ECE, ESCAP, ECLAC, ECA, ESCWA, IAEA, UNCHS
5. Flood control (flood loss management)	UNDRO, WMO, UNESCO, WB, FAO	WMO, WB, UNESCO, UN/DTCD, UNDRO	WMO	WB, UNDP	UNDRO, WMO, UNESCO, ESCAP, WB	WMO, UNESCO, ESCAP	WMO, UNESCO, ESCAP, UNDRO, ECE
6. Drought management and desertification control	UNDRO, UNEP, UNDP, UN/DTCD	UNEP, ESCAP, FAO, UNDRO, UN/DTCD	UNEP, FAO UNDP	WB, UNDP UNEP	UNEP, FAO, WMO	UNEP, FAO, UN/DTCD, ESCWA, WMO	UNEP, FAO, UNEP, WMO, ESCAP, ECE
7. Technical cooperation among developing countries	UNDP	UNDP, WHO	UNDP, WB, IFAD, ILO	UNDP	All	All	All

* Limited funding is also available from extra-budgetary funds held in trust by other organizations, individually or jointly with certain governments.

Reference: UN, 1982, The United Nations Organizations and Water, 83-00237, New York.

Table 4C. Continued

Use and Management Areas	Technical Cooperation Activities			Resources Transfers Funding (loans/grants)*	Supporting Measures		
	Project Execution	Technical Advisory Services	Training		Studies and Publications	Research	Meetings, Conferences Seminars, Symposia, Workshops
1	2	3	4	5	6	7	8
B. DEVELOPMENT AND USE FOR SECTORAL PURPOSES							
1. Agriculture and fisheries (irrigation and drainage; rainfed agriculture; freshwater fisheries; aquaculture)	FAO, WB, UNDP	FAO, WB, UNDP	FAO, WB, UNDP, ILO	WB, UNDP, IFAD	FAO, WB, ECE, ESCAP	FAO, WB	FAO, WB, UNDP, ILO, ESCAP, ESCWA
2. Community water supply and sanitation	WHO, UNDP, WB, UNICEF, UN/DTCD, UNCHS	WHO, WB, UNICEF, FAO, UN/DTCD, UNEP, ESCAP, UNCHS	WHO, WB, UNICEF, UNDP, UNCHS, ILO	WHO, WB, UNICEF	WHO, WB, UNDP, UNICEF, UNCHS	WHO, WB, UNICEF, UNCHS	WHO, WB, UNDP, UNICEF, FAO, UN/DTCD, ECA, ESCAP, ECE, ECLAC, ESCWA, UNCHS
3. Ground water resources development (including exploration and well drilling)	UN/DTCD, UNICEF, FAO, WHO, WB	UN/DTCD, UNICEF, FAO, WHO, WB, ESCAP	UN/DTCD	UNICEF, WB	UN/DTCD, UNICEF, FAO, WHO, UNESCO, WMO, ECA, ECE, ECLAC, ESCWA, ESCAP	ECWA	UN/DTCD, UNICEF, FAO, WHO, UNESCO, WMO, ECA, ECE, ECLAC, ESCWA, ESCAP, UNCHS
4. Industrial water use	UNIDO, WB	UNIDO, WB		WB, UNDP	UNIDO, ECE	UNIDO, ECE	UNIDO, UN/DTCD, ECE, ESCWA
5. Inland navigation		ESCAP, ECLAC, UN/DTCD	ILO	WB	ESCAP, ECLAC	ECLAC	ESCAP, ECLAC, ESCWA, ECE
6. Hydropower	UN/DTCD	FAO, WB, UNDP, (OPE), UN/DTCD		WB, UNDP	ESCAP		UN/DTCD

Appendix 5

International Nongovernmental Organizations
with Water and Land Resources Interests

International Nongovernmental Organizations (NGOs) are international organizations which are not established by intergovernmental agreement. These include organizations which accept members designated by government authorities, provided that such membership does not interfere with the free expression of views of the organization.

The NGOs dealing with land and water resources are listed alphabetically in Table 5A. They may pertain to any of the following categories:

(a) Federations of international organizations
(b) Universal membership organizations
(c) Inter-continental membership organizations
(d) Regional membership organizations
(e) Semi-autonomous bodies
(f) Organizations of special form

Table 5A. List of International Nongovernmental Organizations with Water and Land Resources Interests

Table 5B. Proposed Structure for Evaluating the Usefulness to IWL of International Nongovernmental Organizations with Water and Land Resources Interests

Table 5A
List of International Nongovernmental Organizations
with Water and Land Resources Interests

Name	Abbreviation	Address
International Association of Hydrogeologists	IAH	Markstraat 1 P.O. Box 9090 NL-6800 GX Arnheim, Netherlands
International Association of Sedimentologists	IAS	Université de Liège Place du Vingt-Août 7 B-4000 Liège, Belgium
International Association of Theoretical and Applied Limnology	IAL	Michigan State University Hickory Corners, MI
International Association for Water Law	IAWL	Via Montevideo 5 I-00198 Rome, Italy
International Association for Water Pollution Research and Control	IAWPR	Alliance House 29-30 High Holborn London, WC1V 6BA, UK
International Council of Scientific Unions	ICSU*	Bd de Montmorency 51 F-75016 Paris, France
- Committee on Space Research	COSPAR	see ICSU
- Committee on Science and Technology in Developing Countries	COSTED	see ICSU
- Committee on Data for Science and Technology	CODATA*	see ICSU
- Committee on Water Research (ICSU-UATI)	COWAR*	see ICSU
- Scientific Committee on Problems of the Environment	SCOPE*	see ICSU
- Federation of Astronomical and Geophysical Services	FAGS*	SGNM/DEC Avenue Pasteur 2 F-94160 Saint-Mandé, France
International Union of Geodesy and Geophysics (member of ICSU)	IUGG*	Observatoire Royal Avenue Circulaire 3 B-1180 Brussels, Belgium
- International Association of Hydrological Sciences	IAHS*	Maclean Building Wallingford, OX10 8BB, UK
- International Association of Meteorology and Atmospheric Physics	IAMAP	National Center for Atmospheric Research P.O. Box 3000 Boulder, CO, 80307, USA

* Indicates some links with IWL

Table 5A. Continued

Name	Abbreviation	Address
International Union of Geological Sciences (member of ICSU)	IUGS*	Maison de la Géologie Rue Claude-Bernard 77 F-75005 Paris, France
International Geographical Union (member of ICSU)	IGU*	University of Alberta Edmonton, T6G 2H4, Canada
International Institute for Applied Systems Analysis	IIASA*	A-2361 Laxenburg, Austria
International Organization for Standardization	ISO*	Rue de Varembé 1 CH-1211 Geneva 20, Switzerland
International Society of Soil Science	ISSS	P.O. Box 353 9 Duivendall NL-6700 AJ Wageningen, Netherlands
International Training Centre for Water Resources Management	ITCWRM (CEFIGRE)	BP 13, Sophia Antipolis F-06561 Valbonne CEDEX, France
International Union for Conservation of Nature and Natural Resources	IUCN*	Avenue du Mont-Blanc CH-1196 Gland, Switzerland
International Water Resources Association	IWRA	1, Queen Anne's Gate London SW1H 9BT, UK
International Association for Hydraulic Research	IAHR*	Rotterdamseweg 185 P.O. Box 177 NL-2600 MH Delft, Netherlands
International Commission on Large Dams	ICOLD*	Bld Haussmann 151 F-75008 Paris, France
International Commission of Irrigation and Drainage	ICID*	48 Nyaya Marg Chanakyapuri New Delhi 110021, India
World Energy Conference	WEC	34 St-James Street London SW1A 1HD, UK
Arctic Ocean Science Board		
International Association for Sediment Water Science		

Table 5A. Continued

Name	Abbreviation	Address
International Glaciology Society		
International Reference Centre for Community Water Supply and Sanitation		
International Training Centre for Water Resources Management		
International Society for the Prevention of Water Pollution	ISPWP	
International Association for Great Lakes Research	IAGLR	
International Association for the Physical Science of the Ocean	APSO	
International Association of Theoretical and Applied Limnology		
International Irrigation Information Center	IIIC	
International Water Supply Association	IWSA	
International Mine Water Association	IMWA	
Inter-American Center for the Integral Development of Water and Land Resources		
International Center for Living Aquatic Resources Management		

Table 5B
Proposed Structure for Evaluating
the Usefulness to IWL of International Nongovernmental Organizations
with Water and Land Resources Interests

	Use and Management Areas											
	A. Common Management Functions							B. Development and Use for Sectoral Purposes				
	1	2	3	4	5	6	7	1	2	3	4	5	6
ICSU -- International Council of Scientific Unions													
IUGG International Union of Geodesy and Geophysics													
IAHS--International Association of Hydrological Sciences													
ICSW--International Commission on Surface Water													
ICGW--International Commission on Ground Water													
ICCE--International Commission on Continental Erosion													

Legend: Use and Management Areas

A. Common Management Functions

1. Planning, policy, legislation and administration (including river basin development planning).
2. Resources assessment (collection, processing, storage and dissemination of atmospheric, surface and ground water data), including the application of remote sensing and isotope techniques.
3. Education and training (institutions and curricula).
4. Water, land and human environment (quality management and pollution control).
5. Flood control (flood loss management).
6. Drought management and desertification control.
7. Technical cooperation among developing countries.

B. Development and Use for Sectoral Purposes

1. Agriculture and fisheries (irrigation and drainage, rainfed agriculture; freshwater fisheries; aquaculture).
2. Community water supply and sanitation.
3. Ground water resources development (including exploration and well drilling).
4. Industrial water use.
5. Inland navigation.
6. Hydropower.

Table 5B. Continued

	Use and Management Areas												
	A. Common Management Functions							B. Development and Use for Sectoral Purposes					
	1	2	3	4	5	6	7	1	2	3	4	5	6
ICSI--International Commission on Snow and Ice													
ICWQ--International Commission on Water Quality													
ICWRS--International Commission on Water Resources Systems													
ICRSDT--International Committee on Remote Sensing and Data Transmission													
IAMAP--International Association of Meteorology and Atmospheric Physics													
IUGS--International Union of Geological Sciences													
IAH--International Association of Hydrogeologists													
IAS--International Association of Sedimontologists													
AGID--Association of Geoscientists for International Development													
IGU--International Geographical Union													
ICSU Scientific and Special Committees													
SCAR--Scientific Committee on Antarctic Research													
SCOPE--Scientific Committee on Problems of the Environment													

Table 5B. Continued

	Use and Management Areas												
	A. Common Management Functions							B. Development and Use for Sectoral Purposes					
	1	2	3	4	5	6	7	1	2	3	4	5	6
SCOR--Scientific Committee on Oceanic Research													
CODATA--Committee on Data for Science and Technology													
COSTED--Committee on Science and Technology in Developing Countries													
COWAR--Committee on Water Research													
FAGS--Federation of Astronomical and Geographical Services													
ICSU Scientific Associates													
IUFRO--International Union of Forestry Research Organizations													
ICSTI--International Council for Scientific and Technical Information													
ISSS--International Society of Soil Science													
IAWPRC--International Association on Water Pollution Research and Control													
Other Scientific Organizations													
APMS--Aquatic Plant Management Society													
IUCN--International Union for Conservation of Nature and Natural Resources													
ICAE--International Commission of Agricultural Engineers													
ICID--International Commission on Irrigation and Drainage													

Table 58. Continued

	Use and Management Areas											
	A. Common Management Functions							B. Development and Use for Sectoral Purposes				
	1	2	3	4	5	6	7	1	2	3	4	5	6
ICOLD--International Commission on Large Dams													
IAHR--International Association on Hydraulic Research													
IAWL--International Association for Water Law													
IWRA--International Water Resources Association													
IIASA--International Institute for Applied Systems Analysis													
ILEC--International Lake Environment Committee													
ISEM--International Association of Ecological Modelling													
ISO--International Standards Organization													
ISTAL--International Society for Theoretical and Applied Limnology													
IASWS--International Association for Sediment Water Science													
IAGC--International Association of Geochemistry													
IAGLR--International Association for Great Lakes Research													
IAS--International Association of Sedimentologists													
IBS--International Biodeterioration Society													

Table 5B (Continued)

	Use and Management Areas											
	A. Common Management Functions							B. Development and Use for Sectoral Purposes				
	1	2	3	4	5	6	7	1	2	3	4	5	6
IBSRAM--International Board for Soil Research and Management													
IGS--International Glaciological Society													
IOLM--International Organization of Legal Metrology													
IPS--International Peat Society													
ITSC--Toxicity Testing Symposium Committee													
IASWS--International Association for Sediment Water Science													
WAM--European Wave Modelling Group													

Appendix 6

Terms of Reference for the Task Force Review

Government of Canada / Gouvernement du Canada

MEMORANDUM NOTE DE SERVICE

R. BILL/IW/LD/RCPE/997-3821/1g

SECURITY - CLASSIFICATION - DE SECURITE
OUR FILE/NOTRE REFERENCE
YOUR FILE/VOTRE REFERENCE
DATE: FEB 24 1987

TO/A: IW/L HQ and Institute Directors

FROM/DE: Director General
Inland Waters/Lands Directorate

SUBJECT/OBJET: International Water-related Activities and Obligations of IW/LD

The work of IW/LD related to international activities is to provide the expertise and knowledge on water and land management required to meet the Department's mandate.

The nature of our water programmes often requires that we maintain regular contact between Canada, international organizations and other countries. Canada is a leader in some aspects of water management and research, but always there is something to be learned from the work of others.

Our network of contacts depends in part upon personal links by individuals, as well as official linkages. I want to ensure that this flexibility is maintained. However, I would also like to ensure that IW/LD is gaining as much as possible as an organization from our international contacts, and that we are making the correct resource allocation decisions in the international arena.

I have asked RCPE to lead a task force review of the international water-related activities of the Directorate from this perspective. Terms of Reference and background notes for this review are attached. In order that all appropriate information is considered in this review, I would like each of you to nominate one member of your staff to participate.

Richard Bill, International Programs Officer, RCPE will lead the study. Please identify your representative directly to him at (819) 997-3821 by February 27.

I would like this review to be completed by July 31, 1987.

for D.A. Davis

Attach.

c.c.: J. Reid, ERD, CPG
Regional Directors

IW/LD International Water-related Activities Task Force

Terms of Reference

1. Identify all IW/LD international activities - formal and informal, bilateral and multilateral - of each Branch and Research Institute and the extent to which they contribute to DOE national objectives. Include a discussion of the costs associated with these activities.

2. Identify any significant gaps or duplications in IW/LD coverage of international water management issues.

3. Develop a strategy for IW/LD international activities, focussing on:

   a) IW/LD's international priorities
   b) the way in which IW/LD should address these priorities (e.g. mechanism, personnel, level of commitment, etc.)
   c) Resource requirements
   d) Timing of inputs

4. Submit a report to the Director General by July 31, 1987 which identifies options available for improving the involvement of IW/LD staff and facilities in international activities while meeting national mandate needs.

1987-02-20

International water-related activities and obligations of IW/LD

Background information

The role of IW/LD water related activities is to support federal government policies and departmental priorities for international involvement.

Federal policies

Federal government direction for Canada's international Science and Technology relations has remained the same since 1982. This is based upon developing the following strategy:

- potential economic benefit to Canada is the major consideration in the selection of research activities, and our international partners, on a bilateral or multilateral basis;
- collaboration with other western industrialized countries should receive particular attention;
- increasing collaboration with newly industrialized countries should be given consideration, outside the context of development assistance;
- the favoured programs will involve and draw upon Canadian expertise in industrial, university and provincial research sectors as well as the federal government;
- umbrella agreements in science and technology are to be concluded on an exceptional basis, and only when there are compelling reasons, and only when they are subject to periodic review and when they contain explicit provisions for termination.

In order to provide the thrust, direction and resources for such a strategy, federal departments are directed more assiduously to consider international science and technology collaboration and, where this is of potential economic benefit to Canada, make resources available for such collaboration.

Departmental priorities

In support of this federal government direction, the Department has set itself three major objectives:

- employ the resources and instruments of the international system to fulfill the Department's own mandate so that it may, within the terms of that mandate, meets its priorities in the fullest measure.
- identify and manage external environmental threats or problems which might adversely affect the quality of life and the economic well-being of Canadians.
- make a special contribution to Canadian foreign policy in two specific areas: international economic relations and foreign aid.

This is a general framework within which IW/LD has to work and within which it can emphasize its roles and develop its strategies for effective activity.

.../2

IW/LD international water-related activities

IW/LD provides the expertise for the Department on fresh water management and scientific research and monitoring. Our records indicate that IW/LD is participating in the work of at least 52 international organizations with water-interests, and as many as 28 bilateral agreements with other countries. This degree of involvement needs rationalizing. However, it is an example of the extent to which we have become a partner in the world water science and management while helping to develop and maintain IW/LD expertise and knowledge on national and regional water-related issues in Canada.

Appendix 7

Task Force Membership

RCPE	Richard Bill, International Programs Officer, Water Programs Coordination Division, IW/LD, Environment Canada, Ottawa, Ontario, K1A 0E7 (819) 997-3821
NHRI	Walter Nicholaichuk, Head, Watershed Management, Surface Water Division, NHRI, 11 Innovation Boulevard, Saskatoon, Saskatchewan (306) 975-5511
NWRI	Ralph Daley, Chief, Science Liaison Division, NWRI, 865 Lakeshore Road, Burlington, Ontario, L7R 4A6 (416) 336-4503
WQB	Adrian Demayo, Head, Surveys & Interpretive Services Section, WQB (7th floor), IW/LD, Environment Canada, Ottawa, Ontario, K1A 0E7 (819) 997-3423
Lands	Ian Crain, Chief, Canada Land Data Systems, Lands Branch (10th floor), IW/LD, Environment Canada, Ottawa, Ontario, K1A 0E7 (819) 999-5051
WRB	John Power, Senior Hydrologist, Hydrology Division, Water Resources Branch (8th floor), IW/LD, Environment Canada, Ottawa, Ontario, K1A 0E7 (819) 953-3677
WP&M	Peter Reynolds, Head, Economic Analysis Section, WP&M (9th floor), IW/LD, Environment Canada, Ottawa, Ontario, K1A 0E7 (819) 953-1514
Observers	David LeMarquand and Nicole Jasmin, External Relations, Corporate Planning Group, Environment Canada, Ottawa, Ontario, K1A 0H3

Appendix 8

Synopsis of the 1975 Paper on IWD International Activities

In 1975 a report, entitled "Multi-lateral International Organizations: An IWD Perspective", was prepared as a review of the Directorate's international activities.

It was stated in the Introduction:

- decisions regarding IWD multilateral international involvement are reactive to individual requests or programs;
- more effective participation might be possible if a systematic review is taken periodically;
- there is a need to take a Directorate-level decision as to international involvement pending Department-wide policy and direction;
- the report was prepared with two objectives in mind
  - i) to provide an information base for broader (Service or Departmental level) analyses,
  - ii) to provide guidance for internal decisions in the immediate future;
- the report conclusions could best serve as guidelines because day-to-day circumstances will override firm recommendations.

The main criteria for IWD international involvement were proposed to be:

1. The extent to which international programs contribute to IWD and DOE objectives;
2. Its usefulness in improving knowledge and in developing specific expertise;
3. Its potential for improving federal-provincial cooperation in the water field.

The recommended emphases in international activity were to be:

1. <u>To assist in fulfilling our national mandate</u>
   - where Canada's competence could be raised by coordinating our national research projects with similar efforts in other countries; or,
   - where Canadian participation is likely to improve our capability to manage Canada's water resources.
2. Assist other countries by adapting Canadian guidelines on scientific or technical subjects for use in other countries.

(This was seen as a cheap way of transferring Canadian knowledge abroad.)

By these means it was suggested that the total P/Ys involved in international activities in the Directorate could be cut from 8.6 to 5.5 over a two-year period.

The underlying concern in 1975 was, as now, how to optimize IWD activities within work-force and financial constraints.

Appendix 9

Synopsis of the 1982 Federal Policy for International Science and Technology Involvement

Federal government direction for Canada's international science and technology relations was set in 1982. This was based upon developing the following strategy:

- major consideration is the potential economic benefit to Canada; this should be the basis of the selection of research activities and international partners, be they bilateral or multilateral;
- particular attention should be given to collaboration with other western industrialized countries;
- consideration should be given to increasing collaboration with newly industrialized countries, but outside the context of development assistance;
- favoured programs will involve and draw upon Canadian expertise in industrial, university and provincial research sectors, as well as those of the federal government;
- umbrella agreements in science and technology are to be concluded on an exceptional basis, subject to periodic review, and only when they contain explicit provisions for their termination.

In order to provide the thrust, direction, and resources for such a strategy, federal departments were directed more assiduously to consider international science and technology collaboration and, where this is of potential economic benefit to Canada, to make resources available for such collaboration.

Appendix 10

Synopsis of References to International Activities

in

"Currents of Change"

(The Final Report on Federal Water Policy, The Pearse Commission, 1984)

Other International Activities

Canada's international interests in water extend beyond relations with the United States. Canada participates in the work of a number of international organizations that have an interest directly in water development and management, or indirectly in monitoring, research, technology, development, law, or policy that supports these activities: the United Nations Environment Programme, World Meteorological Organization, World Health Organization, Economic Commission of Europe, United Nations, International Maritime Organization, North Atlantic Treaty Organization, and the Organization for Economic Cooperation and Development.

Much international activity is directed at providing financial and technical assistance for third world development. Canada does this directly through the Canadian International Development Agency and non-governmental organizations, and indirectly through the United Nations and other multinational development agencies.

Some activities are directed at creating international conventions and treaties, which may be translated into Canadian legislation. Other activities aim to promote the development of international law and policy in the water resources and environmental area. The Organization for Economic Cooperation and Development is involved in developing environmental policies appropriate to industrialized countries and the implications for international trade. These activities are only indirectly concerned with the management of Canada's water resources, so they are beyond this inquiry's terms of reference.

Source: Page 82 of The Final Report.

Appendix 11

A Review of the International Aspects of the Department's Submission to the Pearse Commission

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Although the final report of the Pearse Commission did not really consider the international aspects of federal water policy, a submission was made to the Commission by Environment Canada in December, 1984 which included consideration of international aspects.

The relevant submission details were only one page in length. They summarized the current situation and then presented issues and options.

Canadian Involvement

Canadian overseas involvement was through bilateral aid and through fostering scientific advancement; these were to promote development and benefit Canada scientifically and commercially.

This overseas help was being done in three ways: through the UN Family, other multinational organizations, and through international scientific organizations.

Canadian help was in the form of grants and loans, field expertise, training and development, and participation and presentations at meetings of scientific organizations.

Issues and Options

Environment Canada proposed:

- to develop, step by step, a specific international policy and identify this in the Department's strategic plan;
- consider four options for assisting developing countries;
  - i. status quo,
  - ii. status quo, plus including training programs in departmental work plans,
  - iii. develop water experts for long and short term assignments to developing countries, and
  - iv. increase funding when possible;
- foster scientific and technical exchanges by:
  - i. continuing priority assistance to deal with international water-related problems,
  - ii developing bilateral relations with other northern countries,
  - iii. entering "into discussions with External Affairs regarding the possibility of setting up a Northern Environmental Community."

Appendix 12

Synopsis of IWD 1986 Results Definition Study
Reference to International Activities

In February 1986, the Inland Waters Directorate developed a Results Definition Model to articulate more precisely the results for which the Directorate is accountable and how the results contribute to the broad mosaic of Canadian water needs. This model was developed in order to obtain a perspective considered to be representative of the general public.

In the model, activities of the Directorate are linked to various strategies in a way that shows their interrelations and how their resulting effects contribute to the identified needs.

Four of the stated needs have international elements. They are:

A. Provision of leadership and direction to promote management of the water resource on a sustainable basis.

B. Participation in the implementation of various water agreements and representation of Canada on international organizations and the IJC.

D. Reliable and compatible water data useful for water managers across Canada.

E. World-class expertise and knowledge on water science and issues of national significance exists in Canada and is readily accessible to DOE and Canadian water managers.

There are numerous activities that contribute to these needs and they have been summarized to the effect "Canadian obligations to international water resource organizations are met!" In general internatinal activities are considered as adjuncts to national programs.

By and large, international activities are not listed specifically in the model. However, they are identified in the more detailed models for needs A, B and E. The detailed model for need E (Research) stresses the need for international recognition of the Institutes and the importance of international activities, by listing the contribution made by IWL to helping international water organizations meet their goals. This help is accomplished by encouraging staff to publish in international scientific literature and to become more visible and accessible to the national and international science communities. The identified activities include:

- serving on international, national boards, working groups, etc.;
- promoting, organizing and participating in international, national conferences, workshops and training courses;
- reviewing and refereeing scientific papers and reports.

Appendix 13

The 1986 Departmental Statement of International Policy

STATEMENT

OF

INTERNATIONAL POLICY

Prepared by the External Relations
Directorate
Corporate Planning Group

November 1986

TABLE OF CONTENTS

INTRODUCTION

Environmental problems are not confined to any one country. They transcend national boundaries and their analysis and solution require international co-operation. Critical issues, such as the control of pollution, the conservation of resources and the protection of wildlife, call for agreement between nations on the measures to be taken, and these measures must be based on shared knowledge and arrangements for mutual assistance.

The Department of the Environment (DOE), since it was created, has had the responsibility for developing the policies and programs which will enable Canada to resolve its national environmental problems; it is also a source of expert advice to Canadians on environmental matters. If it is to fulfil its mandate, the Department must keep the international aspect of its activities constantly in mind.

Environmental concerns have become an important factor in Canada's diplomatic relations. International treaties concerning environmental questions have been signed by the Canadian government, and these create precise obligations for the Department. In other spheres there are international commitments accepted by Canada which have environmental implications. Both types of situation make it necessary for DOE to involve itself directly in the work of international organizations, such as the specialized agencies of the United Nations, the Organization for Economic Co-operation and Development (OECD) and others.

Moreover, the Department has responsibilities within Canada which cannot be fully discharged unless use can be made of the resources of the international system of co-operation. Examples can be found in the areas of wildlife protection, water resources management, meteorology, and elsewhere.

With all these considerations in mind, DOE has allocated a significant part of its resources to international activities. It has, moreover, felt the need to formulate systematically a policy governing its international activities, so that it may play still more effectively its dual role as an instrument of policy and an advisor.

A proposed outline of this policy is to be found in the following pages.

DOE INTERNATIONAL POLICY

The international policy of DOE is based on three major objectives, the first and most important of which is **to employ the resources and instruments of the international system to fulfil the Department's own mandate so that it may, within the terms of that mandate, meet its priorities in the fullest possible measure.** To this end DOE seeks to rationalize its international activities and commitments. Examples of those activities are: participation in the World Meteorological Organization (WMO) in order to obtain scientific knowledge which can be used to enhance the quality of Canada's meteorological service; the signature of agreements with the United States for the purpose of improving water resources management; and adherence to international conventions for the protection of wildlife.

It is considered that DOE can make its international action most effective through the adoption of a "management-by-issue" approach. The acid rain question is an example of a problem to which this approach is already being successfully applied. While continuing its current participation in international activities, DOE will seek to define its priorities with greater precision, and to identify the instruments which it can most suitably use for meeting them.

The Department will also take the opportunity afforded by its participation in international activities to transmit its broader concerns to international organizations. These include the acceptance, by such

organizations, of the principles of conservation and renewable resources management, the aim of which is to ensure sustainable development. Steps in this direction have already been taken in the OECD Environment Committee, which has been invited by DOE, on a number of occasions, to focus its programs more sharply on aspects of conservation.

The second international policy objective is intended to enable the Department to play a more active and long-term role on the international scene. It is defined as follows: **to identify and manage external environmental threats or problems which might adversely affect the quality of life and the economic well-being of Canadians.** The underlying concept is that of international environmental security, which includes, as an essential element, the assumption that the vital interests of Canada, as a separate geopolitical entity, may be affected by threats to its environment, natural and human, from outside its boundaries. DOE's task is to use its special expertise for the purpose of identifying and warding off such threats, as in the case of acid rain.

The final objective of the Department's international policy is **to make a special contribution to Canadian foreign policy in two specific areas: international economic relations and foreign aid.**

All federal departments must work towards achieving the main objectives of Canada's foreign policy. DOE is already playing a role with respect to some of them; for example, it provides support to the United Nations Environment Programme (UNEP), sends experts to assist developing countries and,

in the economic sector, advises on exports of environmental technologies. Therefore, in terms of this third objective, DOE's task is to define more clearly what its contribution should be, and to make that contribution as cost-effective as possible.

PROPOSED STRATEGY

First objective: to employ the resources and instruments of the international system to fulfil the Department's own mandate so that it may, within the terms of that mandate, meet its priorities in the fullest possible measure.

In order to achieve this objective DOE has defined a number of priority areas which include: toxic substances, acid rain, water resources management, climate, protection of Canada's natural and cultural heritage, and the North.

Within the framework of multilateral co-operation special attention will be given to the following intergovernmental organizations: the OECD, the United Nations Economic Commission for Europe (ECE), the WMO and the UNEP. It appears that these are the organizations which will, in the short run, provide the greatest opportunities for the exchange of environmental information, the harmonization of action between industrialized countries and the promulgation of environmental legislation. There are, moreover, some non-governmental organizations which can also play a useful role in the exchange of information and in scientific co-operation. At this stage, the following are being kept in mind: the International Union for Conservation of Nature and Natural Resources, the International Association of Hydrological Sciences, the International

Council of Scientific Unions and the International Organization for Standardization. Special attention will also be given to international conventions which place obligations on DOE, or in which it has an interest, in order to determine whether these instruments need to be strengthened.

In the search for solutions to the problems covered by the first objective, recourse should also be had to other means of intervention, such as bilateral co-operation. This latter approach is often more pertinent to the interests of Canada than action taken through the multilateral organizations. Therefore, DOE should give priority to its bilateral relations with the following countries: the United States, the Federal Republic of Germany, Great Britain, France, Japan, Australia, the Scandinavian countries and the USSR. These countries are of primary interest because their level of industralization is comparable to that of Canada, they are experiencing similar environmental problems and they possess scientific resources equal, or sometimes superior, to those of this country. DOE's effort should be directed towards scientific co-operation, exchange of information and technology transfer.

Second objective: to identify and manage external environmental threats or problems which might adversely affect the quality of life and economic well-being of Canadians.

To achieve this objective, the Department will pay special attention to two specific geographical areas in which certain actions could threaten the Canadian environment: the circumpolar North and the United States.

DOE is already involved in bilateral co-operative projects with some of the circumpolar countries; this type of co-operation should, however, be further strengthened by formalizing certain bilateral exchanges, in particular those with the USSR and Norway. With this in mind, DOE will give priority to the following areas of co-operation: Arctic fauna, ecological reserves and northern parks, atmospheric science (Arctic haze) and pollution prevention.

On the other hand, the number of environmental issues associated with the Arctic is so vast that it has to be complemented by multilateral action, such as seminars or symposia involving the actors in the circumpolar sphere, or the negotiation of an international convention on the protection of the Arctic as a unique ecosystem.

The United States is still by far the most important partner in Canada's bilateral relations. It is the only country with which Canada shares a 7 000 km border, traversing hundreds of square kilometers of boundary waters. Because of the special nature of this relationship, DOE has already negotiated some forty co-operative agreements with the United States in almost every area of environmental concern, ranging from parks to acid rain. Nevertheless, the relationship is characterized not only by co-operation but also by diverse conflicts arising from situations on the border which can have a direct impact on the territory of Canada; examples are hydroelectric dam construction, mining projects and the dumping of toxic wastes.

Canada has a good knowledge of the problems which it shares with its neighbour; in the past, however, its actions were often the result of piecemeal

policy. With a view to achieving more satisfactory relations with the United States, DOE has developed a strategy paper identifying more precisely the environmental issues involving both countries. The analysis covers both the topics which give rise to adversarial relations, such as acid rain and toxic chemicals, and those which are the subject of co-operation action, such as parks, wildlife, meteorology and so on. The paper describes the steps required to solve the existing problems insofar as they affect Canada; at the same time it establishes the basis for a more comprehensive view of the overall relationship.

The second objective also comprises threats of a global nature; DOE's concern is with their effects on the Canadian environment. It is suggested that priority status should also be given to the following areas: toxic substances, marine pollution, depletion of the ozone layer and climatic change.

In the world as a whole, there is considerable consensus on the degree of seriousness of most of these threats, viewed globally. Some of them are already covered by the World Conservation Strategy which DOE will have to implement with regard to Canada. Furthermore, DOE is already involved in a number of related international activities and agreements, for example: the Convention on Long-Range Transboundary Air Pollution (LRTAP) and the Convention for the Protection of the Ozone Layer.

With a view to finding solutions in each of the proposed priority areas, DOE will work towards the establishment of a strategy for international

co-operation, as was done in the case of acid rain. In the latter area, action had already been taken to secure a bilateral agreement with the United States, which took shape in the Memorandum of Intent on Transboundary Air Pollution, signed on August 5, 1980. Nevertheless, the lack of political will in the United States Administration made it necessary for Canada to work through the ECE, by becoming party to the Convention on LRTAP in 1981. Continuing American resistance has obliged Canada to form environmental alliances with other countries, including the Scandinavian states, for the purpose of maintaining pressure on the United States Administration. Dialogue with the United States has, however, improved significantly since the Reagan-Mulroney Summit of March 1985 and the appointment of two special envoys to address the acid rain issue. Canada will nevertheless continue to maintain its European link for the purpose of multilateral action. This is exemplified by its action in signing a protocol to the Convention on LRTAP on July 9, 1985, in Helsinki, Finland; the document commits the signatory governments to effect, by 1993, a reduction in the annual sulphur emissions within their territories, or in the transboundary flow of such emissions, equivalent to a 30% decrease from 1980 levels. A similar type of analysis should be undertaken for the other priorities with strong emphasis on the long-term perspective.

Third objective: to make a special contribution to Canadian foreign policy in two specific areas: international economic relations and foreign aid.

International economic relations is a major area of Canada's foreign policy and, in accordance with the third objective of its international policy, DOE proposes to make a contribution in this area under two specific headings: the export of Canadian environmental technology and international tourism.

The other foreign policy sector with which DOE intends to concern itself is foreign aid. It is proposed, in this regard, that the Department continue to develop its relations with the Canadian International Development Agency (CIDA) in order to ensure that Canada's actions contribute to a sound, coherently planned development of renewable resources in the developing countries. The management and conservation of resources in these countries is a matter of crucial importance for Canada. Unsatisfactory practices could result in heavy demands on Canadian resources, and thereby have an impact on the Canadian environment. While DOE is already participating in the effort to improve resource management through such international agencies as UNEP, or by sending experts directly to the countries concerned, it could appropriately decide to define for itself a more precise long-term role. For example, it could collaborate with CIDA in seeking remedies for the African crisis. A first step in this direction would be to identify priority areas in which DOE could make a special contribution, such as land use, hydrology and climatology. This is a new perception of Canada's environmental role in the developing countries, and it is due to the recognition that, although large organizations like UNEP or the Food and Agriculture Organization of the United Nations have a major part to play, their actions need to be supported through more specific activities. This is an application of the celebrated motto of the Audubon Society: "Think globally but act locally".

CONCLUSION

The policy outlined in this paper offers DOE a variety of options with respect to lines of approach and specific actions. It provides a basis on which precise, coherently interrelated strategies may be built, thereby providing the Department with the means for more effective action on the international scene, undertaken for the purpose of fulfilling its fundamental mandate: ~~protection of the Canadian environment.~~ to contribute to the management of resources held in common by all Canadians.

Appendix 14

Synopsis of the Federal Government INNOVACTION Strategy
and Its Relevance to International Activities

INNOVACTION is the federal government's 1987 strategy to support its commitment to science and technology. It is based upon the National Science and Technology Policy, signed on March 12, 1987.

The main points are:

- Competition is the key to Canada's economic survival.
- There must be a constant effort to stay at the leading edge of scientific development.
- Almost all technology is developed outside Canada.
- The federal government will work to strengthen bilateral arrangements with other countries.
- The federal government will provide financial support for Canada's technology centres through:
  - . the Technology Outreach Program
  - . the Unsolicited Proposals Program
  - . encouraging new research and development partnerships in Canada and internationally
  - . encouraging greater cooperation between universities and industry in multidisciplinary research needed for strategic technologies
  - . encouraging greater private sector investment
  - . providing adequate research facilities
  - . assisting adjustment to technological change
  - . promoting a science-oriented culture through:
    - education and public awareness
    - science and technology as national priorities.

Appendix 15

Synopsis of the Study of Environmental Reporting in Canada
by the Stakeholder Group on Environmental Reporting, March 1987

The Stakeholder Group on Environmental Reporting consists of representatives from industry, labour, consumers, environmental groups, provincial and federal governments, and scientific advisors. It was set up in 1985 to consider old and recommend any new systems for future environmental data collection and reporting. Environmental reporting is the systematic measurement, collection, storage/retrieval and publication of environmental and resource data which focus on interactions between human activity and the environment. There is direct relevance of the report to IWL international activities.

The Group recommended:

- a long-term comprehensive plan for the collection and management of reliable, credible, and publicly accessible environmental quality and resource data
- the setting up of a permanent, independent environmental reporting agency and an advisory council on environmental reporting
- the agency should be responsible for the development of this plan
- the council would be drawn from national interests, it would have a small secretariat, and would guide the work of the agency
- the scope of environmental reporting would cover all human activities affecting the environment, and the health of natural resources
- data quality control was very important
- data must be publicly accessible and widely publicized
- the new plan must be accompanied by a strong educational effort
- the new plan for environmental reporting should be linked to and be compatible with international environmental information systems such as UNEP GEMS, Unesco MAB and ICSU CODATA.

The last recommendation is the most relevant. It places the onus on organizations such as Environment Canada, IWL, to ensure that its data gathering is done on a compatible basis with other countries or international systems. IWL is already doing this through the ISO and other such organizations, but this Stakeholder Group reinforces the need for maintaining international links and compatibility in research and operations.

Most member countries of OECD are developing environmental reporting systems, and several NGOs as well. OECD itself produced an environmental data compendium in 1985. In addition to UNEP, Unesco and ICSU, other UN agencies, such as FAO, the ECE (Economic Commission for Europe) and the WRI (World Resource Institute) have created international data bases.

Appendix 16

Task Force's Contribution on International Water Relations
to the Federal Water Policy (November 1987)

18. INTERNATIONAL WATER RELATIONS

Until recently, Canada's management of its freshwater resources involved dealings with few countries other than the United States. This limited international involvement was in support of humanitarian assistance and the export of Canadian technology, both of which are becoming increasingly important and warrant continued federal support.

It is now recognized, however, that Canada's water is an interdependent part of a finite global water system. Consequently, the quality and quantity of Canada's water depend, to a considerable extent, upon international efforts to minimize environmental degradation. Canada is committed to conserving and protecting the quality of these water resources. Accordingly, it will continue its participation in various international organizations and forums in the ongoing effort to reduce such global problems as the long range transport of air pollutants, man-induced climate change and desertification.

The general objectives of the federal government's international water management activities are to maximize the potential economic benefit to Canadians by encouraging international, multilateral and bilateral collaboration in the development of water management knowledge, expertise and technology; to provide humanitarian assistance in alleviating water problems; and to encourage the reduction of environmental damage by man to the biosphere. The federal government is obliged to assess environmental effects when considering assistance to other nations.

The federal government is committed to increased collaboration with other nations in freshwater research and management, and to encouraging other levels of government, research institutions and industry within Canada to co-operate in such international collaboration and to protect and advance Canada's economic interests abroad.

To achieve these commitments, the federal government will continue its support of international water activities through:

- support for the United Nations and other multilateral institutions active in international water research, water management and related environmental fields;
- encouragement of international efforts to reduce global environmental degradation;
- provision of training and of humanitarian, economic, scientific and technical assistance to other countries in the management of water quality and quantity and
- prudent involvement in bilateral agreements that support the exchange of scientific knowledge and expertise and the export of Canadian industrial and technological products.

Appendix 17

Synopsis of "For Whose Benefit?"
A Report of the Standing Committee on External Affairs and International Trade on
Canada's Official Development Assistance Policies and Programs
(May 1987)

The report by the Standing Committee on External Affairs and International Trade recommends the following objectives for Canada's Official Development Assistance (ODA) program:

- To help the poorest countries and the poorest peoples of the world;

- To strengthen the institutional capacities of countries to solve their own problems; and

- To ensure that development priorities are foremost in the spending of ODA funds.

The Standing Committee recommended that these objectives be adopted as a "Development Charter" by Parliament.

The report also recommends that the Canadian foreign aid be directed mainly towards human resource development, with emphasis on small "people-to-people" projects rather than on large capital projects, to develop people whenever "developing things". One thousand ODA scholarships for students to come and study in Canada are recommended, and Canadian business is urged to become a resource for the aid program. The government is urged to meet its commitment of 0.6 per cent of GNP by 1995/96, moving towards that target in 1988/99.

According to the report, in the past, the various governments have provided "conflicting objectives", and a very lengthy and complicated decision making process for launching of projects. The report make recommendations to simplify the decision-making and the distribution of funds between various implementing agencies and between countries. Further, the debt problem of the Third World requires attention. Some of Canada's overseas loans should be cancelled, this would provide an example to other donor countries.

Of particular interest to IWL is the second of the proposed objectives, coupled with the recommendation to put emphasis on developing human resources. In its areas of expertise, IWL staff have made and can continue to make very significant contributions. Water and land use, their quality and quantity, are very basic and vital issues in all the poor and developing countries.

Appendix 18

Synopsis of IWL Thrusts for the Period of 1988/89 - 1991/92

In response to the needs identified in the new Federal Water Policy and the Pearse Inquiry, IWL has developed a series of thrusts for the next four fiscal years.

The international activities of IWL can and should provide support for the proposed Canadian national thrusts for the next four fiscal years. International activities have direct value for all the identified thrusts:

*- improving water quality networks and objectives;

*- examining the economic value of water;

*- developing appropriate strategies, guidelines and activities for ground water assessment and protection;

- developing water-economy agreements in support of general conservation strategies and other initiatives related to the sustainable management of water supply and quality;

*- developing guidelines and criteria for assessing interjurisdictional interbasin transfers;

*- enhancing northern data networks and protecting northern water interests;

*- enhancing the understanding of the impact of climate change and variability of water resources;

- encouraging the Canadian environmental industry and more environmentally compatible development;

*- reviewing the adequacy of environmental legislation;

- developing and implementing a communications strategy;

*- developing and implementing a federal wetlands policy;

*- developing and implementing a federal land use policy;

*- assisting in identifying appropriate program and activity shifts, including the promotion of work-sharing arrangements and alliances on applied research, toxic chemicals controls, State of the Environment reporting, and water network integration between quality and quantity.

Those thrusts marked with an * can benefit particularly from the experience of other countries and international agencies. All this can be done with the assistance of the experience gathered from other countries and international organizations.

GLOSSARY

AGID -	Association of Geoscientists for International Development
CHy -	World Meteorological Organization/Commission for Hydrology
CIDA -	Canadian International Development Agency
CNRS -	Centre National Recherche Scientifique (France)
CODATA -	Committee on Data for Science and Technology
COWAR -	Committee on Water Research
ECE -	Economic Commission for Europe
FAGS -	Federation of Geochemical and Geophysical Sciences
FAO -	Food and Agricultural Organization
HOMS -	Hydrological Operational Multipurpose Sub-program
IAEA -	International Atomic Energy Agency
IAGC -	International Association of Geochemistry and Cosmochemistry
IAGLR -	International Association for Great Lakes Research
IAH -	International Association of Hydrogeologists
IAHR -	International Association for Hydraulic Research
IAP -	International Advisory Panel
IASWSC -	International Association for Sediment - Water Science
IAWPR -	International Association for Water Pollution Research
IBS -	International Biodeterioration Society
ICAES -	International Centre for Advanced Environmental Studies
ICID -	International Commission on Irrigation and Drainage
ICOLD -	International Commission on Large Dams
ICSU/IUGG/IAHS -	International Council of Scientific Unions/International Union of Geology and Geophysics/International Associations of Hydrological Sciences
ICSW -	International Commission for Surface Water

ICWQ -	International Commission for Water Quality
ICWRS -	International Commission for Water Resources Systems
IDRC -	International Development Research Centre
IGS -	International Glaciological Society
IIASA -	International Institute for Applied Systems Analysis
ILEC -	International Lake Environment Committee
IOLM -	International Organization of Legal Metrology
ISEM -	International Society of Ecological Modelling
ISO -	International Standards Organization
IUCN -	International Union for the Conservation of Nature and Natural Resources
IUGS -	International Union of Geological Sciences
IWRA -	International Water Resources Association
OECD -	Organization for Economic Cooperation and Development
RAIN -	Recovery of Acidification in Norway
SCOPE -	Scientific Committee on Problems of the Environment
SCOR -	Scientific Committee on Oceanic Research
UNEP/WHO/GEMS -	United Nations Environment Program/World Health Organization/Global Environmental Monitoring System
Unesco/IHP -	United Nations Educational, Scientific and Cultural Organization - International Hydrological Program
Unesco/MAB -	United Nations Educational, Scientific and Cultural Organization - Man and the Biosphere
UN Fellows -	United Nations Fellows
WAM -	Wave Modelling Group
WDDB -	World Digital Data Base
WMO -	World Meteorological Organization
WMO/ICSU/JSC -	World Meteorological Organization/International Council of Scientific Unions/Joint Scientific Committee