Environment Canada
Environnement Canada

Environmental Conservation Service
du Service de la Conservation d l'environnement

Inland Waters Directorate

Western and Northern Region

Direction générale des eaux intérieures

Région de l'Ouest et du Nord

WATER QUALITY BRANCH
WESTERN & NORTHERN REGION (W&NR)
PROGRAM OUTLINE 1984/85

ENVIRONMENT CANADA
WATER QUALITY BRANCH
REGINA, SASKATCHEWAN
WQB-W&NR-84-05

WATER QUALITY BRANCH

WESTERN & NORTHERN REGION (W & NR)

PROGRAM OUTLINE 1984/85

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1.0 INTRODUCTION

This document has been prepared for the use of Inland Waters Directorate (IWD) personnel; in particular, Water Quality Branch personnel, so as to promote a better and common understanding of the Branch's mission and activities. In conjunction with the Work Plan for IWD-W&NR (Environment Canada, 1984) this program outline provides overall guidance and direction of the Branch activities by placing the activities of the Water Quality Branch within the context of the programs of Environment Canada's Environmental Conservation Service. This report organizes the Branch activities into specific projects, describes them and identifies the objectives expected for each activity. In doing so, this document provides the basis against which the achievements of the Branch can be measured and evaluated.

1.1 Water Quality Branch Mandate

The Water Quality Branch (WQB) contributes to the federal role of ensuring, in cooperation with the provinces, that the water resources are protected and enhanced for the greatest social and economic benefit of all Canadians, both present and future generations. This includes planning, special studies, and monitoring in relation to water resource conservation, utilization and development.

Areas of significant federal interest include but are not necessarily limited to: national parks, Indian reservations, Yukon and Northwest Territories, Armed Forces Bases, international and interprovincial waters, and coastal zones and estuaries.

The role of the WQB can be extracted from the Federal Policy on Inland Waters. Specifically, where there is significant federal interest, the WQB provides water quality data, scientific information and advice on the quality of the aquatic environment to resource managers, scientists and the public. In response to its mandate, the Branch undertakes activities such as:

1. identifying pollution problems (early warning systems);

2. maintaining an inventory of baseline water quality information;

3. identifying trends in aquatic quality;

4. developing and establishing water quality objectives;

5. determining the compliance of waters wih objectives;

6. assessing the effectiveness of regulatory measures;

7. providing information for revising effluent control requirements;

8. ensuring that water management actions and activities which affect international boundaries are consistent with the Boundary Waters Treaty of 1909;

9. participating with provinces in joint cooperative, and cost-shared programs defined by federal-provincial agreement;

10. conducting surveys and studies investigating the presence, distribution, prevalence and abundance of environmental contaminants; and,

11. assisting in evaluating environmental impact statements.

The activites of the Branch can be organized into distinct projects. These projects change from year to year but generally include the above activities.

1.2 Environmental Conservation Service Programs

The role of the Branch in meeting Department of Environment's (DOE) obligations can be better understood by placing the activities of the Branch within the context of the programs of the Environmental Conservation Service (ECS). The ECS has identified five program components which are subdivided in the following way:

1. Inland Waters Conservation

    1.1 Canada - U.S. and Interprovincial Waters
    1.2 Flood Damage Reduction
    1.3 Water Quality Management Data
    1.4 Water Quantity Management Data
    1.5 Water Management Research
    1.6 Management and Administration

2. Lands Conservation

2.1 Land Use Policy and Research
2.2 Land Monitoring, Evaluation and Data Systems
2.3 Management and Administration

3. Wildlife Conservation

3.1 Migratory Birds Conservation
3.2 Wildlife Research and Conservation
3.3 Interpretation
3.4 Management and Administration

4. Multiple Resource Conservation

4.1 Toxic Chemicals
4.2 Long-Range Transport of Air Pollutants (LRTAP)
4.3 Environmental Assessment and Baseline Studies

5. Management and Common Support Services

5.1 Management
5.2 Support Services

The WQB participates primarily in the Inland Waters Conservation (IWC) program of the ECS. The objective of the IWC program is "To promote sound management and development of Canada's water resources in keeping with federal responsibilities and national objectives." The WQB particpates in four subcomponents of the Inland Waters Conservation program. These subcomponents and their objectives are as follows:

1.1 Canada - U.S. and Interprovincial Waters

To resolve interjurisdictional water resource problems and realize interjurisdictional water resource opportunities in accordance with national interests.

1.3 Water Quality Management Data

To restore, maintain or improve the quality of international, interprovincial, territorial and other waters of direct federal concern.

The Water Quality Branch also particpates in the Multiple Resource Conservation program of the ECS. The general objective of the Multiple Resource Conservation Program is "To contribute towards minimizing the adverse effects of human activities on the environment." WQB particpates in two of the subcomponents of the

Multiple Resource Conservation Program. These subcomponents and their objectives are as follows:

4.1 Toxic Chemicals

To provide information on the presence of toxic chemicals in the environment and knowledge of their actual and potential impacts.

4.4 Environmental Assessment and Baseline Studies

To participate effectively in the Environmental Assessment and Review Process.

The activities of the Branch are organized into individual projects. Each project contributes to the achievement of one or more of the above ECS National Program components as noted above Thus, all Branch projects can be classified on the basis of the ECS program to which it contributes. In some cases, Branch projects contribute to more than one ECS program components or subcomponents. In such instances, the project is classified according to the program to which it contributes the most. Other related programs are noted.

1.3 Legislation

The Water Quality Branch derives much of its authority from federal legislation. A list of those pieces of legislation most relevant to the Branch and a summary of those sections most applicable to water quality management are outlined below:

Canada Water Act

Sections 3 and 4 give the Minister of the Environment the authority to: formulate policies and programs with respect to the water resources of Canada and to ensure the optimum use of these resources for the benefit of all Canadians; collect, process and provide data on the quality , quantity , distribution and use of those waters; conduct research in connection with any aspect of those waters or provide for the conduct of any research by or in cooperation with any government, institution, or person, and; enter into agreement with one or more provincial governments to carry out any of the above projects, programs, or policies.

Environmental Contaminants Act

Section 3 provides the Minister with the authority to collect data and conduct investigations regarding any substance that is entering or is likely to enter the environment in a quantity or concentration that may constitute a danger to human health or the environment.

Fisheries Act

Section 33 gives the Minister the authority to regulate any activity which may cause injury to fishing grounds or the pollution of waters.

International Rivers Improvement Act

Section 2 provides the Minister with the authority to regulate any dam, obstruction, canal, reservoir or work the purpose or effect of which is to interfere with, alter or affect the actual or potential use of the international river outside Canada.

Northern Inland Waters Act

Sections 5 and 6 give the Minister the authority to enter into agreements with any one or more of the provincial governments providing for the management, on a coopertive basis, of any waters flowing between the territories and the provinces; and, to regulate the deposition of any waste that may enter such waters.

Arctic Waters Pollution Prevention Act

Sections 4, 5 and 6 provide the Minister with the authority to regulate the deposition of waste in arctic waters or in any place in the Canadian Arctic where such waste may enter arctic waters.

Constitution Act

Section 91 establishes the legislative rights of the federal government with respect to Navigation, Shipping, Sea Coasts, Inland Fisheries, International and Interprovincial Affairs, and for the Peace, Order and Good Government of Canada.

Government Organization Act

Sections 3 and 5 establish the Department of the Environment and gives its Minister authority over all matters, over which the Parliament of Canada has jurisdiction, relating to water and including water quality.

The Branch also undertakes work under the terms of the International Boundary Waters Treaty.

Article 4 of this treaty states that waters defined as boundary waters and waters flowing across boundaries shall not be polluted on either side to the injury of health or property on the other side.

2.0 PROJECT DESCRIPTIONS

In order to facilitate administration of the Branch program, the activities of the Branch have been identified in terms of discrete projects. Each project is written up on a standard project description form. These descriptions are divided into headings as described on the following pages.

Number: Each project is assigned a five digit number. The first digit, which iodentifies the region, is common to all projects presented here. The number for the Western and Northern Region is 3. The second and third digits in the project number are unique and used to identify individual projects. They range from 01 to 098. The last two digits, which are common to all projects, identify the first calendar year of the current fiscal year. In this case the number is 84.

Submitter Identification Number (S.I.D.): All samples submitted for analysis must be identified by a S.I.D. number. This facilitates data storage and retrieval and allows the Branch to distinguish between the numerous sample collections. The number is four digits in length and is assigned by the Head, Monitoring and Agreements Division.

Title: A short narrative is assigned to all projects in order to allow immediate descriptive identification.

ECS Program: This number identifies the ECS National Program into which the project fits. In a broad sense, the ECS program helps give direction to the individual projects. The numbers are 1.1, 1.3, 4.1 or 4.3.

Performance Indicators: The performance indicators consist of a series of numbers and letters which correspond to goals and performance indicators identified in the Regional Work Plan (Environment Canada, 1984). These establish a direct linkage between the WQB Program Outline and the Regional

Duration: This indicates whether the project is of long or short duration. Wherever feasible, starting and/or finishing dates are provided.

Objective: The objectives assist the manager by identifying anticipated outputs which can later be used in project evaluations.

Rationale: This section briefly outlines the reason for the project and how it helps the Branch fulfill its mandate.

Description: The description provides a brief explanation of what the project involves.

Extended Description: The extended description provides more detailed information about the project.

Coordinator: Identifies the person or persons in charge of the project and provides a contact for clarification or elaboration. Project coordinators are identified by last name only in the Project Descriptions. For reference, Table 1 provides a complete list of project coordinators' names, locations and telephone numbers.

Table 1 Project Coordinators

Name	Location	Telephone
Block, Howard	Calgary	(403) 231-5320
Roberts, Don	Calgary	(403) 231-5622
Chacko, Val	Winnipeg	(204) 949-5035
Crosley, Bob	Regina	(306) 359-5317
Gregor, Dennis	Regina	(306) 359-5321
Guilbault, Ray	Regina	(306) 359-6535
Gummer, Bill	Regina	(306) 359-5322
McNaughton, Duane	Regina	(306) 359-6412
Munro, Dave	Regina	(306) 359-6014
Thomson, Ken	Regina	(306) 359-6723
Gaskin, James	Saskatoon	(306) 665-5389

Resources: This table identifies the commitment in terms of person years and financial resources to the project. The table also identifies any monies which are recoverable (see Analytical Support Group). Because of shifting regional priorities, these figures are subject to change. It should be noted that the resources presented in the project descriptions cannot be added to identify the total resources of the Branch. For example, there are a number of resource-utilizing activities (e.g. Administration) involving the Branch which are not presented in the project descriptions. In other cases, projects may overlap.

Priority: This section identifies the relative rank of the project and the sample turnaround time. The relative rank is represented by a number between 1 to 5. If for any reason the capabilities of the Branch were to be reduced, projects with lower relative ranks would be suspended until the capabilities were restored. The sample turnaround time, which is generally between 30 and 60 days, is the amount of time available from the time the sample is received at the lab until a "Verify Report" is received by the project

Dissemination of Reports: This portion of the project descriptions

identifies the persons or agencies which are to receive copies of reports associated with the particular project.

Activities/Reporting Calendar : This section of the description graphically displays the milestones towards the completion of the project thereby providing a basis for evaluating progress within a project.

Station List: This table identifies the stations sampled under the particular project. It also provides a map no. so that the station can be located on the maps provided in Appendix A. The station list table also gives the NAQUADAT no. for each station and the frequence of sampling ("V" indicates at time of visit, "M" indicates monthly, "Q" indicates quarterly).

Sampling Matrix: This table shows the parameters for which each water sample collected under the project is analyzed. It also shows the frequency of sampling and the total number of samples.

Analytical Requirements: This table identifies the resources, in terms of PY's and dollars, necessary for the analysis of all samples collected for the project. This information is used to calculate the total resources needed carry out the project.

While all the projects are presented on a standard form, not all headings are applicable to each project. In such instances, the headings are presented but are followed by N/A which stands for "not applicable". Some projects involve analytical and field techniques which are not included in the project description. The respective technique manuals, which are referred to in the project description, provide additional technical information.

In order to facilitate management, the Branch has organized its projects into ten groups:

1. Interjurisdictional Monitoring
2. Agreements
3. Analytical Support
4. Quality Control
5. Water Quality Management
6. Special Studies
7. Toxic Chemicals
8. Northwest Territories
9. Reports
10. Miscellaneous

Each of these groups contains a number of related projects. The projects were organized in this fashion for administrtion purposes and, thus, were influenced by the structure of the Branch. In some

cases the project groups correspond to the ECS Programs. For example, all the projects in Group 7, Toxic Chemicals, fit into the National Program 4.1, Toxic Chemicals. Other Branch groups do not correspond as well to the ECS Programs. For example, the projects in Group 6, Special Studies, fit into several of the National Programs.

The following pages present the project descriptions by group. Each group is preceeded by an introduction which explains the grouping and identifies by name and number the projects in the group. Associations between Branch project groups and ECS National Programs are also examined.

2.1 Interjurisdictional Monitoring

As part of the Federal Government's responsibility with respect to international and interprovincial waters, the WQB conducts water quality assesments and monitoring of interjurisdictional waters. Generally, these monitoring activites represent a long-term commitment. A network approach, which involves sampling for a common set of parameters from different sites at regular intervals of time, allows for the geographical and temporal comparison of water quality data.

While the bulk of the interjurisdictional activity is the collection, analysis and interpretation of water quality data, there is an ongoing activity that searches and collates information that helps in the design and evaluation of the projects. For instance, information is sought from: the private sector, the Provincial governments, other Federal agencies, and the scientific community in general. Such contact ensures that field and laboratory procedures are keeping abreast of technology advancement.

Table 2 lists by province the stations monitored under the Interjurisdictional Monitoring Group. (APPENDIX 1 provides a list of water quality monitoring stations by province with corresponding maps (Figures 1 to 4)). For each station location, the table identifies the project name and number, the ECS National Program number and the map number so that the stations can be located on the provincial maps located in Appendix 1. Table 2 also identifies those stations which are active (A) and those that have been temporarily discontinued (D).

Table 2 Interjurisdictional Monitoring Stations by Province

Manitoba

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
11	Antler River at Coulter	00MA05NF0009	1.3	304	D
12	Souris River at Coulter	00MA05NF0001	1.3	304, 307	A
13	Badger Creek near Cartwright	00MA05DA0003	1.3	304	D
14	Pembina River at Windygates	00MA05DB0001	1.3	304	A

15	Red River at Emerson	00MA05DC0001	1.1	306,307	A
16	Roseau River at Gardenton	00MA05DD0001	1.3	304	A
17	Pine Creek Div. at Hwy. 89	00MA05CD0012	1.3	304	A
18	Gainsborough Ck. at Hwy. 83	00MA05NF0005	1.3	304	A
19	Pipestone Creek 0.8 km from Cromer	00MA05NG0013	1.3	304	A
20	Winnipeg River near Pointe du Bois	00MA05PF0022	1.3	304	A
21	Manigotagan River at Hwy.. 304	00MA05RA0004	1.3	304	A
32	Sask. River above Carrot River	00MA05KH0001	1.3	307	A
56	Swan River at Hwy. 10	00MA05LE0002	1.3	301	A
57	Woody River at Hwy. 10	00MA05LE0003	1.3	301	A
58	Overflowing River at Hwy. 10	00MA05UH0001	1.3	301	A
59	Nelson River near mouth	00MA05UH0001	1.3	301	A
60	Hayes R. below junction with God's River	00MA04AB0001	1.3	301	A
61	Churchill River above Red Head Rapids	00MA06FD0002	1.3	301	A
62	Cochrane River near Brochet	00MA06DA0001	1.3	301	A

Saskatchewan

Map No.	Station Location	NAQUADAT Number	ECS Program	Project	Status
7	E. Poplar R. at Int'l Boundary	00SA11AE0008	1.1	304,307	A
8	Long Creek South of Torquay	00SA05NA0002	1.3	304	A
9	Long Creek near Noonan	00US05NB0001	1.3	304	A
10	Souris R. near Glen Ewen	00SA05ND0001	1.3	304	A
52	Battle Creek near Inter. Boundary	00SA11AB0005	1.3	301	A
53	Frenchman R. at 49th Parallel	00SA11AC0002	1.3	301	A
54	Lodge Creek near Willow Creek	00SA11AB0007	1.3	301	A

Alberta

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
1	Milk River at East Crossing of Int'l Boundary	00AL11AA0003	1.3	304	A
2	Milk River at West Crossing of Int'l Boundary	00AL11AA0002	1.3	304	A
3	North Milk R. at Int'l Boundary	00AL11AA0001	1.3	304	A
4	St. Mary's River near Int'l Boundary	00AL05AE0001	1.3	304	A

5	Belly River at Hwy. 6	00AL05AD0060	1.3	304	A
6	Waterton River at Hwy. 6	00AL05AD0005	1.3	304	A
49	Slave River at Fitzgerald	00AL07NB0001	1.3	301	A
89	Brewster Creek near mouth	00AL05BB0009	1.3	305	D

There are seven projects in the Interjurisdictional Monitoring Group:

301 Interjurisdictional Monitoring by WRB
304 Interjurisdictional Monitoring by WQB
305 Benchmark Basins Monitoring by WQB
306 International Automatic Water Quality Monitoring
307 National Radionuclide Monitoring
308 Revised Red River Monthly Report Format

The complete descriptions for these projects are presented on the following pages. Given that most of the projects in this group involve the generation of water quality data, they generally fit into ECS National Program 1.3, Water Quality Management Data. Some of the projects in this group, however, focus on interjurisdictional waters and, thus, are closely related to ECS Program 1.1, Canada - U.S. and Interprovincial Waters.

The data collected under these projects is available upon request to the project coordinator. Typically, data requests are of the type which can be accomodated regionally by duplicating computer reports on file or by providing reports of published data. Complex data requests should be referred to Headquarters partly because of the request complexity but also because of the charge-back policy of the Branch.

Project Descriptions:

301-84 Interjurisdictional Monitoring by WRB

SUBMITTER - 0001
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To conduct monthly or time of visit water quality surveys at designated interjurisdictional locations; to prepare the data collected from these sites for the detailed data and water quality interpretive reports.

RATIONALE
This project contributes to the administration of the Boundary Waters Treaty of 1909 by making available, water quality data obtained at three border locations on remote interjurisdictional river systems. As well, samples are collected at major remote interprovincial rivers.

DESCRIPTION
Monthly or time of visit samples are collected for a wide spectrum of parameters. The governments concerned are notified of potential and real problems. Depending on the magnitude of the problem, External Affairs may be notified. The data are reviewed on an annual basis to assess the relative quality of the boundary streams.

COORDINATOR(S) - Block (Alta.) Chacko (Man.) Crosley (Sask.)

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.04	0.01	0.06
	PY Tech	0.11	0.07	0.07		0.25
	Salary	2.21	2.17	3.80	0.40	8.58
	O & M	1.50	1.24	3.90	0.50	7.14
	Capital	0.71	0.58	3.70		4.99
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.11	0.08	0.11	0.01	0.31
Total Dollars		4.42	3.99	11.40	0.90	20.71

* Affiliated ECS Program(s) - 1.1

INDICATORS - B-1-A c
PRIORITY - Relative Rank 5, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinators

2 WESTORE

3 NAQUADAT

4 Manitoba data - Mr. D. Brown, Environmental Management Service, Building 2, Box 7, 139 Tuxedo Avenue Winnipeg, Manitoba R3N 0H6

5 Saskatchewan data - Director, Water Pollution Control Branch Saskatchewan Environment 5th Floor, Humford House, 1855 Victoria Avenue, Regina, Saskatchewan S4P 3T1

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Update project description	April	
2 WRB undertakes fieldwork	ongoing	Time of visit sampling
3 Lab analysis	ongoing	Reports due 8 weeks from date of receipt of samples
4 Data verification	ongoing	
5 Review data from 1983 and complete validation for data report	August	As per work plan
6 Publish 1982 and 1983 detailed data reports	October	Data to be verified and submitted for publication by September 1, 1984

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
52	Battle Creek near International Boundary	00SA11AB0005	M
53	Frenchman River at the 49th Parallel	00SA11AC0002	M
54	Lodge Creek near Willow Creek	00SA11AB0007	M
59	Nelson River near mouth of Weier River	00MA05UH0001	V
60	Hayes River below Junction with God's River	00MA04AB0001	V
61	Churchill River above Red Head Rapids	00MA06FD0002	V
62	Cochrane River near Brochet Manitoba	00MA06DA0001	V

SAMPLING MATRIX

Parameter	Lab	STN 52	STN 53	STN 54	STN 59	STN 60	STN 61	STN 62	No. of samples
ALK_P	NAT	M	M	M	V	V	V	V	37
ALK_P_R	REG	M	M	M	V	V	V	V	37
ALK_T	NAT	M	M	M	V	V	V	V	37
ALK_T_R	REG	M	M	M	V	V	V	V	37
AS_D_L	NAT	M	M	M	V	V	V	V	37
B_D_L	REG	M	M	M	V	V	V	V	37
CA	NAT	M	M	M	V	V	V	V	37
CL	NAT	M	M	M	V	V	V	V	37
CN	REG		M						8
COLI_F_F	REG	M	M	M					19
COLI_T_F	REG	M	M	M					19
COLO_TR_R	REG	M	M	M	V	V	V	V	37
COND_F	REG	M	M	M	V	V	V	V	37
COND_L_R	REG	M	M	M	V	V	V	V	37
C_DO_L	REG	M	M	M	V	V	V	V	37
C_PO	REG	M	M	M	V	V	V	V	37
F	NAT	M	M	M	V	V	V	V	37
FE_E	NAT		M		V	V	V	V	24
HERB	NAT		M			V			12
K	NAT	M	M	M	V	V	V	V	37
MET_T	NAT		M		V	V	V	V	24
MG	NAT	M	M	M	V	V	V	V	37
MN_E	NAT		M		V	V	V	V	24
NA	NAT	M	M	M	V	V	V	V	37
NO23_L	REG	M	M	M	V	V	V	V	37
N_D_L	REG	M	M	M	V	V	V	V	35
N_P	REG	M	M	M	V	V	V	V	37
O2_D	REG	M	M	M					19
OC/PCB	NAT		M			V			12
PHENOL	REG		M						8
PH_F	REG	M	M	M	V	V	V	V	37
PH_L_R	REG	M	M	M	V	V	V	V	37
P_D_L	REG	M	M	M	V	V	V	V	37
P_T	REG	M	M	M	V	V	V	V	37
RES_NF	REG	M	M	M	V	V	V	V	37
SE_D_L	NAT	M	M	M	V	V	V	V	37
SIO2	NAT	M	M	M	V	V	V	V	37
SO4	NAT	M	M	M	V	V	V	V	37
TEMP_F	REG	M	M	M	V	V	V	V	37
TEMP_L_R	REG	M	M	M	V	V	V	V	37
TURB_L_R	REG	M	M	M	V	V	V	V	37

301-84 Interjurisdictional Monitoring by WRB

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	37		2.28	84.36	0.002
ALK_P_R	37	0.15	6.19	229.03	0.004
ALK_T	37		2.28	84.36	0.002
ALK_T_R	37	0.12	4.96	183.52	0.003
AS_D_L	37		4.28	158.36	0.004
B_D_L	37	0.12	4.96	183.52	0.003
CA	37		0.86	31.82	0.001
CL	37		1.14	42.18	0.001
CN	8	0.1	4.13	33.04	0.001
COLI_F_F	19	0	0	0.00	0.000
COLI_T_F	19	0	0	0.00	0.000
COLO_TR_R	37	0.1	4.13	152.81	0.003
COND_F	37	0	0	0.00	0.000
COND_L_R	37	0.05	2.07	76.59	0.001
C_DO_L	37	0.24	9.92	367.04	0.007
C_PO	37	0.2	8.26	305.62	0.006
F	37		5.42	200.54	0.005
FE_E	24		0.57	13.68	0.000
HERB	12		142.3	1707.60	0.043
K	37		0.86	31.82	0.001
MET_T	24		23.94	574.56	0.014
MG	37		0.86	31.82	0.001
MN_E	24		0.57	13.68	0.000
NA	37		0.86	31.82	0.001
NO23_L	37	0.17	7.02	259.74	0.005
N_D_L	35	0.24	9.92	347.20	0.006
N_P	37	0.2	8.26	305.62	0.006
O2_D	19	0	0	0.00	0.000
OC/PCB	12		97.35	1168.20	0.029
PHENOL	8	0.3	12.39	99.12	0.002
PH_F	37	0	0	0.00	0.000
PH_L_R	37	0.05	2.07	76.59	0.001
P_D_L	37	0.24	9.92	367.04	0.007
P_T	37	0.19	7.85	290.45	0.005
RES_NF	37	0.19	7.85	290.45	0.005
SE_D_L	37		4.28	158.36	0.004
SIO2	37		1.14	42.18	0.001
SO4	37		1.14	42.18	0.001
TEMP_F	37	0	0	0.00	0.000
TEMP_L_R	37	0	0	0.00	0.000
TURB_L_R	37	0.05	2.07	76.59	0.001
Regional Totals				3643.97	0.067
National Totals				4417.52	0.110

304-84 Interjurisdictional Monitoring by WQB

SUBMITTER - 0003
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing since 1978

OBJECTIVES
To report on the water quality at the interjurisdicational stations and to provide data for the administration of the Boundary Waters Treaty and Federal/Provincial Water Management programs.

RATIONALE
The Water Quality Branch contributes to the administration of the Boundary Waters Treaty of 1909 by making available water quality data obtained at border locations of international river systems.

DESCRIPTION
Samples are collected monthly for a wide variety of parameters from 23 interjurisdictional stations. The data are verified before dissemination. Unusual values are followed up with re-surveys. The governments concerned are notified of potential and real problems. Depending on the magnitude of the international concerns, External Affairs may be notified. The data are reviewed collectively, and by station, on an annual basis for publication. Instrument evaluation and field method development are also carried out.

COORDINATOR(S) - Block (Alta & NWT), Chacko (Man), Crosley (Sask).

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.06	0.67		0.73
	PY Tech	1.65	0.65	1.26		3.56
	Salary	33.08	19.75	67.10		119.93
	O & M	22.49	12.00	24.00		58.49
	Capital	10.58	5.65	7.00		23.23
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		1.65	0.71	1.93		4.29
Total Dollars		66.15	37.40	98.10		201.65

* Affiliated ECS Program(s) - 1.1

304-84 Interjurisdictional Monitoring by WQB

INDICATORS - B-1-A a,c,d,e
PRIORITY - Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 NAQUADAT

3 WESTORE

4 Manitoba data - D. Brown, Environmental Management Service, Building 2, Box 7 139 Tuxedo Avenue, Winnipeg, Manitoba R3N 0H6

5 Sask. data - Director Water Pollution Control Branch Saskatchewan Environment, 5th Floor, Humford House, 1855 Victoria Avenue, Regina, Saskatchewan S4P 3T1

6 Alberta data - A. Masuda, Alberta Environment, 9820 - 106th Street, Edmonton, Alberta T2K 2S6

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Revise project description	April	
2 Conduct sampling	ongoing	Monthly sampling
3 Laboratory analysis	ongoing	Reports due 8 weeks after receipt of samples
4 Data verification	March	
5 Review data from 1983 and complete validation for data report	August	As per work plan
6 Publish 1982 and 1983 detailed data	October	Data to be submitted for verification by Sept. 1/84

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
1	Milk River at Eastern Crossing of International Boundary	00AL11AA0003	M
2	Milk River at Western Crossing of International Boundary	00AL11AA0002	M
3	North Milk River at International Boundary	00AL11AA0001	M
4	St. Mary's River near International Boundary	00AL05AE0001	M
5	Belly River at Highway # 6	00AL05AD0060	M
6	Waterton River at Highway # 6	00AL05AD0005	M
7	East Poplar River at International Boundary	00SA11AE0008	M
8	Long Creek South of Torquay	00SA05NA0002	M
9	Long Creek near Noonan	00US05NB0001	M
10	Souris River near Glen Ewen	00SA05ND0001	M
11	Antler Creek at Highway # 251	00MA05NF0009	M
12	Souris River at Coulter	00MA05NF0001	M
13	Badger Creek near Cart wright	00MA05QA0003	M
14	Pembina River at Windygate	00MA05QB0001	M
16	Roseau River at Gardenton	00MA05QD0001	M
17	Pine Creek Diversion at Highway # 89	00MA05QD0012	M
18	Gainsborough Creek at Hwy 83	00MA05NF0005	M
19	Pipestone Creek at Highway 255	00MA05NG0013	M
20	Winnipeg River at Pointe du Bois	00MA05PF0022	M
21	Manigotagan River at Highway 304	00MA05RA0004	M
56	Swan River at Highway # 10	00MA05LE0002	M
57	Woody River at Highway # 10	00MA05LE0003	M
58	Overflowing River at Highway #	00MA05LD0001	M

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SAMPLING MATRIX

Parameter	Lab	STN 1	STN 2	STN 3	STN 4	STN 5	STN 6	STN 7	STN 8	STN 9	STN 10
ALK_P	NAT	M	M	M	M	M	M	M	M	M	M
ALK_P_R	REG	M	M	M	M	M	M	M	M	M	M
ALK_T	NAT	M	M	M	M	M	M	M	M	M	M
ALK_T_R	REG	M	M	M	M	M	M	M	M	M	M
AS_D_D	NAT	M	M	M	M	M	M	M	M	M	M
AS_D_L	NAT										
B_D_D	REG	M	M	M	M	M	M	M	M	M	M
B_D_L	REG										
CA	NAT	M	M	M	M	M	M	M	M	M	M
CHL_A_D	REG	M	M	M	M	M	M	M	M	M	M
CHL_A_L	REG										
CL	NAT	M	M	M	M	M	M	M	M	M	M
CN	REG	M			M		M	M		M	M
COLI_F_F	NAT	M	M	M	M	M	M	M	M	M	M
COLI_T_F	NAT	M	M	M	M	M	M	M	M	M	M
COLO_TR_R	REG	M	M	M	M	M	M	M	M	M	M
COND_F	REG	M	M	M	M	M	M	M	M	M	M
COND_L_R	REG	M	M	M	M	M	M	M	M	M	M
C_DO_D	REG	M	M	M	M	M	M	M	M	M	M
C_DO_L	REG										
C_PO	REG	M	M	M	M	M	M	M	M	M	M
F	NAT	M	M	M	M	M	M	M	M	M	M
FE_D_D	NAT	M	M	M	M	M	M	M	M	M	M
FE_E	NAT										
HERB	NAT	M			M		M	M		M	M
HG_T	NAT	M	M	M	M	M	M	M	M	M	M
K	NAT	M	M	M	M	M	M	M	M	M	M
MET_T	NAT	M			M		M	M	M	M	M
MG	NAT	M	M	M	M	M	M	M	M	M	M
MN_D_D	NAT	M	M	M	M	M	M	M	M	M	M
MN_E	NAT										
NA	NAT	M	M	M	M	M	M	M	M	M	M
NH3_T	REG	M	M	M	M	M	M	M	M	M	M
NO23_D	REG	M	M	M	M	M	M	M	M	M	M
NO23_L	REG										
N_D_D	REG	M	M	M	M	M	M	M	M	M	M
N_D_L	REG	M	M	M	M	M	M	M	M	M	M
N_P	REG	M	M	M	M	M	M	M	M	M	M
O2_D	REG	M	M	M	M	M	M	M	M	M	M
OC/PCB	NAT	M			M		M	M		M	M
PHENOL	REG	M			M		M	M		M	M
PH_F	REG	M	M	M	M	M	M	M	M	M	M
PH_L_R	REG	M	M	M	M	M	M	M	M	M	M
PIC	NAT	M			M		M	M		M	M
P_D_D	REG	M	M	M	M	M	M	M	M	M	M

P_D_L	REG										
P_T	REG	M	M	M	M	M	M	M	M	M	M
RES_NF	REG	M	M	M	M	M	M	M	M	M	M
SE_D_D	NAT	M	M	M	M	M	M	M	M	M	M
SE_D_L	NAT										
SIO2	NAT	M	M	M	M	M	M	M	M	M	M
SO4	NAT	M	M	M	M	M	M	M	M	M	M
TEMP_F	REG	M	M	M	M	M	M	M	M	M	M
TEMP_L_R	REG	M	M	M	M	M	M	M	M	M	M
TURB_F	REG	M	M	M	M	M	M	M	M	M	M
TURB_L_R	REG	M	M	M	M	M	M	M	M	M	M

Parameter	STN 11	STN 12	STN 13	STN 14	STN 16	STN 17	STN 18	STN 19	STN 20	STN 21	STN 56
ALK_P	M	M	M	M	M	M	M	M	M	M	M
ALK_P_R	M	M	M	M	M	M	M	M	M	M	M
ALK_T	M	M	M	M	M	M	M	M	M	M	M
ALK_T_R	M	M	M	M	M	M	M	M	M	M	M
AS_D_D	M	M	M	M	M	M	M	M	M	M	
AS_D_L											M
B_D_D	M	M	M	M	M	M	M	M	M	M	
B_D_L											M
CA	M	M	M	M	M	M	M	M	M	M	M
CHL_A_D	M	M	M	M	M	M	M	M	M	M	
CHL_A_L											M
CL	M	M	M	M	M	M	M	M	M	M	M
CN		M		M	M		M	M	M		
COLI_F_F	M	M	M	M	M	M	M	M	M	M	
COLI_T_F	M	M	M	M	M	M	M	M	M	M	
COLO_TR_R	M	M	M	M	M	M	M	M	M	M	M
COND_F	M	M	M	M	M	M	M	M	M	M	M
COND_L_R	M	M	M	M	M	M	M	M	M	M	M
C_DO_D	M	M	M	M	M	M	M	M	M	M	
C_DO_L											M
C_PO	M	M	M	M	M	M	M	M	M	M	M
F	M	M	M	M	M	M	M	M	M	M	M
FE_D_D	M	M	M	M	M	M	M	M	M	M	
FE_E											
HERB		M		M	M			M	M		
HG_T	M	M	M	M	M	M	M	M	M	M	
K	M	M	M	M	M	M	M	M	M	M	M
MET_T		M		M	M			M	M		
MG	M	M	M	M	M	M	M	M	M	M	M
MN_D_D	M	M	M	M	M	M	M	M	M	M	
MN_E											
NA	M	M	M	M	M	M	M	M	M	M	M
NH3_T	M	M	M	M	M	M	M	M	M	M	

NO23_D	M	M	M	M	M	M	M	M	M	M	
NO23_L											M
N_D_D	M	M	M	M	M	M	M	M	M	M	M
N_D_L	M	M	M	M	M	M	M	M	M	M	M
N_P	M	M	M	M	M	M	M	M	M	M	M
O2_D	M	M	M	M	M	M	M	M	M	M	M
OC/PCB		M		M	M			M	M		
PHENOL		M		M	M			M	M		
PH_F	M	M	M	M	M	M	M	M	M	M	M
PH_L_R	M	M	M	M	M	M	M	M	M	M	M
PIC		M		M	M			M	M		
P_D_D	M	M	M	M	M	M	M	M	M	M	
P_D_L											M
P_T	M	M	M	M	M	M	M	M	M	M	M
RES_NF	M	M	M	M	M	M	M	M	M	M	M
SE_D_D	M	M	M	M	M	M	M	M	M	M	
SE_D_L											M
SIO2	M	M	M	M	M	M	M	M	M	M	M
SO4	M	M	M	M	M	M	M	M	M	M	M
TEMP_F	M	M	M	M	M	M	M	M	M	M	M
TEMP_L_R	M	M	M	M	M	M	M	M	M	M	M
TURB_F	M	M	M	M	M	M	M	M	M	M	M
TURB_L_R	M	M	M	M	M	M	M	M	M	M	M

Parameter	STN 57	STN 58	No. of samples
ALK_P	M	M	276
ALK_P_R	M	M	276
ALK_T	M	M	276
ALK_T_R	M	M	276
AS_D_D			240
AS_D_L	M	M	36
B_D_D			240
B_D_L	M	M	36
CA	M	M	276
CHL_A_D			240
CHL_A_L	M	M	36
CL	M	M	276
CN		M	156
COLI_F_F			240
COLI_T_F			240
COLO_TR_R	M	M	276
COND_F	M	M	276
COND_L_R	M	M	276
C_DO_D			240
C_DO_L	M	M	36
C_PO	M	M	276

F	M	M	276
FE_D_D			240
FE_E		M	12
HERB		M	144
HG_T			240
K	M	M	276
MET_T		M	144
MG	M	M	276
MN_D_D			240
MN_E		M	12
NA	M	M	276
NH3_T			240
NO23_D			240
NO23_L	M	M	36
N_D_D	M	M	240
N_D_L	M	M	276
N_P	M	M	276
O2_D	M	M	276
OC/PCB		M	144
PHENOL		M	144
PH_F	M	M	276
PH_L_R	M	M	276
PIC		M	144
P_D_D			240
P_D_L	M	M	36
P_T	M	M	276
RES_NF	M	M	276
SE_D_D			240
SE_D_L	M	M	36
SIO2	M	M	276
SO4	M	M	276
TEMP_F	M	M	276
TEMP_L_R	M	M	276
TURB_F	M	M	276
TURB_L_R	M	M	276

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	276		2.28	629.28	0.016
ALK_P_R	276	0.15	6.19	1708.44	0.031
ALK_T	276		2.28	629.28	0.016
ALK_T_R	276	0.12	4.96	1368.96	0.025
AS_D_D	240		4.28	1027.20	0.026
AS_D_L	36		4.28	154.08	0.004
B_D_D	240	0.12	4.96	1190.40	0.022
B_D_L	36	0.12	4.96	178.56	0.003
CA	276		0.86	237.36	0.006
CHL_A_D	240	0.33	13.64	3273.60	0.060
CHL_A_L	36	0.66	27.27	981.72	0.018
CL	276		1.14	314.64	0.008
CN	156	0.1	4.13	644.28	0.012
COLI_F_F	240				
COLI_T_F	240				
COLO_TR_R	276	0.1	4.13	1139.88	0.021
COND_F	276	0	0	0.00	0.000
COND_L_R	276	0.05	2.07	571.32	0.010
C_DO_D	240	0.19	7.87	1888.80	0.035
C_DO_L	36	0.24	9.92	357.12	0.007
C_PO	276	0.2	8.26	2279.76	0.042
F	276		5.42	1495.92	0.037
FE_D_D	240		0.57	136.80	0.003
FE_E	12		0.57	6.84	0.000
HERB	144		142.3	20491.20	0.512
HG_T	240		1.71	410.40	0.010
K	276		0.86	237.36	0.006
MET_T	144		23.94	3447.36	0.086
MG	276		0.86	237.36	0.006
MN_D_D	240		0.57	136.80	0.003
MN_E	12		0.57	6.84	0.000
NA	276		0.86	237.36	0.006
NH3_T	240	0.19	7.85	1884.00	0.035
NO23_D	240	0.12	4.94	1185.60	0.022
NO23_L	36	0.17	7.02	252.72	0.005
N_D_D	240	0.19	7.85	1884.00	0.035
N_D_L	276	0.24	9.92	2737.92	0.050
N_P	276	0.2	8.26	2279.76	0.042
O2_D	276	0	0	0.00	0.000
OC/PCB	144		97.35	14018.40	0.350
PHENOL	144	0.3	12.39	1784.16	0.033
PH_F	276	0	0	0.00	0.000
PH_L_R	276	0.05	2.07	571.32	0.010
PIC	144		142.3	20491.20	0.512
P_D_D	240	0.19	7.85	1884.00	0.035

P_D_L	36	0.24	9.92	357.12	0.007
P_T	276	0.19	7.85	2166.60	0.040
RES_NF	276	0.19	7.85	2166.60	0.040
SE_D_D	240		4.28	1027.20	0.026
SE_D_L	36		4.28	154.08	0.004
SIO2	276		1.14	314.64	0.008
SO4	276		1.14	314.64	0.008
TEMP_F	276	0	0	0.00	0.000
TEMP_L_R	276	0	0	0.00	0.000
TURB_F	276	0	0	0.00	0.000
TURB_L_R	276	0.05	2.07	571.32	0.010

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
Regional	Totals			35307.96	0.647
National	Totals			66156.24	1.654

305-84 Benchmark Basins Monitoring by WQB

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing since April 1980

OBJECTIVES
To conduct water quality surveys of Brewster Creek; to prepare the data for inclusion in detailed and interpretive reports.

RATIONALE
At the request of the Regional Director of IWD, sampling has been carried out to characterize the quality of benchmark streams.

DESCRIPTION
This project was discontinued during FY 83/84 in an effort to reduce the analytical requirements of the Branch during the relocation of its laboratory

The water quality parameters monitored are: major ions, bacteriological parameters, nutrients, metals, physical tests and chlorophyll "A". The data are verified for inclusion in data reports.

COORDINATOR(S) - Block

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.03		0.03
	PY Tech	0.02	0.03	0.08		0.13
	Salary	0.31	0.71	3.50		4.52
	O & M	0.21	0.48	1.92		2.61
	Capital	0.10	0.23	0.98		1.31
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.02	0.03	0.11		0.16
Total Dollars		0.62	1.42	6.40		8.44

305-84 Benchmark Basins Monitoring by WQB

INDICATORS - B-1-A a,c,d
PRIORITY - Relative Rank 5, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Revise project description	May	
2 Conduct sampling	Monthly	
3 Laboratory analyses		Reports due 8 weeks after receipt of samples.
4 Data verification	Variable	Review error listing within 10 days of receipt
5 Review data from 1983 and complete validation for data report.	December	As per work plan
6 Publish 1982 and 1983 detailed data	October	

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
89	Brewster Creek near mouth	00AL05BB0009	M

SAMPLING MATRIX

Parameter	Lab	STN 89	No. of samples
ALK_P	NAT	M	12
ALK_P_R	REG	M	12
ALK_T	NAT	M	12
ALK_T_R	REG	M	12
AS_D_D	NAT	M	12
B_D_D	REG	M	12
CA	NAT	M	12
CHL_A_D	REG	M	12
CL	NAT	M	12
COLI_F_F	REG	M	12
COLI_T_F	REG	M	12
COLO_TR_R	REG	M	12
COND_F	REG	M	12
COND_L_R	REG	M	12
C_DO_D	REG	M	12
C_PO	REG	M	12
F	NAT	M	12
FE_D_D	NAT	M	12
HG_T	NAT	M	12
K	NAT	M	12
MET_T	NAT	M	12
MG	NAT	M	12
MN_D_D	NAT	M	12
NA	NAT	M	12
NH3_T	REG	M	12
NO23_D	REG	M	12
N_D_D	REG	M	12
N_D_L	REG	M	12
N_P	REG	M	12
O2_D	REG	M	12
PH_F	REG	M	12
PH_L_R	REG	M	12
P_D_D	REG	M	12
P_T	REG	M	12
RES_NF	REG	M	12
SE_D_D	NAT	M	12
SIO2	NAT	M	12
SO4	NAT	M	12
STREP_F_F	REG	M	12
TEMP_F	REG	M	12
TEMP_L_R	REG	M	12
TURB_F	REG	M	12
TURB_L_R	REG	M	12

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	12		2.28	27.36	0.001
ALK_P_R	12	0.15	6.19	74.28	0.001
ALK_T	12		2.28	27.36	0.001
ALK_T_R	12	0.12	4.96	59.52	0.001
AS_D_D	12		4.28	51.36	0.001
B_D_D	12	0.12	4.96	59.52	0.001
CA	12		0.86	10.32	0.000
CHL_A_D	12	0.33	13.64	163.68	0.003
CL	12		1.14	13.68	0.000
COLI_F_F	12	0	0	0.00	0.000
COLI_T_F	12	0	0	0.00	0.000
COLO_TR_R	12	0.1	4.13	49.56	0.001
COND_F	12	0	0	0.00	0.000
COND_L_R	12	0.05	2.07	24.84	0.000
C_DO_D	12	0.19	7.87	94.44	0.002
C_PO	12	0.2	8.26	99.12	0.002
F	12		5.42	65.04	0.002
FE_D_D	12		0.57	6.84	0.000
HG_T	12		1.71	20.52	0.001
K	12		0.86	10.32	0.000
MET_T	12		23.94	287.28	0.007
MG	12		0.86	10.32	0.000
MN_D_D	12		0.57	6.84	0.000
NA	12		0.86	10.32	0.000
NH3_T	12	0.19	7.85	94.20	0.002
NO23_D	12	0.12	4.94	59.28	0.001
N_D_D	12	0.19	7.85	94.20	0.002
N_D_L	12	0.24	9.92	119.04	0.002
N_P	12	0.2	8.26	99.12	0.002
O2_D	12	0	0	0.00	0.000
PH_F	12	0	0	0.00	0.000
PH_L_R	12	0.05	2.07	24.84	0.000
P_D_D	12	0.19	7.85	94.20	0.002
P_T	12	0.19	7.85	94.20	0.002
RES_NF	12	0.19	7.85	94.20	0.002
SE_D_D	12		4.28	51.36	0.001
SIO2	12		1.14	13.68	0.000
SO4	12		1.14	13.68	0.000
STREP_F_F	12	0	0	0.00	0.000
TEMP_F	12	0	0	0.00	0.000
TEMP_L_R	12	0	0	0.00	0.000
TURB_F	12	0	0	0.00	0.000
TURB_L_R	12	0.05	2.07	24.84	0.000
Regional Totals				1423.08	0.026

National	Totals	626.28	0.016

306-84 International Automatic Water Quality Monitoring

SUBMITTER - 0140
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
(1) To provide continuous surveillance of the Red River at the Canada - U.S. border in order to detect and document the effect of any industrial and municipal waste spills and other pollution sources originating in the U.S. (2) To acquire water quality data in order to meet obligation of the Red River Pollution Control Board, IJC.

RATIONALE
Under IJC the Red River monitoring was established in 1968 to provide a continuous surveillance of the water quality at the Canada - U.S. border at Emerson. Since 1977, the potential effect of the Garrison Diversion on the Red River water quality has provided an additional reason for maintaining this monitor.

DESCRIPTION
A Schneider Robot RM25 monitor is operated on a continuous basis on the Red River at Emerson. Parameters measured are DO, pH, conductivity, chloride and temperature. Data are collected and transmitted using a LaBarge DCP via GOES satellite and stored at Camp Springs, MD. These data are retrieved and decoded by the Branch computer in Regina. Computed monthly data are distributed to various agencies. Monthly samples are also collected to allow monitor to laboratory comparisons, and, to supplement the monthly reports with complete parametric coverage.

COORDINATOR(S) - Chacko

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.15		0.15
	PY Tech	0.13	0.03	0.35		0.51
	Salary	2.61	0.81	17.20		20.62
	O & M	1.77	0.55	6.50		8.82
	Capital	0.83	0.26	2.00		3.09
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.13	0.03	0.50		0.66
Total Dollars		5.21	1.62	25.70		32.53

INDICATORS - A-1-A a, b, c, d, e, f, g
PRIORITY - Relative Rank 1, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Operate on a real time basis the continuous water quality monitor	ongoing	
2 Submit a grab sample by the 10th of the month for lab analysis	ongoing	
3 Prepare and distribute monthly reports within 30 days	ongoing	
4 Report unusual water quality conditions within 48 hours of detection	ongoing	
5 Revise automonitor report format and distribute to RRPB members for comment	September	
6 Finalize revised automonitor report format	December	
7 Attend one meeting of RRPB as Canadian secretary	January	Annual report will be prepared by U.S.

EXTENDED DESCRIPTION

Included in this project will be the submission of samples by the project coordinator to ensure the accuracy of the Robot Monitors in the region. Prepared samples will be split into two parts: one for analysis by the Saskatoon regional lab, the other to Winnipeg for analyses in the regional field lab. If the parameter of interest falls under the analytical responsibility of the National Water Quality lab, the sample will be sent to Burlington. The parameter of most interest is chloride. It will be sampled every two months.

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
15	Red River at Emerson	00MA050C0001	M

SAMPLING MATRIX

Parameter	Lab	STN 15	No. of samples
ALK_P	NAT	M	12
ALK_P_R	REG	M	12
ALK_T	NAT	M	12
ALK_T_R	REG	M	12
AL_E	NAT	M	12
AS_D_D	NAT	M	12
B_D_D	REG	M	12
CA	NAT	M	12
CHL_A_D	REG	M	12
CL	NAT	M	12
CN	REG	M	12
COLI_F_F	REG	M	12
COLI_T_F	REG	M	12
COLO_TR_R	REG	M	12
COND_F	REG	M	12
COND_L_R	REG	M	12
C_DO_D	REG	M	12
C_PO	REG	M	12
F	NAT	M	12
FE_D_D	NAT	M	12
HERB	NAT	M	12
HG_T	NAT	M	12
K	NAT	M	12
MET_T	NAT	M	12
MG	NAT	M	12
MN_D_D	NAT	M	12
NA	NAT	M	12
NH3_T	REG	M	12
NO23_D	REG	M	12
N_D_D	REG	M	12
N_D_L	REG	M	12
N_P	REG	M	12
O2_D	REG	M	12
OC/PCB	NAT	M	12
PHENOL	REG	M	12
PH_F	REG	M	12
PH_L_R	REG	M	12
PIC	NAT	M	12
P_D_D	REG	M	12
P_T	REG	M	12
RES_NF	REG	M	12
SE_D_D	NAT	M	12
SIO2	NAT	M	12
SO4	NAT	M	12
TEMP_F	REG	M	12

TEMP_L_R	REG	M	12
TURB_F	REG	M	12
TURB_L_R	REG	M	12

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	12		2.28	27.36	0.001
ALK_P_R	12	0.15	6.19	74.28	0.001
ALK_T	12		2.28	27.36	0.001
ALK_T_R	12	0.12	4.96	59.52	0.001
AL_E	12		0.57	6.84	0.000
AS_D_D	12		4.28	51.36	0.001
B_D_D	12	0.12	4.96	59.52	0.001
CA	12		0.86	10.32	0.000
CHL_A_D	12	0.33	13.64	163.68	0.003
CL	12		1.14	13.68	0.000
CN	12	0.1	4.13	49.56	0.001
COLI_F_F	12	0	0	0.00	0.000
COLI_T_F	12	0	0	0.00	0.000
COLO_TR_R	12	0.1	4.13	49.56	0.001
COND_F	12	0	0	0.00	0.000
COND_L_R	12	0.05	2.07	24.84	0.000
C_DO_D	12	0.19	7.87	94.44	0.002
C_PO	12	0.2	8.26	99.12	0.002
F	12		5.42	65.04	0.002
FE_D_D	12		0.57	6.84	0.000
HERB	12		142.3	1707.60	0.043
HG_T	12		1.71	20.52	0.001
K	12		0.86	10.32	0.000
MET_T	12		23.94	287.28	0.007
MG	12		0.86	10.32	0.000
MN_D_D	12		0.57	6.84	0.000
NA	12		0.86	10.32	0.000
NH3_T	12	0.19	7.85	94.20	0.002
NO23_D	12	0.12	4.94	59.28	0.001
N_D_D	12	0.19	7.85	94.20	0.002
N_D_L	12	0.24	9.92	119.04	0.002
N_P	12	0.2	8.26	99.12	0.002
O2_D	12	0	0	0.00	0.000
OC/PCB	12		97.35	1168.20	0.029
PHENOL	12	0.3	12.39	148.68	0.003
PH_F	12	0	0	0.00	0.000
PH_L_R	12	0.05	2.07	24.84	0.000
PIC	12		142.3	1707.60	0.043
P_D_D	12	0.19	7.85	94.20	0.002
P_T	12	0.19	7.85	94.20	0.002
RES_NF	12	0.19	7.85	94.20	0.002
SE_D_D	12		4.28	51.36	0.001
SIO2	12		1.14	13.68	0.000
SO4	12		1.14	13.68	0.000
TEMP_F	12	0	0	0.00	0.000

TEMP_L_R	12	0	0	0.00	0.000
TURB_F	12	0	0	0.00	0.000
TURB_L_R	12	0.05	2.07	24.84	0.000
Regional Totals				1621.32	0.030
National Totals				5216.52	0.130

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
Val Chacko	0.10	4.0	0.50	4.50
James Gaskin	0.02	0.8		0.80
Bob Woychuck	0.35	11.2	5.50	16.70
Ken Thomson	0.03	1.2	0.25	1.45
Wm Gummer	0.02	0.8	0.25	1.05
Total	0.52	18.0	6.50	24.50

307-84 National Radionuclide Monitoring

SUBMITTER - 0007
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - Ongoing since 1980

OBJECTIVES
To measure and assess the significance of radionuclides in waters of federal interest.

RATIONALE
Radiation emitted by radionuclides is harmful to humans, causing damage at both the cellular and molecular levels. The main effect on the individual at low dose levels is the induction of cancer, such as leukemia, while very high dose levels result in death. In addition to somatic changes which affect the individual, genetic changes can also occur which affect the offspring for several generations.

DESCRIPTION
Because of limited field and laboratory resources, samples are composited to make an annual sample for analysis. Four (4) litre samples are collected monthly in polyethylene containers and acidified with 8 ml. concentrated HCL as a preservative. From the 12 monthly samples a composite five (5) litre sample is sent to NWRI annually for analysis.

Stations mointored under this project are included in other projects as follows: Souris River at Coulter and East Poplar River at International Boundary in Project 304-84, Baker Lake 1.6 km from Baker Lake in Project 390-84, Saskatchewan River above Carrot River in Project 315-84, and Red River at Emerson in Project 306-84.

COORDINATOR(S) - Gummer

RESOURCES
N/A

INDICATORS - B-1-A a, c, d
PRIORITY - Relative Rank 5

DISSEMINATION OF LABORATORY DATA REPORTS
1 WESTORE

2 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Collection of samples at monitoring sites	ongoing	
2 Composition of samples and shipment to NWRI for analysis	ongoing	Composition done only one per year
3 Verificatioon of previous years data and inclusion in NAQUADAT	October	

EXTENDED DESCRIPTION

In developing this program there were a number of constraints and concerns that were taken into account:

1 Any nuclear related development falls within the jurisdiction of the AECB, it is therefore automatically of federal concern irrespective of where the development is located in Canada. IWD should therefore be ready to measure and assess the aquatic environment for radionuclides at any location in Canada.

2 There are some instances where radionuclides may be released into the aquatic environment as a result of non-nuclear activities and developments, e.g. from coal mining or phosphate rock processing. In these instances monitoring should be at interjurisdictional boundaries, both international and interprovincial, or in other areas of federal concern.

3 Since it was unlikely that IWD would receive new resources for this program it was constrained within the sampling and analytical capabilities presently available.

308-84 Revised Red River Monthly Report Format

SUBMITTER - N/A
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - 1984/85

OBJECTIVES
1 to provide useful, comprehensive monthly data reports for the Red River monitor by placing these data in the context of the historical data

2 to provide direct input to the annual report

RATIONALE
Under the International Joint Commission (IJC) directives, the Branch operates a continuous water quality monitor on the Red River at Emerson. These data must be reported monthly and annually relative to trends and objectives in an effective manner.

DESCRIPTION
At the present time, monthly reports contain only data for a single month. The lack of a historical data reference for these reports frequently causes water quality changes which are consistent with historical patterns to be of concern or alternatively, may result in deviations from the "historical norm" to be unnoticed. This revised report format will provide ready comparison with data from the preceding 11 months as well as the long term patterns. Additionally, the December report will be directly applicable to the monthly report.

COORDINATOR(S) - Gregor, Giilbault

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof					
	PY Tech					
	Salary					
	O & M			0.5		0.5
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total						
Total Dollars				0.5		0.5

308-84 Revised Red River Monthly Report Format

INDICATORS - A-1-A e
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Finalize report format	June 30	Distribute to RRPB and receive comment by Jul 30/84
2 Identify data base and software requirements	Sept. 1	May be necessary to create a new data base well as input historic data
3 Complete software development and test	Oct. 30	

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Gregor	0.01	0.5		0.5
R. Guilbault			0.5	0.5
Student				
Total	0.01	0.5	0.5	1.0

2.2 AGREEMENTS

In the absence of formal federal-provincial mechanisms, the Branch has entered into a number of ad-hoc water quality agreements. These are negotiated annually since there is no long-term commitment by either party. These agreements provide the Branch with a larger database upon which it can assess water quality within the region. Since the Branch is generally responsible for both the sampling and analysis, standardized and uniform methods, which are essential for proper data interpretation, are maintained.

The Federal government is committed to cooperatively working with the Provinces towards better water resource management. To this end the Branch is actively pursuing the formalization of water quality agreements. Negotiations have been initiated with the Province of Alberta with finalization of the Agreement anticipated during 1984.

Projects in the Water Quality Agreements group involve the collection ,analysis and reporting of water samples. Table 3 provides a list, by province, of the stations monitored under water quality agreements. The table includes the NAQUADAT, project and ECS Program numbers for each station. A map number is also included so that the stations may be located on the provincial maps provided in Appendix 1. The status column refers to whether the station is active (A) or discontinued (D).

Table 3 Agreement Monitoring Stations by Province

Manitoba

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
32	Saskatchewan R. above Carrot R.	00MA05KH0001	1.1	315	A

Saskatchewan

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
25	Churchill River below Wasawaksik Lake	00SA06EA0003	1.1	315	A
26	N. Saskatchewan River at Hwy. 3	00SA05EF0001	1.1	315	A

27	Carrot River at Turnberry	00SA05KH0002	1.1	315	A
28	Battle River near Unwin	00SA05FE0001	1.1	315	A
29	Red Deer River near Erwood	00SA05LC0001	1.1	315	A
30	Qu'Appelle R. 3.2 km south of Welby	00SA05JM0014	1.1	315	A
31	Assiniboine River at Hwy. 8	00SA05MD0002	1.1	315	A
63	Douglas R. below confluence with Cluff Creek	00SA07MA0001	1.1	312	A
64	Fond du Lac R. at Outlet of Black L.	00SA07LC0001	1.1	312	A
66	Geike R. below confluence with Wheeler River	00SA06DA0001	1.1	312	A
67	Churchill River at Otter Rapids	00SA06CD0001	1.1	312	A
68	Churchill River near Patuanak	00SA06BB0004	1.1	312	A
87	Birch River below Cumberland Marshes Dam	00SA05KH0004	1.1	312	A
88	Dragline Channel below control structure	00SA05KH0003	1.1	312	A

Alberta

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
22	S. Saskatchewan River at Hwy. 41	00AL05AK0001	1.1	315	A

23	Red Deer River near Blindloss	00AL05CK0001	1.1	315	A
24	Beaver River at Beaver Crossing	00AL06AD0001	1.1	315	A
33	Oldman River at Hwy. 36 Bridge	00AL05AG0001	1.3	310	A
34	Oldman River above Lethbridge	00AL05AD0002	1.3	310	A
35	Bow River near mouth	00AL05BN0001	1.3	310	A
36	Bow River at Cochrane	00AL05BH0017	1.3	310	A
37	Red Deer River near Drumheller	00AL05CE0001	1.3	310	A
38	Red Deer River above Red Deer	00AL05CC0004	1.3	310	A
39	N. Saskatchewn River at Devon	00A105DF0008	1.3	310	A
40	N. Saskatchewan R. at Pakan Bridge	00AL05EC0005	1.3	310	A
41	Athabasca River at Athabasca	00AL07BE0001	1.3	310	A
42	Smoky River at Watino	00AL07GJ0001	1.3	311	A
43	Peace River at Dunvegan Bridge	00AL07FD0002	1.3	311	A
44	Bow R. at Hwy. 1 above Lake Louise	00AL05BA0011	1.3	314	A
45	Bow River 4.5 km above Canmore	00AL05BE0013	1.3	314	A
46	N. Saskatchewan River at Whirlpool Point	00AL05DA0001	1.3	314	A

47	Athabasca R. at Athabasca Falls	00AL07AA0015	1.3	314	A
48	Athabasca River at Hwy. 16 below Snaring River	00AL07AA0023	1.3	314	A
94	N. Saskatchewan R. at Lea Park	00AL05EF0001	1.1	315	A

There are seven projects in the Agreements Group. Their numbers and titles are as follows:

310 Canada - Alberta Monitoring Agreement by WQB
311 Canada - Alberta Monitoring Agreement by WRB
312 Northern Saskatchewan Monitoring Agreement
313 Formalized Water Quality Agreement Development
314 National Parks Monitoring Agreement
315 Prairie Provinces Water Board Monmitoring
316 Ducks Unlimited Monitoring Agreement
317 East Poplar River Bilateral Monitoring Agreement

The following pages provide the complete descriptions for these projects. Most of the projects in this group involve informal agreements with government and private agencies. These projects are designed to generate water quality data and, therefore, fit into ECS program 1.3, Water Management Data. The remainder of the projects in the group involve international or interprovincial waters and, therefore, fit into ECS program 1.1, Canada - U.S. and Interprovincial Waters.

The data collected under these projects is available upon request to the project coordinator. Typically, data requests are of the type which can be accomodated regionally by duplicating computer reports on file or by providing reports of published data. Complex data requests should be referred to Headquarters partly because of the request complexity but also because of the charge-back policy of the Branch.

Project Descriptions:

310-84 Canada - Alberta Monitoring Agreement by WQB

SUBMITTER - 0479
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Negotiated Annually

OBJECTIVES
To conduct monthly water quality surveys at selected sites identified under the Agreement; to prepare the data for: monthly reports to Alberta DOE; the Regional ambient water quality data reports, and; the annual report on the quality of the aquatic environment (see Project 304-84).

RATIONALE
The Branch is in the process of negotiating a formal agreement with Alberta Environment to monitor the quality of surface water at twelve locations on a monthly bases during FY 84/85. The Branch anticipates that by January 1985, the Ad-Hoc Agreement will be replaced with a formal federal-provincial water quality Agreement. Discussions regarding the details of this formal Agreement are taking place.

DESCRIPTION
Since 1977 the Branch has annually negotiated an ad-hoc agreement with Alberta Environment. Under the terms of the Ad-Hoc Agreement samples are collected monthly by the Branch and WRB and are analyzed by the Branch. The data are verified and reported to Alberta Environment. The data also support the objectives of the Aquatic Quality Measurement and Assessment Subprogram. Because of federal interest at some sites, the program is cost shared by the two governments.

COORDINATOR(S) - Block

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.03	0.35		0.38
	PY Tech	0.08	0.05	0.84		0.97
	Salary	1.58	2.37	40.90		44.85
	O & M	1.08	0.90	21.00		22.98
	Capital	3.04	2.54	11.30		16.88
Recov.	PY Prof			0.32		0.32
	PY Tech	0.40	0.24	0.76		1.40
	Salary	7.91	6.60	34.96		49.47
	O & M	5.38	4.49	19.18		29.05
	Capital			9.75		9.75
PY Total		0.48	0.32	2.27		3.07
Total Dollars		18.99	16.90	137.09		172.98

INDICATORS - B-1-A c, d, e, f, g
PRIORITY - Relative Rank 2, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

4 MR. A. Masuda, Water Pollution Control Branch, Alberta Environment,

Edmonton, Alberta

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Review project description	May	
2 Conduct sampling	Monthly	
3 Laboratory analyses		Report due 5 weeks after receipt of samples
4 Data verification	Periodic	Review error listings within 10 days of receip
5 Publish 80/81 detailed data	Aug	
6 Publish 82 detailed data	Oct	
7 Complete validation of 83 data	Dec	
8 Publish 83 detailed data	Mar 85	

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
33	Oldman River at Highway # 36 Bridge	00AL05AG0001	M
34	Oldman River near Lethbridge	00AL05AD0002	M
35	Bow River near the mouth	00AL05BN0001	M
36	Bow River at Cochrane	00AL05BH0017	M
37	Red Deer River at Drumheller	00AL05CE0001	M
38	Red Deer River above Red Deer	00AL05CC0004	M
39	North Saskatchewan River at Devon	00AL05DF0008	M
40	North Saskatchewan River at Pakan Bridge	00AL05EC0005	M
41	Athabasca River at Athabasca	00AL07BE0001	M
42	Smoky River at Watino	00AL07GJ0001	M
43	Peace River at Highway # 2, Dunvegan	00AL07FD0002	M

SAMPLING MATRIX

Parameter	Lab	STN 33	STN 34	STN 35	STN 36	STN 37	STN 38	STN 39	STN 40	STN 41	STN 42
AG_E	NAT	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
ALK_P	NAT	M	M	M	M	M	M	M	M	M	M
ALK_P_R	REG	M	M	M	M	M	M	M	M	M	M
ALK_T	NAT	M	M	M	M	M	M	M	M	M	M
ALK_T_R	REG	M	M	M	M	M	M	M	M	M	M
AS_D_D	NAT	M	M	M	M	M	M	M	M	M	
AS_D_L	NAT										M
B_D_D	REG	M	M	M	M	M	M	M	M	M	
B_D_L	REG										M
CA	NAT	M	M	M	M	M	M	M	M	M	M
CL	NAT	M	M	M	M	M	M	M	M	M	M
CN	REG	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
COLI_F_F	REG	M	M	M	M	M	M	M	M	M	M
COLI_T_F	REG	M	M	M	M	M	M	M	M	M	M
COLO_TR_R	REG	M	M	M	M	M	M	M	M	M	M
COND_F	REG	M	M	M	M	M	M	M	M	M	M
COND_L_R	REG	M	M	M	M	M	M	M	M	M	M
C_DO_L	REG	M	M	M	M	M	M	M	M	M	M
C_PO	REG	M	M	M	M	M	M	M	M	M	M
F	NAT	M	M	M	M	M	M	M	M	M	M
FE_D_D	NAT	M	M	M	M	M	M	M	M	M	
FE_E	NAT										M
HERB	NAT	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
HG_T	NAT	M	M	M	M	M	M	M	M	M	
K	NAT	M	M	M	M	M	M	M	M	M	M
MET_T	NAT	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
MG	NAT	M	M	M	M	M	M	M	M	M	M
MN_D_D	NAT	M	M	M	M	M	M	M	M	M	
MN_E	NAT										M
NA	NAT	M	M	M	M	M	M	M	M	M	M
NH3_T	REG	M	M	M	M	M	M	M	M	M	M
NO23_D	REG	M	M	M	M	M	M	M	M	M	
NO23_L	REG										M
N_D_D	REG	M	M	M	M	M	M	M	M	M	
N_D_L	REG	M	M	M	M	M	M	M	M	M	M
N_P	REG	M	M	M	M	M	M	M	M	M	M
O2_D	REG	M	M	M	M	M	M	M	M	M	M
OC/PCB	NAT	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
OP	NAT	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
PHENOL	REG	M	M	M	M	M	M	M	M	M	M
PH_F	REG	M	M	M	M	M	M	M	M	M	M
PH_L_R	REG	M	M	M	M	M	M	M	M	M	M
P_D_D	REG	M	M	M	M	M	M	M	M	M	
P_D_L	REG										M
P_T	REG	M	M	M	M	M	M	M	M	M	M

RES_NF	REG	M	M	M	M	M	M	M	M	M	M
SE_D_D	NAT	M	M	M	M	M	M	M	M	M	
SE_D_L	NAT										M
SIO2	NAT	M	M	M	M	M	M	M	M	M	M
SO4	NAT	M	M	M	M	M	M	M	M	M	M
STREP_F_F	REG	M	M	M	M	M	M	M	M	M	M
TEMP_F	REG	M	M	M	M	M	M	M	M	M	M
TEMP_L_R	REG	M	M	M	M	M	M	M	M	M	M
TURB_F	REG	M	M	M	M	M	M	M	M	M	
TURB_L_R	REG	M	M	M	M	M	M	M	M	M	M

Parameter	STN 43	No. of samples
AG_E	Q	44
ALK_P	M	132
ALK_P_R	M	132
ALK_T	M	132
ALK_T_R	M	132
AS_D_D		108
AS_D_L	M	24
B_D_D		108
B_D_L	M	24
CA	M	132
CL	M	132
CN	Q	44
COLI_F_F	M	132
COLI_T_F	M	132
COLO_TR_R	M	132
COND_F	M	132
COND_L_R	M	132
C_DO_L	M	132
C_PO	M	132
F	M	132
FE_D_D		108
FE_E	M	24
HERB	Q	44
HG_T		108
K	M	132
MET_T	Q	44
MG	M	132
MN_D_D		108
MN_E	M	24
NA	M	132
NH3_T	M	132
NO23_D		108
NO23_L	M	24
N_D_D		108

N_D_L	M	132
N_P	M	132
O2_D	M	132
OC/PCB	Q	44
OP	Q	44
PHENOL	M	132
PH_F	M	132
PH_L_R	M	132
P_D_D		108
P_D_L	M	24
P_T	M	132
RES_NF	M	132
SE_D_D		108
SE_D_L	M	24
SIO2	M	132
SO4	M	132
STREP_F_F	M	132
TEMP_F	M	132
TEMP_L_R	M	132
TURB_F		108
TURB_L_R	M	132

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
AG_E	44		0.57	25.08	0.001
ALK_P	132		2.28	300.96	0.008
ALK_P_R	132	0.15	6.19	817.08	0.015
ALK_T	132		2.28	300.96	0.008
ALK_T_R	132	0.12	4.96	654.72	0.012
AS_D_D	108		4.28	462.24	0.012
AS_D_L	24		4.28	102.72	0.003
B_D_D	108	0.12	4.96	535.68	0.010
B_D_L	24	0.12	4.96	119.04	0.002
CA	132		0.86	113.52	0.003
CL	132		1.14	150.48	0.004
CN	44	0.1	4.13	181.72	0.003
COLI_F_F	132	0	0	0.00	0.000
COLI_T_F	132	0	0	0.00	0.000
COLO_TR_R	132	0.1	4.13	545.16	0.010
COND_F	132	0	0	0.00	0.000
COND_L_R	132	0.05	2.07	273.24	0.005
C_DO_L	132	0.24	9.92	1309.44	0.024
C_PO	132	0.2	8.26	1090.32	0.020
F	132		5.42	715.44	0.018
FE_D_D	108		0.57	61.56	0.002
FE_E	24		0.57	13.68	0.000
HERB	44		142.3	6261.20	0.157
HG_T	108		1.71	184.68	0.005
K	132		0.86	113.52	0.003
MET_T	44		23.94	1053.36	0.026
MG	132		0.86	113.52	0.003
MN_D_D	108		0.57	61.56	0.002
MN_E	24		0.57	13.68	0.000
NA	132		0.86	113.52	0.003
NH3_T	132	0.19	7.85	1036.20	0.019
NO23_D	108	0.12	4.94	533.52	0.010
NO23_L	24	0.17	7.02	168.48	0.003
N_D_D	108	0.19	7.85	847.80	0.016
N_D_L	132	0.24	9.92	1309.44	0.024
N_P	132	0.2	8.26	1090.32	0.020
O2_D	132	0	0	0.00	0.000
OC/PCB	44		97.35	4283.40	0.107
OP	44		83.65	3680.60	0.092
PHENOL	132	0.3	12.39	1635.48	0.030
PH_F	132	0	0	0.00	0.000
PH_L_R	132	0.05	2.07	273.24	0.005
P_D_D	108	0.19	7.85	847.80	0.016
P_D_L	24	0.24	9.92	238.08	0.004
P_T	132	0.19	7.85	1036.20	0.019

RES_NF	132	0.19	7.85	1036.20	0.019
SE_D_D	108		4.28	462.24	0.012
SE_D_L	24		4.28	102.72	0.003
SIO2	132		1.14	150.48	0.004
SO4	132		1.14	150.48	0.004
STREP_F_F	132	0	0	0.00	0.000
TEMP_F	132	0	0	0.00	0.000
TEMP_L_R	132	0	0	0.00	0.000
TURB_F	108	0	0	0.00	0.000
TURB_L_R	132	0.05	2.07	273.24	0.005

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
Regional	Totals			15852.40	0.291
National	Totals			18991.60	0.475

311-84 Canada - Alberta Monitoring Agreement by WRB

SUBMITTER - 0001
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Negotiated Annually

OBJECTIVES
See Project 310-84

RATIONALE
See Project 310-84

DESCRIPTION
Sampling at two sites under the Alberta-Canada Agreement is carried out by WRB. This project is integrally linked to project 310-84. For this reason, the resources of the two projects are presented together in the description for project 310-84. For further information see project 310-84.

COORDINATOR(S) - Block

RESOURCES
N/A

INDICATORS - See Project 310-84
PRIORITY - See Project 310-84

DISSEMINATION OF LABORATORY DATA REPORTS
See Project 310-83

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 See project 310-84		

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
42	Smoky River at Watino	00AL07GJ0001	M
43	Peace River at Highway # 2, Dunvegan	00AL07FD0002	M

312-84 Northern Saskatchewan Monitoring Agreement

SUBMITTER - 0001
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Negotiated Annually

OBJECTIVES
(1) To conduct quarterly water quality surveys at sites identified in the agreement. (2) To prepare quarterly data reports for the Saskatchewan Government.

RATIONALE
The Branch and Saskatchewan DOE both have need of ongoing water quality data for these interjurisdictional river systems. The Saskatchewan and Canadian governments, recognizing an opportunity to reduce monitoring costs in Northern Saskatchewan, have negotiated a cost-sharing agreement.

DESCRIPTION
Samples are collected quarterly from 5 river locations in N. Saskatchewan and analyzed by WQB. Radionuclide samples are collected at 2 of the sites, with analysis done by SRC. In addition, samples of lake water and snow are collected from 28 locations at various times of the year to provide information on LRTAP. Analyses of these samples are performed by SRC. Sites are accessible by air only. During 1984-85, collection will be done by WQB. The data are reviewed and reported quarterly.

COORDINATOR(S) - Crosley

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.050		0.060
	PY Tech	0.01	0.01	0.075		0.095
	Salary	0.20	0.56	4.400		5.770
	O & M	0.14	0.14	16.000		16.280
	Capital	0.43	0.44	1.000		1.870
Recov.	PY Prof					
	PY Tech	0.06	0.04			0.100
	Salary	1.14	1.17			2.310
	O & M	0.77	0.80			1.570
	Capital					
PY Total		0.07	0.06	0.125		0.255
Total Dollars		3.29	3.11	21.400		27.800

INDICATORS - B-1-A d
PRIORITY - Relative Rank 4, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

4 Director, Water Pollution Control Branch, Saskatchewan Environment, Regina, Saskatchewan

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Sampling	ongoing	
2 Analysis	ongoing	Relative Rank 4, 8 week turnaround time
3 Data reports to Saskatchewan environment	December	

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
63	Douglas River below confluence with Cluff Creek	00SA07MA0001	Q
64	Fond du Lac River below Black Lake	00SA07LC0001	Q
66	Geike River below junction with Wheeler River	00SA06DA0001	Q
67	Churchill River at Otter Rapids	00SA06CD0001	Q
68	Churchill River near Patuanak	00SA06BB0004	Q

SAMPLING MATRIX

Parameter	Lab	STN 63	STN 64	STN 66	STN 67	STN 68	No. of samples
AG_E	NAT	Q	Q	Q	Q	Q	20
ALK_P	NAT	Q	Q	Q	Q	Q	20
ALK_P_R	REG	Q	Q	Q	Q	Q	20
ALK_T	NAT	Q	Q	Q	Q	Q	20
ALK_T_R	REG	Q	Q	Q	Q	Q	20
AS_D_L	NAT	Q	Q	Q	Q	Q	20
B_D_L	REG	Q	Q	Q	Q	Q	20
CA	NAT	Q	Q	Q	Q	Q	20
CHL_A_L	REG	Q	Q	Q	Q	Q	20
CL	NAT	Q	Q	Q	Q	Q	20
CN	REG	Q	Q	Q	Q	Q	20
COLO_TR_R	REG	Q	Q	Q	Q	Q	20
COND_F	REG	Q	Q	Q	Q	Q	20
COND_L_R	REG	Q	Q	Q	Q	Q	20
CR_E	NAT	Q	Q	Q	Q	Q	20
C_DI	REG	Q	Q	Q	Q	Q	20
C_DO_L	REG	Q	Q	Q	Q	Q	20
C_PO	REG	Q	Q	Q	Q	Q	20
F	NAT	Q	Q	Q	Q	Q	20
FE_E	NAT	Q	Q	Q	Q	Q	20
HERB	NAT					Q	4
K	NAT	Q	Q	Q	Q	Q	20
MET_T	NAT	Q	Q	Q	Q	Q	20
MG	NAT	Q	Q	Q	Q	Q	20
MN_E	NAT	Q	Q	Q	Q	Q	20
MO_E	NAT	Q	Q	Q	Q	Q	20
NA	NAT	Q	Q	Q	Q	Q	20
NO23_L	REG	Q	Q	Q	Q	Q	20
N_D_L	REG	Q	Q	Q	Q	Q	20
N_P	REG	Q	Q	Q	Q	Q	20
O2_D	REG	Q	Q	Q	Q	Q	20
OC/PCB	NAT					Q	4
PHENOL	REG					Q	4
PH_F	REG	Q	Q	Q	Q	Q	20
PH_L_R	REG	Q	Q	Q	Q	Q	20
PIC	NAT					Q	4
P_D_L	REG	Q	Q	Q	Q	Q	20
P_T	REG	Q	Q	Q	Q	Q	20
RES_NF	REG	Q	Q	Q	Q	Q	20
SE_D_L	NAT	Q	Q	Q	Q	Q	20
SIO2	NAT	Q	Q	Q	Q	Q	20
SO4	NAT	Q	Q	Q	Q	Q	20
TEMP_F	REG	Q	Q	Q	Q	Q	20
TEMP_L_R	REG	Q	Q	Q	Q	Q	20
TURB_L_R	REG	Q	Q	Q	Q	Q	20

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
AG_E	20		0.57	11.40	0.000
ALK_P	20		2.28	45.60	0.001
ALK_P_R	20	0.15	6.19	123.80	0.002
ALK_T	20		2.28	45.60	0.001
ALK_T_R	20	0.12	4.96	99.20	0.002
AS_D_L	20		4.28	85.60	0.002
B_D_L	20	0.12	4.96	99.20	0.002
CA	20		0.86	17.20	0.000
CHL_A_L	20	0.66	27.27	545.40	0.010
CL	20		1.14	22.80	0.001
CN	20	0.1	4.13	82.60	0.002
COLO_TR_R	20	0.1	4.13	82.60	0.002
COND_F	20	0	0	0.00	0.000
COND_L_R	20	0.05	2.07	41.40	0.001
CR_E	20		0.57	11.40	0.000
C_DI	20	0.2	8.26	165.20	0.003
C_DO_L	20	0.24	9.92	198.40	0.004
C_PO	20	0.2	8.26	165.20	0.003
F	20		5.42	108.40	0.003
FE_E	20		0.57	11.40	0.000
HERB	4		142.3	569.20	0.014
K	20		0.86	17.20	0.000
MET_T	20		23.94	478.80	0.012
MG	20		0.86	17.20	0.000
MN_E	20		0.57	11.40	0.000
MO_E	20		5.7	114.00	0.003
NA	20		0.86	17.20	0.000
NO23_L	20	0.17	7.02	140.40	0.003
N_D_L	20	0.24	9.92	198.40	0.004
N_P	20	0.2	8.26	165.20	0.003
O2_D	20	0	0.0	0.00	0.000
OC/PCB	4		97.35	389.40	0.010
PHENOL	4	0.3	12.39	49.56	0.001
PH_F	20	0	0	0.00	0.000
PH_L_R	20	0.05	2.07	41.40	0.001
PIC	4		142.3	569.20	0.014
P_D_L	20	0.24	9.92	198.40	0.004
P_T	20	0.19	7.85	157.00	0.003
RES_NF	20	0.19	7.85	157.00	0.003
SE_D_L	20		4.28	85.60	0.002
SIO2	20		1.14	22.80	0.001
SO4	20		1.14	22.80	0.001
TEMP_F	20	0	0	0.00	0.000
TEMP_L_R	20	0	0	0.00	0.000
TURB_L_R	20	0.05	2.07	41.40	0.001

Regional	Totals	2751.76	0.050
National	Totals	2674.20	0.067

313-84 Formalized Water Quality Agreement Development

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES

To negotiate and develop formalized agreements with the provinces of Manitoba, Saskatchewan and Alberta; to annually review and update these agreements.

RATIONALE

In 1982 Water Quality Branch was directed by the Federal Cabinet to negotiate water quality agreements with the provinces. These agreements will fullfill the needs of both the provinces (data aquisition for management purposes) and the federal government (National Water Quality Assessment).

DESCRIPTION

Negotiations with the province of Alberta commenced in 1983 with a view to replacing the existing ad hoc arrangement (Proects 310, 311) with a formalized agreement. This formalized agreement will contain provisions for the sharing of field and analytical work. As well, other joint activities such as quality control/quality assurance studies, interpretive reporting and sediment and biological surveys will take place. Similar agreements are scheduled to be negotiated with Manitoba (starting in 1984) and Saskatchewan.

COORDINATOR(S) - Gummer, Thomson

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			1.0		1.0
	PY Tech			0.1		0.1
	Salary			43.2		43.2
	O & M			5.0		5.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				1.1		1.1
Total Dollars				48.2		48.2

313-84 Formalized Water Quality Agreement Development

INDICATORS - A-1-A a, c, d
PRIORITY - n/a

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Commence negotiations with Manitoba	May	Background briefing material to be prepared
2 Complete negotiations with Alta for '84-'85	June	Negotiations ongoing since June, 1983
3 Assemble background information preparator to negotiations with S	November	To be jointly prepared by Sask. Dist. and HQ
4 Complete negotiations with Manitoba	December	
5 Commence negotiations with Saskatchewan	February	
6 Revise details of Alta agreement for '85-'86	February	As per work plan

313-84 Formalized Water Quality Agreement Development

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
Wm. Gummer	0.2	8	2.0	10.0
K. Thomson	0.2	8	2.0	10.0
H. Block	0.3	12	0.5	12.5
V. Chacko	0.2	8	0.5	8.5
R. Crosley	0.1	4	0.0	4.0
Total	1.0	40	5.0	45.0

314-84 National Parks Monitoring Agreement

SUBMITTER - 0417
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Negotiated Annually

OBJECTIVES
To conduct monthly surveys at selected sites within the Rocky Mountain National Parks; to prepare detailed data reports on data obtained in 1980 and 1981; to develop an Agreement with Parks Canada for FY84/85 and 85/86.

RATIONALE
Parks Canada requested that the Branch establish and maintain a water quality network for the purpose of establishing and maintaining a baseline of surface water quality to optimize the use of Park waters. In addition, the Branch has an interest in these data since both the North and South Saskatchewan and the Athabasca Rivers originate in the Parks.

DESCRIPTION
Under the terms of the Agreement the Branch is committed to monthly monitoring for major ions, nutrients, bacteria and metals at five sites (with some IWD interest) in the Rocky Mt. Parks. The project is reviewed annually in cooperation with Parks Canada and is renewable with or without modification. Data are verified on a monthly basis and reported annually to Parks Canada.

COORDINATOR(S) - Block

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.11		0.12
	PY Tech	0.19	0.09	0.25		0.53
	Salary	3.81	2.90	12.40		19.11
	O & M	2.59	1.73	6.40		10.72
	Capital	1.83	1.22	3.25		6.30
Recov.	PY Prof			0.07		0.07
	PY Tech	0.10	0.05	0.18		0.33
	Salary	1.90	1.27	8.08		11.25
	O & M	1.29	0.86	4.43		6.58
	Capital			2.25		2.25
PY Total		0.29	0.15	0.61		1.05
Total Dollars		11.42	7.98	36.81		56.21

INDICATORS - E-1-A d
PRIORITY - Relative Rank 3, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

4 Pat Benson - Parks Canada

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Update project description	May	
2 Obtain agreement for 84/85	July	Parks Canada budget approval may result in late signature date
3 Sample collection	monthly	
4 Lab analyses	periodic	Turnaround time is 6 weeks
5 Data verification	periodic	Verify within 10 days of receiving from lab
6 Publish data report 1984/85	June	Timing dependant on completion of a data reports for district
7 Verify and publish data report for 1980/81	November	Timing dependent on completion of data reports for district
8 Verify and publish data report for 1982 and 198	October	As per work plan

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
44	Bow River at Highway # 1 above Lake Louise	00AL05BA0011	M
45	Bow River 4.5 Km. above Canmore	00AL05BE0013	M
46	North Saskatchewan River at Whirlpool Point	00AL05DA0001	M
47	Athabasca River at Athabasca Falls	00AL07AA0015	M
48	Athabasca River at Highway # 16 below Snaring River	00AL07AA0023	M

SAMPLING MATRIX

Parameter	Lab	STN 44	STN 45	STN 46	STN 47	STN 48	No. of samples
ALK_P	NAT	M	M	M	M	M	60
ALK_P_R	REG	M	M	M	M	M	60
ALK_T	NAT	M	M	M	M	M	60
ALK_T_R	REG	M	M	M	M	M	60
AS_D_D	NAT	M	M	M	M	M	60
B_D_D	REG	M	M	M	M	M	60
CA	NAT	M	M	M	M	M	60
CHL_A_D	REG	M	M	M	M	M	60
CL	NAT	M	M	M	M	M	60
CN	REG		M			M	24
COLI_F_F	NAT	M	M	M	M	M	60
COLI_T_F	NAT	M	M	M	M	M	60
COLO_TR_R	REG	M	M	M	M	M	60
COND_F	REG	M	M	M	M	M	60
COND_L_R	REG	M	M	M	M	M	60
C_DO_L	REG	M	M	M	M	M	60
C_PO	REG	M	M	M	M	M	60
F	NAT	M	M	M	M	M	60
FE_D_D	NAT	M	M	M	M	M	60
HERB	NAT		M			M	24
HG_T	NAT	M	M	M	M	M	60
K	NAT	M	M	M	M	M	60
MET_T	NAT		M			M	24
MG	NAT	M	M	M	M	M	60
MN_D_D	NAT	M	M	M	M	M	60
NA	NAT	M	M	M	M	M	60
NH3_T	REG	M	M	M	M	M	60
NO23_D	REG	M	M	M	M	M	60
N_D_D	REG	M	M	M	M	M	60
N_D_L	REG	M	M	M	M	M	60
N_P	REG	M	M	M	M	M	60
O2_D	REG	M	M	M	M	M	60
OC/PCB	NAT		M			M	24
PHENOL	REG		M			M	24
PH_F	REG	M	M	M	M	M	60
PH_L_R	REG	M	M	M	M	M	60
PIC	NAT		M			M	24
P_D_D	REG	M	M	M	M	M	60
P_T	REG	M	M	M	M	M	60
RES_NF	REG	M	M	M	M	M	60
SE_D_D	NAT	M	M	M	M	M	60
SIO2	NAT	M	M	M	M	M	60
SO4	NAT	M	M	M	M	M	60
STREP_F_F	REG	M	M	M	M	M	60
TEMP_F	REG	M	M	M	M	M	60

TEMP_L_R	REG	M	M	M	M	M	60
TURB_F	REG	M	M	M	M	M	60
TURB_L_R	REG	M	M	M	M	M	60

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	60		2.28	136.80	0.003
ALK_P_R	60	0.15	6.19	371.40	0.007
ALK_T	60		2.28	136.80	0.003
ALK_T_R	60	0.12	4.96	297.60	0.005
AS_D_D	60		4.28	256.80	0.006
B_D_D	60	0.12	4.96	297.60	0.005
CA	60		0.86	51.60	0.001
CHL_A_D	60	0.33	13.64	818.40	0.015
CL	60		1.14	68.40	0.002
CN	24	0.1	4.13	99.12	0.002
COLI_F_F	60				
COLI_T_F	60				
COLO_TR_R	60	0.1	4.13	247.80	0.005
COND_F	60	0	0	0.00	0.000
COND_L_R	60	0.05	2.07	124.20	0.002
C_DO_L	60	0.24	9.92	595.20	0.011
C_PO	60	0.2	8.26	495.60	0.009
F	60		5.42	325.20	0.008
FE_D_D	60		0.57	34.20	0.001
HERB	24		142.3	3415.20	0.085
HG_T	60		1.71	102.60	0.003
K	60		0.86	51.60	0.001
MET_T	24		23.94	574.56	0.014
MG	60		0.86	51.60	0.001
MN_D_D	60		0.57	34.20	0.001
NA	60		0.86	51.60	0.001
NH3_T	60	0.19	7.85	471.00	0.009
NO23_D	60	0.12	4.94	296.40	0.005
N_D_D	60	0.19	7.85	471.00	0.009
N_D_L	60	0.24	9.92	595.20	0.011
N_P	60	0.2	8.26	495.60	0.009
O2_D	60	0	0	0.00	0.000
OC/PCB	24		97.35	2336.40	0.058
PHENOL	24	0.3	12.39	297.36	0.005
PH_F	60	0	0	0.00	0.000
PH_L_R	60	0.05	2.07	124.20	0.002
PIC	24		142.3	3415.20	0.085
P_D_D	60	0.19	7.85	471.00	0.009
P_T	60	0.19	7.85	471.00	0.009
RES_NF	60	0.19	7.85	471.00	0.009
SE_D_D	60		4.28	256.80	0.006
SIO2	60		1.14	68.40	0.002
SO4	60		1.14	68.40	0.002
STREP_F_F	60	0	0	0.00	0.000
TEMP_F	60	0	0	0.00	0.000

TEMP_L_R		60	0	0	0.00	0.000
TURB_F		60	0	0	0.00	0.000
TURB_L_R		60	0.05	2.07	124.20	0.002
Regional	Totals				7634.88	0.140
National	Totals				11436.36	0.286

315-84 Prairie Provinces Water Board Monitoring

SUBMITTER - 0462
ECS PROGRAM - 1.1* - Interjurisdictional Water Management
DURATION - Ongoing since 1978

OBJECTIVES
To conduct monthly water quality surveys at eleven interprovincial locations.

To prepare monthly detailed data reports for the PPWB.

RATIONALE
The Branch, in order to fulfill its mandate and the terms of an agreement with the Prairie Provinces Water Board, is required to monitor the quality of selected interprovincial rivers.

DESCRIPTION
A total of eleven interprovincial sites are sampled monthly by the branch for a wide spectrum of parameters. The information obtained is verified monthly and reports are prepared for the PPWB. These stations represent river systems in both the Canadian Shield and Plains physiographic regions of the western and northern region.

COORDINATOR(S) - Crosley (Man., Sask.) Block (Alta., NWT.)

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.04	0.80		0.84
	PY Tech	0.20	0.06	0.75		1.01
	Salary	4.05	3.11	56.00		63.16
	O & M	2.76	1.16	21.10		25.02
	Capital	7.86	3.32	10.73		21.91
Recov.	PY Prof					
	PY Tech	1.03	0.32			1.35
	Salary	20.52	8.66			29.18
	O & M	13.95	5.89			19.84
	Capital					
PY Total		1.23	0.42	1.55	0	3.20
Total Dollars		49.14	22.14	87.83		159.11

* Affiliated ECS Program(s) - 1.3, 4.1

315-84 Prairie Provinces Water Board Monitoring

INDICATORS - B-1-A a, b, c
PRIORITY - Relative Rank 2, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

4 PPWB, Motherwell Building, Regina, Saskatchewan

5 Director, Water Pollution Control Branch, Saskatchewan Environment

6 M. Morelli, Manitoba DMREM

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Provide finalized data to users within 8 weeks of collection	ongoing	
2 Verified data for calendar year to be entered on NAQUADAT	March 1, 1985	

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
22	South Saskatchewan River at Highway # 41	00AL05AK0001	M
23	Red Deer River near Bindloss	00AL05CK0001	M
24	Beaver River at Beaver Crossing	00AL06AD0001	M
25	Churchill River below Wasawakasik Lake	00SA06EA0003	M
27	Carrot River at Turnberry	00SA05KH0002	M
28	Battle River near Unwin	00SA05FE0001	M
29	Red Deer River near Erwood	00SA05LC0001	M
30	Qu'Appelle River 3.2 Km. South of Welby	00SA05JM0014	M
31	Assiniboine River at Highway # 8 below Kamsack	00SA05MD0002	M
32	Saskatchewan River above Carrot River	00MA05KH0001	M
94	North Saskatchewan River at Lea Park	00AL05EF0001	M

SAMPLING MATRIX

Parameter	Lab	STN 22	STN 23	STN 24	STN 25	STN 27	STN 28	STN 29	STN 30	STN 31	STN 32
ALK_P	NAT	M	M	M	M	M	M	M	M	M	M
ALK_P_R	REG	M	M	M	M	M	M	M	M	M	M
ALK_T	NAT	M	M	M	M	M	M	M	M	M	M
ALK_T_R	REG	M	M	M	M	M	M	M	M	M	M
AL_D	NAT	M	M	M	M	M	M	M	M	M	M
AL_E	NAT	M	M	M	M	M	M	M	M	M	M
AS_D_D	NAT	M	M	M	M	M	M	M	M	M	M
B_D_D	REG	M	M	M	M	M	M	M	M	M	M
CA	NAT	M	M	M	M	M	M	M	M	M	M
CHL_A_D	REG	M	M	M	M	M	M	M	M	M	M
CL	NAT	M	M	M	M	M	M	M	M	M	M
CN	REG	M	M	M	M	M	M	M	M	M	M
COLI_F_F	REG	M	M	M	M	M	M	M	M	M	M
COLI_T_F	REG	M	M	M	M	M	M	M	M	M	M
COLO_TR_R	REG	M	M	M	M	M	M	M	M	M	M
COND_F	REG	M	M	M	M	M	M	M	M	M	M
COND_L_R	REG	M	M	M	M	M	M	M	M	M	M
CR_T	NAT	M	M	M	M	M	M	M	M	M	M
C_DO_D	REG	M	M	M	M	M	M	M	M	M	M
C_PO	REG	M	M	M	M	M	M	M	M	M	M
F	NAT	M	M	M	M	M	M	M	M	M	M
FE_D_D	NAT	M	M	M	M	M	M	M	M	M	M
HERB	NAT	M	M	M	M	M	M	M	M	M	M
HG_T	NAT	M	M	M	M	M	M	M	M	M	M
K	NAT	M	M	M	M	M	M	M	M	M	M
MET_T	NAT	M	M	M	M	M	M	M	M	M	M
MG	NAT	M	M	M	M	M	M	M	M	M	M
MN_D_D	NAT	M	M	M	M	M	M	M	M	M	M
NA	NAT	M	M	M	M	M	M	M	M	M	M
NH3_T	REG	M	M	M	M	M	M	M	M	M	M
NO23_D	REG	M	M	M	M	M	M	M	M	M	M
N_D_D	REG	M	M	M	M	M	M	M	M	M	M
N_D_L	REG	M	M	M	M	M	M	M	M	M	M
N_P	REG	M	M	M	M	M	M	M	M	M	M
O2_D	REG	M	M	M	M	M	M	M	M	M	M
OC/PCB	NAT	M	M	M	M	M	M	M	M	M	M
PHENOL	REG	M	M	M	M	M	M	M	M	M	M
PH_F	REG	M	M	M	M	M	M	M	M	M	M
PH_L_R	REG	M	M	M	M	M	M	M	M	M	M
PIC	NAT	M		M		M			M		M
P_D_D	REG	M	M	M	M	M	M	M	M	M	M
P_OR_D	REG	M	M	M	M	M	M	M	M	M	M
P_T	REG	M	M	M	M	M	M	M	M	M	M
RES_FNF	REG	M	M	M	M	M	M	M	M	M	M
RES_NF	REG	M	M	M	M	M	M	M	M	M	M

SE_D_D	NAT	M	M	M	M	M	M	M	M	M	M
SIO2	NAT	M	M	M	M	M	M	M	M	M	M
SO4	NAT	M	M	M	M	M	M	M	M	M	M
SULFIDE	REG		V	V		V	V				
TEMP_F	REG	M	M	M	M	M	M	M	M	M	M
TEMP_L_R	REG	M	M	M	M	M	M	M	M	M	M
TURB_F	REG	M	M	M	M	M	M	M	M	M	M
TURB_L_R	REG	M	M	M	M	M	M	M	M	M	M

Parameter	STN 94	No. of samples
ALK_P	M	132
ALK_P_R	M	132
ALK_T	M	132
ALK_T_R	M	132
AL_D	M	132
AL_E	M	132
AS_D_D	M	132
B_D_D	M	132
CA	M	132
CHL_A_D	M	132
CL	M	132
CN	M	132
COLI_F_F	M	132
COLI_T_F	M	132
COLO_TR_R	M	132
COND_F	M	132
COND_L_R	M	132
CR_T	M	132
C_DO_D	M	132
C_PO	M	132
F	M	132
FE_D_D	M	132
HERB	M	132
HG_T	M	132
K	M	132
MET_T	M	132
MG	M	132
MN_D_D	M	132
NA	M	132
NH3_T	M	132
NO23_D	M	132
N_D_D	M	132
N_D_L	M	132
N_P	M	132
O2_D	M	132
OC/PCB	M	132

PHENOL	M	132
PH_F	M	132
PH_L_R	M	132
PIC	M	72
P_D_D	M	132
P_OR_D	M	132
P_T	M	132
RES_FNF	M	132
RES_NF	M	132
SE_D_D	M	132
SIO2	M	132
SO4	M	132
SULFIDE	V	35
TEMP_F	M	132
TEMP_L_R	M	132
TURB_F	M	132
TURB_L_R	M	132

315-84 Prairie Provinces Water Board Monitoring

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	132		2.28	300.96	0.008
ALK_P_R	132	0.15	6.19	817.08	0.015
ALK_T	132		2.28	300.96	0.008
ALK_T_R	132	0.12	4.96	654.72	0.012
AL_D	132		0.57	75.24	0.002
AL_E	132		0.57	75.24	0.002
AS_D_D	132		4.28	564.96	0.014
B_D_D	132	0.12	4.96	654.72	0.012
CA	132		0.86	113.52	0.003
CHL_A_D	132	0.33	13.64	1800.48	0.033
CL	132		1.14	150.48	0.004
CN	132	0.1	4.13	545.16	0.010
COLI_F_F	132	0	0	0.00	0.000
COLI_T_F	132	0	0	0.00	0.000
COLO_TR_R	132	0.1	4.13	545.16	0.010
COND_F	132	0	0	0.00	0.000
COND_L_R	132	0.05	2.07	273.24	0.005
CR_T	132		1.71	225.72	0.006
C_DO_D	132	0.19	7.87	1038.84	0.019
C_PO	132	0.2	8.26	1090.32	0.020
F	132		5.42	715.44	0.018
FE_D_D	132		0.57	75.24	0.002
HERB	132		142.3	18783.60	0.470
HG_T	132		1.71	225.72	0.006
K	132		0.86	113.52	0.003
MET_T	132		23.94	3160.08	0.079
MG	132		0.86	113.52	0.003
MN_D_D	132		0.57	75.24	0.002
NA	132		0.86	113.52	0.003
NH3_T	132	0.19	7.85	1036.20	0.019
NO23_D	132	0.12	4.94	652.08	0.012
N_D_D	132	0.19	7.85	1036.20	0.019
N_D_L	132	0.24	9.92	1309.44	0.024
N_P	132	0.2	8.26	1090.32	0.020
O2_D	132	0	0.00	0.00	0.000
OC/PCB	132		97.35	12850.20	0.321
PHENOL	132	0.3	12.39	1635.48	0.030
PH_F	132	0	0	0.00	0.000
PH_L_R	132	0.05	2.07	273.24	0.005
PIC	72		142.3	10245.60	0.256
P_D_D	132	0.19	7.85	1036.20	0.019
P_OR_D	132	0.08	3.31	436.92	0.008
P_T	132	0.19	7.85	1036.20	0.019
RES_FNF	132	0.19	7.85	1036.20	0.019
RES_NF	132	0.19	7.85	1036.20	0.019

SE_D_D	132		4.28	564.96	0.014
SIO2	132		1.14	150.48	0.004
SO4	132		1.14	150.48	0.004
SULFIDE	35	1	41.32	1446.20	0.027
TEMP_F	132	0	0	0.00	0.000
TEMP_L_R	132	0	0	0.00	0.000
TURB_F	132	0	0	0.00	0.000
TURB_L_R	132	0.05	2.07	273.24	0.005
Regional	Totals			20753.84	0.381
National	Totals			49144.68	1.229

316-84 Ducks Unlimited Monitoring Agreement

SUBMITTER - 0487
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
To characterize and report on the quality of the inflowing and outflowing surface waters of the Cumberland Marshes Watershed.

RATIONALE
The development and operation of the Cumberland Marshes Ducks Unlimited project has the potential to alter the quality of the Birch and Saskatchewan Rivers which are interprovincial rivers.

DESCRIPTION
The monitoring program consists of twelve annual samples. The sampling frequency is dependant on flow, allowing a general overview of differences in water quality.

In the event that evidence of impacts are observed, intensive surveys will be proposed and funds sought from Ducks Unlimited to substantiate these observations more precisely and accurately, and to identify problem sources with recommendation of measures for the protection of the aquatic environment. This project was initiated by the PPWB and is funded by Ducks Unlimited (Canada).

COORDINATOR(S) - Crosley

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.06		0.07
	PY Tech			0.04		0.04
	Salary		0.35	3.70		4.05
	O & M			0.50		0.50
	Capital	0.19	0.51			0.70
Recov.	PY Prof					
	PY Tech	0.03	0.06			0.09
	Salary	0.61	1.58			2.19
	O & M	0.41	1.07			1.48
	Capital					
PY Total		0.03	0.07	0.10		0.20
Total Dollars		1.21	3.51	4.20		8.92

INDICATORS - B-1-A d,e
PRIORITY - Relative Rank 4, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

4 Saskatchewan Environment

5 Mr. M. Morelli, Manitoba

6 Ducks Unlimited

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Sampling	May to March	Flow-dependent sampling schedule
2 Data reports are prepared within 60 days of sample collection	ongoing	
3 Intensive review of 1979-84 water quality data	1985	An inter-agency task force will complete the report for PPWB

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
87	Birch River below Cumberland Marshes Dam	00SA05KH0004	M
88	Dragline Channel below control structure.	00SA05KH0003	M

SAMPLING MATRIX

Parameter	Lab	STN 87	STN 88	No. of samples
ALK_P	NAT	M	M	24
ALK_P_R	REG	M	M	24
ALK_T	NAT	M	M	24
ALK_T_R	REG	M	M	24
AS_D_L	NAT	M	M	24
CA	NAT	M	M	24
CHL_A_L	REG	M	M	24
CL	NAT	M	M	24
COLI_F_F	REG	M	M	24
COLI_T_F	REG	M	M	24
COLO_TR_R	REG	M	M	24
COND_F	REG	M	M	24
COND_L_R	REG	M	M	24
C_DO_L	REG	M	M	24
C_PO	REG	M	M	24
F	NAT	M	M	24
FE_E	NAT	M	M	24
K	NAT	M	M	24
MET_T	NAT	M	M	24
MG	NAT	M	M	24
MN_E	NAT	M	M	24
NA	NAT	M	M	24
NH3_T	REG	M	M	24
NO23_L	REG	M	M	24
N_D_L	REG	M	M	24
N_P	REG	M	M	24
O2_D	REG	M	M	24
PHENOL	REG	M	M	24
PH_F	REG	M	M	24
PH_L_R	REG	M	M	24
P_T	REG	M	M	24
RES_NF	REG	M	M	24
SE_D_L	NAT	M	M	24
SIO2	NAT	M	M	24
SO4	NAT	M	M	24
SULFIDE	REG	V		2
TEMP_F	REG	M	M	24
TEMP_L_R	REG	M	M	24
TURB_L_R	REG	M	M	24

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	24		2.28	54.72	0.001
ALK_P_R	24	0.15	6.19	148.56	0.003
ALK_T	24		2.28	54.72	0.001
ALK_T_R	24	0.12	4.96	119.04	0.002
AS_D_L	24		4.28	102.72	0.003
CA	24		0.86	20.64	0.001
CHL_A_L	24	0.66	27.27	654.48	0.012
CL	24		1.14	27.36	0.001
COLI_F_F	24	0	0	0.00	0.000
COLI_T_F	24	0	0	0.00	0.000
COLO_TR_R	24	0.1	4.13	99.12	0.002
COND_F	24	0	0	0.00	0.000
COND_L_R	24	0.05	2.07	49.68	0.001
C_DO_L	24	0.24	9.92	238.08	0.004
C_PO	24	0.2	8.26	198.24	0.004
F	24		5.42	130.08	0.003
FE_E	24		0.57	13.68	0.000
K	24		0.86	20.64	0.001
MET_T	24		23.94	574.56	0.014
MG	24		0.86	20.64	0.001
MN_E	24		0.57	13.68	0.000
NA	24		0.86	20.64	0.001
NH3_T	24	0.19	7.85	188.40	0.003
NO23_L	24	0.17	7.02	168.48	0.003
N_D_L	24	0.24	9.92	238.08	0.004
N_P	24	0.2	8.26	198.24	0.004
O2_D	24	0	0	0.00	0.000
PHENOL	24	0.3	12.39	297.36	0.005
PH_F	24	0	0	0.00	0.000
PH_L_R	24	0.05	2.07	49.68	0.001
P_T	24	0.19	7.85	188.40	0.003
RES_NF	24	0.19	7.85	188.40	0.003
SE_D_L	24		4.28	102.72	0.003
SIO2	24		1.14	27.36	0.001
SO4	24		1.14	27.36	0.001
SULFIDE	2	1	41.32	82.64	0.002
TEMP_F	24	0	0	0.00	0.000
TEMP_L_R	24	0	0	0.00	0.000
TURB_L_R	24	0.05	2.07	49.68	0.001
Regional Totals				3156.56	0.058
National Totals				1211.52	0.030

317-84 East Poplar River Bilateral Monitoring Agreement

SUBMITTER - 0001
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
To provide ongoing surveillance and an annual description of ground water and surface water quality conditions in the East Poplar River Basin near the International Border and to provide support to a Bilateral Monitoring Committee.

RATIONALE
A Bilateral Monitoring Arrangement has been signed by Canada, Saskatchewan, Montana and the U.S.A. Under the terms of the arrangement, Environment Canada is essentially committed to monthly sampling of the East Poplar River, reporting of surface water data, raising and resolving concerns, preparing reports, reviewing groundwater data, etc. All this is in regards to the Saskatchewan power plant operation near the International Border on the East Poplar River.

DESCRIPTION
Under the terms of the Poplar River Bilateral Monitoring Arrangement, the Branch is committed to: monitoring water quality, maintaining a data base and, upholding other obligations under the Bilateral Agreement.

The resources required for this project have been included in Project 304-84. Refer to Project 304-83 for Sampling Matrix and Analytical Requirements for Station No. 7, East Poplar River at International Boundary.

COORDINATOR(S) - Gummer, Crosley, McNaughton

RESOURCES
N/A

INDICATORS - A-1-A f, g, h
PRIORITY - Relative Rank 1, Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 Saskatchewan Environment Director, Water Pollution Control Branch, 5th Floor Humford House, 1855 Victoria Avenue, Regina, Saskatchewan S4P 3T2

ACTIVITIES/REPORTING CALENDAR
N/A

EXTENDED DESCRIPTION

Under the terms of the Poplar River Bilateral Monitoring Arrangement, the Branch is committed to:

(A) Monitoring Component

1 sampling the East Poplar River near the International Border, on a monthly basis, for selected constituents;

2 conducting quality control activities to ensure data credibility and comparability between the USGS and WQB data bases;

(B) Bilateral Obligations

1 providing quarterly data reports to WPM for inclusion in a formal exchange of data with the USGS and maintaining up-to-date files of U.S. data;

2 providing interpretation of the calendar year's data with emphasis on Boron and TDS in relation to the established surface water quality objectives; computing mean monthly flow weighted averge concentrations;

3 reviewing and providing comments on reports concerning the quality of both ground and surface waters; and

4 providing support to the Canadian Chairman (D. A. Davis) of the Bilateral Committee conerning the monitoring technologies, parametric scope, scheduling, issues and interpretation of data.

(C) Data Base Maintenance

1 acquire all data for both ground and surface water which has, and continues to be made available by all the involved agencies in the Poplar River Basin and consolidate it into an easily accessed and maintainable data base.

2.3 ANALYTICAL SUPPORT

As part of its role of providing services and information, the WQB provides analytical support to other agencies. These agencies include provincial environment departments and other federal agencies. This support is provided on a cost-recovery basis.

The scope and magnitude of the analytical services provided by the Branch in any given year is determined during the project planning excercise. The need for analytical services to other agencies, however, cannot be foreseen. Hence, the laboratory responds to urgent demands as best it can. All laboratory services which are not outlined in this document must receive the proper approval as outlined below.

Within the limits of available resources, analytical services are provided upon request to other federal and provincial agencies in the western and northern region. These services are not normally made directly available to other agencies since this would place the Branch, a federally-funded operation, in direct competition with the private sector. BLANK Requests for analytical support and a cost schedule (see APPENDIX 2) for support services should be made in writing to:

Chief
Water Quality Branch (W & NR)
Inland Waters Directorate
1901 Victoria Avenue
Regina, Saskatchewan
S4P 3R4

A copy of the correspondence should be sent to:

Head
Analytical Services Division
Water Quality Brnch (W & NR)
Prairie Migratory Bird Research Centre
115 Perimeter Road
Saskatoon, Saskatchewan
S7N 0X4

A cost schedule has been developed utilizing many years of cost and test statistics. It is refined annually to reflect changes in analytical methods, automation and increases due to inflation. The cost is broken down as follows:

Cost Component	Percentage
Salary	56

Operation	22
Capital Depreciation	13
Overhead	9

Only the operational and salary components (78%) are recovered from other federal agencies. The salary-recovered component is used to contract analytical support from private analytical service laboratories. Services provided to agencies other than the federal government are charged the full cost as shown in the cost schedule.

There are four projects in the Analytical Support Group. Their titles and numbers are as follows:

320 Analytical Support - Alberta Environment
321 Analytical Support - Saskatchewan Environment
322 Analytical Support - Miscellaneous
323 Analytical Support - Other Federal Agencies

Complete descriptions for the above projects are provided on the following pages. All the projects in the Analytical Support Group involve the generation and interpretation of water quality data and, thus, fit into ECS National Program 1.3, Water Quality Mangement Data.

Project Descriptions:

320-84 Analytical Support - Alberta Environment

SUBMITTER - 0426
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To assist Alberta Department of Environment in carrying out a study of eutrophication in the S. Saskatchewan River in Alberta by analyzing samples on a full cost recovery basis and by providing advice to Alberta Government personnel.

RATIONALE
Federal-Provincial cooperation is encouraged whenever possible. In this case, the laboratory offers a service on a full cost-recovery basis.

DESCRIPTION
The South Saskatchewan River and its tributaries in Alberta are receiving increasing amounts of effluents from irrigation, municipalities and industry. Already there have been reports of algae problems in the Saskatchewan portion of the Basin. These problems have been attributed to Alberta's activities. Alberta designed and is carrying out a study to quantify the magnitude and effects of the nutrient load in the Basin (TP, TDP, NH3, NO3 + NO2, TN, DN).

Because of the interjurisdicational nature of the problem, Water Quality Branch provided advice on the study design and agreed to carry out the analyses on a full cost recovery basis.

COORDINATOR(S) - J. Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof					
	PY Tech					0
	Salary					0
	O & M					0
	Capital					0
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M		10			10
	Capital					
PY Total			0			0
Total Dollars			10			10

INDICATORS - B-1-A d
PRIORITY - Sample Turnaround Time 30 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator

2 H. Hamilton,

Alberta Environment,

2938 11th Street NE,

Calgary, Alberta

ACTIVITIES/REPORTING CALENDAR
N/A

321-84 Analytical Support - Saskatchewan Environment

SUBMITTER - 0428
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Negotiated Annually

OBJECTIVES
To provide analytical support on a full cost recovery basis to Saskatchewan Department of Environment in their program for monitoring and studying toxic substances.

RATIONALE
The WQB (federal government) is committed to federal- provincial cooperation in water resources management programs.

DESCRIPTION
The Branch has a long history of supporting the work of the Government of Saskatchewan. The withdrawal of the Branch from interprovincial monitoring has left a gap which Saskatchewan has attempted to fill. Saskatchewan has limited capability for analyzing for toxic substances, particularly organics. Because of the precedence and because of the federal interest in toxic substances, the Branch has agreed to support the toxic substances program of Saskatchewan by carrying out analysis on a full cost recovery basis. Costs are recovered in accordance with the National Laboratory Cost Schedule and are estimated to be about $15,000 in FY 84/85. An agreement with complete details is on file.

COORDINATOR(S) - J. Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof	0.01	0.01			0.02
	PY Tech	0.05				0.05
	Salary	1.35	0.35			1.70
	O & M					
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M	15.00				15.00
	Capital					
PY Total		0.06	0.01			0.07
Total Dollars		16.35	0.35			16.70

INDICATORS - B-1-A d
PRIORITY - Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
Project Coordinator(s)

Saskatchewan Environment, Humford House 1855 Victoria Avenue Regina, Saskatchewan S4P 3T2

ACTIVITIES/REPORTING CALENDAR
N/A

SUBMITTER - 0459
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To provide field and analytical support to pollution surveys as the urgency may require.

RATIONALE
Not all analytical requirements are known in advance. Sampling is sometimes initiated following spills and other pollution events which require laboratory support.

DESCRIPTION
When sampling of pollution events occurs or when unplanned sampling in support of other budgeted projects is conducted, e.g. follow-up pollution verification surveys, the laboratory is contacted regarding its perceived involvement. Work load, sample type, parameter selection, sample turnaround time and reporting requirements are determined in advance of the sample analysis.

COORDINATOR(S) - J. Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.01		0.02
	PY Tech			0.02		0.02
	Salary		0.35	0.90		1.25
	O & M		1.20	1.10		2.30
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total			0.01	0.03		0.04
Total Dollars			1.55	2.00		3.55

INDICATORS - B-1-A d
PRIORITY - N/A

ACTIVITIES/REPORTING CALENDAR
N/A

323-84 Analytical Support - Other Federal Agencies

SUBMITTER - 0459
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To provide field and analytical support to ongoing programs and pollution surveys by other federal agencies as may be required.

RATIONALE
Not all analytical requirments are known in advance. Sampling is sometimes initiated following spills and other pollution events which may require laboratory support. It is Branch policy to provide analytical support to federal agencies but within the restraints of staff and dollars. When necessary, OM costs and salary are recovered.

DESCRIPTION
When sampling of pollution events occurs or when unplanned sampling by other federal agencies is conducted (e.g. follow-up pollution verification surveys) the laboratory may be asked to provide analytical support. Work load, sample type, parameter selection, sample turnaround time and reporting requirements are determined in advance of the sample analysis. Support is also provided to ongoing activities of the federal agencies (CWS, NHRI, NWRI) to assist them in meeting their analytical needs. There is more information regarding support for CWS and NWRI on file.

COORDINATOR(S) - J. Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.01		0.01
	PY Tech					0.00
	Salary			0.35		0.35
	O & M			12.20		12.20
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0		0.01		0.01
Total Dollars		0		12.55		12.55

INDICATORS - B-1-A d
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

2.4 QUALITY CONTROL

The WQB is committed to ensuring the generation of the best possible data and to fully understanding the limits of its data. To that end the Branch is involved in several quality control activities. The purpose of these activites is to examine and control the known sources of variability.

In the past, field and laboratory quality control activities have most often been planned and implemented separately. A disproportionately large amount of effort was devoted to laboratory quality control (e.g. precision and bias studies of analytical methods). Recently, the Branch has made an effort to integrate the planning of quality control activities and place increasing emphasis on field quality control. Such emphasis includes: the standardization of personnel training, equipment, facilities and the methods of sample collection and handling; and site specific evaluation of sampling strategies relative to the program objectives and the characteristics of the site.

A very important quality control activity of the Branch is not covered by a project description. All data produced by the Branch are screened by computer and the project coordinator before dissemination. Data are compared to limits (expected range), anion-cation balances are checked and consistency checks, such as the dissolved constituent being less than the corresponding total concentration and field and lab tests for the same constituent agreeing, are carried out.

For a more detailed discussion of field and laboratory quality control procedures for water quality samples the reader is referred to Handbook for Collecting, Preserving and Shipping of Southern Water Samples (Environment Canda, 1979). The project coordinators can provide additional specific quality control information for their particular project.

Quality control projects sometimes involve the collection of additional water quality samples. Such sampling is intended to check the accuracy of sampling carried out for one or more of the other project groups (e.g. Interjurisdictional Monitoring, Agreements). Thus, quality control sampling is not fixed at any one station. In fact, quality control sampling is carried out on a rotational basis throughout the entire water quality monitoring network. The list of sampling locations varies from year to year and therefore is included in the projects.

The Quality Control Group consists of six projects. Their numbers and titles are as follows:

330 Regional Quality Control Assurance Program
331 Field Quality Control
332 Miscellaneous Field Quality Control
333 Inter-Laboratory Quality Control
334 Intra-Laboratory Quality Control
335 Evaluation of Major Ion Data from the Burlington Lab

Complete descriptions are provided on the following pages. The projects in this group are designed to improve the quality of water quality data and the understanding of its limitations. Therefore, all the projects in this group fit into ECS National Program 1.3, Water Quality Management Data.

Project Descriptions:

330-84 Regional Quality Control Assurance Program

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing since 1984

OBJECTIVES
To ensure the generation of the highest quality water quuality data.

RATIONALE
In order to fulfill its mandat, the Branch is committed to producing the best possible data and to fully understanding the limits of this data.

DESCRIPTION
In order to meet their commitment to quality control, the Branch operates several projects. These quality control projects focus on both the field and laboratory stages of data production.

COORDINATOR(S) - D. Roberts

RESOURCES
N/A

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

330-84 Regional Quality Control Assurance Program

EXTENDED DESCRIPTION

Regional quality control activities are focused on the field and the laboratory. Both of these locations are involved in numerous quality control activities. They include:

LABORATORY

1. Estimating and controlling the variability associated with:
   (a) sampling
   (b) analytical measurement
2. Standardizing methods of:
   (a) bottle washing
   (b) sample collection
   (c) sample handling
   (d) analytical techniques
3. Data verification
4. Data interpretation
5. Data handling and processing
6. Training of personnel

FIELD

1. Personnel training
2. Manual of sample collection and handling methods
3. Submission of preservatives, distilled water and filter blanks
4. Split samples
5. Replicate samples
6. Method evaluation
7. Standardization of equipment and facilities
8. Data verification and reporting

These activities have been organized into the following quality control projects:

331 Miscellaneous Field Quality Control
332 Inter-Regional Quality Control
333 Intra-Laboratory Quality Control
334 Field Quality Control
335 Evaluation of Major Ion Data

331-84 Field Quality Control

SUBMITTER - 0446
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing since 1980

OBJECTIVES
(1) Ascribe a degree of precision to the existing sampling method for specific parameters. (2) Establish criteria on which to review the project design. (3) Periodically review the project design. (4) Prepare interpretive reports on an as required basis.

RATIONALE
Knowledge of sampling precision is invaluable to data interpretation. In order that the field quality control project be carried out in the most effective manner possible, a routine procedure for the analysis of data and review of the project design in required.

DESCRIPTION
This project is intended to help ensure consistency in field practices and to quantify the precision of sampling practices. In order to carry this out, replicate samples are collected and analyzed. The results are used to determine analytical variability, calibrate instruments and ensure overall quality control.

COORDINATOR(S) - D. Roberts

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01	0.14		0.15
	PY Tech		0.23	0.03		0.26
	Salary		6.18	4.40		10.58
	O & M		8.90			8.90
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M	9.65				9.65
	Capital					
PY Total			0.24	0.17		0.41
Total Dollars		9.65	15.08	4.40		29.13

* Affiliated ECS Program(s) - 1.1

INDICATORS - C-1-A b
PRIORITY - As per project from which QC sample is derived.

DISSEMINATION OF LABORATORY DATA REPORTS
1 Copy of field sheet with lab numbers to D. Roberts

2 Verify reports to appropriate District Officer

3 No final reports required

ACTIVITIES/REPORTING CALENDAR
N/A

EXTENDED DESCRIPTION

The collection of replicate samples is performed routinely. A review of the data to determine the achievements of the project will continue. Sampling reproducibility will be examined and the implications of the findings discussed with reference to analytical variability and interpretation of existing water quality data.

The results will be discussed on both a sampling site and regional basis. Since similarities exist between river systems, some grouping of data may be possible (e.g. water quality districts).

Standard field practices for the Monitoring and Agreements Division are covered in a separate document "Handbook for Collecting, Preserving and Shipping Water Samples", 3rd Edition, 1979, an in-house regional document. Standard practices for the laboratory are covered in the publication "Methods Manual", IWD, 1976. Quality control on anaytical method precision and accuracies is highlighted in quality control reports from the National Water Research Institute CCIW (Burlington) which conducts periodic roundrobin checks for numerous laboratories (private, Provincial and Federal).

In addition to standard procedures, the field conducts frequent instrument calibration, and, replicate sample collection to yield a better understanding of sampling technique reproducibility. Data obtained to date suggest that there is considerable variability among replicates for certain parameters such as non-filterable residue, total phosphorus and metals. Knowledge of the variability is essential for proper data interpretation that may otherwise in the absence of this information be misleading and incorrect.

Quality control is costly but constitutes an integral part of all measurement and assessment activities. Laboratory workload will increase by 10% on account of quality control. Not all parameters are subject to replicate collection and subsequent analysis, but, only those for which there is sufficient reason to suspect large variations. Those constituents associated with the suspended matter of the stream are generally viewed as most problematic with our present-day sampling techniques.

To ensure that quality control is maintained and is itself controlled at about 10%, it is necessary to develop a schedule that applies to the measurement and assessment activities. The schedule is shown in the following Table QC - 1 and will be followed as closely as possible by the field personnel.

It was necessary to regulate this scheduling by assigning schedules to each field office involved in the activities. Essentially, quality control involves the replicate sampling of one sampling site from the grouping of sites per "Season" of the annual spring,

summer, fall and winter cycle. The station numbers in the groupings correspond to the Map in Figures 1, 2, 3, and 4. In cases where the grouping is large, the 10% criteria results in monthly replicates (e.g. WQB - Alberta, component of Table QC - 1).

The schedules have been designed to give each location near- equal weighting. This is not necessarily true where some groupings have both quarterly and monthly sample collection. In this case greater emphasis is placed on the monthly sample collection.

In the event that a scheduled quality control site is inaccessible, has no flow or for some other reason cannot be collected, then it is recommended that quality control be arbitrarily applied to another site for that period. However, if this is done, it is recommended that the next nscheduled quality control sites not be modified (for the sake of simplicity). This will mean over-weighting of certain sites, but, this is acceptable as the "uncontrollable".

In the northern operation where WSC performs sample collection on our behalf, available space is most often a limiting factor. In these cases it is necessary to forego quality control at some sites until space becomes available.

When sample collection such as seasonal (quarterly) sampling does not coincide with the dates in the QC schedule, simply move the dates forward or backwards as required. If this is necessary, the stations do not change, but the date for quality control collection does.

Replicate sampling requirements are shown in Table QC-2. It should be noted that only those parameters identified for quality control in accordance with the appropriate schedule and Table QC - 2 are replicated. For instance, although total metals are identified for quality control, it is only subject to quality control when that station being sampled for total metals is "up" for quality control. It will happen that a particular site is being collected for quality control and will not be a metal site and therefore, there will be no metal quality control samples during that sampling period.

Quality Control Sampling Schedule 1984/85

Map No.	Station Location	Month A	M	J	J	A	S	O	N	D	J	F	M
	Ft. Smith-Simpson-Yellowknife WRB Suboffices												
85	Lockhart River below Artillery L.												
74	Ellice River near mouth												
49	Slave River near Fitzgerald												
73	Tree River near mouth												
50	Hay River near Hay River												
72	Coppermine River at Outlet Pt. L.												
70	Mackenzie R. near Ft. Providence												
	Norman Wells-Inuvik-Baker Lake WRB Suboffices												
76	Great Bear R. at outlet of G.B.L.												
80	Peel River at Fort McPherson												
82	Kazan River above Kazan Falls												
71	Camsell R. at outlet of Clut Lake												
84	Thelon River above Thelon Bluffs												
79	Mackenzie River above Arcic Red												
77	Mackenzie River at Norman Wells												
75	Back River below Carnwath River												
78	Anderson River below Carnwath R.												
83	Baker Lake 1.6 km from Baker L.												
81	Quoich River near Baker Lake												
	WQB Calgary-Peace River WRB Suboffices												
1	Milk River at Eastern Crossing												
2	N. Milk River at Int'l Boundary			X									
3	Milk River at Western Crossing												
4	St. Mary's R. near Int'l Bounary				X								
6	Waterton River at Hwy. 6												
5	Belly River at Hwy. 6							X					
43	Peace River at Dunvegan Bridge										X		
42	Smoky River at Watino												
89	Brewster Creek near Mouth												

331-84 Field Quality Control

Map No.	Station Location	Month											
	WQB Winnipeg	A	M	J	J	A	S	O	N	D	J	F	M
11	Antler River at Hwy. 251	X											
18	Gainsborough Creek at Hwy. 83												
19	Pipestone Creek at Hwy. 255			X									
12	Souris River at Coulter				X								
13	Badger Creek near Cartwright						X						
14	Pembina River at Windygates												
15	Red River at Emerson								X				
16	Roseau River near Gardenton												
17	Pine Creek Diversion at Hwy. 89												
8	Long Creek south of Torquay										X		
9	Long Creek near Noonan												
10	Souris River near Glen Ewen												
20	Winnipeg River at Point du Bois												X
21	Manigotogan River at Hwy. 304												

Map No.	WQB Calgary (Parks, Agreements)	A	M	J	J	A	S	O	N	D	J	F	M
47	Athabasca R. at Athabasca Falls	X											
37	Red Deer River at Drumheller	X											
45	Bow River below Banff			X									
36	Bow River at Cochrane				X								
46	N. Sask. River at Whirlpool Pt.					X							
40	N. Sask. River at Pakan Bridge							X					
48	Athabasca River at Hwy. 16						X						
38	Red Deer River above Red Deer								X				
44	Bow River above Lake Louise												
33	Oldman River at Hwy. 36										X		
41	Athabasca River at Athabasca												
34	Oldman River above Lethbridge											X	
35	Bow River near mouth												
39	N. Saskatchewan River at Devon												X

331-84 Field Quality Control

Map No.	Station Location	Month											
	Thompson WRB Suboffice	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**
62	Cochrane River near Brochet			X									
61	Churchill R. at Red Head Rapids												
59	Nelson River near mouth												
60	Hayes River below God's River										X		
	Shaunavon WRB Suboffice	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**
53	Frenchman River near Int'l Border			X									
52	Battle Creek at Int'l Border												
54	Lodge Creek near Willow Creek												
	WQB Regina	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**
32	Saskatchewan River above Carrot R.		X										
25	Churchill R. below Wasawahasik L.			X									
29	Red Deer River at Erwood				X								
27	Carrot River near Turnberry					X							
30	Qu'Appelle River south of Welby						X						
31	Assiniboine River below Kamsack							X					
7	East Poplar River at Int'l Border			X									
26	North Saskatchewan R. at Hwy. 3								X				
22	South Saskatchewan R. at Hwy. 41									X			
23	Red Deer River near Bindloss										X		
24	Beaver River at Beaver Crossing											X	
28	Battle River near Unwin												X
58	Overflowing River at Hwy. 10	X											
56	Swan River at Hwy. 10												
57	Woody River at Hwy. 10												
67	Churchill R. at Otter Rapids												
66	Geike R. below Wheeler R.												
63	Douglas River below Cluff Creek							X					
68	Churchill River near Patuanak												
64	Fond du Lac River			X									

Table QC-2 PROJECT 330-84

Replicate Sampling Requirements for Quality Control Sampling

Parameter	Replicates Required	Comments
Dissolved Oxygen	3	Standardization
Specific Conductance	1	Calibration
pH	1	Calibration
Mercury-H3	3	
Dissolved Trace Elements F1 & F2	3	
Metals (Total) - E1	3	
Dissolved Metals - E2	3	
Nonfilterable - H6	3	
Total Phosphorus - See D1 & D2	3	
Phenolic Material - H5	3	
Bacteriological - B1, B2, B3	3	
Nutrients - (D1)3	3	
- (D2)	3	
Sulphides - H11	3	

Notes:

1 Replicate sampling requires the physical repeating two or three times of the sampling procedure - it does not mean the physical splitting of a water sample into two or three portions.

2 All samples for one PPWB site are triplicated monthly.

3 D1 - includes triplicating filtered samples for DP, DN and nitrate, and unfiltered samples for TP and TN.

4 D2 - triplicate sample (unfiltered)

332-84 Miscellaneous Field Quality Control

SUBMITTER - 0447
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
Project allows coding of data not intended to be entered on NAQUADAT.

RATIONALE
Some data generated in certain projects is not wanted on NAQUADAT. As a result, a special project number is required to allow coding for in-house data analysis and to make NAQUADAT entry more streamlined.

DESCRIPTION
This is an "umbrella" project intended to allow coding of miscellaneous samples from various projects, which are not to be stored on NAQUADAT (i.e. distilled water blanks, sample to assess field filtering methods, etc.). Annual reports to file based on the results from the filter blank and rinse water blank samples are required from each of the Resource Officers for samples generated in their programs.

COORDINATOR(S) - Roberts

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof					0.00
	PY Tech		0.02			0.02
	Salary	0.05	0.57			0.62
	O & M	0.03	0.38			0.41
	Capital	0.02	0.18			0.20
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total			0.02			0.02
Total Dollars		0.10	1.13			1.23

INDICATORS - C-1-A b
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
Data for this project will be disseminated to the various Resource Offices and the Project Coordinator according to the following list:

Saskatchewan Filter Blanks - Crosley

Milli "Q" Blanks - Crosley

Manitoba Filter Blanks - Chacko

Distilled Water Blanks - Chacko

Alberta Filter Blanks - Block

Demin Blanks - Block

ACTIVITIES/REPORTING CALENDAR
N/A

332-84 Miscellaneous Field Quality Control

EXTENDED DESCRIPTION

There are no field costs associated with the collection of the Milli Q, Distilled Water Blanks, and Demin Blanks since these are collected in the respective lab. The field costs associated with the collection of the Saskatchewan, Alberta and Manitoba Filter Blanks are included in Project Number 330.

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
S1	Sask. Filter Blanks		M
S2	Milli Q Blanks		M
S3	Man. Filter Blanks		M
S4	Distilled H2O Blanks		M
S5	Alta. Filter Blanks		M
S6	Demin Blanks		M

332-84 Miscellaneous Field Quality Control

SAMPLING MATRIX

Parameter	Lab	STN S1	STN S2	STN S3	STN S4	STN S5	STN S6	No. of samples
AL_D	NAT	M	M					24
COND_L	NAT	M	M	M	M	M	M	72
FE_D_D	NAT	M	M	M	M	M	M	72
MN_D_D	NAT	M	M	M	M	M	M	72
N_D_D	REG	M	M	M	M	M	M	72
P_D_D	REG	M	M	M	M	M	M	72

332-84 Miscellaneous Field Quality Control

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
AL_D	24		0.57	13.68	0.000
COND_L	72				
FE_D_D	72		0.57	41.04	0.001
MN_D_D	72		0.57	41.04	0.001
N_D_D	72	0.19	7.85	565.20	0.010
P_D_D	72	0.19	7.85	565.20	0.010
Regional	Totals			1130.40	0.021
National	Totals			95.76	0.002

333-84 Inter-Regional Quality Control

SUBMITTER - 0444
ECS PROGRAM - 1.6
DURATION - Ongoing

OBJECTIVES
To ensure the quality and compatibility of laboratory data by participating in the national round-robin quality control program.

RATIONALE
Quality assurance or quality control ensures that the integrity of the data generated at the laboratory is maintained at a high level of excellence.

DESCRIPTION
The National Coordinator selects parameters for investigation and submits appropriate samples to participating laboratories of which the Saskatoon Branch Laboratory is one. A high priority is given to analyzing these samples.

The accuracy and precision of the data generated by the Saskatoon Laboratory is compared by the project coordinator to the known values and to the results from other laboratories. If the examination shows it to be necessary, methodology is changed to improve the quality of the generated data.

COORDINATOR(S) - D. Roberts

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01			0.01
	PY Tech		0.06			0.06
	Salary		1.91			1.91
	O & M		0.82			0.82
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total			0.07			0.07
Total Dollars			2.73			2.73

INDICATORS - B-1-B a, b
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR
N/A

334-84 Intra-Laboratory Quality Control

SUBMITTER - 0448
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To ensure the quality and compatibility of laboratory data by checking analytical performance of the Inorganic Laboratory through the use of spike, duplicates, blind unknowns, blanks, related parameter correlations and cation-anion balance checks.

RATIONALE
Quality assurance and quality control ensure that the quality and integrity of the data generated at the laboratory is maintained at a high level of excellence.

DESCRIPTION
The Head of the Inorganic Laboratory selects parameters for investigation as the need arises by introducing blind samples whose constituent concentrations are unknown to the analysts. The obtained values are compared with expected results.

On an ongoing basis, all analysts are instructed to duplicate (within practicality) every tenth sample and spike (within practicality) every twentieth sample. The data examined and, if necessary, corrective action taken.

All analysts are required to prepare standards, blanks and rinses to be included with determinations where applicable. The results of each run are calculated and checked for inconsistencies.

COORDINATOR(S) - Roberts

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.02			0.02
	PY Tech		0.21			0.21
	Salary		8.85			8.85
	O & M		0.90			0.90
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total			0.23			0.23
Total Dollars			9.75			9.75

334-84 Intra-Laboratory Quality Control

INDICATORS - B-1-B b
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR
N/A

335-84 Evaluation of Major Ion Data

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1984/85

OBJECTIVES
Determine the feasibility of sending W & NR water samples to the Burlingotrn Lab for Major Ion Analyses.

RATIONALE
Following the transfer of major ion analyses from the Regional to the National Lab, data indicates considerable differences between the values for some major ions from the two laboratories for certain sites. In order to determine whether the longer shipment time to Ontario is detrimental to the production of reliable data for major ions, comparative data will be collected.

DESCRIPTION
The project will involve the collection of all possible comparative data from the two WQB laboratories for alkalinities and calcium. These data will be used to determine which sites are prone to variations in concentrations for the above parameters. Major ions for these stations will be analyzed by a third laboratory in the W & NR. The resulting data and its comparison with WQB lab data will be used to determine if the longer shipment time to Ontario is detrimental to major ion data and, if so, to develop a policy for major ion analyses of W & NR water samples.

The costs of acquiring outside analytical support is included in Field O & M.

COORDINATOR(S) - D. Roberts

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof					0.00
	PY Tech			0.04		0.04
	Salary			1.20		1.20
	O & M			0.30		0.30
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.04		0.04
Total Dollars				1.50		1.50

335-84 Evaluation of Major Ion Data

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Collect major ion data for comparison	Aug. 84	
2 Prepare report	Sept. 84	

2.5 WATER QUALITY MANAGEMENT

Water quality objectives are recognized as tools for the management of water resources. Objectives constitute a set of limiting conditions that have been agreed upon to protect specific uses in a particular waterway. The Branch, in conjunction with headquarters, is promoting the development of surface water quality objectives. In this region, the Branch has participated in multi-disciplinary task forces struck with the responsibility of developing objectives for the Souris, Red and Roseau Rivers. Through participation on the Committee on Water Quality (Prairie Provinces Water Board) the Branch is assisting in the development of objectives for major interprovincial rivers, including the Beaver, and the South Saskatchewan.

The numbers and the titles of the projects in the Water Quality Management Group are as follows:

340 International Water Quality Objectives
341 Water Quality Objectives Liaison
342 Water Quality Objectives Plan

Complete descriptions for these projects can be found on the following pages. The projects are aimed at improving the Branch's understanding of objectives and promoting sound management of the resource through the establishment of objectives for particular drainage basins. Thus, all the projects in this group fit into ECS Program 1.3, Water Quality Management Data.

Project Descriptions:

340-84 International Water Quality Objectives

SUBMITTER - N/A
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
Initiate and implement negotiations with pertinent officials, with respect to the establishment of water quality objectives at specific transboundary locations.

RATIONALE
Within Western and Northern Region, there is a significant amount of transboundary drainage. For those streams which cross international or territorial borders, the federal government has a clear responsibility to promote the establishment of water quality objectives.

DESCRIPTION
During the year 1984/85, negotiations will continue between U.S.A. and Canadian agencies on the establishment of objectives for the Souris River at both transboundary locations. This will involve development of a Canadian negotiating strategy (i.e. Canada, Saskatchewan and Manitoba), meeting with U.S.A. counterparts, review of data and criteria information and ultimately objectives development.

COORDINATOR(S) - Thomson

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.65		0.65
	PY Tech					0.00
	Salary			26.00		26.00
	O & M			7.50		7.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.65		0.65
Total Dollars				33.50		33.50

340-84 International Water Quality Objectives

INDICATORS - D-1-A a, b, c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Assemble data bases for the Souris River transboundary locations	July	In cooperation with HQ
2 Participate in meetings with USA and provincial counterparts	September	
3 Compile relevant water uses and corresponding parameters	December	Inter-agency process

340-84 International Water Quality Objectives

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
K. Thomson	0.15	6	2.5	8.5
Wm. Gummer	0.10	4	2.5	6.5
WQO Specialist	0.40	16	2.5	18.5
Total	0.65	36	7.5	33.5

341-84 Interprovincial and Federal WQO Promotion and Development

SUBMITTER - N/A
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
Provide ongoing assistance and advice upon request to WQB-W&NR staff and to promote and assist in the application of water quality objectives for interprovincial waters; and promote and develop water quality management strategies for federal waters.

RATIONALE
Other divisions of WQB, W&NR, other federal agencies as well as provincial governments are involved in activities that may either support or benefit from the support of the Water Quality Objectives Division. Input to these activities is required on a continuing basis from WQO Division in order that maximum, mutual benefit is achieved.

DESCRIPTION
Support and advice, with respect to water quality objectives, will be given to the Branch representative on the PPWB Committee on Water Quality, Branch staff and, where feasible, to individual provinces. Contact will be developed and maintained with other federal agencies with regard to the promotion of water quality objectives.

COORDINATOR(S) - Thomson

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.3		0.3
	PY Tech					
	Salary			12.0		12.0
	O & M			5.0		5.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.3		0.3
Total Dollars				17.0		17.0

341-84 Interprovincial and Federal WQO Promotion and Development

INDICATORS - D-1-B a,b,c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Provide WQO support to water resource managers as requested	ongoing	
2 Hold meetings with Parks Can. and other federal agencies	January	Discuss WQO and water quality management
3 Provide assistance to WP&M	March	Contribute to dev. of S. Sask water manageme strategy

341-84 Interprovincial and Federal WQO Promotion and Development

EXTENDED DESCRIPTION

Support and advice will be given, with respect to objectives, to the Branch representative on the PPWB Committee on Water Quality. Branch submissions to that committee will be contributed to, as well as comments prepared on various PPWB documents. From time to time, when requested and if feasible, support and advice related to aspects of water quality objectives will be provided to individual provinces.

Support and advice, with repect to objectives, will be provided to Branch staff, as requested.. Scientific and editorial assistance will be given for WQB and related reports.

Contact will be developed and maintained with other relevant federal agencies with regard to the promotion of water quality objectives. Wherever possible and feasible, advice and support in the development of water quality management strategies (in particular water quality objectives) for federal waters will be provided.

341-84 Interprovincial and Federal WQO Promotion and Development

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
K. Thomson	0.1	4	3	7
WQO Specialist	0.2	8	2	10
Total	0.3	12	5	17

342-84 Water Quality Objectives Evaluation

SUBMITTER - N/A
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - Ongoing

OBJECTIVES
To review and revise, where necessary, the existing Regional plan for the Water Quality Objectives Division; tomaintain knowledge of policy and technical advances; develop and review compliance monitoring strategies and resultant data for relevant locations.

RATIONALE
In order to maintain orderly and logical operation of the Water Quality Objectives Division as well as contribute to the Long Term Operational Planning process, the Division regional plan must be kept current. One method of doing this is through maintenance of a continual awareness of advances in related technology and policy. This allows an evaluation of current procedures and appropriate revisions. Compliance monitoring is also a form of water quality objectives evaluation. Not only does it serve to evaluate the quality of water it also points out shortfalls in technologic or strategic design, where appropriate revisions should be made.

DESCRIPTION
Based on the findings of meetings with WQB and other government agencies, and a review of relevant literature, the operational plan will be updated. Transboundary streams will be ranked according to their need for objectives. Interviews will be prepared and conducted for the position of water quality specialist.

COORDINATOR(S) - Thomson

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.5		0.5
	PY Tech					
	Salary			20.0		20.0
	O & M			5.0		5.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.5		0.5
Total Dollars				25.0		25.0

342-84 Water Quality Objectives Evaluation

INDICATORS - D-1-B d, e, f, g
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Staff Water Quality Objectives Specialist position	April 15	Likely to be delayed due to staffing freeze
2 Arrange meetings with HQ, Regional and international counterparts	October	Discuss initiatives and Regional Plan
3 Update Regional transboundary ranking of streams for WQO	November	As part of Regional plan
4 Update operational plan for the WQO Div.	December	Ongoing
5 Staff mWater Quality Objectives Specialist position	March	As part of national reallocation

342-84 Water Quality Objectives Evaluation

EXTENDED DESCRIPTION

Meetings will be held with WQB headquarters to review respective responsibilities of HQ and the Region. In addition, meetings will be held with various other WQB regional offices, NWRI, EPS, Parks Canada, DIAND, provincial and territorial officials, ESEPA, USGS, state officials and the university community. As a result of these meetings, and as a result of an ongoing review survey of relevant literature and documentation, the operational plan will be appropriately revised. The revision will reflect advances in technology as well as changes in Regional and National priorities.

Interviews will be prepared and conducted for the position of water quality objectives specialist.

A ranking of transboundary streams, for which water quality objectives should be established, will be reviewed and revised. Where appropriate, compliance monitoring strategies will be developed, implemented and/or revised.

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
K. Thomson	0.1	4	2	6
WQO Specialist	0.4	16	3	19
Total	0.5	20	5	25

2.6 SPECIAL STUDIES

The WQB is regularly involved with water quality issues which cannot be dealt with through regular water quality monitoring. In such cases, special studies may be needed. Special studies generally take the form of surveys or policy studies.

Surveys are generally short-term in nature and more specific than routine monitoring. Surveys can be organized into three different categories: (1) reconnaissance, (2) short- term assessments, and (3) comprehensive assessments.

Reconnaisance surveys are carried out when limited information exists on a particular area or a potential issue and some preplanning details are required. These surveys may focus on baseline water quality conditions, sampling techniques, delineation of pollution sources or spatial components of flow and quality. Reconnaissance surveys do not normally result in the resolution of issues but do identify ways of acquiring the appropriate information needed to do so.

Intensive surveys are directed to problems of federal concern. They are the most demanding of the Branch field opertions and may involve sampling and analyzing a wide range of water quality parameters over a discrete time in a particular area. Intensive surveys provide the most detailed knowledge about a delected aquatic environment and the temporal and spatial components of water quality.

Comprehensive water quality assessments are usually carried out as a component of a larger water resource management undertaking, such as those carried out under the Canada Water Act. They are often multidimensional and may rely on computer models and multidisciplinary teams of experts from many agencies. Comprehensive assessments are designed to quantify potential and existing problems identified by network monitoring. They may address one or more parameters of the aquatic environment (e.g. water, sediment, biota) and are often linked to environmental impact studies.

Policy studies involve the preparation of reports which do not require laboratory support. They may consist of literature reviews designed to examine new technological advances and their potential applications within the Branch. Policy studies may also be prepared to articulate the position of the WQB with respect to a particular issue.

In some cases, special studies involve the collection of water quality samples not normally monitored. A list of stations monitoried for special studies is provided in Table 4. The table

includes a map number so that the station may be located on the maps provided in Appendix 1. The table also identifies those stations which have been temporarily suspended.

Table 4 Special Studies Monitoring Stations by Province

Manitoba

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
none					

Saskatchewan

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
95	S. Saskatchewan R. near Lemsford	00SA05HB0002	4.1	374	A
96	S. Saskatchewan R. near Leader	00SA05HB0001	4.1	374	A

Alberta

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
none					

Northwest Territories

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
none					

The numbers and names of the projects in the Special Studies Group are as follows:

350 Surveys and Interpretation Strategi Plan
351 Review of Regional Nutrient Analyses
353 Evaluation of Seakem Sampler
357 Cumberland Marshes Water Quality Report
358 Investig'n of the Aquatic Quality of Cookson Reservoir
360 Regional Biomonitoring Program

361 Forage Fish Assessment Program
365 Interjurisdictional Ground Water Quality
366 Regional Groundwater Data Base Development
367 Poplar River Data Base and Interpretation
368 Agricultural Effects on Ground Water Quality
369 Nut Lake I.R. Water Supply Evaluation

The following pages contain the complete descriptions for these projects. The projects in this group do not necessarily share a common ECS progam and individually fit into 1.1, 1.3 and 4.1.

Project Descriptions:

350-84 Surveys and Interpretation Division Strategic Plan

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To identify SID's priorities and directrion in the context of the Water Quality Branch program and to maintain this strategy on an ongoing basis.

RATIONALE
S & ID consists of a group of disparate technical and professional experts whose responsibilities are divided between providing advice and support to other Branch staff as well as undertaking specialized and multi-disciplinary studies and surveys. In order for the Division to fulfill this role effectively it is necessary to identify its working relationships within the Branch and develop a strategy for achieving its goals.

DESCRIPTION
A plan will be prepared for the Division which will identify its priorities, its working relationships within the Branch and develop a strategy for achieving its goals. The Regional EDP Plan, Regional Groundwater Plan, Regional Biomonitoring Plan and other more specific operational plans will identify specific implementation activities of the Division. It will be essential to update this strategic Plan and the operational plans annually.

COORDINATOR(S) - D. Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.05		0.05
	PY Tech					
	Salary			2.25		2.25
	O & M					
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.05		0.05
Total Dollars				2.25		2.25

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Prepare first draft of Strategic Plan	Oct. 1	Allow 2 months for review and comment
2 Revise Strategic Plan and Integrate Operational Plans	Feb. 1	
3 Identify additional Operational Plans which need to be developed	March 31	Include this in work plan as appropriate

351-84 Review of Regional Nutrient Monitoring Requirements

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing since April 1983

OBJECTIVES
To undertake a detailed review of current nutrient monitoring activities in light of current knowledge and needs and to recommend a regional nutrient monitoring strategy.

RATIONALE
With the relocation of the lab, division of services between the regional and national lab and the retention and enhancement of nutrient capability within the region, it is timely to review capability and assess future and present needs.

DESCRIPTION
Current monitoring needs and analytical capability will be reviewed and alternatives assessed. A brief report for internal Branch use will be prepared recommending desireable field sampling practices, analytical procedures and necessary equipment.

COORDINATOR(S) - Gregor, Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.02		0.02
	PY Tech					
	Salary			0.80		0.80
	O & M			0.50		0.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.02		0.02
Total Dollars				1.30		1.30

351-84 Review of Regional Nutrient Monitoring Requirements

INDICATORS - C-1-A c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Undertake review of current practices and needs	July	
2 Assess needs for new equipment and field and lab procedures	August	Identify capital needs for work plan
3 Prepare report for discussing nutrient monitoring strategy	January	Report to be completed by Feb 28/84

353-84 Evaluation of Seakem Sampler

SUBMITTER - N/A
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - 1984/85

OBJECTIVES

To evaluate the effectiveness of the Seakem prototype sampler in highly turbid and highly productive prairie systems.

RATIONALE

WQB-HQ has supported the development of a specialized microprocessor controlled contaminant sampler. The prototype purchased by the Branch has been requested for testing in the region under the extreme water quality conditions of prairie streams prior to further development or production.

DESCRIPTION

The prototype sampler, when provided to the region, will be used for testing in highly turbid and biologically productive river systems including the Qu'Appelle and South Saskatchewan. Initially the effect of turbidity and biological growth in the filter mechanism and the columns will be assessed. If the sampler seems capable of handling these physical problems, its ability to concentrate pesticides in packed columns for analytical measurement will be compared to more conventional techniques. A report and recommendations will be prepared. A calendar cannot be drawn up for this project because the date of receipt for the sampler is unknown at this time.

COORDINATOR(S) - D. Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.1		0.1
	PY Tech					
	Salary			4.5		4.5
	O & M			5.0		5.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.1		0.1
Total Dollars				9.5		9.5

353-84 Evaluation of Seakem Sampler

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

355-84 Trend Assessment Pilot Studies

SUBMITTER - 0483
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing since 1979

OBJECTIVES
To determine those factors which influence the design of a trend assessment project.

RATIONALE
Prior to establishing a trend assessment project, certain design questions must be answered. This is done through a pilot study.

DESCRIPTION
There are no pilot studies planned for this fiscal year.

COORDINATOR(S) - Guilbault

RESOURCES
N/A

* Affiliated ECS Program(s) - 1.1

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

357-84 Cumberland Marshes Water Quality Summary Report

SUBMITTER - 0003
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - 1984/85

OBJECTIVES
1 To summarize the water quality data collected over the last five years for the Cumberland Marshes in order to assess the impacts of the Ducks Unlimited project

2 To recommend future monitoring and assessment needs and strategies

RATIONALE
The development and operation of the Cumberland Marshes Ducks Unlimited project has the potential to alter the quality of the Birch and Saskatchewan Rivers. Monitoring has continued for five years and a thorough review is warranted.

DESCRIPTION
Annual reports have been published in the preceding years. This year a review of all available data will be undertaken by a subcommittee of the Committee on Water Quality in order to evaluate and synthesize the data base and, if necessary, recommend further activities to measure effects on the Birch and Saskatchewan Rivers.

COORDINATOR(S) - D. Gregor, R. Crosley

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.15		0.15
	PY Tech					
	Salary			2.00		2.00
	O & M			1.00		1.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.15		0.15
Total Dollars				3.00		3.00

357-84 Cumberland Marshes Water Quality Summary Report

INDICATORS - A-1-C e
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Organize data into an RS1 table	Nov. 1	
2 Prepare initial statistical summaries	Dec. 1	
3 Meeting of subcommittee to discuss report outline and data manipulations	Dec. 15	
4 Prepare first draft of report	Feb. 1	
5 Revise report and submit draft to COWQ	March 1	Reviewed by subcommittee by Feb. 15/84
6 Prepare final draft report for COWQ	March 31	Reviewed by COWQ ASAP

357-84 Cumberland Marshes Water Quality Summary Report

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Gregor	0.05	2.25	0.5	2.75
R. Crosley	0.10	4.00	0.5	4.50
Total	0.15	6.25	1.0	7.25

358-84 Investigation of the Aquatic Quality of Cookson Reservoir

SUBMITTER - 0001
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - April 1983 to July 1985

OBJECTIVES
To conduct an investigation of the aquatic quality, in particular Hg concentrations, of the Cookson Reservoir in Saskatchewan.

RATIONALE
A survey conducted in 1979, prior to start up of the SPC Poplar River Generating Station, revealed high mercury levels in fish from Cookson Reservoir. This study will re-examine this problem to determine the present status of mercury in the reservoir.

DESCRIPTION
In 1979, the WQB conducted a baseline survey of Cookson Reservoir prior to the start up of the SPC Poplar River Generating Station. That survey examined metals in the water, sediment and biological samples from Cookson Reservoir and from the East Poplar River below the reservoir. These analyses showed that mercury was present at high levels in the muscle tissue of walleye and to a lesser extent in suckers. This study is intended to determine if mercury is still high in the tissues of fish; and, if it is, to attempt to better define the source of this mercury. Biological, sediment and water samples will be collected from the reservoir and the East Poplar River below the reservoir for mercury anaylsis.

COORDINATOR(S) - Munro, Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.2		0.20
	PY Tech	0.02				0.02
	Salary	0.46	0.13	7.1		7.69
	O & M	0.31	0.09	1.5		1.90
	Capital	0.15	0.04			0.19
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.02		0.2		0.22
Total Dollars		0.92	0.26	8.6		9.78

358-84 Investigation of the Aquatic Quality of Cookson Reservoir

INDICATORS - A-1-A k
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Conduct field sampling	March	Sampling may continue into spring of 1984
2 Laboratory analysis of samples	March	
3 Prepare status report	March	Status report due March 31/84
4 Prepare preliminary report.	October	
5 Conduct winter field work	February	
6 Prepare Draft of Final Report	July/85	

EXTENDED DESCRIPTION

In 1979, the WQB conducted a baseline survey of Cookson Reservoir prior to the start up of the SPC Poplar River Generating Station. That survey examined metals in the water, sediment and fish from Cookson Reservoir and in crayfish and clams from the East Poplar River downstream from the reservoir. These analyses showed that mercury was present at high levels in the muscle tissue of walleye and to a lesser extent in suckers. No mercury was found in the water and the levels found in the sediment were low. Based on this data, Waite et. al. (1980) speculated that the cause of the high mercury in fish was a function of the release of methyl-mercury from the recently flooded soil during the filling of the reservoir. They also speculated that the mercury levels in the fish population would decline with time. This study is intended to determine if mercury is still high in the tissues of fish from Cookson reservoir; and, if it is, to attempt to better define the source of this mercury.

Sediment, water and biological samples were collected during 1983 for mercury analysis. Additional work was conducted during March of 1984, however due to the mild winter ice conditions did not allow as complete a winter collection as desired. Therefore it is proposed that this project be continued through the winter of 1984/85 to allow the winter sampling which could not be conducted in 1983/84.

A preliminary report will be prepared based on the results of the 1983/84 sampling program during the 1984/85 fiscal year.

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
96	Cookson Reservoir Lower End	01SA11AE0002	V
97	Cookson Reservoir Upper End	01SA11AE0003	V

SAMPLING MATRIX

Parameter	Lab	STN 96	STN 97	No. of samples
ALK_P	NAT	V	V	20
ALK_T	NAT	V	V	20
AL_D	NAT	V	V	20
AL_E	NAT	V	V	20
AS_D_D	NAT	V	V	20
B_D_D	REG	V	V	20
CA	NAT	V	V	20
CL	NAT	V	V	20
COND_F	REG	V	V	20
FE_D_D	NAT	V	V	20
HG_T	NAT	V	V	20
K	NAT	V	V	20
MET_T	NAT	V	V	20
MG	NAT	V	V	20
MN_D_D	NAT	V	V	20
NA	NAT	V	V	20
O2_D	REG	V	V	20
PH_F	REG	V	V	20
RES_NF	REG	V	V	20
SE_D_D	NAT	V	V	20
TEMP_F	REG	V	V	20

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	20		2.28	45.6	0.001
ALK_T	20		2.28	45.6	0.001
AL_D	20		0.57	11.4	0.000
AL_E	20		0.57	11.4	0.000
AS_D_D	20		4.28	85.6	0.002
B_D_D	20	0.12	4.96	99.2	0.002
CA	20		0.86	17.2	0.000
CL	20		1.14	22.8	0.001
COND_F	20	0	0	0.0	0.000
FE_D_D	20		0.57	11.4	0.000
HG_T	20		1.71	34.2	0.001
K	20		0.86	17.2	0.000
MET_T	20		23.94	478.8	0.012
MG	20		0.86	17.2	0.000
MN_D_D	20		0.57	11.4	0.000
NA	20		0.86	17.2	0.000
O2_D	20	0	0	0.0	0.000
PH_F	20	0	0	0.0	0.000
RES_NF	20	0.19	7.85	157.0	0.003
SE_D_D	20		4.28	85.6	0.002
TEMP_F	20	0	0	0.0	0.000
Regional	Totals			256.2	0.005
National	Totals			912.6	0.023

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Munro	0.15	5.1	1.5	6.6
D. Gregor	0.05	2.0		2.0
Total	0.20	7.1	1.5	8.6

360-84 Regional Biomonitoring Program

SUBMITTER - 0489
ECS PROGRAM - 4.1* - Toxic Chemicals
DURATION - Ongoing

OBJECTIVES
To develop and initiate a biological monitoring program to assist in assessing aquatic quality within the Western and Northern Region.

RATIONALE
An adequate assessment of aquatic quality is an integrated approach of the chemical, physical and biological sciences. The Branch has undertaken the development of a biological monitoring program to meet this need.

DESCRIPTION
A biological monitoring program is being developed through a search of the scientific literature, contacting and meeting experts in the field, reviewing present WQB biological activities and undertaking pilot studies. The plan will outline the techniques commonly used their application, the pros and cons and will recommend methods for use in this region. The plan will be multi-year in scope and will be reviewed annually.

COORDINATOR(S) - Munro

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.18		0.18
	PY Tech					
	Salary			6.30		6.30
	O & M			3.00		3.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.18		0.18
Total Dollars				9.30		9.30

* Affiliated ECS Program(s) - 1.1

360-84 Regional Biomonitoring Program

INDICATORS - A-1-B a,e
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Complete Regional Biological Monitoring Plan	November	
2 Undertake external branch discussion of plan		
3 Revise plan as necessary		Final draft of plan to be completed by January 1985
4 Attend one biomonitoring workshop		

360-84 Regional Biomonitoring Program

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Munro	0.15	5.1	2.5	7.6
D. Gregor	0.03	1.2	0.5	1.7
Total	0.18	6.3	3.0	9.3

361-84 Forage Fish Assessment Program

SUBMITTER - 0489
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing - with annual rotation of sampling sites

OBJECTIVES
To collect forage fish samples are various monitoring locations throughout the region to examine metal and organic pollutant levels in their tissues.

RATIONALE
In order to adequately assess the aquatic quality the Branch feels an integrated approach to monitoring is required which examines chemical, physical and biological sciences and multiple media analysis. This project is intented to expand on the media analyzed by the Branch to include biological organisms at selected sites.

DESCRIPTION
The WQB decided in September 1983 to iniate a forage fish program to assess the bioaccumulation of pollutants in the aquatic environment. This program was to conducted on a limited trail basis during 1984/85. In this Region forage fish samples will be collected at six water quality monitoring sites during the summer of 1984. Five replicate samples will be collected to be analyzed for a number of metals and organic substances.

COORDINATOR(S) - Munro

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.1		0.10
	PY Tech	0.17		0.1		0.27
	Salary	3.37		4.9		8.27
	O & M	2.29		4.0		6.29
	Capital	1.08				1.08
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.17		0.2		0.37
Total Dollars		6.74		8.9		15.64

* Affiliated ECS Program(s) - 1.1, 4.1

361-84 Forage Fish Assessment Program

INDICATORS - A-1-B a
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
D. Munro

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Collect forage fish samples and prepare samples for analysis	August	
2 Send samples out for analysis	September	

361-84 Forage Fish Assessment Program

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
10	Souris River near Glen Ewen	00SA05ND0001	ONCE/5 REPLICATES
22	South Saskatchewan River at Highway # 41	00AL05AK0001	ONCE/5 REPLICATES
23	Red Deer River near Bindloss	00AL05CK0001	ONCE/5 REPLICATES
24	Beaver River at Beaver Crossing	00AL06AD0001	ONCE/5 REPLICATES
28	Battle River near Unwin	00SA05FE0001	ONCE/5 REPLICATES
94	North Saskatchewan River at Lea Park	00AL05EF0001	ONCE/5 REPLICATES

SAMPLING MATRIX

Parameter	Lab	STN 10	STN 22
AS_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CD_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CR_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CU_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
HG_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
NI_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
OC/PCB_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
SE_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES
ZN_T_B	NAT	ONCE/5 REPLICATES	ONCE/5 REPLICATES

Parameter	STN 23	STN 24	STN 28
AS_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CD_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CR_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
CU_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
HG_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
NI_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
OC/PCB_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
SE_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES
ZN_T_B	ONCE/5 REPLICATES	ONCE/5 REPLICATES	ONCE/5 REPLICATES

Parameter	STN 94	No. of samples
AS_T_B	ONCE/5 REPLICATES	30
CD_T_B	ONCE/5 REPLICATES	30
CR_T_B	ONCE/5 REPLICATES	30
CU_T_B	ONCE/5 REPLICATES	30
HG_T_B	ONCE/5 REPLICATES	30
NI_T_B	ONCE/5 REPLICATES	30
OC/PCB_B	ONCE/5 REPLICATES	18
SE_T_B	ONCE/5 REPLICATES	30
ZN_T_B	ONCE/5 REPLICATES	30

361-84 Forage Fish Assessment Program

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
AS_T_B	30		14.25	427.50	0.011
CD_T_B	30		8.55	256.50	0.006
CR_T_B	30		8.55	256.50	0.006
CU_T_B	30		8.55	256.50	0.006
HG_T_B	30		17.1	513.00	0.013
NI_T_B	30		8.55	256.50	0.006
OC/PCB_B	18		227.43	4093.74	0.102
SE_T_B	30		14.25	427.50	0.011
ZN_T_B	30		8.55	256.50	0.006
Regional Totals				0.00	0.000
National Totals				6744.24	0.169

361-84 Forage Fish Assessment Program

PERSONYEAR BREAKDOWN

Py	Sal	O & M	Total $	
D. Munro	0.1	3.4	3	6.4
Summer Student	0.1	1.5	1	2.5
Total	0.2	4.9	4	8.9

365-84 Interjurisdictional Ground Water Quality

SUBMITTER - N/A
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
Revise and implement the regional ground water quality strategy in accordance with the new IWD policies on ground water.

RATIONALE
Many large aquifers in Western and Northern Region are transboundary in nature. Developments in one jurisdiction can degrade the aquifer quality in another, potentially affecting water uses. This is a major issue in historically water short areas, such as those near the International Border across the breadth of the Western and Northern Region.

DESCRIPTION
During 1982-83, a ground water quality strategy was prepared for W & NR. This strategy will be revised for purposes of implementation, in accordance with the new IWD policies on ground water. Contact will be maintained with NHRI, other federal and provincial agencies which have an involvement in ground water. Ongoing support to Water Quality Branch will be provided with respect to other Branch projects, as will support for IWD programs.

COORDINATOR(S) - McNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.1		0.1
	PY Tech					
	Salary			3.5		3.5
	O & M			2.5		2.5
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.1		0.1
Total Dollars				6.0		6.0

* Affiliated ECS Program(s) - 1.1

365-84 Interjurisdictional Ground Water Quality

INDICATORS - B-4-A b
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Finish report on effects of irrigation wrt. groundwater quality	August	Report finalized by Aug/83
2 Update and revise Regional Groundwater Quality Strategy		ongoing as of 31-Mar-1984
3 Finish rp't on agricultural wastes in g.w.	Feb-85	

365-84 Interjurisdictional Ground Water Quality

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
DCMcN	0.1	3.5	2.5	6
Total	0.1	3.5	2.5	6

366-84 Regional Groundwater Data Base Development

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Initiated 1984-85; ongoing after that

OBJECTIVES
To improve the accessibility of groundwater data in W & NR, and to improve communication with the Provinces in this matter.

RATIONALE
Ground water data is difficult to access in W & NR.

DESCRIPTION
Coordinator will be in contact with Provincial Data storage agencies to attempt to work out a method of routine data exchange upon which to build the data base

There is a large amount of ground water data in the region but is is unorganized. The main purpose of this project will be to gather all the ground water data possible and assemble it into one data base administered by IWD.

COORDINATOR(S) - D. McNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.3		0.3
	PY Tech					
	Salary			9.2		9.2
	O & M			3.5		3.5
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.3		0.3
Total Dollars				12.7		12.7

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

367-84 Poplar River Data Base Interpretation

SUBMITTER - 0003
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - 1984-86

OBJECTIVES

(1) To compile onto RS1 tables all water quality data for the Poplar River since approximately 1965. (2) To study the data base in order to determine whether it is sufficient for the characterization of the ground and surface water quality in the area. (3) To write an interpretive report showing the relationships between coal mining in the area and changes in ground and surface water quality over the period of the record, if warranted by the data base.

RATIONALE

Water quality data has been collected in the Poplar River area for approximately 20 years. In 1981, the Bilateral Monitoring Committee of the IJC started producing yearly reports. These reports are very brief and do not go into much detail on water quality. It is necessary to know if the existing water quality data base can be used for a detailed hydrochemical report on the Poplar River Area. If the data base were judged satisfactory, then an interpretive could be written, integrating both the ground and surface water quality data.

DESCRIPTION

This project will consist of three parts: (1) data input to RS1 tables from available sources, (2) data inspection and overall appraisal, and (3) report preparation, if necessary.

COORDINATOR(S) - D. McNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.26	0.01	0.27
	PY Tech			0.10		0.10
	Salary			10.20	0.50	10.70
	O & M					
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.36	0.01	0.37
Total Dollars				10.20	0.50	10.70

367-84 Poplar River Data Base Interpretation

INDICATORS - A-1-A ,1
PRIORITY - Relative Rank 5

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Start data compilation	March 84	Finish by Sept. 84
2 Data inspection	Sept. 1984	Feb. 85
3 Begin report (if necessary)	Feb. 85	Feb. 86

367-84 Poplar River Data Base Interpretation

EXTENDED DESCRIPTION

There has, as yet, been no report written on the extensive water quality data base in the Poplar River area. The data base, which extends back approximately 20 years, to the time that USGS water quality monitoring was first done on the East Poplar River at the International Boundary, includes both surface and ground water but has not been subjected to intense study. This lack of study can be partially attributed to the fact that the data base is fragmented and very large.

The intent of this study is to (a) consolidate this fragemented data base, (b) review the data base, and (c) produce an interpretive report on the data if it appears that the data are reliable.

367-84 Poplar River Data Base Interpretation

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. McNaughton	0.25	8.75		8.75
W. Gummer	0.01	0.50		0.50
D. Gregor	0.01	0.45		0.45
Student	0.10	1.50		1.50
Total	0.37	11.20		11.20

368-84 Agricultural Effects On Groundwater Quality

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - May 1984 to May 1985

OBJECTIVES
This study will shed light upon the overall effects of animal wastes on the quality of ground water in the Western and Northern Region.

RATIONALE
The contamination of ground waters by the infiltration of animal wastes has a potentially-widespread impact on the important ground water supplies of the region. There are interjurisdictional implications, both from the direct movement of ground water across provincial boundaries, and in the contribution of potentially-contaminated waters from the ground water zone into interjurisdictional surface water bodies.

DESCRIPTION
The project will consist of a data search on the subject. An assessment will be made on the magnitude of the problem, if any is seen to exist. Recommendations will be made accordingly.

COORDINATOR(S) - D McNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.3		0.3
	PY Tech					
	Salary			5.0		5.0
	O & M			1.5		1.5
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.3	0	0.3
Total Dollars				6.5	0	6.5

368-84 Agricultural Effects On Groundwater Quality

INDICATORS - N/A
PRIORITY - 4

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 data coll.	sept-84	
2 analysis	dec-84	
3 report	may-85	

369-84 Nut Lake I.R. Water Supply Evaluation

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - April 5 to July 30, 1984

OBJECTIVES
To assess the suitability of surface water and ground water options for Nut Lake IR potable water supply.

RATIONALE
INAC and H & WC have requested the support of the Branch to meet the above stated objective. Federal lands is considered to be an area where the Brnch should be involved particularly with respect to advocating sound management and quality characterizations to those agencies who have the direct responsibilities.

DESCRIPTION
Spring freshet samples will be collected approximately daily from Pipestone Creek above Nut Lake. The suitability of this water for drinking water purposes will be assessed. Two other sources will also be collected but on a much reduced frequency: the town of Fosston water supply and a local ground water source in the northeast quadrant of the IR. Analytical support will be split among three labs: Saskatchewan Health Laboratories, WQB Saskatoon and WQB National laboratories. Collection will be provided essentially by H & WC with some assistance from the Band Planner and if necessary Branch staff. Two reconnaissance trips are planned.

COORDINATOR(S) - Wm. Gummer and D. MacNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof				0.02	0.02
	PY Tech	0.01				0.01
	Salary	0.13	0.04			0.17
	O & M	0.09	0.03			0.12
	Capital	0.42	0.14			0.56
Recov.	PY Prof					
	PY Tech	0.06	0.01			0.07
	Salary	1.19	0.39			1.58
	O & M	0.81	0.27			1.08
	Capital					
PY Total		0.07	0.01		0.02	0.10
Total Dollars		2.64	0.87			3.51

369-84 Nut Lake I.R. Water Supply Evaluation

INDICATORS - A-1-A
PRIORITY - Relative Rank 5, TT - Nutrients/Inorg. 30 D., Org. 60 D

DISSEMINATION OF LABORATORY DATA REPORTS
1 Wm. Gummer

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 samples	May 1	
2 nutrients	5 days	
3 pesticides	90 days	
4 report	August	

369-84 Nut Lake I.R. Water Supply Evaluation

EXTENDED DESCRIPTION

Nut Lake IR is dependent upon the town of Fosston water, which is trucked to the reservation on a daily basis. There is some uncertainty in the reliability of this supply over the long term. Pipestone Creek drains into Nut Lake which borders the western boundary of the IR. Farmers in the Pipestone drainage wish to straighten the Creek near the lake to permit earlier spring access to the land which is otherwise too wet to be worked. The band may let them proceed if serious consideration is given to developing a water supply option capturing spring runoff for year around use. This option depends on water quality and cost-benefit analysis.

STATION LIST

Map no.	Station location	NAQUADAT no.
S1	Pipestone Ck. near Ross Valley	
S2	Well No. 5 or 7 IR	
S3	Fosston Water Supply Truck	

Map no.	Sampling frequency
S1	ONCE DAILY FOR 10 DAYS
S2	3 IN 1 DAY/2 HR. INTERVAL
S3	ONCE BUT DUPLICATE

SAMPLING MATRIX

Parameter	Lab	STN S1	STN S2	STN S3	No. of samples
B_D_D	REG	*	*	*	15
COLI_F_F	REG	*	*	*	15
COLI_T_F	REG	*	*	*	15
COND_L_R	REG	*	*	*	15
FE_D_L	NAT	*	*	*	15
HERB	NAT	*	*	*	10
MET_T	NAT	*	*	*	10
MN_D_L	NAT	*	*	*	15
NO23_D	REG	*	*	*	15
N_D_D	REG	*	*	*	15
N_D_L	REG	*	*	*	15
N_P	REG	*	*	*	15
OC/PCB	NAT	*	*	*	10
PH_L_R	REG	*	*	*	15
P_D_L	REG	*	*	*	15
P_T	REG	*	*	*	15

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
B_D_D	15	0.12	4.96	74.40	0.001
COLI_F_F	15	0	0	0.00	0.000
COLI_T_F	15	0	0	0.00	0.000
COND_L_R	15	0.05	2.07	31.05	0.001
FE_D_L	15		0.57	8.55	0.000
HERB	10		142.3	1423.00	0.036
MET_T	10		23.94	239.40	0.006
MN_D_L	15		0.57	8.55	0.000
NO23_D	15	0.12	4.94	74.10	0.001
N_D_D	15	0.19	7.85	117.75	0.002
N_D_L	15	0.24	9.92	148.80	0.003
N_P	15	0.2	8.26	123.90	0.002
OC/PCB	10		97.35	973.50	0.024
PH_L_R	15	0.05	2.07	31.05	0.001
P_D_L	15	0.24	9.92	148.80	0.003
P_T	15	0.19	7.85	117.75	0.002
Regional	Totals			867.60	0.016
National	Totals			2653.00	0.066

2.7 TOXIC SUBSTANCES

The Assistant Deputy Minister of ECS has been given the responsibility of leading and coordinating the Derpartment of the Environment measurements and characteristics activities for toxic chemicals. In responding to this, the Water Quality Branch conducts monitoring and studies examining the presence of toxic chemicals, their abundance and prevalence in the aquatic ecosystem, their geographic distribution and their effects on life.

The Toxic Substances Group consists of the following projects:

370 Toxic Chemicals - General
371 Synthetic Organic Compounds in the Red River
372 Toxic Chemicals in Impoundments and Deltas
373 Organic Contaminants Downstream of industrial Centres
374 Saskatchewan River and Lake Diefenbaker Study
375 Specimen Banking
377 Lac du Bonnet Radionuclide Study
378 Aquatic Sensitivity to Acid Rain - Mapping

The following pages contain complete descriptions for these projects. All the projects in this group deal specifically with toxic substances. This common focus places them in ECS Program 4.1, Toxic Substances.

Project Descriptions:

370-84 Toxic Chemicals - General

SUBMITTER - N/A
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - Ongoing

OBJECTIVES
Identify and assess the distribution of toxic chemicals in waters of federal interest.

RATIONALE
Toxic chemicals pervade every corner of the environment. Information on their presence, abundance, distribution, mobility and effects is essential towards understanding the risk they pose to man and the environment. The information is also required for managers to make decisions concerning abatement and the effectiveness of controls.

DESCRIPTION
Analytical services are provided in support of Programs 1.1 and 1.6 - as part of the routine monitoring programs. Special studies are carried out with or without TOXFUND assistance. During 1984/85 two new studies dealing with toxic substances will be undertaken (see Projects 361 and 376). In addition, two internal reports dealing with contaminants below industrial centers and in the Red River Basin will be completed (see Project 372 and 373) as well as a review of alternatives for organic measurement and assessment practices will be conducted.

COORDINATOR(S) - D. Munro, J. Gaskin

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.1	0.2		0.3
	PY Tech					
	Salary		4.5	6.8		11.3
	O & M		1.5	2.5		4.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total			0.1	0.2		0.3
Total Dollars			6.0	9.3		15.3

370-84 Toxic Chemicals - General

INDICATORS - A-1-B a, b, d, A-1-A a, b, c, d, e, f, g
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Toxic Chemicals in Impoundments and Deltas		See Project 372-84
2 Synthetic Organic Compounds in the Red River		See Project 371-84
3 Organic Contaminants below Industrial Centres		See Project 373-84
4 Review of alterate organic assessment practices		
5 Initiate a Forage Fish Assessment Program		See Project 361-84
6 Conduct South Saskatchewan Lake Diefenbaker Study		See Project 376-84
7 Attend two Regional Toxic Chemical Committee meetings		

370-84 Toxic Chemicals - General

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Munro	0.2	6.8	2.5	9.3
J. Gaskin	0.1	4.5	1.5	6.0
Total	0.3	12.3	4.0	15.3

371-84 Synthetic Organic Compounds in the Red River

SUBMITTER - 0003
ECS PROGRAM - 4.1* - Toxic Chemicals
DURATION - April 1981 to March 1985

OBJECTIVES
To identify, categorize and report on the fluvial transport of synthetic organic compounds in the Red River at Emerson and at North Perimeter of Winnipeg.

RATIONALE
A large number of organic compounds, primarily of herbicide type, are used in the Red River basin but testing for residual deposition of several of these compounds in the water of the Red River or its sediments is not carried out by any agency. This study is designed to meet this need by collecting and analyzing both water and sediment samples.

DESCRIPTION
Triplicate suspended sediment and water samples were collected from Red River at Emerson, North Perimeter (Winnipeg) and from Assiniboine River at Charleswood in June and August, 1981. Also one set of bottom sediment, in duplicate was collected from all three locations.

Final analyses and reporting has been postponed due to the loss of the Organic Chemist from the Region. No work will be undertaken this year aside from a review of the study and results as part of the review of the Regional Toxic Chemicals Program as per Project 370.

COORDINATOR(S) - J. Gaskin, V. Chacko

RESOURCES
N/A

* Affiliated ECS Program(s) - 1.1

INDICATORS - A-1-A g
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Laboratory analysis	June	
2 Completion of first draft	March	

372-84 Toxic Chemicals in Impoundments and Deltas

SUBMITTER - N/A
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - 1982 to 1985

OBJECTIVES
To determine the presence and level of selected known and unknown toxic chemicals in impoundments and deltas.

RATIONALE
Waterways are major transport mechanisms for toxic substances. Since many of these toxic substances are associated with suspended sediment, zones of sediment deposition such as reservoirs, lakes and deltas are potential sinks for these substances. The Red River Delta is a major depository for sediments in the Red River System. Characterization of toxins in these sediments and biota will greatly assist the hazard and risk assessments of these chemicals to both man and the environment.

DESCRIPTION
A two year survey was proposed to examine bottom sediment, biota and rooted macrophytes in the Red River Delta (sampling completed in 1981/82) for the presence of toxic chemicals including heavy metals and biocides. Samples were collected from the deposition zones by standardized sampling techniques. Only the upper 0.5 to 2 cm of the sediment were sampled so that the results would represent the most recently deposited material. Extra samples were also collected, appropriately labeled and placed in a specimen bank for future analyses as may be required.

Final analyses and reporting has been postponed due to the loss of the organic chemist from the Region. No work will be undertaken this year aside from a review of study and results as part of the review of the Regional Toxic Chemicals Program Review as per Project 370-84.

COORDINATOR(S) - J. Gaskin, V. Chacko

RESOURCES
N/A

INDICATORS - A-1-A g
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

373-84 Organic Contaminants Downstream of Industrial Centres

SUBMITTER - 0003
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - June 1981 to March 1985

OBJECTIVES
To determine the impact of industrial effluents, particularly of petrochemical industry on the Regional Waters and to establish a mass spectra reference file of the organics in these waters for future reference. Prepare a report on the findings.

RATIONALE
The need exists for developing and refining the analytical capability for identifying the present and evolving organics in the waters of Western Canada, which will be an important step in developing an early warning system. Samples for this purpose were collected from rivers downstream of industrial centers where contamination is most likely to occur.

DESCRIPTION
To determine the impact of industrial effluents, particularly of petrochemical industry on the Regional Waters, samples were collected below industrial centers in Western Canada. The proposed locations were: North Saskatchewan River below Edmonton and at Highway 3, South Saskatchewan River below Saskatoon and at Highway 4, Bow River below Calgary, Wascana Creek below Regina and Red River below Winnipeg. The biocides measured are those identified by the Toxic Chemicals Management Program, EPA priority chemicals and WHO.

Final analyses and reporting has been postponed due to the loss of the Organic Chemist from the Region. No work will be undertaken this year aside from a review of the study and results as part of the review of the Regional Toxic Chemicals Program as per Project 370.

COORDINATOR(S) - J. Gaskin, V. Chacko

RESOURCES
N/A

373-84 Organic Contaminants Downstream of Industrial Centres

INDICATORS - A-1-A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

374-84 South Saskatchewan R. and L. Diefenbaker Study

SUBMITTER - 0003
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - 1984/85 and 1985/86

OBJECTIVES
(1) To describe the temporal and spatial water chemistry characteristics of Lake Diefenbaker and the South Saskatchewan and Red Deer Rivers above and below their confluence. (2) To quantify the contaminant burden of the resident biota. (3) To synthesize this and other availablke information in a comprehensive report.

RATIONALE
Lake Diefenbaker is a high priority of the Province of Saskatchewan because of the need to protect the lake as a supply of drinking and irrigation water and as a recreational reservoir. Current priorities require that an extensive short duration study be undertaken in order to assist with pending management discussions. This study will also be used to determine the need for a longer intensive study or monitoring program and/or identify research needs within the basin.

DESCRIPTION
Due to the many facets of this study, a summarized description has not been provided. A study plan which also shows the work sharing program between WQB and SDOE is available from the project coordinator. For information regarding the timing of this project please refer to the detailed study plan.

COORDINATOR(S) - D. Gregor, R. Crosley

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof		0.03	0.6		0.63
	PY Tech	0.65	0.29	0.2		1.14
	Salary	13.07	8.93	35.0		57.00
	O & M	8.89	5.36	34.0		48.25
	Capital	4.18	2.52	15.0		21.70
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M			50.0		50.00
	Capital					
PY Total		0.65	0.32	0.8		1.77
Total Dollars		26.14	16.81	134.0		176.95

INDICATORS - A-1-B d
PRIORITY - Sample Turnaround Time 8 weeks

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinators

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR
N/A

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
22	South Saskatchewan River at Highway # 41	00AL05AK0001	V
23	Red Deer River near Bindloss	00AL05CK0001	V
S1	S. Sask. R. near Leader		V
S2	S. Sask. R. near Lemsford		V

SAMPLING MATRIX

Parameter	Lab	STN 22	STN 23	STN S1	STN S2	No. of samples
ALK_P	NAT	V	V	V	V	84
ALK_P_R	REG	V	V	V	V	84
ALK_T	NAT	V	V	V	V	84
ALK_T_R	REG	V	V	V	V	84
AL_D	NAT	V	V	V	V	84
AL_E	NAT	V	V	V	V	84
AS_D_D	NAT	V	V	V	V	84
AS_T_B	NAT	V	V	V	V	12
AS_T_S	NAT	V	V	V	V	28
B_D_D	REG	V	V	V	V	84
CA	NAT	V	V	V	V	84
CD_T_B	NAT	V	V	V	V	12
CD_T_S	NAT	V	V	V	V	28
CHL_A_D	REG	V	V	V	V	84
CL	NAT	V	V	V	V	84
CN	REG	V	V	V	V	84
COLI_F_F	REG	V	V	V	V	84
COLI_T_F	REG	V	V	V	V	84
COLO_TR_R	REG	V	V	V	V	84
COND_F	REG	V	V	V	V	84
COND_L_R	REG	V	V	V	V	84
CR_E	NAT	V	V	V	V	84
CR_T_B	NAT	V	V	V	V	12
CR_T_S	NAT	V	V	V	V	28
CU_T_B	NAT	V	V	V	V	12
CU_T_S	NAT	V	V	V	V	28
C_DO_D	REG	V	V	V	V	84
C_PO	REG	V	V	V	V	84
F	NAT	V	V	V	V	84
FE_D_D	NAT	V	V	V	V	84
HERB	NAT	V	V	V	V	28
HG_T	NAT	V	V	V	V	84
HG_T_B	NAT	V	V	V	V	12
HG_T_S	NAT	V	V	V	V	28
K	NAT	V	V	V	V	84
MET_T	NAT	V	V	V	V	84
MG	NAT	V	V	V	V	84
MN_D_D	NAT	V	V	V	V	84
NA	NAT	V	V	V	V	84
NH3_T	REG	V	V	V	V	84
NI_T_B	NAT	V	V	V	V	12
NI_T_S	NAT	V	V	V	V	28
NO23_D	REG	V	V	V	V	84
N_D_D	REG	V	V	V	V	84
N_D_L	REG	V	V	V	V	84

N_P	REG	V	V	V	V	84
O2_D	REG	V	V	V	V	84
OC/PCB	NAT	V	V	V	V	28
OC/PCB_B	NAT	V	V	V	V	12
OC/PCB_S	NAT	V	V	V	V	28
PHENOL	REG	V	V	V	V	84
PH_F	REG	V	V	V	V	84
PH_L_R	REG	V	V	V	V	84
PIC	NAT	V	V	V	V	12
P_D_D	REG	V	V	V	V	84
P_OR_D	REG	V	V	V	V	84

Parameter	Lab	STN 22	STN 23	STN S1	STN S2	No. of samples
P_T	REG	V	V	V	V	84
RES_FNF	REG	V	V	V	V	84
RES_NF	REG	V	V	V	V	84
SE_D_D	NAT	V	V	V	V	84
SE_T_B	NAT	V	V	V	V	12
SE_T_S	NAT	V	V	V	V	28
SIO2	NAT	V	V	V	V	84
SO4	NAT	V	V	V	V	84
SULFIDE	REG	V	V	V	V	84
TEMP_F	REG	V	V	V	V	84
TEMP_L_R	REG	V	V	V	V	84
TURB_F	REG	V	V	V	V	84
TURB_L_R	REG	V	V	V	V	84
ZN_T_B	NAT	V	V	V	V	12
ZN_T_S	NAT	V	V	V	V	28

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	84		2.28	191.52	0.005
ALK_P_R	84	0.15	6.19	519.96	0.010
ALK_T	84		2.28	191.52	0.005
ALK_T_R	84	0.12	4.96	416.64	0.008
AL_D	84		0.57	47.88	0.001
AL_E	84		0.57	47.88	0.001
AS_D_D	84		4.28	359.52	0.009
AS_T_B	12		14.25	171.00	0.004
AS_T_S	28		25.65	718.20	0.018
B_D_D	84	0.12	4.96	416.64	0.008
CA	84		0.86	72.24	0.002
CD_T_B	12		8.55	102.60	0.003
CD_T_S	28		8.55	239.40	0.006
CHL_A_D	84	0.33	13.64	1145.76	0.021
CL	84		1.14	95.76	0.002
CN	84	0.1	4.13	346.92	0.006
COLI_F_F	84	0	0	0.00	0.000
COLI_T_F	84	0	0	0.00	0.000
COLO_TR_R	84	0.1	4.13	346.92	0.006
COND_F	84	0	0	0.00	0.000
COND_L_R	84	0.05	2.07	173.88	0.003
CR_E	84		0.57	47.88	0.001
CR_T_B	12		8.55	102.60	0.003
CR_T_S	28		5.69	159.32	0.004
CU_T_B	12		8.55	102.60	0.003
CU_T_S	28		8.55	239.40	0.006
C_DO_D	84	0.19	7.87	661.08	0.012
C_PO	84	0.2	8.26	693.84	0.013
F	84		5.42	455.28	0.011
FE_D_D	84		0.57	47.88	0.001
HERB	28		142.3	3984.40	0.100
HG_T	84		1.71	143.64	0.004
HG_T_B	12		17.1	205.20	0.005
HG_T_S	28		17.10	478.80	0.012
K	84		0.86	72.24	0.002
MET_T	84		23.94	2010.96	0.050
MG	84		0.86	72.24	0.002
MN_D_D	84		0.57	47.88	0.001
NA	84		0.86	72.24	0.002
NH3_T	84	0.19	7.85	659.40	0.012
NI_T_B	12		8.55	102.60	0.003
NI_T_S	28		8.55	239.40	0.006
NO23_D	84	0.12	4.94	414.96	0.008
N_D_D	84	0.19	7.85	659.40	0.012
N_D_L	84	0.24	9.92	833.28	0.015

N_P	84	0.2	8.26	693.84	0.013
O2_D	84	0	0.00	0.00	0.000
OC/PCB	28		97.35	2725.80	0.068
OC/PCB_B	12		227.43	2729.16	0.068
OC/PCB_S	28		227.43	6368.04	0.159
PHENOL	84	0.3	12.39	1040.76	0.019
PH_F	84	0	0	0.00	0.000
PH_L_R	84	0.05	2.07	173.88	0.003
PIC	12		142.3	1707.60	0.043
P_D_D	84	0.19	7.85	659.40	0.012
P_OR_D	84	0.08	3.31	278.04	0.005

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
P_T	84	0.19	7.85	659.40	0.012
RES_FNF	84	0.19	7.85	659.40	0.012
RES_NF	84	0.19	7.85	659.40	0.012
SE_D_D	84		4.28	359.52	0.009
SE_T_B	12		14.25	171.00	0.004
SE_T_S	28		25.65	718.20	0.018
SIO2	84		1.14	95.76	0.002
SO4	84		1.14	95.76	0.002
SULFIDE	84	1	41.32	3470.88	0.064
TEMP_F	84	0	0	0.00	0.000
TEMP_L_R	84	0	0	0.00	0.000
TURB_F	84	0	0	0.00	0.000
TURB_L_R	84	0.05	2.07	173.88	0.003
ZN_T_B	12		8.55	102.60	0.003
ZN_T_S	28		8.55	239.40	0.006
Regional Totals				15757.56	0.289
National Totals				26134.92	0.653

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Gregor	0.2	9	2.0	11.0
R. Crosley	0.2	8	3.0	11.0
D. Munro	0.2	8	3.0	11.0
Student	0.2	3	1.5	4.5
Lab Tech	0.2	6	1.5	7.5
Total	1.0	34	11.0	45.0

375-84 Specimen Banking

SUBMITTER - N/A
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - Ongoing

OBJECTIVES
To establish and maintain a regional specimen bank for sediment, biological, and water samples. Establish procedures for collecting, treating, and storing sediments.

RATIONALE
The establishment of a speciment bank will allow for the timely collection of samples from various field program ,which can be stored for analysis at a latter date; thereby, reducing costs in the field and laboratory. In addition specimen banking could create a source of samples for possible retrospective analysis.

DESCRIPTION
Initially this project will consist of a review of available literature on the subject of sample storage including collection methods, splitting and preservation method and storage containers required for the various forseeable analysis. Also included in the initial stages of this project will be the establishment of a procedure for recording and cataloguing of samples placed in the specimen bank.

COORDINATOR(S) - Munro, Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.12		0.12
	PY Tech			0.22		0.22
	Salary			7.80		7.80
	O & M			2.50		2.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.34		0.34
Total Dollars				10.30		10.30

INDICATORS - A-1-B c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Collect and prepare samples for storage	ongoing	
2 Review and prepare procedures for storing sediment, biota, water	March	Development of a manual on sample storage to be ongoing

375-84 Specimen Banking

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
Summer Student	0.20	3.0	0.0	3.0
R. Woychuk	0.02	0.6	0.5	1.1
D. Munro	0.10	3.4	1.0	4.4
D. Gregor	0.02	0.8	1.0	1.8
TOTAL	0.24	7.8	2.5	10.3

377-84 Lac du Bonnet Radioisotopes Study

SUBMITTER - N/A
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - 1984-1985

OBJECTIVES
(1) Conduct a sampling program during the summer of 1984 in the Lac du Bonnet area (2) Have samples analyzed for Uranium, Radium, major ions, physical parameters (3) Define the area of contamination in relation to the regional geolgy (4) Report on the results

RATIONALE
The project's stated purpose is to define the area affected by high radionuclide concentrations, and to relate it to the geological and hydrochemical conditions in the region. The reason for federal involvement is that the AECL underground research facility is being built nearby, and it is necessary to establish some of the baseline hydrochemical conditions prior to its commissioning. This could prevent future disputes as to the antecedence of groundwater quality problems with respect to the Underground Lab.

DESCRIPTION
The project will involve approximately 3 weeks field work during the summer of 984. Samples will be collected from existing wells in the area, by prior arrangement with well owners. Samples will be submitted to Burlington for the major ions (Ca, Mg, Na, SO4, Cl, F, K, ALE, SIO2, CondF, pHF), and to SRC for radionulcide determinations. The physical parameters will be done in the field.

COORDINATOR(S) - D. McNaughton

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.13	0.01	0.14
	PY Tech					0.00
	Salary			4.60		4.60
	O & M	0.61		7.50		8.11
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M				6.90	6.90
	Capital					
PY Total				0.13	0.01	0.14
Total Dollars		0.61		12.10	6.90	19.61

377-84 Lac du Bonnet Radioisotopes Study

INDICATORS - B-4-A c
PRIORITY - Relative Rank 5, Sample Tunaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1) project coordinator

2) westore

3) NAQUADAT

4) Manitoba Environmental Management Service

Mr. D Brown

Building 2, Box 7, 139 Tuxedo Ave.,

Winnipeg Manitoba, R3N 0H6

5) Mr A. Andres

Environmental Protection Service

8th floor, 275 Portage Ave

Winnipeg, Manitoba

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 start	june	
2 field	july-aug	
3 complete	nov, '84	

377-84 Lac du Bonnet Radioisotopes Study

EXTENDED DESCRIPTION

In 1983, Manitoba Environment conducted an initial survey, within a 5-mile radius of the U.R.L.. They discovered what were sometimes found to be prohibitively high levels of U and Rd in the ground waters. It was further postulated that these were associated with granitic bedrock in the area, into which some of the water wells had been drilled. After a meeting between the Winnipeg office of the EPS, and representatives of Manitoba Environment, it was decided that further work should be done, for reasons stated in the Rational. A submission has been made to TOXFUND for the bulk of the necessary resources, with the remainder made of of A-base. As of March 1984, no word has been heard as whether or not the project will get the required funding.

377-84 Lac du Bonnet Radioisotopes Study

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. McNaughton	0.12	4.20	7.5	11.70
D. Gregor	0.01	0.45		0.45
W. Gummer	0.01	0.50		0.50
Total	0.14	5.15		5.15

378-84 Aquatic Sensitivity to Acid Rain - Mapping

SUBMITTER - 0003
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - 1984/85

OBJECTIVES
(1) To map the available data for the NWT for aquatic sensitivity to acid rain in accordance with guidelines established by the Western Canada LRTAP Committee. (2) To provide assistance and coordination to the provinces of Manitoba, Saskatchewan, and Alberta in their mapping. (3) Identify sensitive or potentially sensitive areas requiring further data collection.

RATIONALE
The Western Canada LRTAP Committee has recommended that all of Western Canada should be mapped. WQB is providing support for the NWT through computerized isochronal mapping capabilities. In order to ensure that the maps for all three provinces are comparable, WQB is providing mapping assistance and overall coordination.

DESCRIPTION
NAQUADAT data available for the last 10 years for the NWT have been screened for suitability within this excercise. Stations on large river systems and lakes which receive drainage from heterogeneous soil types and rock parent materials were excluded. The remaining stations will be used in the preparation of isochronal maps for pH, Ca, Mg, Alk and Al, which together with the terrestrial sensitivity maps should outline sensitive areas and/or areas requiring more data. This information will be compiled with that of other provinces to prepare a map for Western Canada.

COORDINATOR(S) - D. Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.1		0.1
	PY Tech					
	Salary			4.5		4.5
	O & M			3.0		3.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.1		0.1
Total Dollars				7.5		7.5

378-84 Aquatic Sensitivity to Acid Rain - Mapping

INDICATORS - A-1-A g,h
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Screening of data and coordination of data accumulation		Completed in late FY 83/84 due to the urge of the project
2 Prepare preliminary maps of NWT and Prairie Provinces	June	To be completed for discussion at a Techn Committee Meeting in
3 Discuss with GNWT and DIAND	June	Obtain any additional data and compare with terr. sens. mapping
4 Revise maps and prepare report	Sept.	

2.8 NORTHWEST TERRITORIES

The Department of the Environment is emphasizing its role in the north as a direct result of the development pressures being placed on the north as well as in recognition of the fact that prevention of environmental degredation is more effective than curative measures. Environment Canada has a role of environmental coordinator and advisor in the north. In support of this emphasis, WQB-W&NR is endevouring to increase its presence and expand its activities in the Northwest Territories. In direct support of this intiative, IWD appointed a Water Quality Specialist to the Yellowknife office during FY 83/84. In conjunction with the Regina staff, the Water Quality Specialist began a review of the NWT water quality program and began development of a long-term "Water Quality Assessment Strategy for the NWT." This strategy will be finalized in FY 84/85 and implementation will be phased over the next several years.

In anticipation of an expanded WQB program in the NWT, and due to the specific characteristics of the projects undertaken in the NWT, the Branch Program Outline highlights NWT activities by placing them in a separate section. There are of course relationships with other projects and Branch activities and these will be noted as appropriate.

The 21 station monitored in the NWT during FY 84/85 are listed in Table 5 and located on Figure 4 which can be found in Appendix 1. Additional sites may be monitored in response to issues and special studies.

Table 5 Northwest Territories Monitoring Stations

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
49	Slave River at Fitzgerald	00AL07NB0001	1.3	392	A
50	Hay River near Highway 5	00NW07DB0001	1.3	392	A
51	Liard River above Fort Simpson	00NW10ED0002	1.3	392	A
70	Mackenzie R. near Fort Providence	00NW10FB0001	1.3	390	A
71	Camsell R. at outlet of Clut L.	00NW10JA0001	1.3	390	A

72	Coppermine R. at outlet of Pt. L.	00NW10PB0001	1.3	390	A
73	Tree River near mouth	00NW10QA0001	1.3	390	A
74	Ellice River near mouth	00NW10QD0001	1.3	390	A
75	Back River below Deep Rose Lake	00NW10RC0001	1.3	390	A
76	Great Bear River at outlet of Great Bear Lake	00NW10JC0001	1.3	390	A
77	Mackenzie River at Norman Wells	00NW10KA0003	1.3	390	A
78	Anderson River above Carnath R.	00NW10NC0001	1.3	390	A
79	Mackenzie River above Arctic Red River	00NW10LA0003	1.3	390	A
80	Peel River above Fort ~~Simpson~~ McPherson	00NW10MC0002	1.3	390	A
81	Quoich River near Baker Lake	00NW06MB0001	1.3	390	A
82	Kazan River above Kazan Falls	00NW06LC0001	1.3	390	A
83	Baker Lake at Baker Lake ~~from Baker Lake~~	00NW06MA0001	1.3	390	A
84	Thelon R. above ~~Thelon Bay~~ Beverley Lake	00NW06JC0002	1.3	390	A
85	Lochart R. above Artillery Lake	00NW07RD0001	1.3	390	A
86	Flat River near mouth	00NW10EA0004	1.3	393	A
~~90~~	~~Beechmask Creek~~	~~00NW07MB0001~~	~~1.3~~	~~39~~	~~A~~
91	LIARD RIVER AT FORT LIARD	00NW10ED0001	1.3	392	A
92	CAMERON RIVER BELOW REID LAKE	----07SB-010	1.3	390	A

near Ft. Simpson

N.B. Stations with an Alberta NAQUADAT code which appear in the above list are administered by the Yellowknife Office and, therefore, have been included in the NWT section.

At present there are seven projects administered for the NWT:

390 Water Quality Monitoring by WRB
~~391 Benchmark Basins Monitoring by WRB~~
392 NWT Interjurisdictional Monitoring
393 Nahanni National Park Monitoring Agreement
394 Freshette Monitoring Acitivity
~~395 Tsichu River Baseline Study~~
396 NWT Monitoring Evaluation

The complete descriptions for these projects are presented on the following pages. These projects contribute to both ECS Nation Programs 1.1 and 1.3. The data produced by these projects are available upon request from the project coordinators or through the Regina Office. Complex or lengthy requests may be referred to Naquadat.

Project Descriptions:

390-84 Water Quality Monitoring by WRB

SUBMITTER - 0001
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing since 1978

OBJECTIVES
In cooperation with Water Resources Branch (WRB), to monitor the quality of surface waters at 16 locations in the NWT, to prepare the regional ambient water quality data reports and the periodic reports on the quality of the aquatic environment.

RATIONALE
Since the NWT are classified as Federal Lands the water quality at 16 sites considered to be of significant interest to Environment Canada is being monitored. These data are required for the report on the quality of the aquatic environment.

DESCRIPTION
A total of 16 sites will be monitored as stations of significant federal interest. These sites are co-located with the hydrometric sites and are sampled by WRB at time of visit. An in-depth review of water quality monitoring in the NWT was initiated in FY 83/84 and will be completed in FY 84/85. As a result of this review the monitoring program may change. It is unlikely however that any changes will be instituted until FY 85/86.

COORDINATOR(S) - B. Olding

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.01			0.01
	PY Tech	0.10	0.12	0.05		0.27
	Salary	2.02	3.72	1.50		7.24
	O & M	1.37	2.29	7.50		11.16
	Capital	0.65	1.08			1.73
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.10	0.13	0.05		0.28
Total Dollars		4.04	7.09	9.00		20.13

* Affiliated ECS Program(s) - 1.1

390-84 Water Quality Monitoring by WRB

INDICATORS - B-1-A c
PRIORITY - Relative Rank 5, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Update project description	April	
2 WRB undertakes fieldwork	ongoing	Time of visit sampling
3 Lab analysis	ongoing	Reports due 8 weeks from date of receipt at lab
4 Data verification	ongoing	Verify data within 10 days of receipt from lab
5 Review data from 1982 and complete validation for data report	December	As per work plan
6 Publish 1982 data		To be completed under Project 3015 in 84/85
7 Complete review of monitoring program	June	

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
70	Mackenzie River near Fort Providence	00NW10FB0001	V
71	Camsell River at outlet of Clut Lake	00NW10JA0001	V
72	Coppermine River at outlet of Point Lake	00NW10PB0001	V
73	Tree River near mouth	00NW10QA0001	V
74	Ellice River near mouth	00NW10QD0001	V
75	Back River near Deep Rose Lake	00NW10RC0001	V
76	Great Bear River at outlet of Great Bear Lake	00NW10JC0001	V
77	Mackenzie River at Norman Wells	00NW10KA0001	V
78	Anderson River above Carnwath River	00NW10NC0001	V
79	Mackenzie River above Arctic Red River	00NW10LA0003	V
80	Peel River ~~at~~ above Fort McPherson	00NW10MC0002	V
81	Quoich River near Baker Lake	00NW06MB0001	V
82	Kazan River above Kazan Falls	00NW06LC0001	V
83	Baker Lake ~~at Baker~~ at Baker Lake	01NW06MA0001	V
84	Thelon River above ~~Thelon~~ Beverley Lake ~~Rapids~~	00NW06JC0002	V
85	Lockhart River below Artillery Lake	00NW07RD0001	V

86 Cameron River below Reid Lake ---07SB-010

SAMPLING MATRIX

Parameter	Lab	STN 70	STN 71	STN 72	STN 73	STN 74	STN 75	STN 76	STN 77	STN 78	STN 79
ALK_P	NAT	V	V	V	V	V	V	V	V	V	V
ALK_T	NAT	V	V	V	V	V	V	V	V	V	V
AS_D_D	NAT	V	V	V	V	V	V	V	V	V	V
B_D_D	REG	V	V	V	V	V	V	V	V	V	V
CA	NAT	V	V	V	V	V	V	V	V	V	V
CL	NAT	V	V	V	V	V	V	V	V	V	V
COLO_TR_R	REG	V	V	V	V	V	V	V	V	V	V
COND_F	REG	V	V	V	V	V	V	V	V	V	V
COND_L_R	REG	V	V	V	V	V	V	V	V	V	V
C_DO_L	REG	V	V	V	V	V	V	V	V	V	V
C_PO	REG	V	V	V	V	V	V	V	V	V	V
F	NAT	V	V	V	V	V	V	V	V	V	V
FE_E	NAT	V	V	V	V	V	V	V	V	V	V
K	NAT	V	V	V	V	V	V	V	V	V	V
MET_T	NAT	V	V	V	V	V	V	V	V	V	V
MG	NAT	V	V	V	V	V	V	V	V	V	V
MN_E	NAT	V	V	V	V	V	V	V	V	V	V
NA	NAT	V	V	V	V	V	V	V	V	V	V
NO23_L	REG	V	V	V	V	V	V	V	V	V	V
N_D_L	REG	V	V	V	V	V	V	V	V	V	V
N_P	REG	V	V	V	V	V	V	V	V	V	V
PH_F	REG	V	V	V	V	V	V	V	V	V	V
PH_L_R	REG	V	V	V	V	V	V	V	V	V	V
P_D_L	REG	V	V	V	V	V	V	V	V	V	V
P_T	REG	V	V	V	V	V	V	V	V	V	V
RES_NF	REG	V	V	V	V	V	V	V	V	V	V
SE_D_D	NAT	V	V	V	V	V	V	V	V	V	V
SIO2	NAT	V	V	V	V	V	V	V	V	V	V
SO4	NAT	V	V	V	V	V	V	V	V	V	V
TEMP_F	REG	V	V	V	V	V	V	V	V	V	V
TEMP_L_R	REG	V	V	V	V	V	V	V	V	V	V
TURB_L_R	REG	V	V	V	V	V	V	V	V	V	V

Parameter	STN 80	STN 81	STN 82	STN 83	STN 84	STN 85	No. of samples
ALK_P	V	V	V	V	V	V	80
ALK_T	V	V	V	V	V	V	80
AS_D_D	V	V	V	V	V	V	80
B_D_D	V	V	V	V	V	V	80
CA	V	V	V	V	V	V	80
CL	V	V	V	V	V	V	80
COLO_TR_R	V	V	V	V	V	V	80
COND_F	V	V	V	V	V	V	80

COND_L_R	V	V	V	V	V	V	80
C_DO_L	V	V	V	V	V	V	80
C_PO	V	V	V	V	V	V	80
F	V	V	V	V	V	V	80
FE_E	V	V	V	V	V	V	80
K	V	V	V	V	V	V	80
MET_T	V	V	V	V	V	V	80
MG	V	V	V	V	V	V	80
MN_E	V	V	V	V	V	V	80
NA	V	V	V	V	V	V	80
NO23_L	V	V	V	V	V	V	80
N_D_L	V	V	V	V	V	V	80
N_P	V	V	V	V	V	V	80
PH_F	V	V	V	V	V	V	80
PH_L_R	V	V	V	V	V	V	80
P_D_L	V	V	V	V	V	V	80
P_T	V	V	V	V	V	V	80
RES_NF	V	V	V	V	V	V	80
SE_D_D	V	V	V	V	V	V	80
SIO2	V	V	V	V	V	V	80
SO4	V	V	V	V	V	V	80
TEMP_F	V	V	V	V	V	V	80
TEMP_L_R	V	V	V	V	V	V	80
TURB_L_R	V	V	V	V	V	V	80

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	80		2.28	182.4	0.005
ALK_T	80		2.28	182.4	0.005
AS_D_D	80		4.28	342.4	0.009
B_D_D	80	0.12	4.96	396.8	0.007
CA	80		0.86	68.8	0.002
CL	80		1.14	91.2	0.002
COLO_TR_R	80	0.1	4.13	330.4	0.006
COND_F	80	0	0	0.0	0.000
COND_L_R	80	0.05	2.07	165.6	0.003
C_DO_L	80	0.24	9.92	793.6	0.015
C_PO	80	0.2	8.26	660.8	0.012
F	80		5.42	433.6	0.011
FE_E	80		0.57	45.6	0.001
K	80		0.86	68.8	0.002
MET_T	80		23.94	1915.2	0.048
MG	80		0.86	68.8	0.002
MN_E	80		0.57	45.6	0.001
NA	80		0.86	68.8	0.002
NO23_L	80	0.17	7.02	561.6	0.010
N_D_L	80	0.24	9.92	793.6	0.015
N_P	80	0.2	8.26	660.8	0.012
PH_F	80	0	0	0.0	0.000
PH_L_R	80	0.05	2.07	165.6	0.003
P_D_L	80	0.24	9.92	793.6	0.015
P_T	80	0.19	7.85	628.0	0.012
RES_NF	80	0.19	7.85	628.0	0.012
SE_D_D	80		4.28	342.4	0.009
SIO2	80		1.14	91.2	0.002
SO4	80		1.14	91.2	0.002
TEMP_F	80	0	0	0.0	0.000
TEMP_L_R	80	0	0	0.0	0.000
TURB_L_R	80	0.05	2.07	165.6	0.003
Regional Totals				6744.0	0.124
National Totals				4038.4	0.101

391-84 Benchmark Basins Monitoring by WRB

SUBMITTER - 0001
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing since April 1980

OBJECTIVES
To conduct a water quality survey of a benchmark station.

RATIONALE
At the request of the Regional Director of IWD, sampling is being conducted by WRB to characterize the quality of a benchmark stream.

DESCRIPTION
A station hasnot yet been identified as a benchmark stream. Otherwise, water sampling is conducted by WSC during the regular hydrometric surveys. The water quality parameters include major ions, nutrients, metals and some field tests. The data are verified and submitted for inclusion in regional data reports.

COORDINATOR(S) - B. Olding

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.01		0.01
	PY Tech	0.01	0.01	0.01		0.03
	Salary	0.13	0.21	0.70		1.04
	O & M	0.09	0.14	0.30		0.53
	Capital	0.04	0.07			0.11
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.01	0.01	0.02		0.04
Total Dollars		0.26	0.42	1.00		1.68

391-84 Benchmark Basins Monitoring by WRB

INDICATORS - B-1-A c
PRIORITY - Relative Rank 5, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator(s)

2 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 WSC undertakes fieldwork	April	Time of visit sampling
2 Lab analysis	ongoing	Reports due 8 weeks from date of receipt at lab
3 Data verification	ongoing	Verify data within 10 days of receipt from lab
4 Review data from 1982 and complete validation for data report	December	As per work plan
5 Publish 1982 detailed data		Data to be submitted for publication in accordance with project 3015

391-84 Benchmark Basins Monitoring by WRB

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
S1	Benchmark Station		V

391-84 Benchmark Basins Monitoring by WRB

SAMPLING MATRIX

Parameter	Lab	STN S1	No. of samples
ALK_P	NAT	V	5
ALK_T	NAT	V	5
AS_D_D	NAT	V	5
B_D_D	REG	V	5
CA	NAT	V	5
CL	NAT	V	5
COLO_TR_R	REG	V	5
COND_L_R	REG	V	5
C_DO_L	REG	V	5
C_PO	REG	V	5
F	NAT	V	5
FE_E	NAT	V	5
K	NAT	V	5
MET_T	NAT	V	5
MG	NAT	V	5
MN_E	NAT	V	5
NA	NAT	V	5
NO23_L	REG	V	5
N_D_L	REG	V	5
N_P	REG	V	5
PH_F	REG	V	5
PH_L_R	REG	V	5
P_D_L	REG	V	5
P_T	REG	V	5
RES_NF	REG	V	5
SE_D_D	NAT	V	5
SIO2	NAT	V	5
SO4	NAT	V	5
TEMP_F	REG	V	5
TEMP_L_R	REG	V	5
TURB_L_R	REG	V	5

391-84 Benchmark Basins Monitoring by WRB

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	5		2.28	11.40	0.000
ALK_T	5		2.28	11.40	0.000
AS_D_D	5		4.28	21.40	0.001
B_D_D	5	0.12	4.96	24.80	0.000
CA	5		0.86	4.30	0.000
CL	5		1.14	5.70	0.000
COLO_TR_R	5	0.1	4.13	20.65	0.000
COND_L_R	5	0.05	2.07	10.35	0.000
C_DO_L	5	0.24	9.92	49.60	0.001
C_PO	5	0.2	8.26	41.30	0.001
F	5		5.42	27.10	0.001
FE_E	5		0.57	2.85	0.000
K	5		0.86	4.30	0.000
MET_T	5		23.94	119.70	0.003
MG	5		0.86	4.30	0.000
MN_E	5		0.57	2.85	0.000
NA	5		0.86	4.30	0.000
NO23_L	5	0.17	7.02	35.10	0.001
N_D_L	5	0.24	9.92	49.60	0.001
N_P	5	0.2	8.26	41.30	0.001
PH_F	5	0	0	0.00	0.000
PH_L_R	5	0.05	2.07	10.35	0.000
P_D_L	5	0.24	9.92	49.60	0.001
P_T	5	0.19	7.85	39.25	0.001
RES_NF	5	0.19	7.85	39.25	0.001
SE_D_D	5		4.28	21.40	0.001
SIO2	5		1.14	5.70	0.000
SO4	5		1.14	5.70	0.000
TEMP_F	5	0	0	0.00	0.000
TEMP_L_R	5	0	0	0.00	0.000
TURB_L_R	5	0.05	2.07	10.35	0.000
Regional Totals				421.50	0.008
National Totals				252.40	0.006

392-84 Interjurisdictional Monitoring by WRB

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
1 To conduct monthly or time of visit water quality sampling at the designated interjurisdictional locations.

2 To prepare the data collected from these sites for the detailed data reports.

RATIONALE
WQB has aresponsibility to measure the water quality of interjurisdictional river systems.

DESCRIPTION
Monthly or time of visit samples are collected for a wide spectrum of parameters. The governments concerned are notified of potential or real problems. The data are reviewed on an annual basis to assess the relative quality of the boundary streams.

COORDINATOR(S) - B. Olding

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.02		0.02
	PY Tech	0.07	0.02			0.09
	Salary	1.33	0.63			1.96
	O & M	0.91	0.43			1.34
	Capital	0.43	0.20			0.63
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.07	0.02	0.02		0.11
Total Dollars		2.67	1.26			3.93

392-84 Interjurisdictional Monitoring by WRB

INDICATORS - N/A
PRIORITY - Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Update project description	May	
2 Undertake fieldwork	ongoing	Time of visit sampling
3 Lab Analysis	ongoing	Reports due 8 weeks from date of receipt of samples
4 Data verification	ongoing	
5 Review data and complete validation for data report		scheduliong in accordance with Project 3015

392-84 Interjurisdictional Monitoring by WRB

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
49	Slave River at Fitzgerald	00AL07NB0001	V
50	Hay River near Highway # 5	00NW07OB0001	V
51	Liard River above Fort Simpson	00NW10ED0002	V
52	Liard River at Fort Liard	00NW10ED0001	

SAMPLING MATRIX

Parameter	Lab	STN 49	STN 50	STN 51	No. of samples
ALK_P	NAT	V	V	V	15
ALK_T	NAT	V	V	V	15
AS_D_L	NAT	V	V	V	15
B_D_D	REG	V	V	V	15
CA	NAT	V	V	V	15
CL	NAT	V	V	V	15
CN	REG	V	V	V	15
COLI_F_F	REG	V	V	V	15
COLI_T_F	REG	V	V	V	15
COLO_TR_R	REG	V	V	V	15
COND_F	REG	V	V	V	15
COND_L_R	REG	V	V	V	15
C_DO_D	REG	V	V	V	15
C_PO	REG	V	V	V	15
F	NAT	V	V	V	15
FE_D_L	NAT	V	V	V	15
HERB	NAT	V			5
K	NAT	V	V	V	15
MET_T	NAT	V	V	V	15
MG	NAT	V	V	V	15
MN_D_L	NAT	V	V	V	15
NA	NAT	V	V	V	15
NO23_D	REG	V	V	V	15
N_D_D	REG	V	V	V	15
N_P	REG	V	V	V	15
O2_D	REG	V	V	V	15
OC/PCB	NAT	V			5
PHENOL	REG	V			5
PH_F	REG	V	V	V	15
PH_L_R	REG	V	V	V	15
PIC	NAT	V			5
P_D_D	REG	V	V	V	15
P_T	REG	V	V	V	15
RES_NF	REG	V	V	V	15
SE_D_L	NAT	V	V	V	15
SIO2	NAT	V	V	V	15
SO4	NAT	V	V	V	15
TEMP_F	REG	V	V	V	15
TEMP_L_R	REG	V	V	V	15
TURB_L_R	REG	V	V	V	15

392-84 Interjurisdictional Monitoring by WRB

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	15		2.28	34.20	0.001
ALK_T	15		2.28	34.20	0.001
AS_D_L	15		4.28	64.20	0.002
B_D_D	15	0.12	4.96	74.40	0.001
CA	15		0.86	12.90	0.000
CL	15		1.14	17.10	0.000
CN	15	0.1	4.13	61.95	0.001
COLI_F_F	15	0	0	0.00	0.000
COLI_T_F	15	0	0	0.00	0.000
COLO_TR_R	15	0.1	4.13	61.95	0.001
COND_F	15	0	0	0.00	0.000
COND_L_R	15	0.05	2.07	31.05	0.001
C_DO_D	15	0.19	7.87	118.05	0.002
C_PO	15	0.2	8.26	123.90	0.002
F	15		5.42	81.30	0.002
FE_D_L	15		0.57	8.55	0.000
HERB	5		142.3	711.50	0.018
K	15		0.86	12.90	0.000
MET_T	15		23.94	359.10	0.009
MG	15		0.86	12.90	0.000
MN_D_L	15		0.57	8.55	0.000
NA	15		0.86	12.90	0.000
NO23_D	15	0.12	4.94	74.10	0.001
N_D_D	15	0.19	7.85	117.75	0.002
N_P	15	0.2	8.26	123.90	0.002
O2_D	15	0	0	0.00	0.000
OC/PCB	5		97.35	486.75	0.012
PHENOL	5	0.3	12.39	61.95	0.001
PH_F	15	0	0	0.00	0.000
PH_L_R	15	0.05	2.07	31.05	0.001
PIC	5		142.3	711.50	0.018
P_D_D	15	0.19	7.85	117.75	0.002
P_T	15	0.19	7.85	117.75	0.002
RES_NF	15	0.19	7.85	117.75	0.002
SE_D_L	15		4.28	64.20	0.002
SIO2	15		1.14	17.10	0.000
SO4	15		1.14	17.10	0.000
TEMP_F	15	0	0	0.00	0.000
TEMP_L_R	15	0	0	0.00	0.000
TURB_L_R	15	0.05	2.07	31.05	0.001
Regional Totals				1264.35	0.023
National Totals				2666.95	0.067

393-84 Nahanni National Park Monitoring Agreement

SUBMITTER - 0001
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing since April 1980

OBJECTIVES
To collect quarterly water samples from the Flat River to provide an overview of water quality characteristics.

RATIONALE
IWD has a cost sharing Agreement with Parks Canada for hydrometric work in Nahanni Park. Included in this is the requirement for water quality monitoring on the Flat River.

DESCRIPTION
Quarterly sampling is carried out by WRB at the hydrometric station on the Flat River. The Branch provides sampling material and preservatives to the NWT office.

COORDINATOR(S) - B. Olding

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.01		0.01
	PY Tech	0.01	0.01	0.01		0.03
	Salary	0.13	0.20	0.70		1.03
	O & M	0.09	0.13	0.50		0.72
	Capital	0.04	0.06			0.10
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total		0.01	0.01	0.02		0.04
Total Dollars		0.26	0.39	1.20		1.85

INDICATORS - B-1-A c
PRIORITY - Relative Rank 5, Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator

2 Parks Canada

ACTIVITIES/REPORTING CALENDAR
N/A

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
86	Flat River near mouth	00NW10EA0004	V

SAMPLING MATRIX

Parameter	Lab	STN 86	No. of samples
ALK_P	NAT	V	5
ALK_T	NAT	V	5
AS_D_L	NAT	V	5
B_D_D	REG	V	5
CA	NAT	V	5
CL	NAT	V	5
COLO_TR_R	REG	V	5
COND_F	REG	V	5
COND_L_R	REG	V	5
C_DO_D	REG	V	5
C_PO	REG	V	5
F	NAT	V	5
FE_D_L	NAT	V	5
K	NAT	V	5
MET_T	NAT	V	5
MG	NAT	V	5
MN_D_L	NAT	V	5
NA	NAT	V	5
NO23_D	REG	V	5
N_D_L	REG	V	5
N_P	REG	V	5
PH_F	REG	V	5
PH_L_R	REG	V	5
P_D_D	REG	V	5
P_T	REG	V	5
RES_NF	REG	V	5
SE_D_L	NAT	V	5
SIO2	NAT	V	5
SO4	NAT	V	5
TEMP_F	REG	V	5
TEMP_L_R	REG	V	5
TURB_L_R	REG	V	5

393-84 Nahanni National Park Monitoring Agreement

ANALYTICAL REQUIREMENTS

Parameter	No. of tests	TMU	Unit cost	Ext'd cost	Tech PY's
ALK_P	5		2.28	11.40	0.000
ALK_T	5		2.28	11.40	0.000
AS_D_L	5		4.28	21.40	0.001
B_D_D	5	0.12	4.96	24.80	0.000
CA	5		0.86	4.30	0.000
CL	5		1.14	5.70	0.000
COLO_TR_R	5	0.1	4.13	20.65	0.000
COND_F	5	0	0	0.00	0.000
COND_L_R	5	0.05	2.07	10.35	0.000
C_DO_D	5	0.19	7.87	39.35	0.001
C_PO	5	0.2	8.26	41.30	0.001
F	5		5.42	27.10	0.001
FE_D_L	5		0.57	2.85	0.000
K	5		0.86	4.30	0.000
MET_T	5		23.94	119.70	0.003
MG	5		0.86	4.30	0.000
MN_D_L	5		0.57	2.85	0.000
NA	5		0.86	4.30	0.000
NO23_D	5	0.12	4.94	24.70	0.000
N_D_L	5	0.24	9.92	49.60	0.001
N_P	5	0.2	8.26	41.30	0.001
PH_F	5	0	0	0.00	0.000
PH_L_R	5	0.05	2.07	10.35	0.000
P_D_D	5	0.19	7.85	39.25	0.001
P_T	5	0.19	7.85	39.25	0.001
RES_NF	5	0.19	7.85	39.25	0.001
SE_D_L	5		4.28	21.40	0.001
SIO2	5		1.14	5.70	0.000
SO4	5		1.14	5.70	0.000
TEMP_F	5	0	0	0.00	0.000
TEMP_L_R	5	0	0	0.00	0.000
TURB_L_R	5	0.05	2.07	10.35	0.000
Regional Totals				390.50	0.007
National Totals				252.40	0.006

394-84 Freshette Monitoring Activity

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1984/85

OBJECTIVES
To conduct intensive freshette sampling at sites where WRB undertakes high flow rating activities

RATIONALE
One of the most difficult but most important periods to monitor is the spring freshette. WRB conducts high flow rating measurements at selected sites. Their presence provides an opportunity to collect useful information in a cost-effective manner.

DESCRIPTION
The sampling and analytical program will be determined for each site, however, in general, WRB staff will undertake daily sampling for a variety of parameters. Samples will be taken under ice cover prior to the freshette and during the rising and falling stages of the hydrograph over the course of about two weeks.

COORDINATOR(S) - B. Olding

RESOURCES
N/A

INDICATORS - B-1-A i
PRIORITY - Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinator

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR
N/A

395-84 Tischu River Baseline Study

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1984/85

OBJECTIVES
To collect baseline aquatic quality data for the Tsichu River prior to the development of mining activities in the basin

RATIONALE
A mine is presently being developed within the basin. In order to assess whether or not the mining activities will affect the environment, baseline studies are essential.

DESCRIPTION
A joint study is proposed with DIAND, EPS, GNWT and DFO. Details of the study will not be available until mid-FY 84/85 due to the need to conduct a reconnaissance trip and undertake further discussions with other members of the study team. Some preliminary water quality work is planned in FY 84/85.

COORDINATOR(S) - B. Olding, D. Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.1		0.1
	PY Tech					
	Salary			4.0		4.0
	O & M			5.0		5.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.1		0.1
Total Dollars				9.0		9.0

INDICATORS - B-1-A i
PRIORITY - Sample Turnaround Time 60 Days

DISSEMINATION OF LABORATORY DATA REPORTS
1 Project Coordinators

2 WESTORE

3 NAQUADAT

ACTIVITIES/REPORTING CALENDAR
N/A

395-84 Tischu River Baseline Study

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Gregor	0.02	1.0	2	3.0
B. Olding	0.07	2.8	3	5.8
Total	0.09	3.8	5	8.8

396-84 NWT Monitoring Evaluation

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - April 1983 to March 1984

OBJECTIVES
To evaluate and summarize the activities in the NWT program and to develop a strategy for aquatic quality assessment in the NWT.

RATIONALE
In cooperation with WRB, the Branch monitors the quality of surface water at a number of locations in the NWT. While the project is assessed on an on-going basis, it is useful to periodically summarize the activities of the program, evaluate its effectiveness and recommend changes and alternatives.

DESCRIPTION
A total of 16 sites in the NWT have been monitored as part of several Branch projects during the past few years.

During 83/84 the program was briefly evaluated. Discussions were held with other agencies involved in the NWT (e.g. DIAND, GNWT, NWRI, DFO, etc.) and work on a draft NWT water quality strategy was begun. This strategy will be completed in 84/85 and, if approved, planning for implementation will begin. An outline of the strategy was prepared in FY 83/84.

COORDINATOR(S) - D. Gregor, B. Olding

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.15		0.15
	PY Tech					
	Salary			6.00		6.00
	O & M			4.00		4.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.15		0.15
Total Dollars				10.00		10.00

INDICATORS - B-1-A f
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Review of data and preparation of outline	April	This work was completed by March 31/84
2 Development of first draft of proposed strategy	April	First draft due by April 30/84
3 Internal review, discussion with WQB and others of strategy	May	
4 Revision and submission of final report to RD	June	To be submitted to RD by June 30/84

2.9 REPORTS

Projects undertaken by the Branch generally progress through four stages: planning, designing, implementing and reporting. Once in the reporting stage, no laboratory support is necessary but, a large amount of time is generally needed for writing and reviewing the final report. In order to better understand the amount of time necessary for the completion of the final phases of projects, a category has been created for projects which are in the reporting phase.

It is the policy of the Branch to make its data readily available and accessible to data users. To this end the Western and Northern Region publishes water quality data. Sometimes, the data user requires the data within a time frame that precludes the computer verification steps. In such instances, data reports are made available with the understanding that the data are provisional and subject to change. Within a reasonable period of time, the final data reports, which supercede any preliminary reports, are prepared and disseminated. Typically, data requests can be accomodated regionally by duplicating computer reports on file or by providing reports of published data. Complex data requests are referred to headquarters because of the charge-back policy of the Branch.

Most data publications include an alpha-numeric index and a map showing station locations. The data publications also include detection limits. The detection limits normally reflect the sensitivity routinely obtained using a given analytical procedure. These have been developed in one of three different ways, depending on the analytical technique. Listed in order of the method most frequently used, the detection limit is:

1 defined as two sigma, measured near the lower limits of the concentration attainable using a particular method;

2 defined with respect to the measuring instrument as being the concentration giving a S/N (sensitivity to noise) ratio of 2:1; or

3 is inferred from the slope of a plot of concentration versus instrument response.

In addition to making water quality data available to data users, the Branch also has a responsibility to assess and interpret data. At present, manpower is insufficient to allow the proper level of involvement with interpretive report writing. However, using monitoring data, the Western and Northern Region plans to prepare periodic interpretive reports with emphasis on interjurisdictional water systems.

The interpretive reports may be published regionally, in the national publication series, or in journals, depending on the audience. The Inland Waters Directorate publishing policy (Environment Canada, 1982) will be used as a guide for these publications.

The following is a list of the titles and numbers of the projects in the Reports Group:

3001 Souris River Nitrogen and Phosphorus Speciation
3002 Nutrient Quality of Interjurisd'l Waters in Man.
3003 Metal Quality of Interjurisd'l Waters in Man.
3004 Marmot Research Basin Study
3005 Comparison of Stream Sampling Methods
3006 Red and Souris River Nutrient Assessment
3007 Qu'Appelle Nutrient Loading Study
3008 Qu'Appelle River Periphyton Productivity Study
3009 Assessment of Bioaccumulation of Metals
3010 Evaluation of Sampling Methods Report
3011 Red River Automonitor Data Review
3012 Report on Field Quality Control
3013 Mercury Mobility Following Instream Dredging
3014 Development of a Biological Data Base
3015 Water Quality Data Reports

The complete descriptions for each of the above projects can be found on the pages that follow. Like special studies, all the projects in this group do not have a common subject and fit into several programs; specifically, 1.1 (Canada - U.S. and Interprovincial Waters), 1.3 (Water Quality Management Data) and 4.1 (Toxic Substances).

Project Descriptions:

3001-84 Souris River Nitrogen and Phosphorus Speciation

SUBMITTER - 0488
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - June 1979 to September 1984

OBJECTIVES
To determine the concentration and seasonal variation of nitrogen and phosphorus species in the Souris River.

RATIONALE
Implementation of the Garrision Diversion Scheme will result in diverting part of the Missouri River flow to the Souris and Red Rivers and eventually to Lake Wnnipeg. Runoff from the Garrision Diversion, or future irrigation schemes could modify nitrogen and phosphorus species in the Souris River. Future changes in the nitrogen and phosphorus species can only be determined if the present pattern is established.

DESCRIPTION
Samples were collected for the period August, 1979 to August, 1980 at approximately monthly intervals in addition to the routine monthly samples. The cross-section of the river was divided into grids from which 12 were randomly selected for sampling during each visit. The parameters measured were NH3, NO2, NO3, TDN, PN, TDON, TN, OP, TDP, PP, TOP, TP, PC and SS.

Study results were summarized in a draft report in 1982. Following a thorough review of this draft, the report is being completely revised with draft report completion scheduled for September, 1984.

COORDINATOR(S) - Chacko, Gregor

RESOURCES
N/A

3001-84 Souris River Nitrogen and Phosphorus Speciation

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Revise results and discussion sections of present draft	May	
2 Undertake additional data analysis	June	
3 Revise draft	June	Draft to be submitted by July 1/84
4 Internal review of first draft	August	
5 Revise draft	September	Internal Branch report to be completed by Oct. 1/84

3001-84 Souris River Nitrogen and Phosphorus Speciation

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
V. Chacko	0.06	1.9	1	2.9
D. Gregor	0.08	3.6	1	4.6
Total	0.14	5.5	2	7.5

3002-84 Nutrient Quality of Interjurisdictional Waters in Manitoba

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1980 to 1985

OBJECTIVES
To summarize, interpret and report on the nutrient data of the interjurisdictional river monitoring sites in Manitoba for the purpose of providing background information.

RATIONALE
The branch recognizes its responsibility to prepare summary and interpretive reports of its historical data base. These reports are primarily intended as background information for data users such as the interested public, scientific community, other government agencies and water resource managers.

DESCRIPTION
The nutrient data base for interjurisdictional river sites in Manitoba for the decade 1970 - 1979 are being summarized and interpreted. Discussion in the report will focus on the general nature and significance of spatial patterns and temporal trends as well as an overall evaluation of the data base. A first draft has been prepared and reviewed. Extensive revision of the report is in progress with a draft planned by April, 1984. This report is intended to serve as a guide for other parameter groups in this and other districts and, as such, will be extensively reviewed and evaluated by the Branch and selected reviewers with respect to the ability of this type of report to meet the needs of its target audience.

COORDINATOR(S) - Chacko, Gregor

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.15		0.15
	PY Tech					
	Salary			6.00		6.00
	O & M			2.00		2.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.15		0.15
Total Dollars				8.00		8.00

3002-84 Nutrient Quality of Interjurisdictional Waters in Manitoba

INDICATORS - B-3-A c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Complete draft report	April	
2 Internal review of draft	May	
3 Revise draft report	June	Draft to be completed by July 1/84
4 Internal and external review of draft	Sept.	
5 Final revision of draft report	Oct.	Second ddraft to be completed by Nov. 1/84
6 Report on merits of this report format to the Branch Chief	Jan.	Report due Jan. 31/85 so recommendations can be incorp. in 85/86 workpla

3002-84 Nutrient Quality of Interjurisdictional Waters in Manitoba

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
V. Chacko	0.05	2.0	1	3.0
D. Gregor	0.10	4.5	2	6.5
Total	0.15	6.5	3	9.5

3003-84 Metal Quality of Interjurisdictional Waters in Manitoba

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1983 to 1985

OBJECTIVES
To summarize, interpret and report on the metal quality of interjurisdictional river monitoring sites in Manitoba

RATIONALE
The Branch recognizes its responsibility to prepare summary and interpretive reports of its historical data base. These reports are primarily intended as background information for data users such as the interested public, scientific community, other government agencies and water resource managers.

DESCRIPTION
The historical metals data base for interjurisdictional sites in Manitoba will be summarized and interpreted along the lines of the format developed in the corresponding nutrient report. The format will, however, be discussed with the province of Manitoba for the purpose of investigating the feasibility of preparing a report jointly with the province on the combined data set. This report is intended to parallel the nutrient report outlined in Project 3002. Therefore, this metals report wil be postponed during FY 84/85 while the nutrient report is being evaluated.

COORDINATOR(S) - Chacko, Gregor

RESOURCES
N/A

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

3004-84 Marmot Research Basin Study

SUBMITTER - 0020
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1963 to Sept. 1984

OBJECTIVES
To determine if the clearcutting activities which took place in Cabin Creek Basin during 1974 and 1975 had an effect on the quality of Cabin Creek.

RATIONALE
As part of the Alberta Watershed Research Program, the Water Quality Branch was asked to undertake a study to determine the effects on stream water quality of forest cover manipulation in Marmot Creek Basin.

DESCRIPTION
Data collection in the Marmot Basin terminated in 78/79. During 83/84 a draft report describing the effect of the clearcutting was prepared and reviewed internally. During 84/85 the final report will be prepared. In addition a paper discussing the methods of assessing long term data sets will be prepared and presented at the CHS symposium in June.

COORDINATOR(S) - Block

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.20		0.20
	PY Tech			0.05		0.05
	Salary			9.50		9.50
	O & M			3.00		3.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.25		0.25
Total Dollars				12.50		12.50

3004-84 Marmot Research Basin Study

INDICATORS - B-3-A a
PRIORITY - N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Prepare draft for external review	May	Allow June-July for comments
2 Prepare final draft	Aug	Allow Sept for comments
3 Publish report	Oct	
4 Prepare paper "Evaluating Long-Term Water Quality Data Sets"	May 1	Will require comments by May 15
5 Present paper at CHS	June	

3005-84 Comparison of Stream Sampling Methods

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - May 1982 to March 1985

OBJECTIVES
Comparison of sampling methods for nutrients and other parameters in terms of load and trend in river systems of the region.

RATIONALE
Over the past decade, a variety of sampling methods have been used by the Water Quality Branch in W & NR. These methods including (1) the continuous (one sample per every 8 hours) sampling using an autosampler, (2) replicate periodic sampling and (3) monthly routine sampling. Their respective merits and limitations need to be evaluated relative to a variety of objectives.

DESCRIPTION
Since sampling is a major concern of the Branch, and the data are already available, these data will be evaluated in terms of nutrient load and trend. Statistical tests, such as comparison of the means, and variance and regression analysis, etc., shall be used in comparing the data. The data need to be carefully reviewed and an appropriate method(s) developed and employed to undertake the comparison.

COORDINATOR(S) - Gregor, Chacko

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.1		0.1
	PY Tech					
	Salary			4.0		4.0
	O & M			10.0		10.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.1		0.1
Total Dollars				14.0		14.0

3005-84 Comparison of Stream Sampling Methods

INDICATORS - C-1-A e
PRIORITY - N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Organize data	August	
2 Identify appropriate contractors and prep contract specificati	September	
3 Initiate contract to complete work	Oct	

3005-84 Comparison of Stream Sampling Methods

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Gregor	0.06	2.7	10	12.7
V. Chacko	0.04	1.4	0	1.4
Total	0.10	4.1	10	14.1

3006-84 Red and Souris Rivers Nutrient Assessment

SUBMITTER - 0401
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
Assess baseline conditions and the presence of trends for nitrogen and phosphorus in the Red and Souris Rivers at the international border.

RATIONALE
The International Garrision Diversion Study Board in its report to the U.S. and Canadian Governments (1976) indicated that T.D.S., sulphates, hardness, sodium, phosphorous and nitrates would have the most adverse effect on Lake Manitoba and Lake Winnipeg. The Board also expressed concern about the very limited data base for nitrogen. Based on these concerns and based on the Branch mandate for assessing the water quality at the U.S. - Canada border, the Branch initiated a long term DN, PN and TP study in the Red River at Emerson and Souris River near Coulter.

DESCRIPTION
Two automatic samplers collected samples at a frequency of every eight hours from July, 1979 to September, 1982. The samples were refrigerated on site and delivered to the lab where they were composited to provide daily samples. Additional sampling was undertaken as part of a quality evaluation exercise of the composited samples. Routine monthly monitoring was conducted throughout this period as well as intensive monthly cross-sectional sampling over a 12 month period. The data were verified and entered on Naquadat. During 1983/84 the data were reviewed and statistically summarized.

No work will be undertaken on this project during 84/85 due to the heavy workload of the coordinators unless an appropriate contractor can be identified.

COORDINATOR(S) - Gregor, Chacko

RESOURCES
N/A

INDICATORS - C-1-A e
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

STATION LIST

Map no.	Station location	NAQUADAT no.	Sampling frequency
12	Souris River at Coulter	00MA05NF0001	V
15	Red River at Emerson	00MA05DC0001	V

3006-84 Red and Souris Rivers Nutrient Assessment

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
V. Chacko	0.15	6.0	4	10.0
D. Gregor	0.04	1.6	1	2.6
R. Guilbault	0.01	0.4	-	0.4
Total	0.20	8.0	5	13.0

3007-84 Qu'Appelle Nutrient Loading Study

SUBMITTER - 0138
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - April 1980 to June 1984

OBJECTIVES
To determine if management strategies to abate pollution in the Qu'Appelle River Basin correspond with a quantifiable reduction in nutrient loading to and from the Fishing Lakes.

RATIONALE
As part of the Qu'Appelle Implementation Agreement considerable money and effort have been spent to reduce the phosphorus load to the Qu'Appelle Lakes, in the hopes reducing the rate of eutrophication. Unfortunately, no provisions were made to evaluate changes in water quality. Subsequently, the WQB, under agreement to the Board, agreed to study trends in nutrient loading to and from the Fishing Lakes.

DESCRIPTION
Water samples for nutrient analsis were collected at the hydrometric station above and below the Fishing Lakes from April, 1980 to June 1983. Using these results and the WRB flow data, loading into and out of the lakes will be calculated and trends and characteristics assessed. Historical nutrient data from various sources will also be gather to assess the change in nutrient quality of the Qu'Appelle River as a result of nutrient management practices. During 1984/85 the final report will be completed.

COORDINATOR(S) - Munro

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.16		0.16
	PY Tech					
	Salary			5.80		5.80
	O & M			0.50		0.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.16		0.16
Total Dollars				6.30		6.30

INDICATORS - B-3-A a
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
Project Coordinator(s)

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Review second draft	April	
2 Prepare final draft	May	Final draft to be completed by June

3007-84 Qu'Appelle Nutrient Loading Study

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Munro	0.10	3.4	0.5	3.9
D. Gregor	0.05	2.0	-	2.0
R. Guilbault	0.01	0.4	-	0.4
Total	0.16	5.8	0.5	6.3

3008-84 Qu'Appelle River Periphyton Productivity Study

SUBMITTER - 0482
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - April 1980 to May 1984

OBJECTIVES
To investigate periphyton productivity in the Qu'Appelle River to assess the nutrient quality of the river and to evaluate the use of periphyton as a biomonitoring within the region.

RATIONALE
As part of the Regional Biomonitoring Program, regional assessment of biomonitoring methods is required. This project assesses the use of periphyton productivity biomonitoring and gives information about the nutrient quality of the Qu'Appelle River.

DESCRIPTION
Two stations were extablished on the Qu'Appelle River, above and below the Fishing Lakes. Periphyton were collected during 1980 and 1981 using artificial substrates. Samples were collected 1, 2, and 3 weeks after the substrates were placed in the river to provide a measurement of the rate of productivity of a well-established mat of periphyton. Samples were analyzed for chlorophyll - a, and ash free weight. A report will be completed during 1984-85

COORDINATOR(S) - D. Munro

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.11		0.11
	PY Tech					
	Salary			3.80		3.80
	O & M			0.50		0.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.11		0.11
Total Dollars				4.30		4.30

* Affiliated ECS Program(s) - 1.1

INDICATORS - B-3-A a
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Prepare final report	May	Report to be completed by May 1984

PERSONYEAR BREAKDOWN

Py	Sal	O & M	Total $	
D. Munro	0.10	3.4	0.5	3.9
D. Gregor	0.01	0.4		0.4
Total	0.11	3.8	0.5	4.3

3009-84 Assesment of Bioaccumulation of Metals

SUBMITTER - N/A
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - April 1 to June 1 1984

OBJECTIVES
To examine the use of clam and sport fish population as a tool for assessing the presence of metals in the aquatic environment.

RATIONALE
As part of the Regional Biological Monitoring Program some regional assessment of biomonitoring methods are required. This project is to assess the use of clams and fish as indicators of contaminants and their possible use as a biomonitoring tool. In addition, the study gives information on the presence of contaminants in the Qu'Appelle and Montreal Rivers.

DESCRIPTION
During the summer of 1978, selected tissues of clams and of four fish species were monitored for the bioaccumulation of PCB's, chlorinated hydrocarbons (insecticide group), Hg, Se, As, Cd, Cu and Pb. The results of this assessment were presented at the PAR Conference in 1981. Based on the results of the metal analysis, two draft reports were initiated but never completed. These metal reports will be redrafted to produce a final report.

COORDINATOR(S) - D. Munro

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.12		0.12
	PY Tech					
	Salary			4.20		4.20
	O & M			0.50		0.50
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.12		0.12
Total Dollars				4.70		4.70

* Affiliated ECS Program(s) - 4.1

3009-84 Assesment of Bioaccumulation of Metals

INDICATORS - B-3-A a
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Prepare Final Draft reports	June	
2 Submit final drafts for review	June	

3009-84 Assesment of Bioaccumulation of Metals

PERSONYEAR BREAKDOWN

Py	Sal	O & M	Total $	
D. Munro	0.10	3.4	0.5	3.9
D. Gregor	0.02	0.8		0.8
Total	0.12	4.2	0.5	4.7

3010-84 Evaluation of Sampling Methods

SUBMITTER - 0494
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - April 1980 to October 1984

OBJECTIVES
To compare the results obtained using present Branch sampling techniques to those obtained using the equal discharge increment method.

RATIONALE
Metals, nutrients and organics are important in Branch programs and may be influenced by the presence of suspended sediment. Since the present sampling techniques were not designed to collect representative suspended sediment samples, the technique needs to be evaluated.

DESCRIPTION
An accepted procedure for collecting suspended sediment is the equal discharge increment (EDI) method. For this study, the EDI method will be compared to present Branch methods. The field work for the study was carried out in FY 80/81. During 83/84 the interpretation of the data was undertaken and a draft of the report was completed. During 84/85 the final report will be completed and published.

COORDINATOR(S) - Block

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	TOTALS
A Base	PY Prof			0.09		0.09
	PY Tech			0.05		0.05
	Salary			4.70		4.70
	O & M			2.00		2.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.14		0.14
Total Dollars				6.70		6.70

* Affiliated ECS Program(s) - 1.1, 4.1

3010-84 Evaluation of Sampling Methods

INDICATORS - B-3-A a
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Internal review of draft report	May	
2 Preparation of report for external review	June	Allow July-Aug for comments
3 Review of comments from external review	September	
4 Revision and submission of final report for publication	October	

3011-84 Red River Automonitor Data Review

SUBMITTER - 0003
ECS PROGRAM - 1.1 - Interjurisdictional Water Management
DURATION - 1984/85

OBJECTIVES
To enter all Red River automonitor data on the Branch computer, evaluate this data and prepare a detailed report outline.

RATIONALE
Under International Joint Commission (IJC) directives, the Water Quality Branch operates a continuous water quality monitor on the Red River at Emerson. Along with the continuous monitor data, monthly samples are collected. After 13 years, a large data base is available and the assessment of these data is a priority of the Branch.

DESCRIPTION
Since 1971, the Branch has operated a continuous monitor at Emerson, Manitoba. Parameters measured are: DO, pH, conductivity, chlorides and temperature. With very few exceptions, the monitor has operated on a continuous basis; acquiring more than 95% of the intended data base. This data base is not only useful in evaluating IJC objectives but is valuable in assessing the water quality of the Red River during this period. These data will be entered on the Branch computer and a detailed report outline will be prepared for interpreting the many years of continuous data.

COORDINATOR(S) - D. Gregor, V. Chacko

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.15		0.15
	PY Tech			0.05		0.05
	Salary			7.75		7.75
	O & M			3.00		3.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.20		0.20
Total Dollars				10.75		10.75

3011-84 Red River Automonitor Data Review

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Enter data into computer	August	
2 Data evaluation and assessment	Oct. 1	
3 Draft outline	Oct. 1	Including recommendations and reasoning for statistical procedures
4 Finalization of detailed draft outline	Feb.	

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
V. Chacko	0.10	3.50		3.50
D. Gregor	0.05	2.25	1	3.25
R. Woychuk	0.05	1.50		1.50
Student	0.10	2.00		2.00
Total	0.30	9.25	1	10.25

3012-84 Report on Field Quality Control

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - 1984 April to 1985 March

OBJECTIVES
The objectives of this report is to estimate the precision of the water quality measurements made over the last few years and to investigate any cases of particularly poor precision in order to identify ways of improving the precision of the data the Branch produces.

RATIONALE
The Branch is committed to providing the best data on water quality that it can practically achieve. However running an operational quality control project is not effective without a periodic evaluation of the data and audit of the project.

DESCRIPTION
The report will cover the data collected under project 330 since its inception. The treatment will follow that used in the paper "Initial Quality Control Results from a Canadian Water Quality Assessment Network" presented to the Third Biennial Plains Aquatic Research Conference.

COORDINATOR(S) - Guilbault

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.2		0.2
	PY Tech					
	Salary			8.0		8.0
	O & M			1.0		1.0
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.2		0.2
Total Dollars				9.0		9.0

3012-84 Report on Field Quality Control

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Report outline	August	
2 Data analysis completed	October	
3 Draft completed	December	
4 Final report printed	March	Timing is dependent on extent of revisions

3013-84 Mercury Mobility Following Instream Dredging

SUBMITTER - 0003
ECS PROGRAM - 4.1 - Toxic Chemicals
DURATION - March 1982 to June 1984

OBJECTIVES
To determine if dredging of Thunder Creek at Moose Jaw, Saskatchewan resulted in mobilization of mercury to recieving waters during the annual high flow spring period.

RATIONALE
A similar study was conducted in the spring of 1979 at which time mercury transport was observed and attributed to the erosion of contaminated deposits in Thunder Creek. Dredging of Thunder Creek commenced September 14, 1981. Using the 1979 data base, a comparison will be made to the results from the 1982 spring runoff period.

DESCRIPTION
Depth integrated samples were collected daily from three locations in the Moose Jaw River Basin during spring run-off, 1982. The samples were analyzed for total mercury, dissolved mercury, and NFR. In addition, WRB analyzed samples for total suspended solids and particle size distribution, and proved daily discharges for the Moose Jaw River sites. The results of the 1982 work were compared to data gathered during 1979.

COORDINATOR(S) - Crosley

RESOURCES
N/A

3013-84 Mercury Mobility Following Instream Dredging

INDICATORS - A-1-A i
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Revise second draft	June 15/84	
2 Submit for publication	July 15/84	

3014-84 Development of a Biological Data Storage System

SUBMITTER - N/A
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - April 1984 to March 1985

OBJECTIVES
To develop a computerized data storage system and procedure for storing data generated from biological studies conducted by the Water Quality Branch in the Region.

RATIONALE
The Water Quality Branch in the Western and Northern Region believes that all the data generated in the Region should be electronically stored. With the increasing emphasis being placed on biological monitoring in the Region, an increasing volume of biological data is being generated. This data does not lend itself to computerized storage by the methods presently in use for storage of water chemistry data, therefore a storage procedure for biological data must be developed.

DESCRIPTION
There are three steps in the development of the facility to store biological information. The first is the preparation of a parameter code dictionary. The second is the development of a data entry procedure since existing software is inadequate. The final step is documenting the facility for use.

COORDINATOR(S) - Dave Munro and Ray Guilbault

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.08		0.08
	PY Tech					
	Salary			3.00		3.00
	O & M			0.20		0.20
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.08		0.08
Total Dollars				3.20		3.20

INDICATORS - N/A
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Develop a Parameter Code Dictionary	December	
2 Develop a Storage Procedure	January	
3 Prepare Procedure Documentation	February	

3014-84 Development of a Biological Data Storage System

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
D. Munro	0.03	1	0.2	1.2
R. Guilbault	0.05	2		2.0
Total	0.08	3	0.2	3.2

3015-84 Water Quality Data Reports

SUBMITTER - 0003
ECS PROGRAM - 1.3 - Water Quality Management Data
DURATION - Ongoing

OBJECTIVES
To publish detailed water quality data reports for Alberta, Saskatchewan, Manitoba and the Northwest Territories.

RATIONALE
Data from the Branch monitoring measurement and assessment programs should be made readily available to data users, including the public, the scientific community and other government agencies.

DESCRIPTION
Data from monitoring, measurement and assessment programs are verified and stored on NAQUADAT. These data are published on a semi-annual basis in provincial and territorial data reports.

COORDINATOR(S) - Block (Alta & NWT), Crosley (Sask), Chacko (Man)

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof			0.20		0.20
	PY Tech			0.14		0.14
	Salary			12.60		12.60
	O & M			12.00		12.00
	Capital					
Recov.	PY Prof					
	PY Tech					
	Salary					
	O & M					
	Capital					
PY Total				0.34		0.34
Total Dollars				24.60		24.60

INDICATORS - B-3-A c
PRIORITY - N/A

DISSEMINATION OF LABORATORY DATA REPORTS
N/A

ACTIVITIES/REPORTING CALENDAR
N/A

2.10 MISCELLANEOUS

Because the Water Quality Branch is involved in a wide range of projects not all fit into the previous eight groups. As a result, a Miscellaneous group was created to handle the remaining projects.

The numbers and names of the projects in the Miscellaneous Group are as follows:

3098 Electronic Data Processing Coordination

The following pages contain a complete description for the above project. This project fits into ECS Program 1.3, Water Quality Management Data.

Project Descriptions:

3098-84 Electronic Data Processing Coordination

SUBMITTER - 0501
ECS PROGRAM - 1.3* - Water Quality Management Data
DURATION - Ongoing since 1980

OBJECTIVES
To coordinate EDP activities within the Branch to ensure the orderly implementation and operation of EDP facilities.

RATIONALE
The Western and Northern Region Water Quality Branch is expanding its use of electronic data processing to enhance its data management and interpretation capabilities. In order to coordinate these activities, and attempt to see that the Branch EDP resources are used effectively, this project has been established as an umbrella.

DESCRIPTION
This project covers those electronic data processing (EDP) activities which are not project specific. The operation, maintenance, development and management of the Branch's EDP resources are overhead activities in that they benefit all projects which use EDP resources. The recoverable PY's shown in the Resources table cover summer student and Environment 2000 support.

COORDINATOR(S) - Guilbault

RESOURCES

Category		Nat Lab	Reg Lab	Field	Admin.	Totals
A Base	PY Prof		0.1	1.10	0.05	1.25
	PY Tech		0.5			0.50
	Salary		17.0	43.50	2.50	63.00
	O & M			84.80		84.80
	Capital			43.00		43.00
Recov.	PY Prof					
	PY Tech			0.73		0.73
	Salary			13.30		13.30
	O & M					
	Capital					
PY Total			0.6	1.83	0.05	2.48
Total Dollars			17.0	184.60	2.50	204.10

* Affiliated ECS Program(s) - 1.1, 4.1

3098-84 Electronic Data Processing Coordination

INDICATORS - B-3-B a, b, c, d, e, f B-2-A c, e
PRIORITY - N/A

ACTIVITIES/REPORTING CALENDAR

Milestone	Timing	Comments
1 Prepare appropriate planning documents	November	Timing is dependent on request from CASD
2 Have this project evaluated by third party	December	
3 Prepare action plan based on above evaluation	March	
4 Develop or revise four software packages	March	
5 Prepare EDP procedural guidelines and standards	March	
6 Provide computer services	Daily	This covers the daily operation of the VAX
7 Send verified data to NAQUADAT	Quarterly	
8 Provide data reporting capabilities according to revised format	August	

EXTENDED DESCRIPTION

The Water Quality Branch in the Western and Northern Region has historically used electronic data processing for two primary functions. These are the dissemination and the analysis of water quality data. The growth of electronic data processing in the Branch is fed by the need for increased computing power arising from the evolution of the Branch mandate. There is an ongoing effort to improve the Branch's information management capability in order to increase its relevancy by providing more timely and complete water quality information.

There are four application areas which can be defined for the Branch's automation efforts.

1. Acquisition of Data The goal in this area is to reduce the personpower required for acquiring data from lab and field instruments by automating the process to the maximum extent possible.

2. Storage and Dissemination of Data The application of EDP in this area was recognized when the National Water Quality Data Bank (NAQUADAT) was conceived. However, not all the data produced by the Water Quality Branch, Western and Northern Region, are suitable for storage on NAQUADAT. A regional data bank has therefore been established in parallel to NAQUADAT to store this data. The regional data bank is known as WESTORE.

3. Statistical Analysis of Data The requirement for the computer in this area is self-evident given the quantities of data and the complexity of the analyses involved.

4. Management Information This area includes lab management, quality control and remote instrument malfunction detection. It is also hoped that better and more timely access to the data will improve project management.

The Branch computer is a VAX - 11/750 midicomputer with 2 megabytes of primary memory, 131 megabytes of on-line disk memory, a 9-track, dual density, magnetic tape drive and 16 serial communication ports. The communication ports are used for printers, printer/plotters, terminals (some with slave printers) and remote communication devices (DATAPAC packet switchers, autodialing and autoanswering modems). System software consists of the VMS operating system and a FORTRAN language compiler.

The primary application package on the Branch computer is RS/1. RS/1 is a data handling and analysis tool as well as a programming language.

All Branch EDP activities will conform to the relevant policies and regulations.

The following is a list of software development tasks which will be undertaken this fiscal year. The resources required to complete these tasks are included in the Resources table.

1. CRIS - Revision to WESTORE interface
2. WESTORE - Implementation of RMS data structure
3. WESTORE - Detailed and summary reports
4. WESTORE - User's and programmer's documentation
5. Terminal support in RS/1 and PEN
6. SYSTEM/140 - Revision of monthly report format
7. SYSTEM/140 - Review and evaluation of data structure design
8. LABDAT - Multi-user capability
9. Computer resources accounting

There are a number of other software development tasks which have been identified as high priority but for which resources are not available. These tasks are listed below in order of precedence so as to indicate which ones would be taken up if resources were to become available.

1. WESTORE - Implementation of audit trails when facility is available in VMS
2. LABDAT - Further automation of sample login
3. LABDAT - Data acquisition from lab instruments
4. LABDAT - Programmer's documentation
5. SYSTEM/140 - Programmer's documentation

All of the above software tasks are further described in a document entitled "New Software Development Required" which is available to Branch personnel from the Data Interpretation Officer. This document also lists a number of medium and low priority tasks.

In addition to development tasks there are several other EDP tasks which will be carried out this fiscal year.

1. Operating the VAX-11/750 including

   a) Supervising hardware and software maintenance contracts

   b) Operating peripheral equipment such as disk and tape drives and printers

   c) Dissemination of printed output

   d) Performing information archiving, dearchiving and backup routines

2. Maintaining software which was previously developed by the Branch

3. Managing this project including

   a) Preparing policies

   b) Preparing budget estimates and plans

   c) Reporting EDP resources use

   d) Evaluating project effectiveness

4. Helping users make effective use of the EDP facilities

5. Data entry

The planned level of output for the EDP project for this fiscal year is contingent on our having student and or contract person-based support.

3098-84 Electronic Data Processing Coordination

PERSONYEAR BREAKDOWN

Person	Py	Sal	O & M	Total $
Gummer	0.05	2.5	0.0	2.5
Gregor	0.10	4.5	0.0	4.5
Gaskin	0.10	4.5	0.0	4.5
Guilbault	0.80	32.0	82.8	114.8
McNaughton	0.10	3.5	2.0	5.5
Munro	0.10	3.5	0.0	3.5
Lab techs	0.50	12.5	0.0	12.5
Students	0.73	13.3	0.0	13.3
Totals	2.48	76.3	84.8	161.1

3.0 SUMMARY

The activities of the Branch can be organized into 71 individual projects. These projects can be organized into ten different groups. Each of these groups contributes to the achievement of one or more of the four ECS National Programs in which the Branch participates.

The programs of the Water Quality Branch continue to evolve in response to changing government priorities, new management and conservation strategies, and new technological and scientific information. In addition to providing advice on aspects relating to environmental quality, the WQB conducts monitoring and studies the physical, chemical and biological components of the environment. Emphasis is placed on characterizing existing environmental conditions, detecting pollutants and pollution events, and on the determination of trends in environmental quality.

The WQB focusses its attention primarily on interjurisdictional waters. WQB activities on interprovincial waters is generally restricted to sites where federal-provincial agreements are in place. Intrerjurisdictional aquifers and their quality will receive increasing attention in the next few years. Biomonitoring and sediment monitoring strategies are being developed and will become important components of toxic substances and eutrophication studies. Federal-provincial discussions are taking place regarding the philosophy and establishment of water quality objectives and the formalization of water quality agreements. As a result, during the next few years, the programs of the Water Quality Branch could take on new dimensions, particularly with respect to water quality objectives and surveillance activities.

4.0 REFERENCES

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APPENDIX A

WATER QUALITY MONITORING STATIONS BY PROVINCE

MANITOBA

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
11	Antler River at Coulter	00MA05NF0009	1.3	304	A
12	Souris River at Coulter	00MA05NF0001	1.3	304, 307	A
13	Badger Creek near Cartwright	00MA05DA0003	1.3	304	A
14	Pembina River at Windygates	00MA05DB0001	1.3	304	A
15	Red River at Emerson	00MA05DC0001	1.1	306, 307	A
16	Roseau River at Gardenton	00MA05DD0001	1.3	304	A
17	Pine Creek Div. at Hwy. 89	00MA05CD0012	1.3	304	A
18	Gainsborough Ck. at Hwy. 83	00MA05NF0005	1.3	304	A
19	Pipestone Creek 0.8 km from Cromer	00MA05NG0013	1.3	304	A
20	Winnipeg River near Pointe du Bois	00MA05PF0022	1.3	304	A
21	Manigotagan River at Hwy. 304	00MA05RA0004	1.3	304	A
32	Sask. River above Carrot River	00MA05KH0001	1.3	307	A
56	Swan River at Hwy. 10	00MA05LE0002	1.3	301	A
57	Woody River at Hwy. 10	00MA05LE0003	1.3	301	A
58	Overflowing River	00MA05UH0001	1.3	301	A

	at Hwy. 10				
59	Nelson River near mouth	00MA05UH0001	1.3	301	A
60	Hayes R. below junction with God's River	00MA04AB0001	1.3	301	A
61	Churchill River above Red Head Rapids	00MA06FD0002	1.3	301	A
62	Cochrane River near Brochet	00MA06DA0001	1.3	301	A

SASKATCHEWAN

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
7	E. Poplar R. at Int'l Boundary	00SA11AE0008	1.3	304, 307	A
8	Long Creek South of Torquay	00SA05NA0002	1.3	304	A
9	Long Creek near Noonan	00US05NB0001	1.3	304	A
10	Souris R. near Glen Ewen	00SA05ND0001	1.3	304	A
25	Churchill River below Wasawaksik Lake	00SA06EA0003	1.1	315	A
26	N. Saskatchewan River at Hwy. 3	00SA05EF0001	1.1	315	A
27	Carrot River at Turnberry	00SA05KH0002	1.1	315	A
28	Battle River near Unwin	00SA05FE0001	1.1	315	A
29	Red Deer River near Erwood	00SA05LC0001	1.1	315	A

30	Qu'Appelle R. 3.2 km south of Welby	00SA05JM0014	1.1	315	A
31	Assiniboine River at Hwy. 8	00SA05MD0002	1.1	315	A
52	Battle Creek near Inter. Boundary	00SA11AB0005	1.3	301	A
53	Frenchman R. at 49th Parallel	00SA11AC0002	1.3	301	A
54	Lodge Creek near Willow Creek	00SA11AB0007	1.3	301	A
63	Douglas R. below confluence with Cluff Creek	00SA07MA0001	1.1	312	A
64	Fond du Lac R. at Outlet of Black L.	00SA07LC0001	1.1	312	A
66	Geike R. below confluence with Wheeler River	00SA06DA0001	1.1	312	A
67	Churchill River at Otter Rapids	00SA06CD0001	1.1	312	A
68	Churchill River near Patuanak	00SA06BB0004	1.1	312	A
87	Birch River below Cumberland Marshes Dam	00SA05KH0004	1.1	312	A
88	Dragline Channel below control structure	00SA05KH0003	1.1	312	A
92	Qu'Appelle River below Loon Creek	00SA05JK0003	1.3	3007	D
93	Qu'Appelle River below Katepwa L.	00SA05JL0001	1.3	3007	D
95	S. Saskatchewan R. near Leader	00SA05HB0002	4.1	374	A

96	S. Saskatchewan R. near Lemsford	00SA05HB0001	4.1	374	A

ALBERTA

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
1	Milk River at East Crossing of Int'l Boundary	00AL11AA0003	1.3	304	A
2	Milk River at West Crossing of Int'l Boundary	00AL11AA0002	1.3	304	A
3	North Milk R. at Int'l Boundary	00AL11AA0001	1.3	304	A
4	St. Mary's River near Int'l Boundary	00AL05AE0001	1.3	304	A
5	Belly River at Hwy. 6	00AL05AD0060	1.3	304	A
6	Waterton River at Hwy. 6	00AL05AD0005	1.3	304	A
22	S. Saskatchewan River at Hwy. 41	00AL05AK0001	1.1	315	A
23	Red Deer River near Bindloss	00AL05CK0001	1.1	315,374	A
24	Beaver River at Beaver Crossing	00AL06AD0001	1.1	315	A
33	Oldman River at Hwy. 36 Bridge	00AL05AG0001	1.3	310	A
34	Oldman River above Lethbridge	00AL05AD0002	1.3	310	A
35	Bow River near mouth	00AL05BN0001	1.3	310	A

36	Bow River at Cochrane	00AL05BH0017	1.3	310	A
37	Red Deer River near Drumheller	00AL05CE0001	1.3	310	A
38	Red Deer River above Red Deer	00AL05CC0004	1.3	310	A
39	N. Saskatchewn River at Devon	00A105DF0008	1.3	310	A
40	N. Saskatchewan R. at Pakan Bridge	00AL05EC0005	1.3	310	A
41	Athabasca River at Athabasca	00AL07BE0001	1.3	310	A
42	Smoky River at Watino	00AL07GJ0001	1.3	311	A
43	Peace River at Dunvegan Bridge	00AL07FD0002	1.3	311	A
44	Bow R. at Hwy. 1 above Lake Louise	00AL05BA0011	1.3	314	A
45	Bow River 4.5 km above Canmore	00AL05BE0013	1.3	314	A
46	N. Saskatchewan River at Whirlpool Point	00AL05DA0001	1.3	314	A
47	Athabasca R. at Athabasca Falls	00AL07AA0015	1.3	314	A
48	Athabasca River at Hwy. 16 below Snaring River	00AL07AA0023	1.3	314	A
49	Slave River at Fitzgerald	00AL07NB0001	1.3	301	A
89	Brewster Creek near mouth	00AL05BB0009	1.3	305	A
94	N. Saskatchewan R. at Lea Park	00AL05EF0001	1.1	315	A

NORTHWEST TERRITORIES

Map No.	Station Location	NAQUADAT Number	ECS Program	Project Number	Status
50	Hay River near Highway 5	00NW07DB0001	1.3	392	A
51	Liard River above Fort Simpson	00NW10ED0002	1.3	392	A
70	Mackenzie R. near Fort Providence	00NW10FB0001	1.3	390	A
71	Camsell R. at Outlet of Clut L.	00NW10JA0001	1.3	390	A
72	Coppermine R. at outlet of Pt. L.	00NW10PB0001	1.3	390	A
73	Tree River near mouth	00NW10QA0001	1.3	390	A
74	Ellice River near mouth	00NW10QD0001	1.3	390	A
75	Back River below Deep Rose Lake	00NW10RC0001	1.3	390	A
76	Great Bear River at outlet of Great Bear Lake	00NW10JC0001	1.3	390	A
77	Mackenzie River at Norman Wells	00NW10KA0003	1.3	390	A
78	Anderson River above Carnath R.	00NW10NC0001	1.3	390	A
79	Mackenzie River above Arctic Red River	00NW10LA0003	1.3	390	A
80	Peel River above Fort ~~Simpson~~ Macpherson	00NW10MC0002	1.3	390	A
81	Quoich River near	00NW06MB0001	1.3	390	A

	Baker Lake				
82	Kazan River above Kazan Falls	00NW06LC0001	1.3	390	A
83	Baker Lake, at ~~km 80m~~ Baker L.	01NW06MA0001	1.3	390, 307	A
84	Thelon R. above ~~Thelon Bluffs~~ Beverley Lake	00NW06JC0002	1.3	390	A
85	Lochart R. above Artillery Lake	00NW07RD0001	1.3	390	A
86	Flat River near mouth	00NW10EA0004	1.3	393	A
87	Liard River at Ft. Liard	00NW10ED0001	1.3	392	A
88	Cameron River below Reid Lake	----07SE-010	1.3	390	A

FIGURE 1 WATER QUALITY SAMPLING STATIONS – MANITOBA

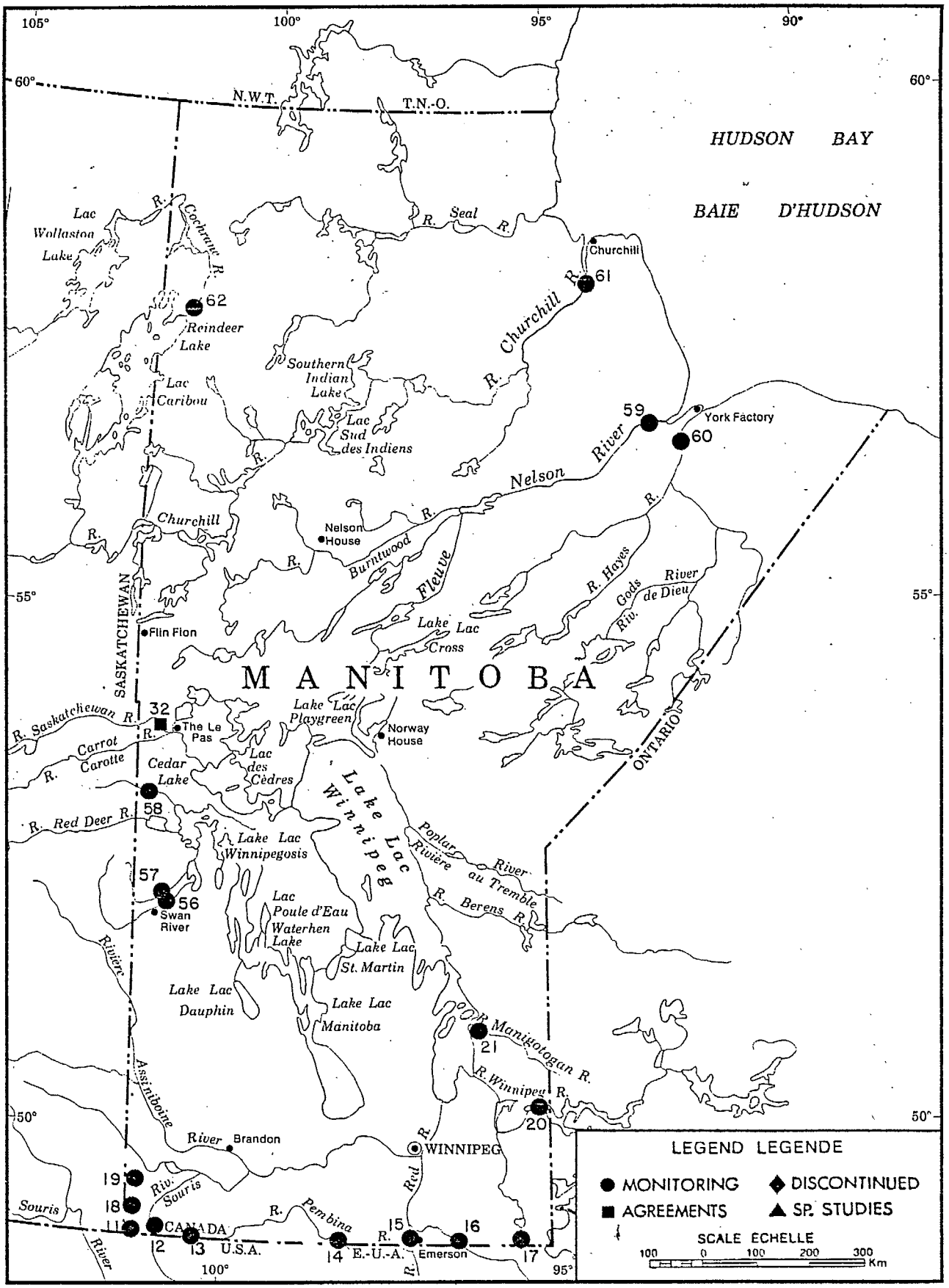


FIGURE 2 WATER QUALITY SAMPLING STATIONS – SASKATCHEWAN

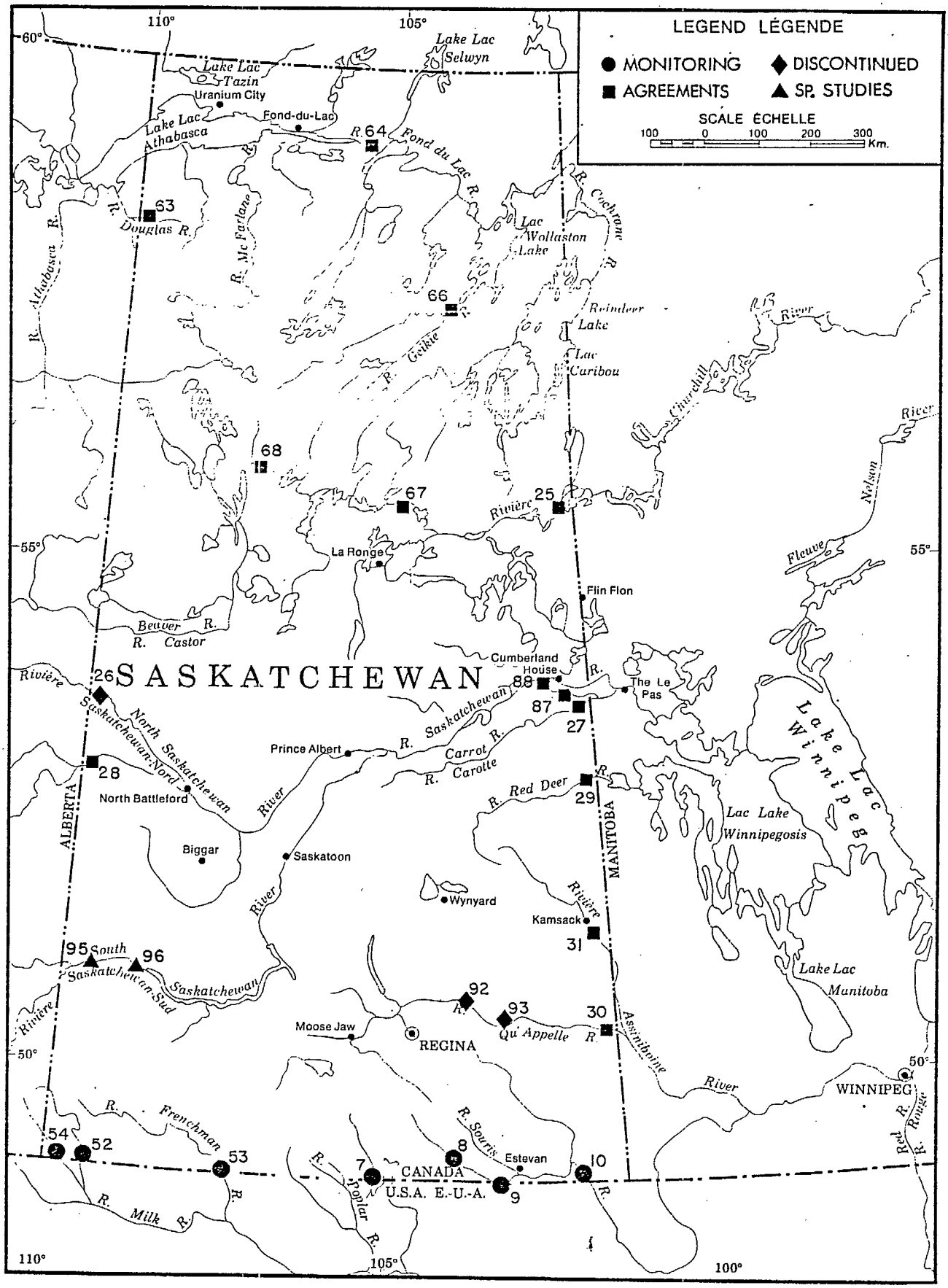
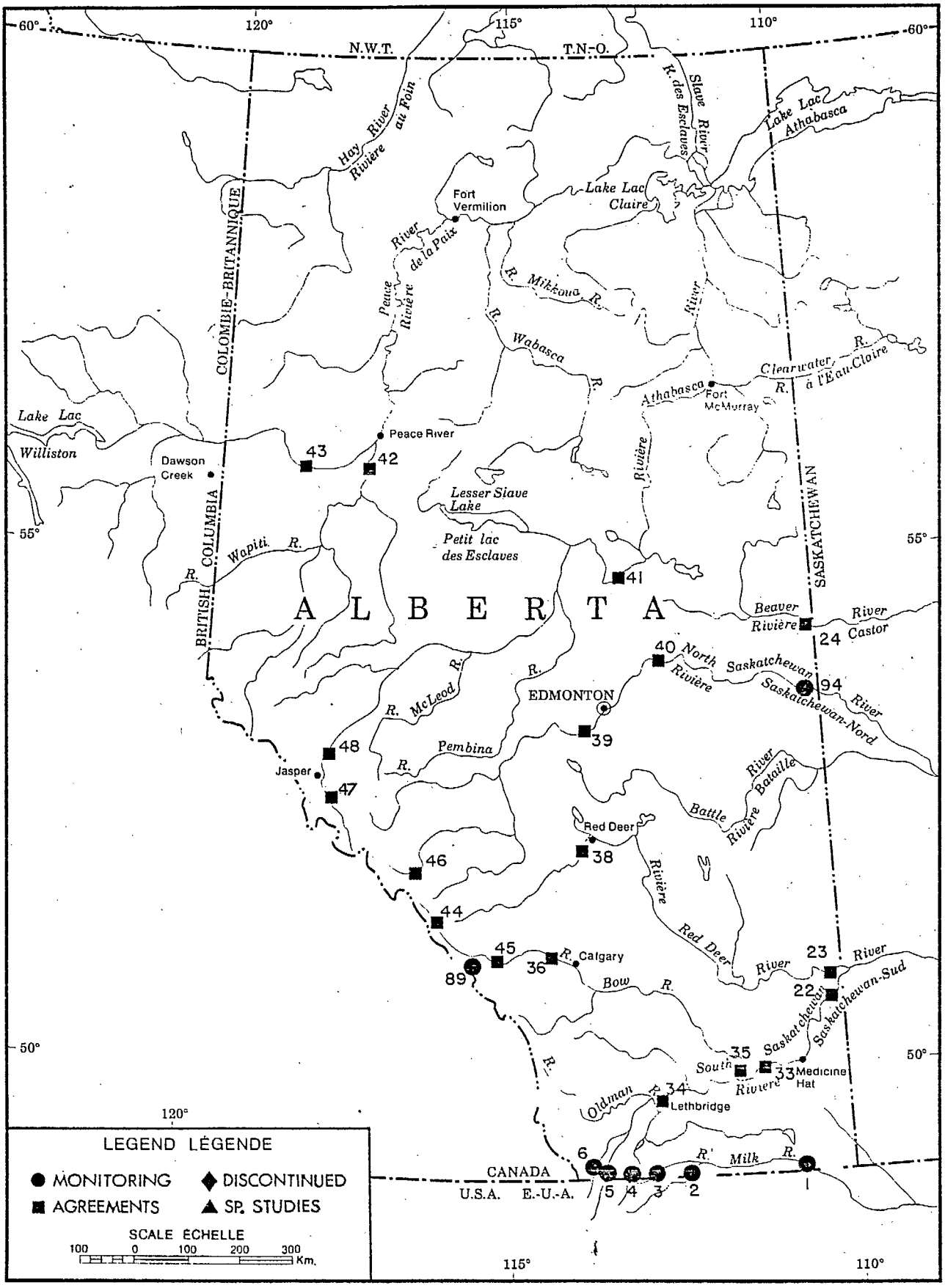


FIGURE 3 WATER QUALITY SAMPLING STATIONS - ALBERTA



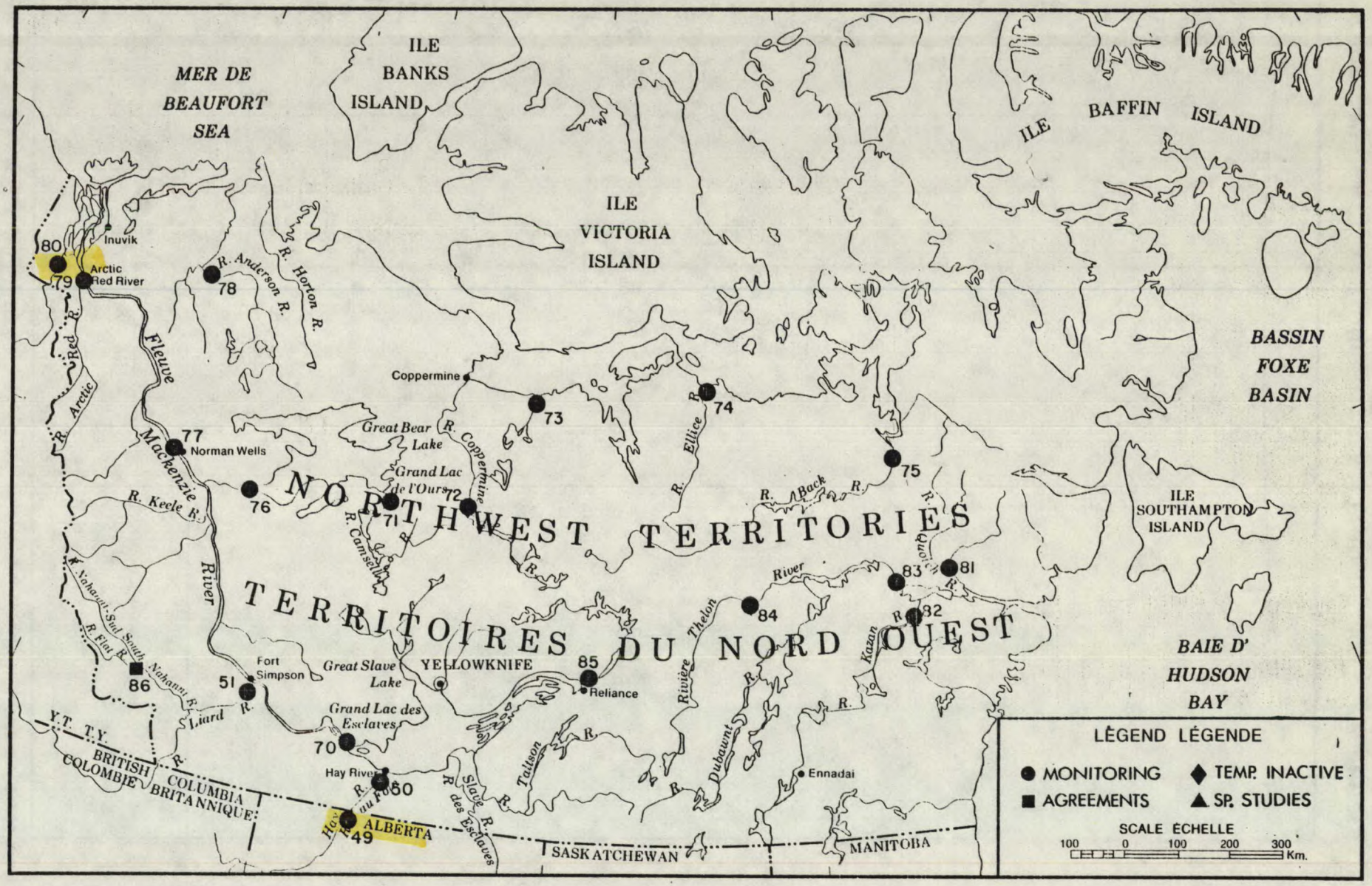


FIGURE 4 WATER QUALITY SAMPLING STATIONS – NWT

APPENDIX B

LABORATORY PRICE LIST

National Laboratory Price List

Parameter	Description	Bottle	Units	Nat Code	Nat Limit	Nat Price
AG_E	Silver	E	mg/L	47301	0.005	0.57
ALK_P	Alkalinity-Field	A	mg/L	N/A	N/A	2.28
ALK_T	Alkalinity-Lab	A	mg/L	10106		2.28
AL_D	Aluminum	G	mg/L	13102	0.1	0.57
AL_E	Aluminum	C	mg/L	13302	0.1	0.57
AL_E*	Aluminum	C	mg/L	13305	0.001	2.85
AS_D_D	Arsenic-Field	A	mg/L	33108	0.0001	4.28
AS_D_L	Arsenic-Lab	A	mg/L	33108	0.0001	4.28
AS_T_B	Arsenic-Bio	W	mg/kg	33601	N/A	14.25
AS_T_S	Arsenic-Sed	W	mg/kg	33050	N/A	25.65
BA_T	Barium	C	mg/L	56001	0.1	1.71
CA	Calcium	A	mg/L	20103	0.01	0.86
CD_T	Cadmium	C	mg/L	48001	0.001	1.71
CD_T*	Cadmium	C	mg/L	48002	0.001	2.28
CD_T_B	Cadmium-Bio	W	mg/kg	48601	N/A	8.55
CD_T_S	Cadmium-Sed	W	mg/kg	48053	N/A	8.55
CL	Chloride	A	mg/L	17206		1.14
CO_T	Cobalt	C	mg/L	27001	0.001	1.71
CO_T*	Cobalt	C	mg/L	27002	0.001	2.28
CR_E	Chromium	C	mg/L	24302	0.001	0.57
CR_T	Chromium	C	mg/L	24002	0.0001	1.71
CR_T_B	Chromium-Bio	W	mg/kg	24601	N/A	8.55
CR_T_S	Chromium-Sed	W	mg/kg	24054	N/A	5.69
CU_T	Copper	C	mg/L	29005	0.001	2.28
CU_T_B	Copper-Bio	W	mg/kg	29601	N/A	8.55
CU_T_S	Copper-Sed	W	mg/kg	29053	N/A	8.55
F	Fluoride	A	mg/L	09106		5.42
FE_D_D	Iron-Field	G	mg/L	26104		0.57
FE_D_L	Iron-Lab	G	mg/L	16104		0.57
FE_E	Iron	C	mg/L	26304		0.57
HERB	Herbicides	M	ug/L	#	#	142.3
HG_T	Mercury-total	G	ug/L	80011	0.02	1.71
HG_T_B	Mercury-Bio	W	ug/kg	80050	N/A	17.1
HG_T_S	Mercury-Sed	W	ug/kg	80050	N/A	17.10
K	Potassium	A	mg/L	19103	0.1	0.86
MET_T	Total metals	C	mg/L	#	#	23.94
MG	Magnesium	A	mg/L	12102	0.1	0.86
MN_D_D	Manganese-Field	G	mg/L	25104	0.02	0.57
MN_D_L	Manganese-Lab	G	mg/L	25104	0.02	0.57
MN_E	Manganese	C	mg/L	25304	0.02	0.57
MO_E	Molybdenum	C	mg/L	42302	0.1	5.70
NA	Sodium	A	mg/L	11103	0.1	0.86
NI_T	Nickel	C	mg/L	28001	0.001	1.71
NI_T*	Nickel	C	mg/L	28002	0.001	2.28

NI_T_B	Nickel-Bio	W	mg/kg	28601	N/A	8.55

National Laboratory Price List

Parameter	Description	Bottle	Units	Nat Code	Nat Limit	Nat Price
NI_T_S	Nickel-Sed	W	mg/kg	28053	N/A	8.55
OC/PCB	OC's & PCB's	M	ug/L	#	#	97.35
OC/PCB_B	OC's & PCB's-Bio	T	ug/L	#	#	227.43
OC/PCB_S	OC'S & PCB's	M	ug/L	#	#	227.43
OP	Organophos Pests	M	ug/L	#	#	83.65
PB_T	Lead	C	mg/L	82001	0.001	1.71
PB_T*	Lead	C	mg/L	82002	0.001	2.28
PIC	Picloram	M	ug/L	18601	0.2	142.3
SE_D_D	Selenium-Field	A	mg/L	34108	0.0001	4.28
SE_D_L	Selenium-Lab	A	mg/L	34108	0.0001	4.28
SE_T_B	Selenium-Bio	W	mg/kg	34601	N/A	14.25
SE_T_S	Selenium-Sed	W	mg/kg	34050	N/A	25.65
SIO2	Silica	A	mg/L	14102	0.1	1.14
SO4	Sulfate	A	mg/L	16306	0.1	1.14
V_T	Vanadium	C	mg/L	23001	0.0005	1.71
V_T*	Vanadium	C	mg/L	23002	0.0005	8.55
ZN_T	Zinc	C	mg/L	30004	0.001	1.71
ZN_T*	Zinc	C	mg/L	30005	0.001	2.28
ZN_T_B	Zinc-Bio	W	mg/kg	30601	N/A	8.55
ZN_T_S	Zinc-Sed	W	mg.kg	30053	N/A	8.55

Regional Laboratory Price List

Parameter	Description	Bottle	Units	Reg Code	Reg Limit	Reg Price
ALK_P_R	Alkalinity-Field	A	mg/L	10151	0.5	6.19
ALK_T_R	Alkalinity-Lab	A	mg/L	10101	0.5	4.96
B_D_D	Boron	A	mg/L	05105	0.02	4.96
B_D_L	Boron	A	mg/L	05105	0.02	4.96
CHL_A_D	Chlorophyll a	P	mg/L	06717F	0.001	13.64
CHL_A_L	Chlorophyll a	P	mg/L	06717L	0.001	27.27
CN	Cyanide-total	F	mg/L	06604	0.001	4.13
COLI_F_F	Fecal Coliform	K	no/100mL	36012F	N/A	0
COLI_T_F	Total Coliform	K	no/100mL	36002F	N/A	0
COLO_AP_R	Colour-apparent	A	Relative	2011	5	3.31
COLO_TR_R	Colour-true	A	Relative	02021	5	4.13
COND_F	Conductivity	A	uS/cm	02041F	0.1	0
COND_L_R	Conductivity	A	uS/cm	02041L	0.1	2.07
C_DI	Dis Inorg C	F	mg/L	06152	1	8.26
C_DO_D	Dis Org C	F	mg/L	06104	1	7.87
C_DO_L	Dis Org C	F	mg/L	06104	1	9.92
C_PO	Part Org C	F	mg/L	06902	0.01	8.26
NH3_T	Ammonia	E	mg/L	07506	0.1	7.85
NO23_D	Nitrate+Nitrite	F	mg/L	07110	0.01	4.94
NO23_L	Nitrate+Nitrite	F	mg/L	07110	0.01	7.02
N_D_D	Dis Nitrogen	L	mg/L	07651	0.01	7.85
N_D_L	Dis Nitrogen	L	mg/L	07651	0.01	9.92
N_P	Part Nitrogen	L	mg/L	07902	0.01	8.26
O2_D	Dis Oxygen	O	mg/L	08101P		0
PHENOL	Phenols (4-AAP)	I	ug/L	06535	0.1	12.39
PH_F	pH	A	pH Units	10301F	0	0
PH_L_R	pH	A	pH Units	10301L	0	2.07
P_DI	Dis Inorg P	A	mg/L	15356	0.003	9.92
P_D_D	Dis Phosphorus	H	mg/L	15103	0.003	7.85
P_D_L	Dis Phosphorus	H	mg/L	15103	0.003	9.92
P_OR_D	Ortho Phosphorus	H	mg/L	15256	0.003	3.31
P_T	Total Phosphorus	H	mg/L	15406	0.003	7.85
P_TI	Total Inorg P	A	mg/L	15301	0.003	7.85
RES_FNF	NFFR	B	mg/L	10501	1	7.85
RES_NF	NFR	B	mg/L	10401	1	7.85
R_F	FR	B	mg/L	10451	1	7.85
R_FF	FFR	B	mg/L	10551	1	7.85
STREP_F_F	Faecal Strep	K	no/100mL	36103F	N/A	0
SULFIDE	Sulfide-total	N	ug/L	16104	1	41.32
TEMP_F	Temperature	N/A	Deg. C	02061F	N/A	0
TEMP_L_R	Temperature	A	Deg. C	02061L	N/A	0
TURB_F	Turbidity	A	JTU	02073F	0.1	0
TURB_L_R	Turbidity	A	JTU	02073F	0.1	2.07

LABORATORY PRICE LIST

Bottle Types

A - 2 litre polethylene
B - 1 litre polyethylene
C - 1 litre teflon
D - 500 ml polyethylene
E - 250 ml polyethylene
F - 250 ml polypropylene
G - 250 ml teflon
H - 45 ml sovirel
I - 8 oz brown glass
J - 40 oz glass
K - sterile
L - 125 ml polypropylene
M - 1 litre glass
N - 500 ml polycrbonate
O - Winkler Bottle
P - Filter Paper
T - Tin Foil
W - Whirlpak Bag
N/A - Not Applicable

* - Solvent extraction as opposed to direct aspiration
\# - Group of parameters, therefore no national code or detection limit applicable

APPENDIX C

CROSS REFERENCE LIST OF 1984/83 PROJECT DESCRIPTIONS

SPECIAL STUDIES

TOXIC CHEMICALS

NORTHWEST TERRITORIES

REPORTS

MISCELLANEOUS