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COMMITTEE ON WATER QUALITY

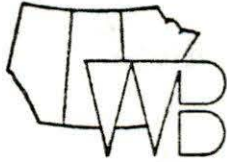
A LONG TERM FIRST ORDER MINIMUM WATER
QUALITY NETWORK FOR THE PRAIRIE PROVINCES

MARCH 23, 1978
PPWB REPORT #51



PRAIRIE PROVINCES WATER BOARD
CANADA ALBERTA SASKATCHEWAN MANITOBA

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no. 51



PRAIRIE PROVINCES WATER BOARD

FOREWORD

The Committee on Water Quality has reviewed the river water quality data which have been collected on interprovincial rivers by Federal and Provincial agencies since 1960 and found a lack of continuous long term water quality data. In examining the history of water quality monitoring, the Committee found this lack of data was caused by frequent changes in the location of monitoring sites and parameters monitored, changes in agency monitoring strategies, and fluctuating resources required to maintain long term monitoring programs. In addition, this review revealed that there has been some duplication of river water quality monitoring by Federal and Provincial agencies, and that since 1974, a substantial reduction of Federal water quality monitoring at intraprovincial sites has resulted in a discontinuation of several long term water monitoring records.

After completing this review, and considering the present and future needs for long term river water quality data, the Committee concluded that there is a need to stabilize the location, frequency of sampling, and parameters monitored at a minimum number of first order monitoring sites to ensure that long term water quality records are developed. To this end, the Committee has concluded that this can best be done by establishing and maintaining the first order long term minimum water quality network documented in this report.

The Committee determined that this first order long term minimum water quality monitoring network is required to:

1. document seasonal, annual, and long term river water quality conditions needed to establish an inventory of current and historical water quality trends;
2. stabilize the location, the type of information collected, and the frequency of monitoring needed to ensure that continuous long term water quality records are developed in the most efficient manner;
3. provide a base network of regularly monitored first order water quality stations which more intensive periodic basin and/or short term site specific surveys can be related to;
4. provide data needed to assess the success of water pollution control programs and define historical background conditions for future environmental assessments;
5. identify and trace the movement of intraprovincial and transboundary water borne pollutants;
6. document the long term impact of major developments and major storage facilities operated on eastward flowing interprovincial streams;
7. supply the Provinces with data needed to establish and/or revise intraprovincial river water quality objectives or classification schemes;
8. supply the Prairie Provinces Water Board with data needed to estimate natural and/or existing background concentrations needed to revise the PPWB boundary water quality criteria.

In addition to documenting a detailed network rationale, this report suggests guidelines to be used to fix the location of monitoring sites, recommends specific parameters and monitoring frequencies for developed and remote basins, and details the location and monitoring history of 94 proposed water quality monitoring stations.

In summary, the application of the network criteria developed by the Committee and consultation with the water quality monitoring agencies of Alberta, Manitoba, Saskatchewan and Canada, has resulted in the identification of 94 first order long term water quality monitoring sites for the Prairie Provinces. Only two of these 94 monitoring sites are new, approximately 76 have been monitored in the last year, and the remaining 18 have been operated for extended periods of time but have been recently discontinued. It is also interesting to note that approximately 75% of these monitoring sites are located at existing Water Survey of Canada hydrometric stations and that 25 of these stations are located on the international boundary.

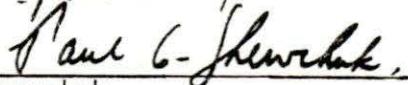
The 94 water quality monitoring sites summarized in the map on page iv can be broken down by province into the following classifications.

<u>Classification</u>	<u>Manitoba</u>	<u>Saskatchewan</u>	<u>Alberta</u>	<u>Total</u>
Intraprovincial	17	16	17	50
Interprovincial	2	8	6	16
International	7	9	8	24
National Parks	--	--	4	4
Total	26	33	35	94

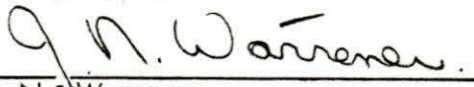
The Committee on Water Quality has concluded that the operation and maintenance of the first order, long term, water quality monitoring network is in the best long term interests of all water quality management agencies in the Prairie Provinces. The Committee, therefore, recommends that the Board support this concept and recommend that all member agencies work toward the implementation of the first order, long term, minimum water quality network documented in this report.



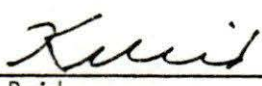
 D.J. Berry (Chairman)




 P. Shewchuk



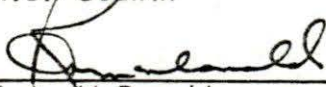
 J.N. Warrenner



 K.W. Reid



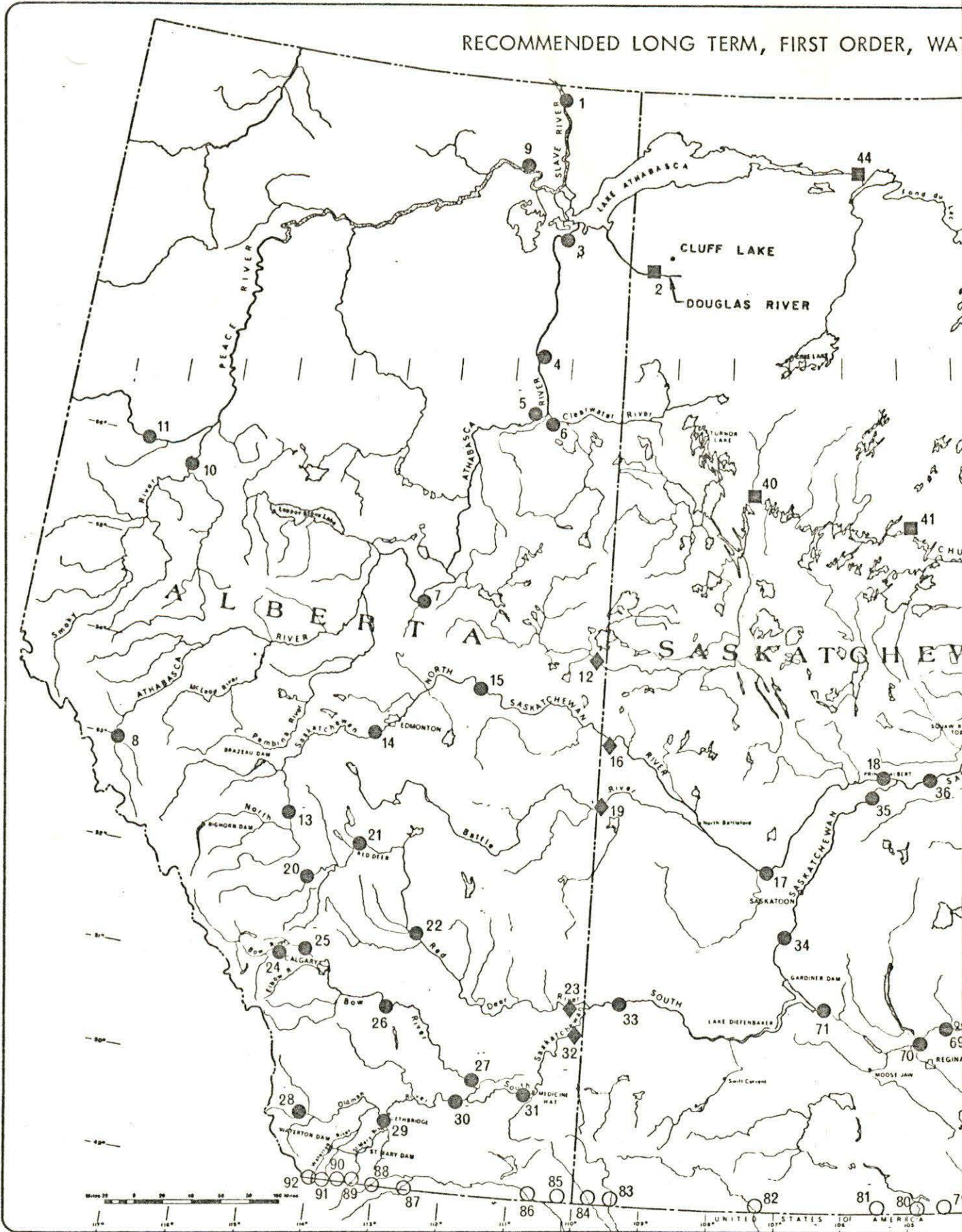
 R.B. Godwin



 R.A. McDonald

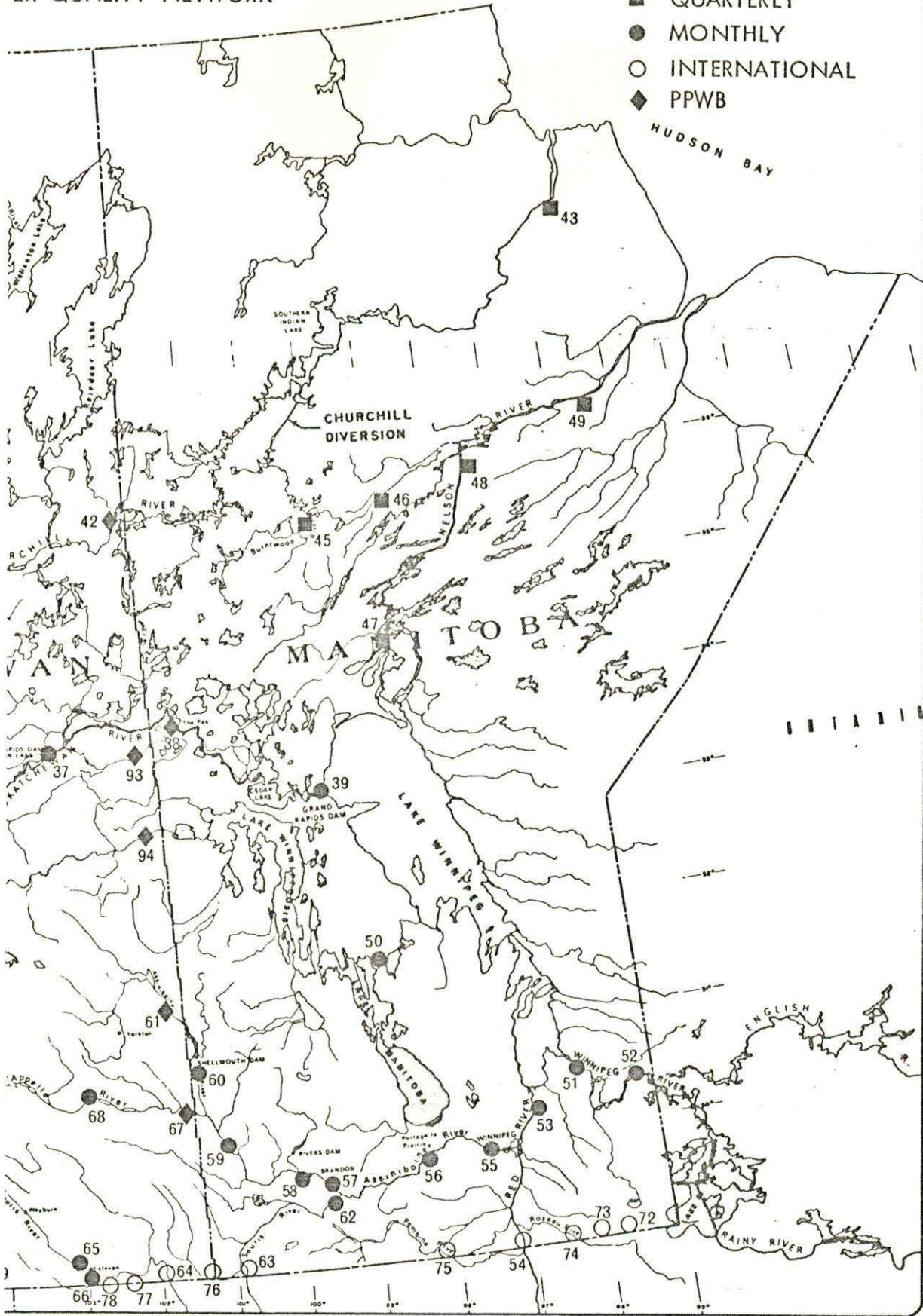
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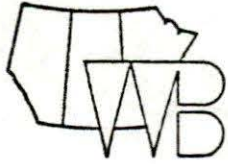
RECOMMENDED LONG TERM, FIRST ORDER, WA



WATER QUALITY NETWORK

- QUARTERLY
- MONTHLY
- INTERNATIONAL
- ◆ PPWB

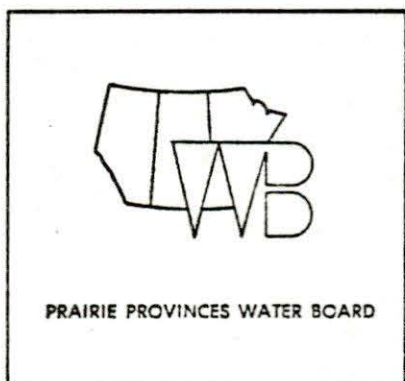




PRAIRIE PROVINCES WATER BOARD

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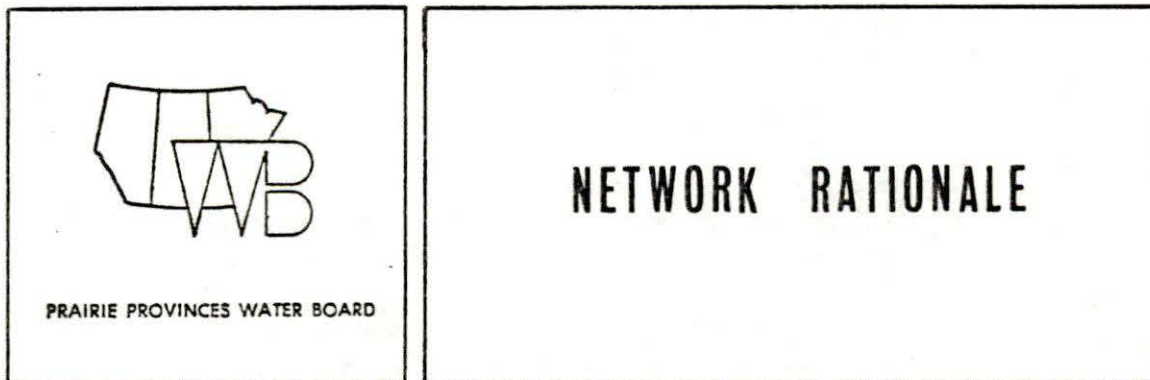
INTRODUCTION

This report summarizes the results of water quality network discussions and investigations conducted by the Prairie Provinces Water Board Committee on Water Quality from February 4, 1976 to February 2, 1978. During this period, the Committee reviewed river water quality monitoring strategies being employed in the United States, discussed the shortcomings of historical river water quality data needed to address interjurisdictional water quality issues such as the Garrison Diversion, and reviewed the operation of river water quality monitoring networks in Western Canada.

In these discussions, the Committee concluded that there was a need to upgrade and stabilize water quality monitoring being conducted on major rivers and interjurisdictional streams in the Prairie Provinces.

The Committee, therefore, examined alternative water quality monitoring strategies, discussed the usefulness of data collected in short term problem specific water pollution surveys and more intensive periodic basin studies, and concluded that a first order water quality network should be operated at a minimum number of monitoring sites.

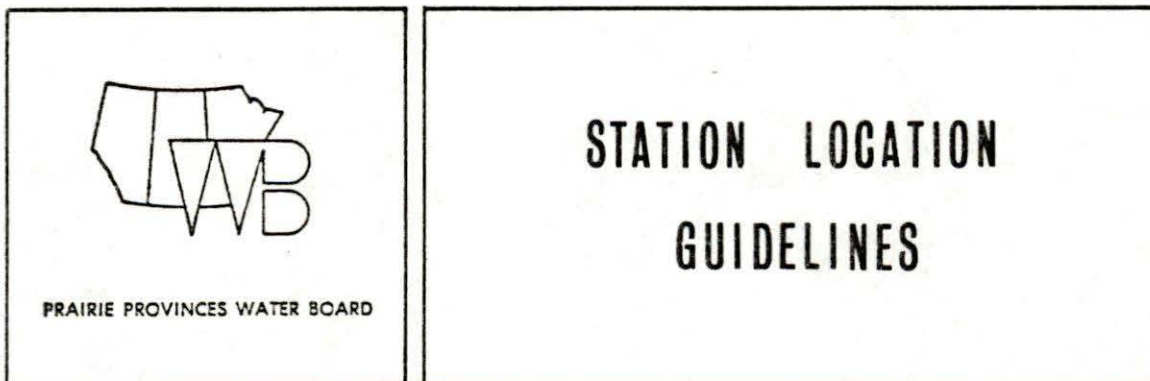
In summary, this report documents the rationale for establishing the network, suggests guidelines to be used to fix the location of network monitoring sites, recommends parameters and monitoring frequencies for developed and remote basins, and details the location and monitoring history of 94 proposed water quality monitoring stations.



At the fourteenth meeting of the PPWB Committee on Water Quality, it was agreed that a first order minimum long term water quality network for the Prairie Provinces was required to:

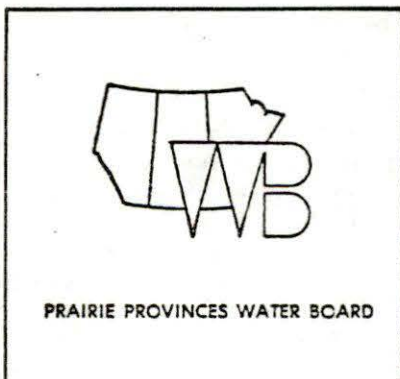
1. document seasonal, annual, and long term river water quality conditions needed to establish an inventory of current and historical water quality trends;
2. stabilize the location, the type of information collected, and the frequency of monitoring needed to ensure that continuous long term water quality records are developed in the most efficient manner;
3. provide a base network of regularly monitored first order water quality stations which more intensive periodic basin and/or short term site specific surveys can be related to;
4. provide data needed to assess the success of water pollution control programs and define historical background conditions for future environmental assessments;

5. identify and trace the movement of intraprovincial and transboundary water borne pollutants;
6. document the long term impact of major developments and major storage facilities operated on eastward flowing interprovincial streams;
7. supply the Provinces with data needed to establish and/or revise intraprovincial river water quality objectives or classification schemes;
8. supply the Prairie Provinces Water Board with data needed to estimate natural and/or existing background concentrations needed to revise the PPWB boundary water quality criteria.



At the thirteenth meeting of the PPWB Committee on Water Quality, it was agreed that the following guidelines should be used to establish the location of a base network of first order long term water quality stations on inter-provincial streams in the Prairie Provinces.

1. One station should be located in the upper reaches of each major stream.
2. A station should be located below each major tributary and impoundment.
3. Stations should be located below the mixing zones of major developments.
4. Stations should be located on major streams at or near interprovincial and international boundaries.
5. One station should be located at or near the downstream terminus of major rivers.
6. If possible, all stations should be located near long term hydrometric stations or where existing water quality stations have been operated.



PARAMETERS AND MONITORING FREQUENCIES

At the fifteenth meeting of the PPWB Committee on Water Quality, the Committee reached the consensus that different parameters and monitoring frequencies should be recommended for network stations located in developed and remote basins. This recommendation was formulated after the Committee reviewed existing agency priorities, monitoring costs, existing water use and basin characteristics. In summary, this recommendation focuses most of the water quality monitoring resources in the developed basins and suggests that fewer parameters should be monitored less frequently in the undeveloped remote basins.

Minimum Parameter List

The Committee is of the opinion that all agencies should monitor a minimum uniform set of parameters on interprovincial and international streams to ensure that data collected can be aggregated on a basin basis. The Committee found that complete standardization of all methods and parameters was not possible at this time as the analytical capabilities, methodology, and monitoring philosophies of the Provincial and Federal water quality laboratories were different. They did, however, agree that the minimum set of water quality parameters documented in Table One should be monitored in the developed and remote basins.

It is important to note that agencies have differing monitoring philosophies regarding the monitoring of biological parameters and toxic organic compounds. Consequently, no agreement could be reached regarding the frequency of monitoring or the parameters which should be monitored for the

biological parameters and toxic organic compounds listed in Table Two. The point here is that the Committee agreed that monitoring for the constituents and biota listed in Table Two should be conducted but could not reach any agreement at this time as to the media (water, sediments, shellfish/fish) or methodology which should be incorporated in this network on a routine basis. Thus, the Committee recommends that these parameters should be monitored at the first order long term network sites at the discretion of the monitoring agencies.

TABLE ONE

MINIMUM PARAMETER LIST AND SAMPLING FREQUENCY FOR
FIRST ORDER MINIMUM LONG TERM NETWORK

Parameter	Group One Developed	Group Two Remote
1. Field Analyses		
- Total and fecal coliforms	Monthly (M)	Quarterly (Q)
- Dissolved oxygen	M	Q
- Biochemical oxygen demand	M	Q
- Temperature	M	Q
- pH	M	Q
- Specific Conductance	M	Q
2. Physical Parameters		
- True color	M	Q
- Non Filterable & Filterable Residues	M	Q
- Turbidity	M	Q
3. Dissolved Ions		
- HCO ₃ , CO ₃ , SO ₄ , Cl, F	M	Q
- Ca, Mg, Na, K, Si	M	Q
- Lab. specific conductance	M	Q
4. Nutrients		
- Total and Dissolved Phosphorus	M	Q
- Total Nitrogen	M	Q
- Nitrate and Nitrite	M	Q
- Total Dissolved Nitrogen	M	Q
- Total Inorganic Carbon	M	Q
- Total Organic Carbon	M	Q
5. Trace Metals/Toxic Substances *		
- Aluminum extractable	M	N.A.
- Boron dissolved	M	N.A.
- Mercury extractable	M	Q
- Iron extractable	M	Q
- Chromium extractable	M	Q
- Cadmium extractable	M	Q

* frequencies may be decreased at discretion of monitoring agency provided adequate data base is acquired.

TABLE TWO

PARAMETERS TO BE MONITORED AT THE DISCRETION
OF MONITORING AGENCIESOrganic CompoundsBiological AnalysesBiocides

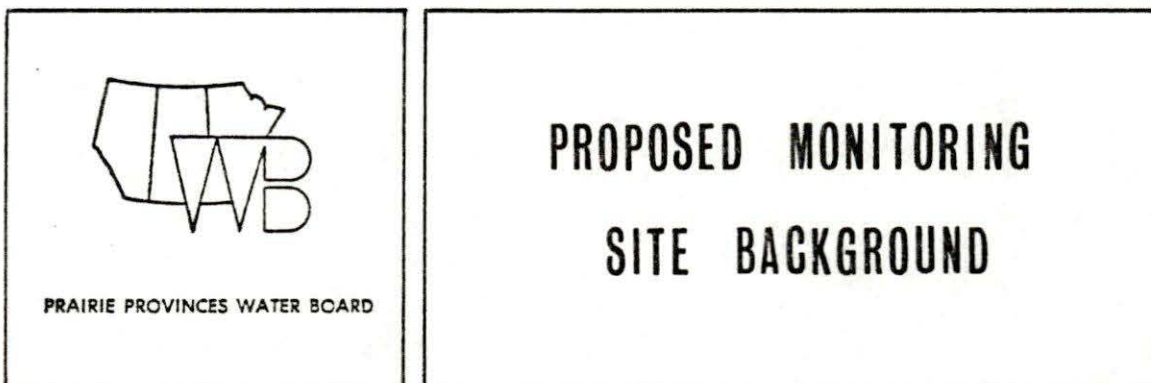
Carbamate Herbicides
 Chlorinated Hydrocarbons
 Chlorophenoxy Herbicides
 Polychlorinated Hydrocarbons
 Phenolic Compounds
 Aliphatic Hydrocarbons
 Aromatic Hydrocarbons
 NTA or MBAS

- fish/shellfish for toxic bioaccumulative substances
- algal assays
- chlorophyll

Frequency of Monitoring

The Committee is of the opinion that the frequency of monitoring at any particular network station should reflect the collective priorities of all water quality monitoring agencies in the Prairies. After consulting the Federal and Provincial water quality monitoring agencies, comparing monitoring costs for accessible and remote basins, and identifying areas of mutual concern, the Committee recommends that:

1. All Prairie Provinces Water Board stations should be monitored monthly.
2. All international stations should be monitored monthly.
3. The monitoring sites indicated on the map on page IV which are located in remote basins should be monitored quarterly.
4. The monitoring sites indicated in the map on page IV which are located in developed basins should be monitored monthly.



The following water monitoring site background information was extracted from the January 1976 NAQUADAT Station Index and obtained from Committee members. As the status of many of the water quality monitoring sites was under discussion when this report was prepared, the date the background analyses were conducted is specified.

PRAIRIE PROVINCES WATER QUALITY NETWORK - PROPOSED STATION LOCATIONS
DRAFT THREE (DECEMBER 1977)

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>SLAVE RIVER</u>					
1. at Fitzgerald (00AL07DA0003)	Federal	1960-74	95	discontinued	<ul style="list-style-type: none"> - near interjurisdictional boundary - below Lake Athabasca and the downstream terminus of Peace - continuous hydrometric data since 1960
<u>DOUGLAS RIVER</u>					
2. below confluence of Cluff Creek (00SA07MA0001)	Sask.	1975 -	5	Sask. Canada W.Q. Monitoring Contract	<ul style="list-style-type: none"> - near interprovincial boundary - below proposed Cluff Lake Uranium Development
<u>ATHABASCA RIVER BASIN</u>					
3. Athabasca River near mouth at Embarras Airport	proposed	--	--	proposed	<ul style="list-style-type: none"> - near downstream terminus - above Lake Athabasca - below Tar Sands - continuous hydrometric data since 1971
4. Athabasca River at Fort MacKay (00AL07DA0003) or below Fort MacKay	Federal	1974-	4	AOSERP station	<ul style="list-style-type: none"> - below major development (monitoring site evaluation needed)
5. Athabasca River at Fort McMurray (00AL07DA0001)	Federal	1967-	67	AOSERP station	<ul style="list-style-type: none"> - above major development - above confluence with Clearwater - continuous hydrometric data since 1960

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
6. Clearwater River above Fort McMurray (near Draper) (00AL07CD0001)	Federal	1970	67-75	discontinued ?	- at downstream terminus - interprovincial stream - continuous hydrometric data since 1958
7. Athabasca River at Athabasca (00AL07BE0001)	Federal	1952-75	191	proposed Canada Alberta W.Q. station	- below proposed development - requested by Alberta DOE - continuous hydrometric data since 1959
8. Athabasca River above Jasper at Hwy. #16 (00AL07AA0007)	Federal	1971-	42	quarterly	- headwater station
<u>PEACE RIVER</u>					
9. Peace River at Peace Point (00AL07KC0001)	Federal	1967-74	72	discontinued	- near downstream terminus of Peace - continuous hydrometric data since 1961
10. Smoky River at Watino (00AL07GJ0001)	Federal	1967-75 1977-	80	proposed Canada Alberta W.Q. Station	- requested by Alberta DOE - near downstream terminus of Smoky River - continuous hydrometric data since 1956

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
11. Peace River at Dunvegan Bridge at Hwy 2 (00AL07FD0002)	Federal	1969-74 1977-	23	proposed Canada Alberta W.Q. station	- requested by Alberta DOE - downstream of Williston Lake - interprovincial station ? - seasonal hydrometric data since 1960
<u>BEAVER RIVER</u>					
12. at Beaver Crossing (00AL06AD0001)	Federal	1966-75	73	PPWB - monthly	- PPWB interprovincial boundary station - continuous hydrometric record available from 1970 to date
<u>NORTH SASKATCHEWAN RIVER</u>					
13. near Rocky Mountain House (00AL05DC0001)	Federal	1966-	123	quarterly	- headwater station - seasonal hydrometric records 1973 to date
14. at Devon Bridge (00AL05DF0005) (00AT05DF2070)	Federal	1966-71	13		- requested by Alberta DOE
	Provincial	1953-	85	proposed Canada Alberta W.Q. station	
15. at Pakan (00AT05EC1050)	Provincial	1976-	10	proposed Canada Alberta W.Q. station	- approx. 74 miles downstream Edmonton - below mixing zone

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
16. near Deer Creek (Hwy 3) (00SA05EF0001)	Federal	1971-	28	PPWB - monthly	- PPWB interprovincial boundary station - continuous hydrometric data 1969 to date
17. at Borden (Hwy 5) (00SA05GD0001) at Borden	Federal	1968-74	54	discontinued	- downstream of Battle River mixing zone
	Provincial	1970-	25	bimonthly	
18. Cole Rapids	Provincial	1971-	50	monthly	- at downstream terminus above backwater but below P.A. mixing zone
<u>BATTLE RIVER</u>					
19. near Unwin (00SA05FE0001)	Federal	1966-	117	PPWB - monthly	- PPWB interprovincial boundary station - continuous hydrometric data
<u>RED DEER RIVER</u>					
20. near Sundre (00AL05CA0001)	Federal	1963-	85	quarterly	- headwater station - some hydrometric data - above Red Deer Dam Site 6

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
21. at Red Deer (Hwy 2) (00AL05CC0001)	Federal	1967-74	98	proposed Canada Alberta W.Q. station	- below Red Deer Dam Site 6 - above major user - hydrometric data from 1912 to date
22. at Drumheller (Hwy 9) (00AL05CE0001)	Federal	1960-	165	proposed Canada Alberta W.Q. station	- below mixing zone--Red Deer - above major user - hydrometric data from 1960 to date
23. at Bindloss (00AL05CK0001)	Federal	1966-	118	PPWB - monthly	- interprovincial boundary station - hydrometric data 1960 to date
<u>BOW RIVER</u>					
24. below confluence with Spray River (00AL05BD0002)	Federal	1972-76	36	quarterly	- headwater station above Banff S.T.P. - continuous hydrometric data from 1955 to date
25. at Cochrane (00AL05BE0013)	Federal	1971-74	17	proposed Canada Alberta W.Q. station	- requested by Alberta DOE - above major user
26. below Carseland Dam (00AL05BM0002)	Federal	1967-74	95	discontinued	- below major mixing zone - below impoundment - continuous hydrometric data 1972 to 1976

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
27. near mouth (00AL05BN0001)	Federal	1967-	86	proposed Canada Alberta W.Q. station	- near downstream terminus - continuous hydrometric data since 1964
<u>OLDMAN RIVER</u>					
28. near Waldron's Corner (00AL05AA0005)	Federal	1964-75	110	quarterly	- headwater station - continuous hydrometric data since 1950
29. near Lethbridge (00AL05AD0002)	Federal	1951-74	103	proposed Alberta Canada W.Q. station	- below confluence of Waterton and Oldman - above major user - continuous hydrometric data since 1911
30. north of Taber at Hwy 36 (00AL05AG0001)	Federal	1967-	45	proposed Alberta Canada W.Q. station	- below mixing zone - near downstream terminus of Oldman
<u>SOUTH SASKATCHEWAN</u>					
31. at Medicine Hat (Hwy 1) (00AL05AJ0001)	Federal	1960-74	175	discontinued	- below confluence of Bow and Oldman - continuous hydrometric data since 1964 - above fertilizer plant

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
32. at Sandy Point (Hwy 41) (00AL05AK0001)	Federal	1968-	69	PPWB - monthly	- interprovincial boundary station - hydrometric data since 1966
33. at Leader Bridge	Provincial	1975-	5	monthly	- below confluence of Red Deer - above Lake Diefenbaker - requested by Sask. DOE
34. near Outlook (Hwy 15) (00SA05HF0001)	Federal Provincial	1968-74 1970-	58 ?	discontinued quarterly	- below major impoundment - above major user
35. Birch Hills Ferry (00SA05HH0004)	Federal Provincial	1969-74 1966-	18 ?	discontinued monthly	- at downstream terminus of major stream - below mixing zone of major city - continuous hydrometric data since 1959 available at St. Louis
<u>SASKATCHEWAN RIVER</u>					
36. at Hwy 6 north of Gronlid (00SA05KD0002)	Federal Provincial	1968-74 1972-	39 ?	discontinued monthly	- below confluence of N. and S. Saskatchewan (Note: This station could be affected by backwater if proposed Nipawin Dam is built.)

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
37. below Tobin Lake Reservoir (00SA05KD0001)	Federal Provincial	1967-74 1969-	41 ?	discontinued monthly	- below major impoundment - hydrometric data since 1962
38. above Carrot River (00MA05KH0001)	Federal	1974-	13	PPWB - monthly	- interprovincial station - above confluence with Carrot River - hydrometric data since 1973
39. below Grand Rapids Power Plant (00MA05SH0001)	Federal	1970-	54	quarterly	- below Cedar Lake - at downstream terminus above Lake Winnipeg
<u>CHURCHILL RIVER</u>					
<u>Saskatchewan</u>					
40. at Patuanak (00SA06BB0004)	Federal & Provincial	1973-	9	quarterly - sampled by Canada, financed by Saskatchewan	- headwater station - continuous hydrometric data since 1973
41. at Otter Rapids (00SA06CD0001)	Federal & Provincial	1971-	26	quarterly - sampled by Canada, financed by Saskatchewan	- continuous hydrometric data since 1964
42. at Wasawakasik Lake (00SA06EA0003)	PPWB	1974-	12	monthly - PPWB	- PPWB interprovincial station - continuous hydrometric data since 1929

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>Manitoba</u>					
43. at Fort Churchill Fresh Water Intake (00MA06FD0001)	Federal Provincial	1960-	60	discontinued	- at downstream terminus - above estuary
<u>FOND DU LAC RIVER</u>					
44. at outlet of Black Lake (00SA04LC0001)	Federal	1969-	17	discontinued	- requested by Saskatchewan DOE - above Lake Athabasca
<u>BURNTWOOD RIVER</u>					
45. above Churchill Diversion at Burntwood River above Three Point Lake (00MA05TF0002)	Federal Provincial	1971-74 ?	22	discontinued	- above Churchill Diversion
46. near Thompson (00MA05TG0001)	Federal	1971-	21	monthly	- below diversion of Churchill - continuous hydrometric data since 1958
<u>NELSON RIVER</u>					
47. at Jenpeg (West Channel)	Provincial	?	?	?	- below Lake Winnipeg - seasonal hydrometric data

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
48. at Kelsey Generating Station (00MA05UE0001)	Federal	1965-75	59	discontinued	- below Churchill diversion - continuous hydrometric data available since 1960
49. at Kettle Generating Station (00MA05UF0002) OR downstream of Long Spruce	Federal proposed	1972-	31	quarterly	- below mixing zone of Churchill diversion - continuous hydrometric data since 1961 - near downstream terminus
50. FAIRFORD RIVER near Fairford (00MA05LM0001)	Federal	1967-74	86	discontinued	- at outlet of Lake Manitoba - continuous hydrometric data since 1956
<u>WINNIPEG RIVER</u>					
51. at Pine Falls below Power Plant (00MA05PF0002)	Federal	1960-74	82	discontinued	- at downstream terminus of Winnipeg River
52. at Point Du Bois (00MA05PF0022) OR near Ontario-Manitoba Boundary	Federal	1971-	12	quarterly	- interprovincial station - continuous hydrometric data since 1954 (stage only)

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>RED RIVER</u>					
53. At Selkirk (00MA05OJ0001) OR Provincial station at Selkirk or Breezy Bend	Federal	1960-75	161	quarterly	- below Winnipeg - above Lake Winnipeg
	Provincial	?	?	?	
54. at Emerson (00MA05OC0001)	Federal	1953-	434	continuous monitor	- above major development - international station - hydrometric data since 1912
	Provincial	1964-	?	continuing	
<u>ASSINIBOINE RIVER</u>					
55. at Highway #1 West of Winnipeg	Provincial	?	?	?	- near downstream terminus - above influence of Winnipeg
56. above Portage below diversion (00MA05MJ0035) (00MA05MH0001)	Federal	1973-75	64	discontinued	- below impoundment - above major user - below groundwater discharge ? - below confluence of Souris and Assiniboine - continuous hydrometric data since 1953
		1960-75	168	discontinued	

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
57. at Treesbank above Souris R. (00MA05MH0003)	Federal	1971-75	60	discontinued	- above confluence with Souris - downstream major development
58. above Brandon (00MA05MH0001)	Federal	1960-	168	quarterly	- below Minnedosa River - above major user - continuous hydrometric data since 1914
59. at PTH #83 South of Miniota	(Provincial)	?	?	?	- below confluence of Qu'Appelle and Assiniboine - continuous hydrometric data since 1974
60. west of Russel at Hwy 4 (00MA05ME0001)	Federal	1960-74	117	discontinued	- below Shellmouth - above confluence with Qu'Appelle - continuous hydrometric data since 1969
	Provincial	?	?	?	
61. below Kamsack at Hwy 8 (00SA05MD0002)	Federal	1968-75	57	PPWB - monthly	- interprovincial station - above Shellmouth
	Provincial	1969-	?	monthly	- continuous hydrometric data since 1958
<u>SOURIS RIVER</u>					
62. at Wawanesa (00MA05NG0001)	Federal Souris Study Provincial	1962-75	150	discontinued	- near downstream terminus

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
63. at Coulter (Hwy 251 Bridge) (00MA05NF0001)	Federal Souris Study	1960- 04/75 - 10/76	392 50	continuous monitor	- international station - continuous hydrometric data available at (near Westhope) since 1930
	Provincial	?	?	?	
64. near Glen Ewen (00SA05ND0001)	Federal Souris Study	1960- 04/75 - 10/76	233 50	continuous monitor	- international station - continuous hydrometric data available since 1971
	Provincial	1970-	?	bimonthly	
65. above Long Creek at Hwy 18 Bridge (00SA05NB0015)	Souris Study	04/75 - 10/76	40	discontinued ?	- downstream of Weyburn - downstream of Nickle Reservoir - above Estevan - above confluence of Long Creek
	Federal	1975-75	2		
	Provincial	1971-	?	bimonthly	
66. Long Creek at mouth above Estevan Water Treatment Plant (00SA05NB0009)	Federal	1975-75	2	discontinued ?	- below Boundary Reservoir - above confluence with Souris - above Estevan W.T.P. - continuous hydrometric data since 1960
	Souris Study	04/75 - 10/76	40		
	Provincial	1971-	?	quarterly	

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>QU'APPELLE RIVER</u>					
67. 3.2 km South of Welby (00SA05JM0014)	Federal Provincial	11/75 - 1975-	3 ?	PPWB - monthly quarterly	- interprovincial - continuous hydrometric data since 1974 - below Crooked and Round Lakes
Note: This station replaces near St. Lazare (00MA05JM0001)	Federal	1969 - 11/75	91	moved 11/75	- Qu'Appelle Basin Study Station ? - some hydrometric data
68. north of Grenfell at Hwy 47 (00SA05JM0002)	Federal Provincial	1969-74 1972-	69 ?	discontinued monthly	- below Fishing Lakes - above Round and Crooked Lakes - continuous hydrometric data since 1956
69. above Pasqua Lake (00SA05JK0003)	Federal Provincial	1970-74 1969-	48 20 ?	discontinued continuous monitor since 77	- above Fishing Lakes - below Last Mountain Lake - continuous hydrometric data from 1971-
70. at Lumsden Bridge (Hwy 11)	Provincial	1972-	--	monthly	- above Last Mountain Lake - below major development (Regina and Moose Jaw) - hydrometric station - headwater station
71. below Qu'Appelle Dam at Hwy 19 (00SA05JG0001)	Federal Provincial	1969-74 1968-	87 ?	discontinued bimonthly	

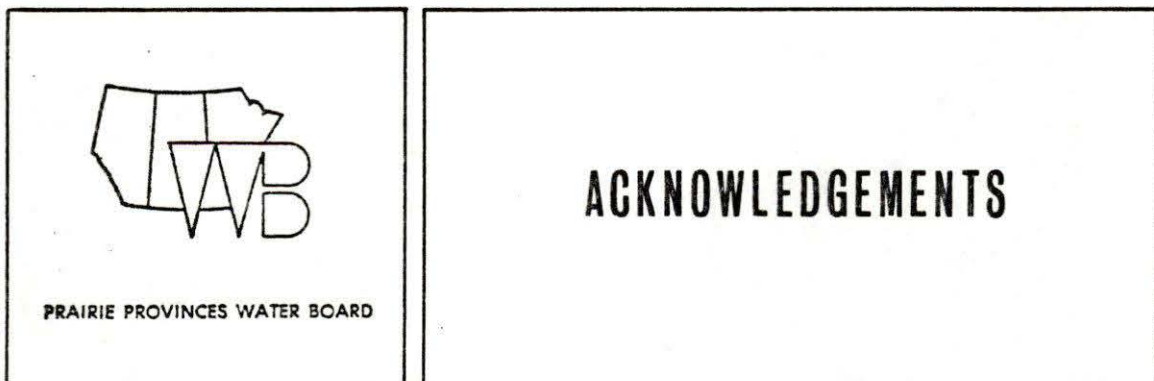
STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>INTERNATIONAL STATIONS - MANITOBA</u>					
72. Sprague Creek near Sprague, Man. (00MA05OD0007)	Federal	1971-	41	monthly	- international station - continuous hydrometric data since 1940
73. Pine Creek at Hwy 89 (00MA05OD0012)	Federal	1972-	30	monthly	- international station - continuous hydrometric data since 1959
74. Roseau River at Gardenton (00MA05OD0001)	Federal	1960-	159	monthly	- international - continuous hydrometric data since 1970
75. Pembina River near Windy Gates (00MA05OB0001)	Federal	1960-	302	monthly	- international - continuous hydrometric data since 1962
76. Antler River near Coulter at Hwy 254 (00MA05NF0009)	Federal Souris Study	1963-	71	monthly	- international and interprovincial - seasonal hydrometric data since 1945

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>INTERNATIONAL STATIONS - SASKATCHEWAN</u>					
77. Long Creek near Noonan, N. Dakota (00US05NB0001)	Federal Souris Study	1975-	16	monthly	- international station - above Boundary Dam - continuous hydrometric data since 1960
78. Long Creek South of Torquay (West Crossing) (00SA05NA0002)	Federal Provincial	1960- 1974-	130	monthly semi-annual	- international - continuous hydrometric data since 1959
79. East Poplar River at International Boundary (00SA11AE0008)	Federal Sask. Power Provincial	1975- 1975-	1	monthly quarterly	- Poplar River Water Quality Study re Coronach Thermal Station - hydrometric data
80. Middle Poplar River above International Boundary (00SA11AE0006)	Federal Sask. Power	1974-	1	monthly	- Poplar River Water Quality Study re Coronach Thermal Station - hydrometric data
81. West Fork Poplar River near International Boundary (00SA11AE0009)	Federal Sask. Power ?	1975	1	monthly	- Poplar River Water Quality Study re Coronach Thermal Station - hydrometric data
82. Frenchman River at International Boundary (00SA11AC0001)	Federal	1951-	92	monthly	- international - seasonal hydrometric data since 1917
83. Battle Creek at International Boundary (00SA11AB0005)	Federal	1974-	5	monthly	- international - seasonal hydrometric data since 1917

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
84. Lodge Creek, 0.6 km N.E. of Canada Customs Building at Hwy 21 (00SA11AB0007)	Federal	1975-	1	monthly	- international - seasonal hydrometric data since 1951

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
<u>INTERNATIONAL STATIONS - ALBERTA</u>					
85. Sage Creek near Wildhorse (00AL11AA0014)	Federal	1971-75	11	discontinued	- international (intermittent flow)
86. Milk River, Eastern Crossing at International Boundary (00AL11AA0003)	Federal	1960-	166	monthly	- international - seasonal hydrometric data
87. Milk River at Western Crossing of International Boundary (00AL11AA0002)	Federal	1960-	135	monthly	- international - seasonal hydrometric data
88. North Milk River at International Boundary (00AL11AA0001)	Federal	1960-	190	monthly	- international - seasonal hydrometric data
89. St. Mary River near International Boundary (00AL05AE0001)	Federal	1960-	173	monthly	- international
90. Lee Creek at Beazer (00AL05AE0026)	Federal	1971-	11	monthly	- international
91. Belly River at Hwy 6 Waterton Lakes National Park (00AL05AD0060)	Federal	1974-	15	monthly	- international

STATION LOCATION	AGENCY HISTORY	PERIOD OF RECORD	# SAMPLES (JAN. 76)	STATUS (NOV. 77)	STATION RATIONALE
92. Waterton River at Hwy 6 Bridge near Waterton Lakes National Park (00AL05AD0005)	Federal	1964-	172	monthly	- international
<u>MISCELLANEOUS INTERPROVINCIAL BASINS</u>					
93. Carrot River near Turnberry, Saskatchewan (00SA05KH0002)	Federal	1973-	14	monthly	- interprovincial PPWB station - continuous hydrometric data since 1966
94. Red Deer River near Erwood, Saskatchewan (00SA05LC0001)	Federal Provincial	1967- 1973-	71 ?	monthly quarterly	- interprovincial PPWB station - continuous hydrometric data since 1974 - seasonal record since 1954



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