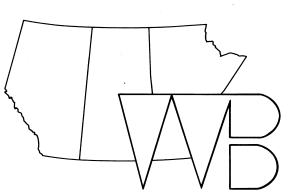

PRAIRIE PROVINCES
WATER BOARD

THE 1969

MASTER AGREEMENT ON APPORTIONMENT

AND

BY-LAWS, RULES AND PROCEDURES

JULY 2021

PREFACE

In 1948, Alberta Saskatchewan, Manitoba and Canada signed the Prairie Provinces Water Board Agreement. This Agreement established a Board to recommend the best use of interprovincial waters, and to recommend allocations between provinces. After some twenty years, changes in regional water management philosophies resulted in a need to modify the role of the Board, Consequently, the four governments entered into the Master Agreement on Apportionment on October 30, 1969. This Agreement provided an apportionment formula for eastward flowing interprovincial streams, gave recognition to the problem of water quality, and reconstituted the Prairie Provinces Water Board.

The Master Agreement on Apportionment has five schedules which form part of the Agreement. These Schedules are:

1. Schedule A. An apportionment agreement between Alberta and Saskatchewan.

2. Schedule B. An apportionment agreement between Saskatchewan and Manitoba.

3. Schedule C. the Prairie Provinces Water Board Agreement describing the composition, functions and duties of the Board.

4. Schedule D. A listing of Orders-in-Council for allocations of interprovincial waters made before 1969.

5. Schedule E. A Water Quality Agreement describing the role of the PPWB in interprovincial water quality management and establishing PPWB Water Quality Objectives for 12 interprovincial river reaches. This Schedule became part of the Master Agreement in 1992. Attachment “A” was updated in July 2015 and in July 2021.

This document contains the Master Agreement on Apportionment along with Schedules to this Agreement. The document also includes the By-Laws and the Rules and Procedures under which the Board operates.

For Further information about the Prairie Provinces Water Board, please contact:
Prairie Provinces Water Board
Suite 1001 - 10th Floor, Alvin Hamilton Building
1783 Hamilton Street
Regina, SK S4P 2B6
Website: www.ppwb.ca

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MASTER AGREEMENT

ON

APPORTIONMENT

MASTER AGREEMENT ON APPORTIONMENT

THIS AGREEMENT is made in quadruplicate this THIRTIETH day of OCTOBER, 1969, A.D.

BETWEEN:

Government of Canada, represented herein by the Minister of Energy, Mines and Resources

(Hereinafter called "Canada")

- and -

Government of Alberta, represented herein by the Minister in charge of Water Resources for Alberta

(Hereinafter called "Alberta")

- and -

Government of Saskatchewan, represented herein by the Minister in charge of The Water Resources Commission Act of the said Province

(Hereinafter called "Saskatchewan")

- and -

Government of Manitoba, represented herein by the Minister in charge of The Water Control and Conservation Branch Act of the said Province

(Hereinafter called "Manitoba")

WHEREAS under natural conditions the waters of the watercourses hereinafter referred to arising in or flowing through the Province of Alberta would flow into the Province of Saskatchewan and under the said conditions the waters of some of the said watercourses arising in or flowing through the Province of Saskatchewan would flow into the Province of Manitoba;

AND WHEREAS the Governor-in-Council has authorized Canada to enter into this agreement by Order-in-Council P.C. 1969-8/2051 dated October 29, 1969, and the Lieutenant Governors-in-Council for Alberta, Manitoba and Saskatchewan, respectively, have authorized them to enter into this agreement by the following Orders-in-Council:

Alberta	- O.C. 2053-69
Manitoba	- O.C. 1359/69
Saskatchewan	- O.C. 1612/69

AND WHEREAS the parties hereto deem it to be in their mutual interest that an agreement be reached among the four parties as to the apportionment as described in the schedules attached hereto of such interprovincial waters among the three Provinces;

AND WHEREAS Alberta and Saskatchewan have entered into an agreement, which agreement is attached to this agreement as Schedule A, that permits the Province of Alberta to make a net depletion of one-half the natural flow of water arising in or flowing through the Province of Alberta and that permits the remaining one-half of the natural flow of each such watercourse to flow into the Province of Saskatchewan, subject to certain exceptions as are set forth in the said agreement;

AND WHEREAS Saskatchewan and Manitoba have entered into an agreement which agreement is attached to this agreement as Schedule B, that permits the Province of Saskatchewan to make a net depletion of one-half the natural flow of water arising in, and one-half of the water flowing into the Province of Saskatchewan, and that permits the remaining one-half of the flow of each such watercourse to flow into the Province of Manitoba, subject to such conditions and agreements as therein contained;

AND WHEREAS the parties are desirous that the Prairie Provinces Water Board (referred to herein as the Board), reconstituted by this agreement will be responsible for the administration of this agreement;

AND WHEREAS the parties hereto recognize the continuing need for consultation and co-operation as between themselves with respect to the matters herein referred to so that the interests of all the parties are best served;

NOW THEREFORE, THIS AGREEMENT (hereinafter known as the Master Agreement) witnesseth that each party agrees as follows:

Interprovincial Agreements

1. Alberta and Saskatchewan agree that the agreement between them (hereinafter called the First Agreement), a copy of which is set out in Schedule A to the Master Agreement, will become binding upon them upon the date that the Master Agreement is executed.

2. Saskatchewan and Manitoba agree that the agreement between them (Hereinafter called the Second Agreement), a copy of which is set out in Schedule B to the Master Agreement, will become binding upon them upon the date that the Master Agreement is executed.

3. The parties agree to the apportionment of water between Alberta and Saskatchewan and Manitoba as provided in the First and Second Agreements and each party agrees to be bound by the said agreements as they relate to apportionment as if it were a party thereto.

4. The parties agree that the First or Second Agreement, or both, may be altered by an agreement in writing among the four parties to the Master Agreement, but not otherwise.

5. The parties agree that the First and Second Agreements will continue in force and effect until cancelled by an agreement in writing among the four parties to the Master Agreement.

Water Quality

6. The parties mutually agree to consider water quality problems; to refer such problems to the Board; and to consider recommendations of the Board thereon.

Groundwater

6.1 The parties mutually agree to consider groundwater matters that have implications affecting transboundary surface and groundwater, to refer such matters to the Board, and to consider recommendations of the Board thereon.

Monitoring

7. The parties agree that the monitoring of the quantity and quality of waters as

specified in the First and Second Agreements, the collection, compilation and publication of water quantity and quality data required for the implementation and maintenance of the provisions of this agreement shall be conducted by Canada, subject to provision of funds being voted by the Parliament of Canada.

Administration

8. The parties agree, subject to Clause 9 of this agreement that it at any time, any dispute, difference or question arises between the parties with respect to this agreement or the construction, meaning and effect thereof, or anything therein, or the rights and liabilities of the parties thereunder or otherwise in respect thereto, then every such dispute, difference or question will be referred for determination to the Federal Court of Canada, Trial Division, under the provisions of the Federal Court Act of Canada and each of the parties hereto agrees to maintain or enact the necessary legislation to provide the Federal Court of Canada with jurisdiction to determine any such dispute, difference, or question in the manner provided under the Federal Court Act of Canada.

9. The parties also agree that the Board, with the consent of the parties in dispute, may cause to be prepared, a factual report of the dispute for consideration by the parties hereto prior to the referral of the dispute to the Federal Court of Canada.

10. The parties agree that the Prairie Provinces Water Board shall monitor and report on the apportionment of waters as set out in the provisions of the First and Second Agreements and ratified by this Master Agreement.

11. The parties agree to revoke the agreement dated July 28, 1948, establishing the Prairie Provinces Water Board and to reconstitute the Prairie Provinces Water Board in the form of Schedule C hereto and the said Schedule shall form and become part of this Master Agreement.

12. Because the Orders-in-Council referred to in Schedule D hereto will become redundant upon the execution of this Master Agreement, the parties agree to take steps to have them revoked.

13. The parties agree for the future application of the provisions of the Master Agreement (and the First and Second Agreements thereunder), to work together and to co-operate to the fullest extent each with the other for the integrated development and use of water and related resources to support economic growth according to selected social goals and priorities and to participate in the formulation and implementation of comprehensive planning and development programs according to their national, regional and provincial interest and impor-tance.

14. No Member of the Parliament of Canada or Member of the Legislative Assemblies of the Provinces party to this agreement shall hold, enjoy, or be admitted to any share or part of any contract, agreement, commission or benefit arising out of this agreement.

IN WITNESS HEREOF Canada has caused its presents to be executed by its Minister of Energy, Mines and Resources, and Alberta has caused its presents to be executed by its Minister in charge of Water Resources, and Saskatchewan has caused its presents to be executed by its Minister in charge of The Water Resources Commission Act, and Manitoba has caused its presents to be

executed by its Minister in charge of The Water Control and Conservation Branch Act of the day and year first mentioned above.

"A. Davidson"
Witness to the signature of the Minister (Energy, Mines and Resources) for Canada

"J.J. Greene"
Minister (Energy, Mines and Resources) for Canada

October 30, 1969
Date

"R.E. Bailey"
Witness to the signature of the Minister in charge of Water Resources for Alberta

"Henry A. Ruste"
Minister in charge of Water Resources for Alberta

October 30, 1969
Date

"Harold W. Pope"
Witness to the signature of the Minister in charge of The Water Resources Commission Act for Saskatchewan

"Allan R. Guy"
Minister in charge of The Water Resources Commission Act for Saskatchewan

October 30, 1969
Date

"Thomas E. Weber"
Witness to the signature of the Minister in charge of The Water Control and Conservation Branch Act for Manitoba

"Leonard S. Evans"
Minister in charge of The Water Control and Conservation Branch Act for Manitoba

October 30, 1969
Date

4th Recital Clause amended on July 5, 1984
Description of the parties amended April 2, 1992

Section 6.1 amended on April 2, 1992

SCHEDULE A

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

SCHEDULE A

THIS AGREEMENT is made in quadruplicate this THIRTIETH day of OCTOBER, 1969, A.D.

BETWEEN:

Alberta, represented herein by the Minister in charge of Water Resources for Alberta

(Hereinafter called "Alberta")

- and -

HER Majesty, the Queen, in right of Saskatchewan, represented herein by the Minister in charge of The Water Resources Commission Act of the said Province

(Hereinafter called "Saskatchewan")

WHEREAS under natural conditions the waters of the watercourses hereinafter referred to arising in or flowing through the Province of Alberta would flow into the Province of Saskatchewan and under the said conditions the waters of some of the said watercourses arising in or flowing through the Province of Saskatchewan would flow into the Province of Manitoba;

AND WHEREAS the parties hereto deem it to be in their mutual interest and in the interest of Manitoba that an agreement in principle be reached among the said three Provinces as to the apportionment of such interprovincial waters among them;

AND WHEREAS the parties hereto are of the opinion that an equitable apportionment of such waters as between the adjoining Provinces of Alberta and Saskatchewan would be to permit the Province of Alberta to make a net depletion of one-half the natural flow of water arising in or flowing through the Province of Alberta and to permit the remaining one-half of the natural flow of water of each such watercourse to flow into the Province of Saskatchewan, subject to certain prior rights as are hereinafter set forth or may hereafter be mutually agreed upon in writing;

AND WHEREAS on the basis of the foregoing apportionment as between the Provinces of Alberta and Saskatchewan the parties hereto are of the opinion that in a similar manner, an equitable apportionment of the remainder of the natural flow of the said watercourses that flow into the Province of Manitoba after permitting the Province of Alberta to make its depletion of one-half thereof would be to permit the Province of Saskatchewan to make a net depletion of one-half of the said remainder and to permit the other one-half thereof to flow into the Province of Manitoba; and that the natural flow of any tributaries to the said water-courses which tributaries join the said watercourses in the Province of Saskatchewan without arising in or first flowing through the Province of Alberta could be apportioned one-half to the Province of Saskatchewan and one-half to the Province of Manitoba in a manner similar to the apportionment of waters as between the Provinces of Alberta and Saskatchewan, in all cases subject to such prior rights as may be mutually acknowledged by the said Provinces of Manitoba and Saskatchewan;

AND WHEREAS the parties hereto recognize the continuing need for

consultation and cooperation as between themselves and with Manitoba with respect to the matters herein referred to so that the best and most beneficial use of the said waters may be made and the interests of all said provinces best served:

NOW THIS AGREEMENT witnesseth as follows:

1. IN THIS AGREEMENT:

(a) "Natural flow" means the quantity of water which would naturally flow in any watercourse had the flow not been affected by human interference or human intervention, excluding any water which is part of the natural flow in Alberta but is not available for the use of Alberta because of the provisions of any international treaty which is binding on Alberta.

(b) “Watercourse” means any river, stream, creek, inter-provincial lake, or other natural channel which, from time to time, carries a flowing body of water from the Province of Alberta to the Province of Saskatchewan, and includes all tributaries of each such river, stream, creek, inter-provincial lake, or other natural channel which do not themselves cross the common boundary be-tween the Provinces of Alberta and Saskatchewan. Such tributaries as do themselves cross the common boundary be-tween the Provinces of Alberta and Saskatchewan shall be deemed to be “watercourses” for the purpose of this agreement.

(c) “Inter-provincial lake” means any lake that is situated on or intersected by the common boundary between the Provinces of Alberta and Saskatchewan which either has no outlet or, if it does have an outlet, drains from time to time into a river, stream, creek, lake, or other natural channel situated in the Province of Saskatchewan, or into a river, stream, creek, lake, or other natural channel situated in Alberta and which carries a flowing body of water from the Province of Alberta to the Province of Saskatchewan”.

2. (a) The parties hereto shall mutually establish a method by which to determine the natural flow of each watercourse flowing across their said common boundary.

(b) For the purpose of this agreement, the said natural flow shall be determined at a point as near as reasonably may be to their said common boundary.

(c) Notwithstanding sub-paragraph (b) the point of which the natural flow of the watercourses known as the South Saskatchewan and Red Deer Rivers is to be determined may be, at the option of Alberta, a point at or as near as reasonably may be below the confluence of the said two rivers.

3. Alberta shall permit a quantity of water equal to one-half the natural flow of each watercourse to flow into the Province of Saskatchewan, and the actual flow shall be adjusted from time to time on an equitable basis during each calendar year, but this shall not restrict or prohibit Alberta from diverting or consuming any quantity of water from any watercourse provided that Alberta diverts water to which it is entitled of comparable quality from other streams or rivers into such watercourse to meet its commitments to Saskatchewan with respect to each watercourse.

4. Notwithstanding paragraph 3 hereof, the following special provisions shall apply as between the parties hereto with respect to the watercourse known as the South Saskatchewan River.

(a) Alberta shall be entitled in each year to consume, or to divert or store for its consumptive use a minimum of 2,100,000 acre-feet net depletion out of the flow of the watercourse known as the South Saskatchewan River even though its share for the said year, as calculated under paragraph 3 hereof, would be less than 2,100,000 acre-feet net depletion, provided however Alberta shall not be entitled to so consume or divert, or store for its consumptive use, more than one-half the natural flow of the said South Saskatchewan watercourse if the effect thereof at any time would be to reduce the actual flow of the said watercourse at the common boundary of the said Provinces of Saskatchewan and Alberta to less than 1,500 cubic feet per second.

(b) The consumption or diversion by Alberta provided for under the preceding sub-paragraph shall be made equitably during each year, depending on the actual flow of water in the said watercourse and the requirements of each Province, from time to time.

5. The parties hereto shall work together and co-operate to the fullest extent, each with the other, for the most effective, economical and beneficial use of waters flowing from the Province of Alberta into the Province of Saskatchewan, including the construction and operation of approved projects of mutual advantage to our Provinces on a cost-share basis proportionate to the benefits derived therefrom by each Province, (the approval of which projects shall not be unreasonably withheld by either of the parties hereto) and shall enter into such other arrangements, agreements or accords with each other, and with the Governments of Canada and other Provinces to best achieve the principles herein agreed upon.

6. Notwithstanding paragraph 3 hereof, with respect to each of the three watercourses known as Battle Creek, Lodge Creek, and Middle Creek, the annual flow shall be apportioned such that, in each of the said watercourses, Alberta permits a quantity of water equal to 75 percent of the natural flow to pass the interprovincial boundary from Alberta to Saskatchewan.

7. If at any time any dispute, difference or question shall arise between the parties or their representatives touching this agreement or the construction, meaning and effect thereof, or anything therein, or the rights or liabilities, of the parties or their representatives thereunder or otherwise in respect thereto then every such dispute, difference or question shall be referred for determination to the Federal Court of Canada under the provisions of the Federal Court Act of Canada, and each of the parties hereto agrees to enact the necessary legislation to provide the Federal Court of Canada with jurisdiction to determine any such dispute, difference or question in the manner provided under the Federal Court Act of Canada.

8. This agreement shall become effective upon the execution of an agreement by Canada, Alberta, Manitoba and Saskatchewan relative to the apportionment of waters referred to in this agreement.

IN WITNESS WHEREOF Alberta has caused these presents to be executed on its behalf by its Minister in charge of Water Resources, and Saskatchewan has caused these presents to be executed by its Minister in charge of The Water Resources Commission Act, both on the day and year first above mentioned.

"R.E. Bailey"

Witness to the signature of the Minister in charge of Water Resources for Alberta

"Henry A. Ruste"

Minister in charge of Water Resources for Alberta

"Harold W. Pope"

Witness to the signature of the Minister in charge of The Water Resources Commission Act

"Allan R. Guy"

Minister in charge of The Water Resources Commission Act

Section 6 amended on July 5, 1984.
Section 1(b), 1(c) and 7 amended on October 1, 1999.

SCHEDULE B

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

SCHEDULE B

THIS AGREEMENT is made in quadruplicate this THIRTIETH day of October, 1969, A.D.

BETWEEN:

HER Majesty, the Queen, in right of Saskatchewan, represented herein by the Minister in charge of The Water Resources Commission Act of the said Province

(Hereinafter called "Saskatchewan)

- and -

HER Majesty, the Queen, in right of Manitoba, represented herein by the Minister in charge of The Water Control and Conservation Branch Act of the said Province

(Hereinafter called "Manitoba")

WHEREAS under natural conditions the waters of the watercourses hereinafter referred to arising in or flowing through the Province of Saskatchewan would flow into the Province of Manitoba;

AND WHEREAS the parties hereto deem it to be in their mutual interest and in the interest of Alberta that an agreement in principle be reached among the said three Provinces as to the apportionment of interprovincial waters among them;

AND WHEREAS the parties hereto are of the opinion that an equitable apportionment of such waters as between the adjoining Provinces of Saskatchewan and Manitoba would be to permit the Province of Saskatchewan to make a net depletion of one-half the natural flow of water arising in, and one-half the flow of water flowing into, the Province of Saskatchewan, and to permit the remaining one-half of the flow of water of each such watercourse to flow into the Province of Manitoba, subject to certain rights as may hereafter be mutually agreed upon in writing;

AND WHEREAS on the basis of the forgoing apportionment as between the Provinces of Saskatchewan and Manitoba, the parties hereto are of the opinion that in a similar manner, an equitable apportionment of the natural flow of the said watercourses arising in or flowing through the Province of Alberta would be to permit the Province of Alberta to make a net depletion of one-half thereof, subject to such prior rights as may be mutually acknowledged by the said Provinces of Alberta, Saskatchewan and Manitoba;

AND WHEREAS the parties hereto recognize the continuing need for consultation and co-operation as between themselves and with Alberta with respect to the matters herein referred to so that the interests of all said Provinces are best served;

NOW THIS AGREEMENT witnesseth as follows:

1. IN THIS AGREEMENT:

(a) "Natural flow' means the quantity of water which would naturally flow in any watercourse had the flow not been affected by human interference or human intervention.

(b) “Watercourse” means any river, stream, creek, inter-provincial lake, or

other natural channel which, from time to time, carries a flowing body of water from the Province of Saskatchewan to the Province of Manitoba, and includes all tributaries of each such river, stream, creek, inter-provincial lake, or other natural channel which do not themselves cross the common boundary between the Provinces of Saskatchewan and Manitoba. Such tributaries as do themselves cross the common boundary between the Provinces of Saskatchewan and Manitoba shall be deemed to be “watercourses” for the purpose of this agreement".

(c) “Inter-provincial lake” means any lake that is situated on or intersected by the common boundary between the Provinces of Saskatchewan and Manitoba which either has no outlet or, if it does have an outlet, drains from time to time into a river, stream, creek, lake, or other natural channel situated in the Province of Manitoba, or into a river, stream, creek, lake, or other natural channel situated in Saskatchewan and which carries a flowing body of water from the Province of Saskatchewan to the Province of Manitoba.”

2. (a) The parties hereto shall mutually establish a method by which to determine the natural flow of each watercourse flowing across their said common boundary.

(b) For the purpose of this agreement, the said natural flow shall be determined at a point as near as reasonably may be to their said common boundary.

3. Saskatchewan shall permit in each watercourse the following quantity of water to flow into the Province of Manitoba during the period from January 1 of each year to the following December 31 of that year, a quantity of water equal to the natural flow for that period determined at the point referred to in paragraph 2(b) hereof, less:

(a) one-half the water flowing into the Province of Saskatchewan in that watercourse from the Province of Alberta; and

(b) any water which would form part of the natural flow in that watercourse but does not flow into the Province of Saskatchewan because of the implementation of any provision of any subsisting water apportionment agreement made between Alberta and Saskatchewan and approved by Manitoba; and

(c) one-half of the natural flow arising in the Province of Saskatchewan.

The actual flow shall be adjusted from time to time by mutual agreement on an equitable basis during such period but this shall not restrict or prohibit Saskatchewan from diverting, storing or consuming any quantity of water from any watercourse, provided that Saskatchewan diverts water to which it is entitled of comparable quality from other streams or rivers into such watercourse to meet its commitments to Manitoba with respect to each watercourse.“

4. Saskatchewan shall be entitled during such period to consume or to divert or store for its consumptive use the water it is not required to permit to flow into Manitoba in each watercourse under paragraph 3 hereof, but such consumption or diversion shall be made equitably depending on the actual flow of water in each watercourse and the requirements of each Province from time to time, but Saskatchewan shall permit sufficient water to flow into Manitoba to meet its commitments during such period under paragraph 3 hereof.

5. The parties hereto shall work together and co-operate to the fullest extent,

each with the other, for the use of waters flowing from the Province of Saskatchewan into the Province of Manitoba, including the construction and operation of approved projects of mutual advantage to the said Provinces on a cost-share basis proportionate to the benefits derived therefrom by each Province (the approval of which projects shall not be unreasonably withheld by either of the parties hereto) and shall enter into such other arrangements, agreements or accords with each other, and with the Governments of Canada and other Provinces to best achieve the principles herein agreed upon.

6. If at any time any dispute, difference or question shall arise between the parties or their representatives touching this agreement or the construction, meaning and effect thereof, or anything therein, or the rights or liabilities of the parties or their representatives thereunder or otherwise in respect thereto then every such dispute, difference or question shall be referred for determination to the Federal Court of Canada under the provisions of the Federal Court Act of Canada, and each of the parties hereto agrees to maintain or enact the necessary legislation to provide the Federal Court of Canada with jurisdiction to determine any such dispute, difference or question in the manner provided under the Federal Court Act of Canada.

7. This agreement shall become effective upon the execution of an agreement by Canada, Alberta, Manitoba and Saskatchewan relative to the apportionment of waters referred to in this agreement.

IN WITNESS WHEREOF Saskatchewan has caused these presents to be executed by its Minister in charge of The Water Resources Commission Act, and Manitoba has caused these presents to be executed by its Minister in charge of The Water Control and Conservation Branch Act on the day and year first above mentioned.

"Harold W. Pope"
Witness to the signature of the Minister in charge of The Water Resources Commission Act

"Allan R. Guy"
Minister in charge of The Water Resources Commission Act

"Thomas E. Weber"
Witness to the signature of the Minister in charge of The Water Control and Conservation Branch Act

"Leonard S. Evans"
Minister in charge of The Water Control and Conservation Branch Act.

Sections 1(b), 1(c), 3 and 6 amended on October 1, 1999.

SCHEDULE C

(Prairie Provinces Water Board Agreement)

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

SCHEDULE C

PRAIRIE PROVINCES WATER BOARD AGREEMENT

THIS AGREEMENT made this THIRTIETH day of OCTOBER, 1969, A.D.

BETWEEN:

THE GOVERNMENT OF CANADA, (hereinafter called "Canada")

- and -

THE GOVERNMENT OF MANITOBA, (hereinafter called "Manitoba")

- and -

THE GOVERNMENT OF SAS-KATCHEWAN,
(hereinafter called "Saskatchewan")

- and -

THE GOVERNMENT OF ALBERTA, (hereinafter called "Alberta")

1. Manitoba, Saskatchewan, Alberta and Canada agree to establish and there is hereby established a Board to be known as the Prairie Provinces Water Board to consist of five members to be appointed as follows:

(a) two members to be appointed by the Governor General in Council, one of whom shall be Chairman of the Board, on the recommendation of the Minister of Energy, Mines and Resources,

(b) one member to be appointed by the Lieutenant Governor in Council of each of the Provinces of Manitoba, Saskatchewan and Alberta.

2. Functions

The Board shall oversee and report on the Master Agreement (including the First and Second Agreements thereunder) executed by Canada, Alberta, Manitoba and Saskatchewan for the apportionment of waters flowing from one province into another province; shall take under consideration, comprehensive planning, water quality management including the mandate in respect of interprovincial management of water quality described in paragraph 2 of Schedule "E" and other questions pertaining to water resource management referred to it by the parties hereto; shall recommend appropriate action to investigate such matters and shall submit recommendations for their resolution to the parties hereto.

3. Composition of Board

The members of the Board shall be chosen from those engaged in the administration of water resources or related duties for Manitoba, Saskatchewan, Alberta or Canada, as the case may be, and shall serve as members of the Board in addition to their other duties.

4. Duties of the Board

In accordance with its functions, the duties of the Board shall be as follows:

(a) to review, collate, and analyze streamflow data and prepare reports and recommendations on the apportionment of water,

(b) to review water quality

problems, particularly such problems located at the interprovincial boundaries, and to recommend to the parties hereto, appropriate management approaches for their resolution including the establishment of new institutional arrangements,

(c) to develop recommendations on other water matters, in addition to problems on water quality, referred to the Board by any party hereto including the review and analysis of existing information and the requesting of additional studies and assistance by appropriate governmental agencies to provide information for formulating its recommendations,

(d) to promote through consultation and the exchange of information the integrated development of water resources of interprovincial streams,

(e) to cause to be prepared with the consent of the parties involved factual reports on disputes arising out of the water apportionment for consideration by the parties hereto,

(f) to ensure the co-ordination of such technical programs as water quantity and quality monitoring and streamflow forecasting required for the effective apportionment of water,

(g) to comply with the list of duties described in paragraph 8 of Schedule E concerning its water quality mandate.

5. Confirmation of the Board's Recommendations

A recommendation of the Board with respect to any matters referred to it under Section 2 shall, subject to the Master Agreement for the apportionment of water, become effective when adopted by Orders-in-Council passed by Canada and each of the Provinces.

6. Authority of Board

The Board shall have authority to correspond with all Governmental organizations and other sources of information in Canada or abroad concerned with the administration of water resources, and such other authority as may be conferred on the Board from time to time by agreement between the parties hereto; all agencies of the four governments having to do with the water and associated resources in the area covered by the Agreement shall be required to supply the Board with all data in their possession requested by the Board.

7. Records

The records relating to the water resources of the three provinces collected and compiled by the P.F.R.A. organization at Regina shall be made available to the Board.

8. Meetings of the Board

The Board shall meet at the call of the Chairman and meetings shall be called at least twice annually; the expenses of the members shall be borne by their respective governments.

9. Reports

The Board shall submit an annual progress report outlining work done and work contemplated in the agreed program to each of the responsible Ministers of the parties hereto and such other reports as may be requested by any one of such Ministers.

10. Operation of the Board

The Executive Director for the Board and

such other technical and clerical staff as may be required, shall be Federal or Provincial public servants with office headquarters located in a city within one of the prairie provinces as designated from time to time by the Board. The cost of administration, excluding the cost of monitoring as described in Section 7 of the Master Agreement, but including staff, accommodation, supplies and incidental expenses of the Board, shall be borne by the parties hereto on the basis of one-half by Canada and one-sixth by each of the Provinces. The Board shall prepare, for the approval of the parties hereto, work program, staff requirements, annual budgets and 5 year forecasts and such other reports as may be required for the operation of the Board.

11. Any water development project already constructed or to be constructed by any one of the parties shall be so operated as to maintain the apportionment of water as set out in the Master Agreement (and the First and Second Agreements thereunder) for the apportionment of waters of interprovincial streams.

Sections 2 and 4(g) amended April 2, 1992

Section 10 amended on October 1, 1999

SCHEDULE D

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

SCHEDULE D

PREVIOUS ALLOCATIONS OF INTERPROVINCIAL WATERS
APPROVED BY ORDERS-IN-COUNCIL BY THE GOVERNMENTS OF
CANADA, ALBERTA, MANITOBA, AND SASKATCHEWAN

	Order-in-Council			
Item	Canada	Alberta	Saskatchewan	Manitoba
Allocation of water for specific projects in Alberta	4030/49	857/49	1307/51	1121/49
Allocation of water for specific projects in Saskatchewan	1874/51	1091/51	1310/51	1264/51
Allocation of water for South Saskatchewan River Project in Saskatchewan	973/53 924/53	991/53	1271/53	

SCHEDULE E

(AGREEMENT ON WATER QUALITY)

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

SCHEDULE E

AGREEMENT ON WATER QUALITY

THIS AGREEMENT made this SECOND day of APRIL, A.D. 1992.

BETWEEN:

The Government of Canada, as represented by the Minister of the Environment, (hereinafter called "Canada")

-and-

The Government of Alberta, as represented by the Minister of the Environment and by the Minister of Federal and Intergovernmental Affairs, (hereinafter called "Alberta")

-and-

The Government of Manitoba, as represented by the Minister of Natural Resources, (hereinafter called "Manitoba")

- and -

The Government of Saskatchewan, as represented by the Minister for the Saskatchewan Water Corporation, (hereinafter called "Saskatchewan").

WHEREAS under natural conditions the waters of the watercourses hereinafter referred to arising in or flowing through the Province of Alberta would flow into the Province of Saskatchewan and under the said conditions the waters of some of the said watercourses arising in or flowing through the Province of Saskatchewan would flow into the Province of Manitoba;

AND WHEREAS the water quality of the said watercourses is important to the social and economic development as well as the environmental and public protection of all of the parties to this Agreement;

AND WHEREAS the parties entered into an agreement dated October 30, 1969, and an Amending Agreement on April 30, 1984, collectively referred to herein as the "Master Agreement", providing for the apportionment of water in watercourses arising in or flowing through the Provinces of Alberta, Saskatchewan, and Manitoba and providing for the reconstitution of the Prairie Provinces Water Board, hereinafter referred to as the "Board", which is responsible for the administration of the Master Agreement;

AND WHEREAS the parties have in paragraph 6 of the Master Agreement agreed to consider water quality problems, to refer such problems to the Board, and to consider recommendations of the Board thereon;

AND WHEREAS, in furtherance of the provisions of paragraph 6 of the Master Agreement, and on the recommendation of the Board, the parties consider it is in their mutual interest that an agreement be entered into on certain water quality objectives for the water in the said watercourses;

AND WHEREAS the parties intend to define the mandate of the Board in respect of interprovincial management of water quality of the said watercourses;

NOW THEREFORE THIS AGREEMENT witnesseth that the parties mutually agree as follows:

DEFINITIONS

1. IN THIS AGREEMENT:

(a) "aquatic environment" means water and the environment containing all living things upon or in water including all bottom substrates and physical, chemical and biological constituents;

(b) "ecosystem" means a system made up of a community of animals, plants and microbes and its interrelated physical and chemical environment;

(c) "interprovincial water quality management" means management of the water in accordance with the water quality objectives agreed to herein by the parties as set out in the Tables referred to in Attachment "A";

(d) "monitoring" means the process of developing plans for the collection of samples from the aquatic environment, conducting analyses and interpretation of data that is provided by Canada pursuant to paragraph 7 of the Master Agreement;

(e) "objective" means a numerical concentration or narrative statement of limit or limits, to a chemical, physical or biological variable within a river reach, that will support and protect uses of water, as such limit or limits are more particularly specified in each of the Tables referred to in Attachment A annexed hereto and forming a part hereof;

(f) "river reach" means each section of a river of a predetermined length that is identified in Attachment A;

(g) "watercourse" means any river, stream, creek, or other natural channel which from time to time carries a flowing body of water from the Province of Alberta to the Province of Saskatchewan, or from the Province of Saskatchewan to the Province of Manitoba, and includes all tributaries of each such river, stream, creek or natural channel which do not themselves cross the common boundary between the Provinces of Alberta, Saskatchewan, and Manitoba. Such tributaries as do themselves cross the said common boundaries between the Provinces of Alberta, Saskatchewan, and Manitoba shall be deemed to be "watercourses" for the purpose of this Agreement.

WATER QUALITY MANDATE

2. The mandate of the Board with respect to water quality in the watercourses shall be to foster and facilitate interprovincial water quality management among the parties that encourages the protection and restoration of the aquatic environment.

WATER QUALITY OBJECTIVES

3. The objectives specified in the Tables that are referred to in Attachment A are considered by the parties to be appropriate and acceptable water quality objectives in each river reach.

4. If the concentration of a chemical, physical or biological variable in a river reach, as a result of human activities, is not within the acceptable limit or limits when compared to the agreed objective for that chemical, physical or biological variable, reasonable and practical measures will be taken by the party in whose jurisdiction the chemical, physical or biological variable originates so that the quality of the water in the river reach is within the acceptable limit or limits.

5. If the concentration of a chemical, physical or biological variable in a river reach is within the acceptable limit or limits when compared to the agreed objective for that chemical, physical or biological variable, and if trend analysis or an assessment of the impact of a proposed development indicates

that water quality has been or may be significantly altered within the acceptable limit or limits, the parties shall agree as to the reasonable and practical measures that will be taken by the party in whose jurisdiction the chemical, physical or biological variable originates to endeavour to maintain the water quality in the river reach.

6. The objectives for each river reach should be reviewed on a periodic basis of at least every five (5) years.

7. Attachment "A" hereto and the numbered Tables may be amended, from time to time, by the written agreement of all the Ministers, which amendment shall be effective on the date and year of execution by the Minister last signing.

WATER QUALITY DUTIES OF THE BOARD

8. The duties of the Board with respect to its water quality mandate shall be as follows:

(a) monitoring the quality of the aquatic environment in the river reaches and making comparisons with the objectives established herein;

(b) providing a written report to the parties annually, and from time to time as the Board considers necessary, on the quality of the water in the river reaches, and providing such other reports or information as may be requested by any of the parties to this Agreement;

(c) reviewing the appropriateness of the objectives and making recommendations to the parties based on available water quality data and scientific information;

(d) promoting through consultation and the exchange of information the establishment by the parties of compatible water quality objectives in the Provinces of Alberta, Saskatchewan and Manitoba;

(e) promoting through consultation and the exchange of information a preventive and proactive ecosystem approach to interprovincial water quality management; and

(f) promoting through consultation and the exchange of information the recognition of the interdependence of quality and quantity of water in the management of the watercourses.

9. This Agreement shall take effect on the date and year of execution by the party last signing, and shall continue in full force and effect until termination of the Master Agreement, or upon any of the parties giving one year's notice to the other parties of their intention to withdraw from this Agreement.

10. The headings used in this Agreement are for convenience only and are not to be considered a part of this Agreement and do not in any way limit or amplify the terms and provisions of this Agreement.

11. No member of the Parliament of Canada or Member of the Legislative Assemblies of the Provinces party to this Agreement shall hold, enjoy, or be admitted to any share or part of any contract, agreement, commission or benefit arising out of this Agreement.

IN WITNESS WHEREOF Alberta has caused these presents to be executed by the Minister of the Environment and the Minister of Federal and Intergovernmental Affairs, and Manitoba has caused these presents to be executed by the Minister of Natural Resources, and Saskatchewan has caused these presents to be executed by the Minister responsible for the Saskatchewan Water Corporation, and Canada has caused these presents to be executed by the Minister of the Environment, on the day and year first mentioned above.

Affairs Act

"James D. Horsman"
Minister of Federal and Intergovernmental Affairs

March 11, 1992
Date

THE GOVERNMENT OF CANADA

"T. Price" per: "Jean J. Charest"
Witness Minister of the Environment

January 23, 1992
Date

THE GOVERNMENT OF ALBERTA

"S. Burns" per: "Ralph Klein"
Witness Minister of the Environment

February 21, 1992
Date

Approved Pursuant to the Alberta Department of Federal and Intergovernmental

THE GOVERNMENT OF SASKATCHEWAN

"J. Samuelson" per: "Darrel Cunningham"
Witness Minister responsible for the Saskatchewan Water Corporation

March 25, 1992
Date

THE GOVERNMENT OF MANITOBA

"L.J. Whitney" per: "Harry Enns"
Witness Minister of Natural Resources

April 2, 1992
Date

2021

MINISTERIAL SIGNATURES TO UPDATE ATTACHMENT "A" AND TABLES OF WATER QUALITY OBJECTIVES

The Ministers for the member jurisdictions of the Prairie Provinces Water Board (PPWB) hereby approve the updated 2021 Water Quality Objectives attached hereto as Attachment "A". Attachment "A" replaces the 2015 Water Quality Objectives set out in Attachment "A" of Appendix 1 to Schedule E.

IN WITNESS WHEREOF Alberta has caused these presents to be executed by the Minister of Environment and Parks and by Intergovernmental Relations pursuant to the *Government Organization Act*, and Saskatchewan has caused these presents to be executed by the Minister Responsible for the Saskatchewan Water Security Agency, and Manitoba has caused these presents to be executed by the Minister of Agriculture and Resource Development, and Canada has caused these presents to be executed by the Minister of Environment and Climate Change, on the day and year of execution by the party last signing.

THE GOVERNMENT OF CANADA

per: "Jonathan Wilkinson"
Minister of Environment and Climate Change

December 23, 2020
Date

THE GOVERNMENT OF ALBERTA

per: "Jason Nixon"
Minister of Environment and Parks

March 30, 2021
Date

Approved pursuant to the *Government Organization Act*:

per: "Coleen Volk"
Intergovernmental Relations, Executive Council

April 29, 2021
Date

THE GOVERNMENT OF SASKATCHEWAN

per: "Joe Hargrave"
Minister Responsible for the Saskatchewan Water Security Agency

December 16, 2020
Date

THE GOVERNMENT OF MANITOBA

per: "Ralph Eichler"
Minister of Agriculture and Resource Development

July 26, 2021
Date

ATTACHMENT "A"

To Schedule E
(LISTING OF RIVER REACHES AND REFERENCES TO TABLES OF WATER QUALITY OBJECTIVES)

RIVER	REACH (predetermined length)	TABLE LISTING WATER QUALITY OBJECTIVES (for River Reach)
Beaver River	Beaver Crossing to the Border	1
North Saskatchewan River	Lea Park to Lloydminster Ferry	2
Red Deer River A/S	Bindloss to the Confluence with the South Saskatchewan River	3
South Saskatchewan River	Highway #41 to Confluence with Red Deer River	4
Battle River	Blackfoot Creek to Unwin	5
Churchill River	Islands Falls to Pukatawagan Lake	6
Saskatchewan River	Outlet of Cumberland Lake to Mouth of Carrot River	7
Carrot River	Turnberry to Mouth of Carrot River	8
Red Deer River S/M	Etomami River to Red Deer Lake	9
Assiniboine River	Whitesand River to Outlet of Shellmouth Reservoir	10
Qu'Appelle River	Kaposvar Creek to Assiniboine River	11
Cold River	Outlet of Cold Lake	12

Table 1

WATER QUALITY OBJECTIVES – Updated 2021			
Beaver River Reach: Beaver Crossing to the Border			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.171	0.127
Total Dissolved Phosphorus	mg/L	0.043	0.042
		0.060	0.060
Total Nitrogen	mg/L	1.140	1.862
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.19	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	No Objective	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	3.0-48.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	40.0	2270.0
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg\cdot L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg\cdot L\text{-}1)] + 4.625)}$.

Table 2

WATER QUALITY OBJECTIVES – Updated 2021			
North Sask. River Reach: Lea Park to Lloydminster Ferry			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.253	0.063
		0.278	0.115
Total Dissolved Phosphorus	mg/L	0.026	0.048
		0.046	0.101
Total Nitrogen	mg/L	1.169	1.175
		1.230	1.225
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.0-295.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(\log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $\exp^{(0.947[\ln(\text{hardness mg·L-1})] - 0.815[pH] + 0.398[\ln(\text{DOC mg·L-1})] + 4.625)}$.

Table 3

WATER QUALITY OBJECTIVES – Updated 2021			
Red Deer River A/S Reach: Bindloss to Confluence with the S. Sask. River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.315	0.035
		0.563	0.069
Total Dissolved Phosphorus	mg/L	0.023	0.008
		0.035	0.024
Total Nitrogen	mg/L	2.320	0.860
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.2	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	30.0-832.6	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calaculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
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Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg{\cdot}L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg{\cdot}L\text{-}1)] + 4.625)}$.

Table 4

WATER QUALITY OBJECTIVES – Updated 2021			
South Sask. River Reach: Highway #41 to Confluence with Red Deer River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.159	0.054
		0.246	0.110
Total Dissolved Phosphorus	mg/L	0.014	0.010
		0.018	0.067
Total Nitrogen	mg/L	1.073	1.638
		1.114	1.771
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.19	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.6-339.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(\log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $\exp(0.947[\ln(\text{hardness mg·L-1})] - 0.815[pH] + 0.398[\ln(\text{DOC mg·L-1})] + 4.625)$.

Table 5

WATER QUALITY OBJECTIVES – Updated 2021			
Battle River Reach: Blackfoot Creek to Unwin			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.267	0.075
		0.335	0.100
Total Dissolved Phosphorus	mg/L	0.051	0.045
Total Nitrogen	mg/L	2.260	1.550
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	872	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.31	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	No Objective	
Sodium Adsorption Ratio	rel units	No Objective	
Total Suspended Solids	mg/L	5.0 - 320.0	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	27.0	1257.0
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg{\cdot}L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg{\cdot}L\text{-}1)] + 4.625)}$.

Table 6

WATER QUALITY OBJECTIVES – Updated 2021			
Churchill River Reach: Island Falls to Pukatawagan Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.025	0.021
Total Dissolved Phosphorus	mg/L	0.010	0.010
Total Nitrogen	mg/L	0.484	0.411
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.12	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	2.2-6.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detecetions
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg{\cdot}L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg{\cdot}L\text{-}1)] + 4.625)}$.

Table 7

WATER QUALITY OBJECTIVES – Updated 2021			
Saskatchewan River Reach: Outlet of Cumberland Lake to Mouth of Carrot River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.088	0.028
		0.124	0.034
Total Dissolved Phosphorus	mg/L	0.014	0.011
		0.018	0.017
Total Nitrogen	mg/L	0.838	0.761
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	27.0 - 125.0	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calaculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg{\cdot}L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg{\cdot}L\text{-}1)] + 4.625)}$.

Table 8

WATER QUALITY OBJECTIVES – Updated 2021			
Carrot River Reach: Turnberry to Mouth of Carrot River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.099	0.170
		0.140	0.266
Total Dissolved Phosphorus	mg/L	0.027	0.031
		0.057	0.059
Total Nitrogen	mg/L	1.087	1.814
		1.417	2.052
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	742	1672
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	164	442
Fluoride Dissolved	mg/L	0.2	0.29
Chloride Dissolved	mg/L	267	728
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	No Objective	
Sodium Adsorption Ratio	rel units	No Objective	
Total Suspended Solids	mg/L	6.08 -98.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	No Objective	
Arsenic Dissolved	µg/L	50	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	237.2	2121.0
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	271.8	2014.0
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg{\cdot}L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg{\cdot}L\text{-}1)] + 4.625)}$.

Table 9

WATER QUALITY OBJECTIVES – Updated 2021			
Red Deer River S/M Reach: Etomami River to Red Deer Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.052	0.074
		0.066	0.161
Total Dissolved Phosphorus	mg/L	0.021	0.025
		0.029	0.055
Total Nitrogen	mg/L	1.195	1.998
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	1.0 - 19.7	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $\exp(^{0.947[ln(hardness\ mg\cdot L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg\cdot L\text{-}1)] + 4.625)}$.

Table 10

WATER QUALITY OBJECTIVES – Updated 2021			
Assiniboine River Reach: Whitesand River to Outlet of Shellmouth Reservoir			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.311	0.180
Total Dissolved Phosphorus	mg/L	0.186	0.115
Total Nitrogen	mg/L	1.801	2.252
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	834	
Sulphate Dissolved	mg/L	299	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.26	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.0-69.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	224.8	329.0
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolvedl	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption
Background

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp(^{0.947[ln(hardness\ mg\cdot L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg\cdot L\text{-}1)] + 4.625)}$.

Table 11

WATER QUALITY OBJECTIVES – Updated 2021			
Qu'Appelle River Reach: Kaposvar Creek to Assiniboine River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.278	0.221
		0.304	0.290
Total Dissolved Phosphorus	mg/L	0.156	0.129
		0.190	0.249
Total Nitrogen	mg/L	1.822	1.767
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	1144	
Sulphate Dissolved	mg/L	486	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.25	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	No Objective	
Total Suspended Solids	mg/L	22.6 -122.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	No Objective	
Arsenic Dissolved	µg/L	50	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	93.8	116.8
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calaculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
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Ag-Irrigation + Treatability
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Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg\cdot L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg\cdot L\text{-}1)] + 4.625)}$.

Table 12

WATER QUALITY OBJECTIVES – Updated 2021			
Cold River Reach: Outlet of Cold Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.023	0.024
Total Dissolved Phosphorus	mg/L	0.010	0.017
Total Nitrogen	mg/L	0.453	0.452
		0.460	0.467
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.12	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	1.2-4.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.25	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Dissolved	µg/L	Calculated[b]	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
AMPA	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

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b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $Cadmium = 10^{(0.83(log[hardness]) - 2.46)}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[ln(hardness)]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[ln(hardness)]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[ln(hardness)]+2.255\}}$. Zinc dissolved is calculated using Zinc = $exp^{(0.947[ln(hardness\ mg\cdot L\text{-}1)] - 0.815[pH] + 0.398[ln(DOC\ mg\cdot L\text{-}1)] + 4.625)}$.

AMENDING AGREEMENT

TO THE

MASTER AGREEMENT

ON

APPORTIONMENT

AND TO

SCHEDULE "C" THERETO

(APRIL 2, 1992)

AMENDING AGREEMENT TO THE MASTER AGREEMENT ON APPORTIONMENT AND TO SCHEDULE "C" THERETO

This Amending Agreement made this SECOND day of APRIL, A.D. 1992 .

BETWEEN:

The Government of Canada, as represented by the Minister of Environment, (hereinafter called "Canada")

-and-

The Government of Alberta, as represented by the Minister of the Environment and by the Minister of Federal and Intergovernmental Affairs, (hereinafter called "Alberta")

-and-

The Government of Manitoba, as represented by the Minister of Natural Resources, (hereinafter called "Manitoba")

-and-

The Government of Saskatchewan, as represented by the Minister responsible for the Saskatchewan Water Corporation, (hereinafter called "Saskatchewan")

WHEREAS the parties entered into an agreement dated October 30, 1969, and an Amending Agreement on April 30, 1984, collectively referred to herein as the "Master Agreement", providing for the apportionment of water in watercourses arising in or flowing through the Provinces of Alberta, Saskatchewan, and Manitoba and providing for the reconstitution of the Prairie Provinces Water Board, hereinafter referred to as the "Board", which is responsible for the administration of the Master Agreement;

AND WHEREAS the parties desire to further amend the Master Agreement with respect to water quality and groundwater matters;

AND WHEREAS the Governor-in-Council has authorized Canada to enter into this Amending Agreement by Order-in-Council P.C. 1991-2101 dated 31 October, 1991 and the Lieutenant Governors-in-Council for Alberta, Manitoba and Saskatchewan, respectively, have authorized the respective parties to enter into this Amending Agreement by the following Orders in Council:

	DATED
Alberta - O.C. 525/91	August 15, 1991
Manitoba - O.C. 885/91	October 2, 1991
Saskatchewan - O.C. 91/843	Sept. 13, 1991

NOW THEREFORE, in consideration of the mutual agreements and covenants hereinafter contained, the parties hereto agree as follows:

1. The Master Agreement is hereby amended as follows:

(a) The description of the parties is amended by substituting the words "Her Majesty, the Queen, in right of", with the words "Government of" wherever they appear; and

(b) by adding the heading "Groundwater" and paragraph 6.1 immediately after

paragraph 6 as follows:

"Groundwater

6.1 The parties mutually agree to consider groundwater matters that have implications affecting transboundary surface and groundwater, to refer such matters to the Board, and to consider recommendations of the Board thereon."

2. Schedule "C" to the Master Agreement is amended as follows:

(a) by deleting therefrom paragraph 2 and substituting therefore the following:

"2. The Board shall oversee and report on the Master Agreement (including the First and Second Agreements thereunder) executed by Canada, Alberta, Manitoba and Saskatchewan for the apportionment of waters flowing from one province into another province; shall take under consideration, comprehensive planning, water quality management including the mandate in respect of interprovincial management of water quality described in paragraph 2 of Schedule "E" and other questions pertaining to water resource management referred to it by the parties hereto; shall recommend appropriate action to investigate such matters and shall submit recommendations for their resolution to the parties hereto."

(b) by adding to paragraph 4 subparagraph (g) as follows:

"4(g). to comply with the list of duties described in paragraph 8 of Schedule E concerning its water quality mandate."

3. Schedule "E" a copy of which is annexed hereto is added as a Schedule to the Master Agreement;

4. In all other respects the terms and provisions of the Master Agreement and the Schedules thereto shall continue in full force and effect.

5. No member of the Parliament of Canada or Member of the Legislative Assemblies of the Provinces party to this Agreement shall hold, enjoy, or be admitted to any share or part of any contract, agreement, commission or benefit arising out of this Agreement.

6. This Amending Agreement enures to the benefit of and is binding on the parties and their respective successors and assigns, and shall be effective as at the date and year of execution by the party last signing.

IN WITNESS WHEREOF Alberta has caused these presents to be executed by the Minister of the Environment and the Minister of Federal and Intergovernmental Affairs, and Manitoba has caused these presents to be executed by the Minister of Natural Resources, and Saskatchewan has caused these presents to be executed by the Minister responsible for the Saskatchewan Water Corporation, and Canada has caused these presents to be executed by the Minister of the Environment, on the day and year first mentioned above.

THE GOVERNMENT OF CANADA

"T. Price" per: "Jean J. Charest"
Witness Minister of the Environment

January 23, 1992
Date

THE GOVERNMENT OF ALBERTA

"S. Burns" per: "Ralph Klein"
Witness Minister of the

Environment

February 21, 1992
Date

Approved Pursuant to the Alberta Department of Federal and Intergovernmental Affairs Act

"James D. Horsman"
Minister of Federal and Intergovernmental Affairs

March 11, 1992
Date

THE GOVERNMENT OF SASKATCHEWAN

"J. Samuelson" per: "Darrel Cunningham"
Witness Minister responsible for the Saskatchewan Water Corporation

March 25, 1992
Date

THE GOVERNMENT OF MANITOBA

"L.J. Whitney" per: "Harry Enns"
Witness Minister of Natural Resources

April 2, 1992
Date

AMENDING AGREEMENT

TO THE MASTER

AGREEMENT ON

APPORTIONMENT

AND TO SCHEDULES A, B,

AND C THERETO

(OCTOBER 1, 1999)

THIS AGREEMENT made as of the 1st day of October, 1999

B E T W E E N: HER MAJESTY THE QUEEN in right of CANADA, (hereinafter called **"Canada"**), as represented by the Minister of the Environment (hereinafter called "the Federal Minister"),

AND

HER MAJESTY THE QUEEN in right of ALBERTA, (hereinafter called **"Alberta"**), as represented by the Minister of Environmental Protection (hereinafter called "the Alberta Minister")

AND

HER MAJESTY THE QUEEN in right of MANITOBA, (hereinafter called **"Manitoba"**), as represented by the Minister of Natural Resources (hereinafter called "the Manitoba Minister")

AND

HER MAJESTY THE QUEEN in right of SASKATCHEWAN, (hereinafter called **"Saskatchewan"**), as represented by the Minister responsible for the Saskatchewan Water Corporation (hereinafter called "the Saskatchewan Minister")

WHEREAS the parties entered into an agreement dated October 30, 1969, and an Amending Agreement on April 30, 1984, and a second Amending Agreement on April 2, 1992, all of which are collectively described herein as "the Master Agreement", providing for the apportionment of water in watercourses arising in or flowing through the Provinces of Alberta, Saskatchewan, and Manitoba and providing for the reconstitution of the Prairie Provinces Water Board, hereinafter referred to as "the Board", which Board is responsible for the administration of the Master Agreement;

AND WHEREAS the parties desire to further amend the Master Agreement with respect to inter-provincial lakes, and as otherwise provided hereinafter;

AND WHEREAS the Governor-in-Council has authorized Canada to enter into this Amending Agreement by Order-in-Council P.C. 1998- 2252, dated December 16, 1998, and the Lieutenant Governors-in-Council for Manitoba and Saskatchewan, respectively, have authorized the respective Provinces to enter into this Amending Agreement by the following Orders-in-Council:

	Order	Dated
Manitoba	O.C.369/98	Jul 15, 1998
Saskatchewan	O.C.478/99	Oct 1, 1999

and Alberta may enter into and be bound by this Amending Agreement without the need of a further Order-in-Council;

NOW THEREFORE, in consideration of the mutual covenants and agreements herein contained and subject to the terms and conditions hereinafter set out, the parties hereto agree as follows:

1. Schedule "A" to the Master Agreement is amended by deleting therefrom paragraph 1. (b) and substituting therefore the following:

"(b) "Watercourse" means any river, stream, creek, inter-provincial lake, or other natural channel which, from time to time, carries a flowing body of water from the Province of Alberta to the Province of Saskatchewan, and includes all tributaries of each such river, stream, creek, inter-provincial lake, or other natural channel

which do not themselves cross the common boundary between the Provinces of Alberta and Saskatchewan. Such tributaries as do themselves cross the common boundary between the Provinces of Alberta and Saskatchewan shall be deemed to be "watercourses" for the purpose of this agreement."

2. Schedule "A" to the Master Agreement is further amended by adding after the amended paragraph 1. (b) the following:

"(c) "Inter-provincial lake" means any lake that is situated on or intersected by the common boundary between the Provinces of Alberta and Saskatchewan which either has no outlet or, if it does have an outlet, drains from time to time into a river, stream, creek, lake, or other natural channel situated in the Province of Saskatchewan, or into a river, stream, creek, lake, or other natural channel situated in Alberta and which carries a flowing body of water from the Province of Alberta to the Province of Saskatchewan".

3. Schedule "B" to the Master Agreement is amended by deleting therefrom paragraph 1. (b) and substituting therefore the following:

"(b) "Watercourse" means any river, stream, creek, inter-provincial lake, or other natural channel which, from time to time, carries a flowing body of water from the Province of Saskatchewan to the Province of Manitoba, and includes all tributaries of each such river, stream, creek, inter-provincial lake, or other natural channel which do not themselves cross the common boundary between the Provinces of Saskatchewan and Manitoba. Such tributaries as do themselves cross the common boundary between the Provinces of Saskatchewan and Manitoba shall be deemed to be "watercourses" for the purpose of this agreement".

4. Schedule "B" to the Master Agreement is further amended by adding after the amended paragraph 1. (b) the following:

"(c) "Inter-provincial lake" means any lake that is situated on or intersected by the common boundary between the Provinces of Saskatchewan and Manitoba which either has no outlet or, if it does have an outlet, drains from time to time into a river, stream, creek, lake, or other natural channel situated in the Province of Manitoba, or into a river, stream, creek, lake, or other natural channel situated in Saskatchewan and which carries a flowing body of water from the Province of Saskatchewan to the Province of Manitoba."

5. Schedule "B" to the Master Agreement is further amended by deleting therefrom paragraph 3. and substituting therefore the following:

"3. Saskatchewan shall permit in each watercourse the following quantity of water to flow into the Province of Manitoba during the period from January 1 of each year to the following December 31 of that year, a quantity of water equal to the natural flow for that period determined at the point referred to in paragraph 2(b) hereof, less:

a) one-half the water flowing into the Province of Saskatchewan in that watercourse from the Province of Alberta; and

b) any water which would form part of the natural flow in that watercourse but does not flow into the Province of Saskatchewan because of the implementation of any provision of any subsisting water apportionment agreement made between Alberta and Saskatchewan and approved by Manitoba; and

c) one-half of the natural flow arising in the Province of Saskatchewan.

The actual flow shall be adjusted from time to time by mutual agreement on an equitable basis during such period but this shall not restrict or prohibit Saskatchewan from diverting, storing or consuming any quantity of water from any watercourse, provided that Saskatchewan diverts water to which it is entitled of comparable quality from other streams or rivers into such watercourse to meet its commitments to Manitoba with respect to each watercourse."

6. Schedule "C" to the Master Agreement is amended by deleting therefrom the existing Clause 10 and substituting therefor the following:

"10. Operation of the Board

The Executive Director for the Board and such other technical and clerical staff as may be required, shall be Federal or Provincial public servants with office headquarters located in a city within one of the prairie provinces as designated from time to time by the Board. The cost of administration, excluding the cost of monitoring as described in Section 7 of the Master Agreement, but including staff, accommodation, supplies and incidental expenses of the Board, shall be borne by the parties hereto on the basis of one-half by Canada and one-sixth by each of the Provinces. The Board shall prepare, for the approval of the parties hereto, work program, staff requirements, annual budgets and 5 year forecasts and such other reports as may be required for the operation of the Board."

7. The Master Agreement and all Schedules thereto are amended by deleting the reference to "the Exchequer Court of Canada" and "the Exchequer Court Act" wherever they appear, and substituting therefore "the Federal Court of Canada, Trial Division" and "the Federal Court Act of Canada", respectively.

8. In all other respects the terms and provisions of the Master Agreement and the Schedules thereto shall continue in full force and effect.

9. No Member of the Parliament of Canada or Member of any of the Legislative Assemblies of Alberta, Manitoba, or Saskatchewan shall hold, enjoy, or admitted to any share or part of any contract, agreement, commission or benefit arising out of this Agreement.

10. This Amending Agreement shall become and be effective as at the date and year of execution by the party last signing, and shall enure to the benefit of and be binding upon each of the parties and their respective successors and assigns.

IN WITNESS WHEREOF Canada, Alberta, Manitoba, and Saskatchewan have caused these presents to be executed by each of their duly-authorized and responsible Ministers, on the respective dates set out below.

HER MAJESTY THE QUEEN in right of CANADA

Per: Christine Stewart
Witness Minister of the Environment

Date: March 12, 1999

HER MAJESTY THE QUEEN in right of ALBERTA

Per: Ty Lund
Witness Minister of Environmental Protection

Date: May 4, 1999

HER MAJESTY THE QUEEN in right of MANITOBA

Per: J. Glen Cummings
Witness Minister of Natural Resources

Date: July 15, 1998

HER MAJESTY THE QUEEN in right of Saskatchewan

Per: Maynard Sonntag
Witness Minister responsible for the Saskatchewan Water Corporation

Date: October 1, 1999

APPENDIX 1
ATTACHMENT "A" TO SCHEDULE E, 2015 & 1992

LISTING OF RIVER REACHES AND REFERENCE TO TABLES OF WATER QUALITY OBJECTIVES IN 2015 AND 1992

ATTACHMENT “A” TO SCHEDULE E, 2015*

* Superseded by 2021 Water Quality Objectives (Page 26 to 51)

2015

MINISTERIAL SIGNATURES TO UPDATE ATTACHMENT "A" AND TABLES OF WATER QUALITY OBJECITVES

On June 22, 2015 and July 8, 2015, the Provinces Water Board Ministers approved and signed the updated 2015 Water Quality Objectives (Attachment "A"). Attachment "A" and Tables 1 to 12 come into effect on July 8, 2015 and replace the Tables 1 to 11 in Appendix 1.

In WITNESS WHEREOF Alberta has caused these presents to be executed by the Minister of Environment and Parks and the Minster of International and Intergovernmental Relations, and Manitoba has caused these presents to be executed by the Minister of Conservation and Water Stewardship and Minister of Infrastructure and Transportation, and Saskatchewan has caused these presents to be executed by the Minister responsible for the Saskatchewan Water Security Agency, and Canada has caused these presents to be executed by the Minister of the Environment, on the day and year first mentioned above.

THE GOVERNMENT OF CANADA

per: "Leona Aglukkaq"
Minister of the Environment

June 22, 2015
Date

THE GOVERNMENT OF ALBERTA

per: "Shannon Phillips"
Minister of Environment and Parks

June 22, 2015
Date

Approved Pursuant to the Government Organization Act:

per: "Rachel Notley"
Minister of International and Intergovernmental Relations

July 8, 2015
Date

THE GOVERNMENT OF SASKATCHEWAN

per: "Herb Cox"
Minister responsible for the Water Security Agency

June 22, 2015
Date

THE GOVERNMENT OF MANITOBA

per: "Thomas Nevakshonoff"
Minister of Conservation and Water Stewardship

June 22, 2015
Date

per: "Steve Ashton"
Minister of Infrastructure and Transportation

June 22, 2015
Date

ATTACHMENT "A"

To Schedule E
(LISTING OF RIVER REACHES AND REFERENCES TO TABLES OF WATER QUALITY OBJECTIVES)

RIVER	REACH (predetermined length)	TABLE LISTING WATER QUALITY OBJECTIVES (for River Reach)
Beaver River	Beaver Crossing to the Border	1
North Saskatchewan River	Lea Park to Lloydminster Ferry	2
Red Deer River A/S	Bindloss to the Confluence with the South Saskatchewan River	3
South Saskatchewan River	Highway #41 to Confluence with Red Deer River	4
Battle River	Blackfoot Creek to Unwin	5
Churchill River	Islands Falls to Pukatawagan Lake	6
Saskatchewan River	Outlet of Cumberland Lake to Mouth of Carrot River	7
Carrot River	Turnberry to Mouth of Carrot River	8
Red Deer River S/M	Etomami River to Red Deer Lake	9
Assiniboine River	Whitesand River to Outlet of Shellmouth Reservoir	10
Qu'Appelle River	Kaposvar Creek to Assiniboine River	11
Cold River	Outlet of Cold Lake	12

Table 1

WATER QUALITY OBJECTIVES			
Beaver River Reach: Beaver Crossing to the Border			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.171	0.127
Total Dissolved Phosphorus	mg/L	0.043	0.042
		0.060	0.060
Total Nitrogen	mg/L	1.140	1.862
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.19	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	Under Review	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	3.0-48.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	Under Review	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 2

WATER QUALITY OBJECTIVES			
North Sask. River Reach: Lea Park to Lloydminster Ferry			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.253	0.063
		0.278	0.115
Total Dissolved Phosphorus	mg/L	0.026	0.048
		0.046	0.101
Total Nitrogen	mg/L	1.169	1.175
		1.230	1.225
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.0-295.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 3

WATER QUALITY OBJECTIVES			
Red Deer River A/S Reach: Bindloss to Confluence with the S. Sask. River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.315	0.035
		0.563	0.069
Total Dissolved Phosphorus	mg/L	0.023	0.008
		0.035	0.024
Total Nitrogen	mg/L	2.320	0.860
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.2	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	30.0-832.6	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Under Review	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Under Review	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
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Diclofopmethyl (Hoegrass)	µg/L	0.18
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Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
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Glyphosate	µg/L	Report Detections
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Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
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Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 4

WATER QUALITY OBJECTIVES			
South Sask. River Reach: Highway #41 to Confluence with Red Deer River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.159	0.054
		0.246	0.110
Total Dissolved Phosphorus	mg/L	0.014	0.010
		0.018	0.067
Total Nitrogen	mg/L	1.073	1.638
		1.114	1.771
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.19	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.6-339.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 5

WATER QUALITY OBJECTIVES			
Battle River Reach: Blackfoot Creek to Unwin			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.267	0.075
		0.335	0.100
Total Dissolved Phosphorus	mg/L	0.051	0.045
Total Nitrogen	mg/L	2.260	1.550
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	872	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.31	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	Under Review	
Sodium Adsorption Ratio	rel units	Under Review	
Total Suspended Solids	mg/L	5.0 - 320.0	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	Under Review	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 6

WATER QUALITY OBJECTIVES			
Churchill River Reach: Island Falls to Pukatawagan Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.025	0.021
Total Dissolved Phosphorus	mg/L	0.010	0.010
Total Nitrogen	mg/L	0.484	0.411
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.12	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	2.2-6.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
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Ag-Irrigation + Treatability
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Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 7

WATER QUALITY OBJECTIVES			
Saskatchewan River Reach: Outlet of Cumberland Lake to Mouth of Carrot River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.088	0.028
		0.124	0.034
Total Dissolved Phosphorus	mg/L	0.014	0.011
		0.018	0.017
Total Nitrogen	mg/L	0.838	0.761
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	27.0 - 125.0	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
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Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 8

WATER QUALITY OBJECTIVES			
Carrot River Reach: Turnberry to Mouth of Carrot River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.099	0.170
		0.140	0.266
Total Dissolved Phosphorus	mg/L	0.027	0.031
		0.057	0.059
Total Nitrogen	mg/L	1.087	1.814
		1.417	2.052
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	742	1672
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	164	442
Fluoride Dissolved	mg/L	0.2	0.29
Chloride Dissolved	mg/L	267	728
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	Under Review	
Sodium Adsorption Ratio	rel units	Under Review	
Total Suspended Solids	mg/L	6.08 -98.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	No Objective	
Arsenic Dissolved	µg/L	50	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	Under Review	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	Under Review	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
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Ag-Irrigation
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Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 9

WATER QUALITY OBJECTIVES			
Red Deer River S/M Reach: Etomami River to Red Deer Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.052	0.074
		0.066	0.161
Total Dissolved Phosphorus	mg/L	0.021	0.025
		0.029	0.055
Total Nitrogen	mg/L	1.195	1.998
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.18	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	1.0 - 19.7	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 10

WATER QUALITY OBJECTIVES			
Assiniboine River Reach: Whitesand River to Outlet of Shellmouth Reservoir			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.311	0.180
Total Dissolved Phosphorus	mg/L	0.186	0.115
Total Nitrogen	mg/L	1.801	2.252
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	834	
Sulphate Dissolved	mg/L	299	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.26	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	5.0-69.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
Biota			
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	Under Review	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 11

WATER QUALITY OBJECTIVES			
Qu'Appelle River Reach: Kaposvar Creek to Assiniboine River			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.278	0.221
		0.304	0.290
Total Dissolved Phosphorus	mg/L	0.156	0.129
		0.190	0.249
Total Nitrogen	mg/L	1.822	1.767
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	1144	
Sulphate Dissolved	mg/L	486	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.25	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	Under Review	
Total Suspended Solids	mg/L	22.6 -122.2	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	No Objective	
Arsenic Dissolved	µg/L	50	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	Under Review	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

Table 12

WATER QUALITY OBJECTIVES			
Cold River Reach: Outlet of Cold Lake			
Chemical, Physical or Biological Variable	**Unit**	**Acceptable Limit or Limits**	
Nutrients		Open	Closed
Total Phosphorus	mg/L	0.023	0.024
Total Dissolved Phosphorus	mg/L	0.010	0.017
Total Nitrogen	mg/L	0.453	0.452
		0.460	0.467
Nitrate as N	mg/L	3	
Ammonia Un-ionized	mg/L	0.019[a]	
Major Ions			
Total Dissolved Solids	mg/L	500	
Sulphate Dissolved	mg/L	250	
Sodium Dissolved	mg/L	200	
Fluoride Dissolved	mg/L	0.12	
Chloride Dissolved	mg/L	100	
Physicals and Other			
pH Lab	pH units	6.5-9.0	
pH Field	pH units	6.5-9.0	
Oxygen Dissolved			
Temperature > 5°C (Open Season)	mg/L	5	
Temperature < 5°C (Closed Season)	mg/L	3	
Sodium Adsorption Ratio	rel units	3	
Total Suspended Solids	mg/L	1.2-4.8	
Reactive Chlorine Species	mg/L	0.0005	
Cyanide (free)	mg/L	0.005	
E. Coli	No./100 mL	200	
Coliforms Fecal	No./100 mL	100	
Metals			
Arsenic Total	µg/L	5	
Arsenic Dissolved	µg/L	No Objective	
Barium Total	µg/L	1000	
Beryllium Total	µg/L	100	
Boron Total	µg/L	500	
Cadmium Total	µg/L	Calculated[b]	
Chromium Total	µg/L	50	
Cobalt Total	µg/L	50	
Copper Total	µg/L	Calculated[b]	
Iron Dissolved	µg/L	300	
Lead Total	µg/L	Calculated[b]	
Lithium Total	µg/L	2500	
Manganese Dissolved	µg/L	50	
Mercury Total	µg/L	0.026	
Molybdenum Total	µg/L	10	
Nickel Dissolved	µg/L	Calculated[b]	
Selenium Total	µg/L	1	
Silver Total	µg/L	0.1	
Thallium Total	µg/L	0.8	
Uranium Total	µg/L	10	
Vanadium Total	µg/L	100	
Zinc Total	µg/L	30	

Pesticides		
Acid Herbicides		
2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
MCPA	µg/L	0.025
Picloram	µg/L	29
Organochlorine Pesticides in Water		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
Neutral Herbicides in Water		
Atrazine	µg/L	1.8
Diclofopmethyl (Hoegrass)	µg/L	0.18
Metolachlor	µg/L	7.8
Metribuzin	µg/L	0.5
Simazine	µg/L	0.5
Triallate	µg/L	0.24
Trifluralin	µg/L	0.2
Other		
Glyphosate	µg/L	Report Detections
Fish Tissue		
Mercury in fish (muscle tissue)	µg/kg	200
Arsenic in fish (muscle tissue)	µg/kg	3500
Lead in fish (muscle tissue)	µg/kg	500
DDT (total) in fish (muscle tissue)	µg/kg	5000
Aquatic Biota Consumption		
PCB in fish (muscle tissue) mammalian	µg TEQ/kg diet wet weight	0.00079
PCB in fish (muscle tissue) avian	µg TEQ/kg diet wet weight	0.0024
DDT (total) in fish (muscle tissue)	µg/kg diet wet weight	14
Toxaphene in fish (muscle tissue)	µg/kg diet wet weight	6.3
Radioactive		
Cesium-137	Bq/L	10
Iodine-131	Bq/L	6
Lead-210	Bq/L	0.2
Radium-226	Bq/L	0.5
Strontium-90	Bq/L	5
Tritium	Bq/L	7000

Protection of Aquatic Life
Ag-Livestock
Ag-Irrigation
Recreation
Treatability
Ag-Irrigation + Treatability
Ag- Irrigation and Livestock
Fish Consumption

Superscripts

a. Ammonia objective: Expressed as mg unionized ammonia/L. This would be equivalent to 0.0156 mg ammonia-nitrogen/L (0.019*14.0067/17.031).

b. The objective value in µg/L is a function of total hardness (CaCO3 mg/L) in the water column: Cadmium Total is calculated using $10^{\{0.86[\log(\text{hardness})]-3.2\}}$. Copper Total's objective is 2 when total hardness is <82 or unknown, 4 when >180, and calculated using $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$ when total hardness is ≥82 to ≤180. Lead Total's objective is 1 when total hardness is ≤60 or unknown, 7 when >180, and calculated using $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$ when total hardness is >60 to ≤180. Nickel Dissolved is calculated using $0.998*e^{\{0.8460[\ln(\text{hardness})]+2.255\}}$.

ATTACHMENT “A” TO SCHEDULE E, 1992*

* Superseded by 2015 Water Quality Objectives (Page 63 to 88)

ATTACHMENT "A"

To Schedule E
(LISTING OF RIVER REACHES AND
REFERENCE TO TABLES OF WATER QUALITY OBJECTIVES)

REACH RIVER	(predetermined length)	TABLE LISTING WATER QUALITY OBJECTIVES (FOR RIVER REACH)
Beaver River the Border	Beaver Crossing to	1
North Saskatchewan River	Lea Park to Lloydminster Ferry	2
Red Deer River A/S with the South Saskatchewan River	Bindloss to Confluence	3
South Saskatchewan River Deer River	Highway #41 to Confluence with Red	4
Battle River Unwin	Blackfoot Creek to	5
Churchill River Pukatawagan Lake	Island Falls to	6
Saskatchewan River Lake to Mouth of Carrot River	Outlet of Cumberland	7
Carrot River Carrot River	Turnberry to Mouth of	8
Red Deer S/M Deer Lake	Etomami River to Red	9
Assiniboine River Outlet of Shellmouth Reservoir	Whitesand River to	10
Qu'Appelle River Assiniboine River	Kaposvar Creek to	11

TABLE 1

WATER QUALITY OBJECTIVES

BEAVER RIVER REACH: BEAVER CROSSING TO THE BORDER

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.001
CHLORIDE (diss.)	100.
CHROMIUM (total)	0.011
COPPER (total)	0.004
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.5
IRON (diss)	1.0
LEAD (total)	0.007
MANGANESE (diss)	0.2
NICKEL (total)	0.1
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.001
SODIUM (diss)	100.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.03
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	OW 6.0
pH (pH units)	6.5-9.0
LINDANE	0.0001
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
SILVER (total)	0.0001
PCP	0.0005
MERCURY IN FISH (ug/g)	0.5
PCB IN FISH (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.
- OW - open water objective only.

TABLE 2

WATER QUALITY OBJECTIVES

NORTH SASK. R. REACH: LEA PARK TO LLOYDMINSTER FERRY

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.001
CHLORIDE	100
CHROMIUM (total)	0.011
COPPER (total)	0.004
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.5
IRON (diss)	0.3
LEAD (total)	0.007
MANGANESE (diss)	0.05
NICKEL (total)	0.1
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.001
SODIUM	100
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.03
ALUMINUM (total)	5.0
COBALT	0.05
TOTAL DISS. SOLIDS	500
VANADIUM (TOTAL)	0.1
AMMONIA (total)	TABLE BACK SIDE
OXYGEN	6.5
pH (pH UNITS)	6.5-9.0
LINDANE	0.0001
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
MERCURY IN FISH (ug/g)	0.5
PCB IN FISH (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 3

WATER QUALITY OBJECTIVES

RED DEER RIVER A/S REACH: BINDLOSS TO CONFLUENCE WITH THE S. SASK. R.

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.001
CHROMIUM (total)	0.011
COPPER (total)	0.004
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.5
IRON (diss)	0.3
LEAD (total)	0.007
MANGANESE (diss)	0.05
NICKEL (total)	0.025
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.001
SULPHATE (diss)	500.
ZINC (total)	0.03
COBALT	1.0
SAR	3.0
TOTAL DISS. SOLIDS	500
VANADIUM	0.1
AMMONIA (total)	TABLE BACK SIDE
LINDANE	0.0001
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CYANIDE (free)	0.005
MERCURY IN FISH (ug/g)	0.5
PCB IN FISH (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 4

WATER QUALITY OBJECTIVES

SOUTH SASK. R. REACH: HIGHWAY #41 TO CONFLUENCE WITH RED DEER RIVER

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.001
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.5
IRON (diss)	1.0
LEAD (total)	0.02
MANGANESE (diss)	0.05
NICKEL (total)	0.025
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.002
SULPHATE (diss)	500.
ZINC (total)	0.05
COBALT	1.0
SAR	3.0
TOTAL DISS. SOLIDS	500
VANADIUM (TOTAL)	0.1
AMMONIA (total)	TABLE BACK SIDE
LINDANE	0.0001
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CYANIDE (free)	0.005
MERCURY IN FISH (ug/g)	0.5
PCB IN FISH (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 5

WATER QUALITY OBJECTIVES

BATTLE RIVER REACH: BLACKFOOT CREEK TO UNWIN

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.001
CHLORIDE	100
CHROMIUM (total)	0.011
COPPER (total)	0.004
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.5
IRON (diss)	0.3
LEAD (total)	0.007
MANGANESE (diss)	0.05
NICKEL (total)	0.1
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.001
SODIUM	100
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.03
ALUMINUM (total)	5.0
COBALT	0.05
TOTAL DISS. SOLIDS	500
VANADIUM	0.1
AMMONIA (total)	TABLE BACK SIDE
OXYGEN	OW 6.0
pH (pH UNITS)	6.5-9.0
LINDANE	0.0001
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
MERCURY IN FISH (ug/g)	0.5
PCB IN FISH (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.
- OW - indicates open water period

.TABLE 6

WATER QUALITY OBJECTIVES

CHURCHILL RIVER REACH: ISLAND FALLS TO PUKATAWAGAN LAKE

CHEMCIAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.00058
CHLORIDE (diss.)	250.
CHROMIUM (total)	0.011
COPPER (total)	0.0057
FECAL COLIFORM	200/100ml
FLUORIDE (diss)	1.5
IRON (diss)	0.3
LEAD (total)	0.011
MANGANESE (diss)	0.05
NICKEL (total)	0.025
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	300.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	6.5
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.2
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 7

WATER QUALITY OBJECTIVES

SASKATCHEWAN RIVER REACH: OUTLET OF CUMBERLAND LAKE TO MOUTH OF CARROT RIVER

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTALBE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	0.5
CADMIUM (total)	0.001
CHLORIDE (diss.)	68.
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	200/100ml
FLUORIDE (diss)	1.0
IRON (diss)	0.3
LEAD (total)	0.0061
MANGANESE (diss)	0.05
NICKEL (total)	0.10
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	100.
SULPHATE (diss)	250.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	6.5
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.2
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 8

WATER QUALITY OBJECTIVES

CARROT RIVER REACH: TURNBERRY TO MOUTH OF CARROT RIVER

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	2.0
CADMIUM (total)	0.001
CHLORIDE (diss.)	100.
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	200/100ml
FLUORIDE (diss)	1.0
IRON (diss)	0.3
LEAD (total)	0.015
MANGANESE (diss)	0.05
NICKEL (total)	0.10
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	100.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	OW 6.5
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.5
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.
- OW - indicates open water period.

TABLE 9

WATER QUALITY OBJECTIVES

RED DEER RIVER S/M REACH: ETOMAMI RIVER TO RED DEER LAKE

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	5.0
CADMIUM (total)	0.00058
CHLORIDE (diss.)	100.
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	200/100ml
FLUORIDE (diss)	1.0
IRON (diss)	0.3
LEAD (total)	0.0118
MANGANESE (diss)	0.05
NICKEL (total)	0.10
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	100.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	6.0
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.5
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 10

WATER QUALITY OBJECTIVES

ASSINIBOINE RIVER REACH: WHITESAND RIVER TO OUTLET OF SHELLMOUTH RESERVOIR

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	2.0
CADMIUM (total)	0.001
CHLORIDE (diss.)	100.
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	200/100ml
FLUORIDE (diss)	1.0
IRON (diss)	0.3
LEAD (total)	0.02
MANGANESE (diss)	0.05
NICKEL (total)	0.10
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	100.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	6.0
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.5
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

TABLE 11

WATER QUALITY OBJECTIVES

QU'APPELLE RIVER REACH: KAPOSVAR CREEK TO ASSINIBOINE RIVER

CHEMICAL, PHYSICAL OR BIOLOGICAL VARIABLE	ACCEPTABLE LIMIT OR LIMITS
ARSENIC (diss)	0.05
BARIUM (total)	1.0
BORON (diss)	2.
CADMIUM (total)	0.001
CHLORIDE (diss.)	100.
CHROMIUM (total)	0.011
COPPER (total)	0.01
FECAL COLIFORM	100/100ml
FLUORIDE (diss)	1.0
IRON (diss)	0.3
LEAD (total)	0.02
MANGANESE (diss)	0.05
MERCURY (total) (ug/L)	0.006
NICKEL (total)	0.10
NO_2+NO_3 (as N)	10.0
SELENIUM (diss)	0.01
SODIUM (diss)	100.
SULPHATE (diss)	500.
URANIUM	0.02
ZINC (total)	0.047
PHOSPHORUS (total)	0.05
AMMONIA (total)	TABLE BACK SIDE
OXYGEN (diss)	6.0
pH (pH units)	6.5-9.0
LINDANE	0.00008
2,4-D	0.004
2,4,5-TP	0.01
CHLOROPHENOLS (total)	0.001
CHLORINE	0.002
CYANIDE (free)	0.005
PCP	0.0005
CESIUM-137 (Bq/L)	50.
IODINE-131 (Bq/L)	10.
RADIUM-226 (Bq/L)	1.0
STRONTIUM-90 (Bq/L)	10.
TRITIUM (Bq/L)	40000.
MERCURY IN FISH (ug/g)	0.5
PCB in Fish (ug/g)	2.0

SYMBOLS:
- all units are in mg/L unless otherwise noted.

PPWB

BY-LAWS

BY-LAWS Revised
and Approved
At PPWB Meeting #120
February 8-10, 2017

BY-LAWS

PART I

1. In these By-Laws:

(a) "Agreement" means the 1969 Master Agreement on Apportionment, including all schedules to that Agreement, between Canada, Alberta, Saskatchewan and Manitoba.

(b) "Alternate" means Alternate Member of the Prairie Provinces Water Board.

(c) "Board" means the Prairie Provinces Water Board.

(d) "By-Laws" means the ordinances adopted by the Board for the regulation of the Board's internal affairs.

(e) "Chair" means Chair of the Prairie Provinces Water Board.

(f) “Executive Director means the Environment and Climate Change Canada (ECCC) employee responsible for the technical and administrative duties of the Board. The appointment and actions of the Executive Director shall at all times be subject to the approval of the Board.

(g) "Member" means Member of the Prairie Provinces Water Board.

(h) "Ministers" means the responsible ministers of the governments which are party to the Agreement.

(i) "Schedule C" means the Prairie Provinces Water Board Agreement under the Master Agreement (1969) executed by Canada, Alberta, Saskatchewan and Manitoba establishing the Prairie Provinces Water Board.

PART II

The following shall be the By-Laws of the Prairie Provinces Water Board.

1. Objectives

The objectives of the Board shall be to promote the integrated development and use of water and related resources to support economic growth according to selected social goals and priorities, and to participate in the formulation and implementation of comprehensive planning and development programs according to their national, regional and provincial interest and importance.

In general, the Board will provide coordination and liaison between water resource agencies and will advise governments on the planning, development and management of interprovincial waters.

In particular, the Board will ensure the

equitable apportionment of water flowing from one province into another province in accordance with the Agreement; promote effective water quality management of transboundary streams relative to standards and procedures adopted by the Board from time to time; and, promote cooperative interprovincial management of transboundary groundwater and aquifers.

2. Membership

In accordance with Section 1 of Schedule "C", the Prairie Provinces Water Board shall consist of five Members to be appointed as follows:

(a) two Members to be appointed by the Governor General in Council, one of whom shall be Chair of the Board;

(b) one Member to be appointed by the Lieutenant Governor in Council of each of the Provinces of Manitoba, Saskatchewan and Alberta.

(c) Members shall be chosen from those engaged in administration of water resources or related duties for Manitoba, Saskatchewan, Alberta or Canada.

3. Alternate Members

Each member, including the Chair, shall designate in writing an Alternate Member to act on his/her behalf during his/her absence, in which case the Alternate shall enjoy all the rights and privileges conferred on the Member.

4. Meetings and Notice

The Board shall meet at least twice a year by the call of the Chair. Any Member may request a meeting of the Board at any time, in which case the Chair must call the meeting within one month (30 days).

Meetings of the Board shall be called with at least 14 days notice unless every Member agrees otherwise.

5. Quorum

Meetings of the Board shall be official when all Members or their appointed Alternates are present.

6. Chairing

In the absence of the Chair, meetings shall be chaired by the other Federal Member. If both Federal Members are absent then the Alternate Member for the Chair shall chair the meeting.

7. Voting

All recommendations to government, all By-Laws and budgets-in-total shall require unanimous approval. The majority of votes determine a question on any other matter. In the event of a tie, the Chair shall cast the deciding vote.

8. Powers

In accordance with the duties, functions and operations of the Board, as contained in Schedule "C", the Board shall have the power to authorize expenditures within the limits of approved

budgets for purposes necessary for administering the Agreement and furthering the objectives of the Board.

9. Authority

Within the general responsibilities given to it, the Board shall determine its technical and administrative functions from time to time and shall decide all matters regarding the authority of the Board and the delegation thereof.

10. Financial Year

The financial year shall end on the 31st day of March in each year.

11. Budgets

The Executive Director shall submit fiscal year program and budget estimates to the Board and to the parties to the Agreement for their approval. Such estimates shall be submitted at the Board's fall meeting preceding the financial year to which they pertain.

12. Support Services

(a) ECCC shall house the Secretariat, within the three prairie provinces, employ its staff and administer the Board's financial resources. The Secretariat staff shall provide technical, administrative and information management support including, but not limited to, reporting of apportionment and water quality of transboundary streams, conducting approved studies and furthering the policies and objectives of the PPWB.

(b) The Board may arrange by agreement for the employees of the Parties of the agreement to work for the Secretariat.

13. Assignments to Associated Agencies and Consultants

(a) The Board shall have the authority to engage agencies of those party to the Agreement, at cost, to undertake assignments from the Board, whenever in the opinion of the party concerned, the services of such agencies are available.

(b) Agencies may enter into service sub- contracts subject to approval of the Executive Director.

(c) The Board may engage consultants to undertake assignments from the Board where such services are deemed necessary.

(d) The services of consultants and of agencies of those parties to the Agreement shall be engaged under a contractual arrangement. Contracts shall be entered into by the Chair and/or the Executive Director subject to delegated authorities under the federal government contract regulations.

(e) Contracts for services shall also be subject to budgetary appropriations and any other controls imposed by the Board for the conduct of the work.

14. Terms of Payment for Services

Provided by Associated Agencies

Canada, through the Board, shall reimburse the Provinces of Alberta, Saskatchewan and Manitoba on a monthly basis, for expenditures made pursuant to the Agreement and approved by the Board. Payment for such expenditures will be made by Canada upon the submission of a claim in a mutually agreed manner and form.

15. Financial Records

Canada, and the Provinces of Alberta, Saskatchewan and Manitoba shall keep complete records of all expenditures made severally pursuant to the Agreement and shall support such expenditures with proper documentation. Canada and the Provinces of Alberta, Saskatchewan and Manitoba shall make these records and documents available to auditors appointed by the other.

16. Cost of Administration of the Board

In Accordance with Section 10 of Schedule "C", all budgeted expenditures, which shall not include the cost of monitoring, as described in Section 7 of the Master Agreement, but including staff, accommodation, supplies and incidental expenses of the Board, shall be borne by the parties to the Agreement on the basis of one-half by Canada and one-sixth by each of the Provinces.

17. Financing the Operations of the Board

(a) ECCC, shall assume responsibility for managing the finances of the Board.

(b) Prior to the beginning of each fiscal year, the Board will approve its operational budget and level of contributions for the forthcoming fiscal year.

(c) Subject to the cost sharing provisions of the Agreement, the Provinces of Alberta, Saskatchewan and Manitoba, and Agriculture and Agri-Food Canada (AAFC) shall pay to ECCC their agreed contributions toward the approved operational budget of the Board.

(d) On or before July 1st of each year, Canada shall prepare and submit to each of the parties to the Agreement, statements of final claim respecting the contribution and expenditure of monies related to the operations of the Board during the previous financial year. Statements of claim shall be certified by a senior official of Canada.

(e) Any funds contributed by the provinces party to the Agreement remaining at the end of a fiscal year shall be held in a Special Purposes Account and carried forward into the next fiscal year to support the operations of the Board.

18. Annual Report

Within eight (8) months after the end of the financial year, the Chair shall submit

to the Ministers the Annual Report of the Board.

19. Amendment of By-Laws

By-Laws may be enacted, amended or repealed by unanimous approval of the Board. "Notice of Motion" to enact, amend or repeal By-Laws must be served on Members at least sixty (60) days prior to a vote on such issue.

20. Rules and Procedures

The Board may formulate and adopt "Rules and Procedures" governing the day-to-day affairs of the Board. These "Rules and Procedures" may be a-mended, adopted or repealed in accordance with Article 7 of these By-Laws.

PART III

EXECUTIVE DIRECTOR

1. Functions

(a) The Executive Director, subject to the Board's direction, shall be responsible for the technical and administrative activities of the Board including, but not limited to, collating and analysing data and reporting apportionment and water quality of interprovincial streams; conducting approved studies, and furthering the policies and objectives of the Board. The actions of the Executive Director shall at all times be subject to the approval of the Board.

(b) The Executive Director shall record, or cause to be recorded, all votes and minutes of all proceedings in books to be kept for that purpose.

(c) The Executive Director shall give, or cause to be given, notice of all meetings of the Board.

(d) The Executive Director shall keep the Board informed at all times of matters pertinent or relevant to the programs and operations of the Board.

(e) The Executive Director shall have charge of all records of the Board, together with copies of all reports made by the Board, and such other books or papers as the Board may direct.

(f) The Executive Director shall implement all orders and resolutions of the Board and perform any other duties that the Board may prescribe.

(g) The Executive Director may speak on behalf of the Board on issues pertinent to PPWB.

PPWB

RULES AND

PROCEDURES

Revised and Approved
PPWB Meeting #120
February 8-10, 2017

RULES AND PROCEDURES

The Prairie Provinces Water Board hereby adopts the following Rules and Procedures governing the operations of the Prairie Provinces Water Board.

Financial Administration

1. The Executive Director is authorized to make disbursements of funds in conformity with the main items of expenditure allotted in the budget estimates approved by the Board, subject to those restrictions specified elsewhere in these Rules and Procedures.

2. Contracts with private consultant firms and individuals shall conform to accepted practices and procedures of the Federal Treasury Board.

3. The Executive Director may contract services on behalf of the Board, however, prior approval must be obtained if the contract is greater than $10,000.

4. Payment of accounts will be made only after they have been approved by the Executive Director.

Establishment of Salaried Positions, Appointments and Administration of Salaries

5. The appointment of the Executive Director shall be approved by the Board.

6. The Board shall approve the duties of the Executive Director.

7. The Board shall approve the skill sets and the selection of the PPWB Secretariat staff members.

8. The classification and remuneration of the Executive Director shall be governed by the appropriate federal authority.

9. The financial and personnel administration of the PPWB activities shall be carried out in accordance with federal government practices.

10. To facilitate the operations of the PPWB, personnel and financial administrative support services shall be provided, at cost, by the Federal Department of the Environment.

Board Offices

11. The Executive Director is authorized to lease and maintain property within which to conduct Board affairs providing that terms of such leasing shall be sanctioned by the Board.

12. Costs for the operation of the Board offices shall include, but shall not necessarily be limited to, expenditures for the following items:

    (a) Salaries and wages and related benefits of Board employees or personnel seconded to the Board offices, including removal expenses, both at the commencement and termination of the appointment, where applicable, and living expenses for seconded personnel where

approved by the Board.

(b) Field surveys and investigations including travel and living expenses when applicable, by personnel engaged in conducting studies or field investigations.

(c) Rentals for office space and equipment and charges for utilities and related services for the operation of Board offices.

(d) Purchases of furniture, equipment, computers and necessary software.

(e) Operating, maintenance and transportation expenses for equipment.

(f) Contracts awarded by the Board including, where applicable, arbitration, settlements, legal fees and other matters, made in accordance with the provisions of the contract.

(g) Settlement and legal fees arising out of property damaged or public liability made or incurred by an employee of the federal government working on behalf of the Board or a party to the Agreement working for the Board and engaged in the activities of the Board offices.

(h) Other items required for conducting the work and for operations of the Board offices which have been approved by the Board.

Payment for Services Provided by Participating Government Agencies

13. Costs of participating government agencies for services, field investigations, planning studies, etc., specifically requested by the Board shall include the following items:

(a) Salaries, wages, travel and living expenses for employees engaged in providing the service.

(b) Rental charges for equipment and operators.

(c) Normal operating maintenance and transportation expenses for equipment where such expenses are not included in the rental rate.

(d) All contracts as provided under the provisions of Article 13(b) of the By-Laws.

(e) Other items required for conducting the work of the Board and approved by the Executive Director.

Board Members, Alternates and Advisory Committees

14. (a) The Board may establish, as required, committees to advise the Board and/or the Executive Director. The Board will approve the terms of reference for all committees. Unless otherwise agreed to by the

Board, each Board member will appoint a representative from his/her own jurisdiction to serve on the committee. The Board may also appoint committee members from non-member departments or agencies.

(b) The costs incurred by Board Members and their Alternates in representing their respective governments at Board functions shall be paid for by the appropriate government. The salaries and travelling expenses of government officials appointed to represent those party to the Agreement on Committees established to advise the Board and/or the Executive Director shall be paid by the appropriate party.

* Approved PPWB #5 -Nov. 2, 1971
* Revised and Approved PPWB #56 - March 22, 1996.
* Item 15 Revised and Approved PPWB #71 - March 6-7, 2003
*Revised and Approved – PPWB #120, February 8-10, 2017