

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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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

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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 $10^{(0.86[\log(\text{hardness})]-3.2)}$. 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	
		Open	Closed
Nutrients			
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			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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
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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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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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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
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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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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 $10^{(0.86[\ln(\text{hardness})]-3.2)}$. 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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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 $10^{(0.86[\ln(\text{hardness})]-3.2)}$. 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	
		Open	Closed
Nutrients			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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 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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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 $10^{(0.86[\ln(\text{hardness})]-3.2)}$. 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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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 $10^{(0.86[\ln(\text{hardness})]-3.2)}$. 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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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 10

WATER QUALITY OBJECTIVES			
Assiniboine River Reach: Whitesand River to Outlet of Shellmouth Reservoir			
Chemical, Physical or Biological Variable	Unit	Acceptable Limit or Limits	
		Open	Closed
Nutrients			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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	
		Open	Closed
Nutrients			
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	
Microbiology			
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		
<i>Acid Herbicides</i>		
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
<i>Organochlorine Pesticides in Water</i>		
Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
<i>Neutral Herbicides in Water</i>		
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
<i>Other</i>		
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
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Tritium	Bq/L	7000

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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 $10^{(0.86[\log(\text{hardness})]-3.2)}$. 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	
		Open	Closed
Nutrients			
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	
Bacteria			
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	
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2,4-D	µg/L	4
Bromoxynil	µg/L	0.33
Dicamba	µg/L	0.006
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Picloram	µg/L	29
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Endosulfan	µg/L	0.003
Hexachlorocyclohexane (gamma-HCH) (Lindane)	µg/L	0.01
Hexachlorobenzene	µg/L	0.52
Pentachlorophenol (PCP)	µg/L	0.5
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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
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