



Status of  
**WATER QUALITY**

South Saskatchewan Region, Alberta  
for April 2014–March 2015

Reporting on the  
**Surface Water Quality Management Framework**  
South Saskatchewan Regional Plan

Environmental Monitoring and Science Division,  
Alberta Environment and Parks

*Alberta*   
Government

ISBN 978-1-4601-3068-1

# Table of Contents

About EMSD.....	3
Executive Summary.....	4
South Saskatchewan Regional Plan.....	5
Monitoring Stations.....	6
Water Quality Indicators, Triggers and Limits .....	7
Exceedances of Water Quality Triggers, 2014–2015 .....	9
Exceedances of Water Quality Limits, 2014–2015 .....	9
References .....	10
Appendix A - Descriptive Statistics for the Nine Long Term River Network Stations.....	11

# About EMSD

The Environmental Monitoring and Science Division (EMSD) is responsible for monitoring, evaluating and reporting on key air, water, land and biodiversity indicators. The division's mandate is to provide open and transparent access to scientific data and information on the condition of Alberta's environment, including specific indicators as well as cumulative effects, both provincially and in specific locations.

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- Based on sound science and evidence.
- Presented in a timely, open and transparent manner.
- That respects and incorporates community and Traditional Ecological Knowledge (TEK) from First Nations and Métis people.

This includes providing the information necessary to understand cumulative effects, and to inform the public, policy makers, regulators, planners, researchers, communities, and industry.

The role of environmental monitoring and science is to provide proactive, objective reporting of scientific data and information on the condition of Alberta's environment, including:

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- Data evaluation and management.
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*This report was initiated under the auspices of the former Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) and completed by EMSD.*

# Executive Summary

## BACKGROUND

This report was prepared by the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) to fulfill reporting requirements mandated by the Surface Water Quality Management Framework, which supports the South Saskatchewan Regional Plan (SSRP). Reporting requirements for the SSRP are determined by the Government of Alberta and AEMERA (now EMSD) has a responsibility for monitoring, evaluation and reporting under the Environmental Management Frameworks, including the Surface Water Quality Management Framework. This is a report that communicates whether water quality triggers or limits were exceeded in 2014–2015.

## METHODOLOGY

The Surface Water Quality Management Framework includes 15 primary indicators and 6 secondary indicators. In 2014–2015 (April 1–March 31), these water quality parameters were measured monthly at nine water quality monitoring stations. Using methodology described in the [South Saskatchewan Region \(SSR\) Surface Water Quality Management Framework \(SWQMF\)](#), the resulting data were compared to the historic record (1999–2009) to determine if values exceeded the historic median or peak trigger values. Those values that exceeded historic triggers were statistically assessed for changes in the central tendency or peak concentration. In addition, the 2014–2015 data were compared to water quality limits as defined in the SSR SWQMF. Seasonal 2014–2015 data for each indicator at each station were compared to historic data and water quality limits for both the open water (April–October) and winter (November–March) seasons.

## 2014–2015 (APRIL 1–MARCH 31) RESULTS

A significant deviation from the historic mean or median concentration in an undesirable direction occurred for:

- Total Nitrogen at the Bow River (Cochrane)
- Specific Conductance<sup>1</sup> at the Old Man River (Hwy 36)

A significant increase in peak concentration values (i.e. 90<sup>th</sup> percentile values) relative to the historic record occurred for:

- Specific Conductance at the Bow River (Carseland)
- pH at the Old Man River (Brocket)

In summary, statistically significant exceedances of median or peak triggers occurred at four stations for three primary indicators (total nitrogen, pH, and specific conductance). For all other stations, season and parameter combinations there were no significant differences in median or 90<sup>th</sup> percentile values.

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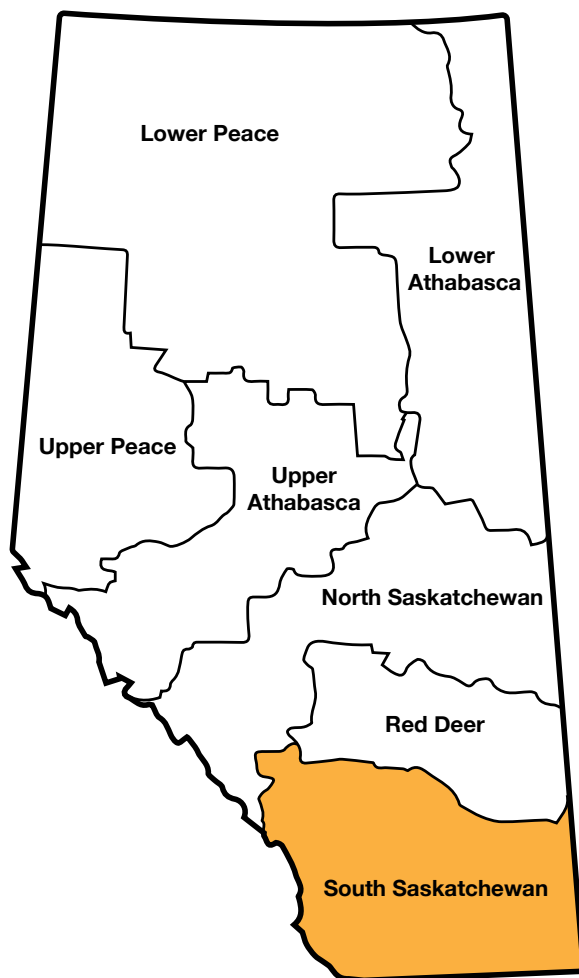
<sup>1</sup> Referred to as Specific Conductivity in the SSR SWQMF.

A single sample exceeded the water quality guideline value for Ammonia on December 16, 2014 in the South Saskatchewan River (Hwy 1). However, this single occurrence did not constitute a seasonal limit exceedance as defined in the SSR SWQMF. No water quality limits were exceeded for any of the primary or secondary indicators at any of the other long-term river network (LTRN) stations.

## South Saskatchewan Regional Plan

The SSRP applies to the South Saskatchewan Region, an area approximately 83,764 square kilometres in size located in southern Alberta (see the [South Saskatchewan Regional Plan](#)). The SSRP is a regional plan developed by the Government of Alberta under the Land Use Framework. The plan sets outcomes that describe what the Government of Alberta wants to accomplish at a regional level, and is given legislative authority under the *Alberta Land Stewardship Act*. EMSD is responsible for monitoring, assessing and reporting on the condition of the environment in the South Saskatchewan Region, while the Government of Alberta is responsible for management of activities and resources in response to environmental conditions.

**Fig 1: Land Use Frameworks in Alberta**



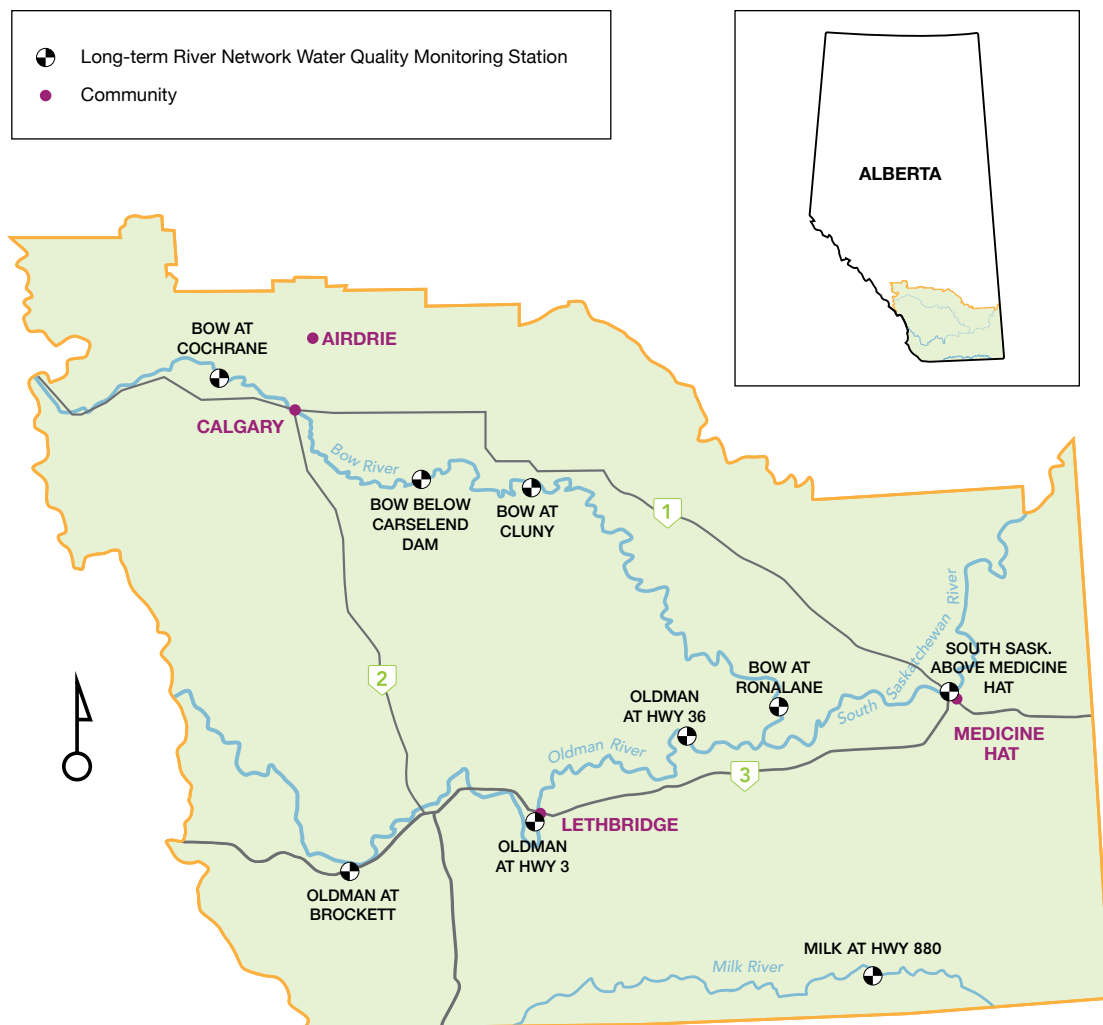
# Monitoring Stations

In this report, water quality in the South Saskatchewan Region is assessed based on data derived from monthly water quality sampling at nine LTRN stations within the South Saskatchewan Region (Fig 2). The nine LTRN stations are located within four major river systems:

- **The Bow River** – Bow River at Cochrane, Bow River at Carseland, Bow River at Cluny and Bow River at Ronalane
- **The Milk River** – Milk River at Hwy 880
- **The Oldman River** – Oldman River at Brockett, Old Man River at Hwy 3 in Lethbridge and Oldman River at Hwy 36
- **The South Saskatchewan River** – South Saskatchewan River at Medicine Hat-Hwy 1

Additional details on the four major river basins and the nine LTRN stations are given in the [South Saskatchewan Region: Surface Water Quality Management Framework \(SSR SWQMF\)](#).

**Fig 2: Location of water quality stations in the South Saskatchewan Region**



# Water Quality Indicators, Triggers and Limits

## WATER QUALITY INDICATORS

Twenty-one water quality parameters measured at the LTRN stations are indicators in the SSR SWQMF. Fifteen primary indicators (Table 1) and six secondary indicators (Table 2) were used to assess 2014–2015 water quality at the nine LTRN stations. Justification for indicator selection is given in the SSR SWQMF.

**Table 1: List of primary indicators for the SSRP: SWQMF**

Total Ammonia	Specific Conductance
Chloride	Total Dissolved Solids
Nitrate	Total Organic Carbon
Total Nitrogen	Total Suspended Solids
Total Dissolved Phosphorus	Turbidity
Total Phosphorus	pH
Sulphate	<i>Escherichia coli</i>
Sodium Adsorption Ratio (SAR)	

**Table 2: List of secondary indicators for the SSRP: SWQMF**

Mercury	Dicamba
Selenium	Methylchlorophenoxyacetic acid (MCPA)
2,4-Dichlorophenoxyacetic acid (2,4-D)	Mecoprop (MCP)

## WATER QUALITY TRIGGERS

Median and 90th percentile values from the historic record (1999–2009<sup>1</sup>) are the “median triggers” and “peak triggers” in the SSR SWQMF. Exceedances in peak triggers reflect changes in the frequency of observed extreme values in relation to historic data while exceedances in median triggers are used to identify shifts in the central tendency of annual data relative to the historic record. Both are intended to act as early warning systems of potential changes in surface water quality and a signal to do statistical assessments. In this report, seasonal 2014–2015 medians and 90th percentiles were compared with historic trigger values to determine if the seasonal median and 90th percentile values crossed the triggers in an undesirable direction. Where exceedances were found for an indicator, a statistical assessment was done to determine if there was a significant shift in the central tendency or peak concentration (i.e., 90th percentile) of water quality indications during 2014–2015 relative to the historic record. Note that in this report, depending on the distribution of data, either the mean or median are used to assess for a statistically significant change in central tendency for those annual values that exceeded the historic trigger values.

<sup>1</sup> The historic data set for some indicators were based on shorter time series. See the SSR SWQMF for a description of the specific time period used for each indicator at each station

All statistical methods used in this report are described in the South Saskatchewan Region Surface Water Quality Management Framework: Statistical Methods Final Report (2011). Statistical assessments were performed using custom statistical software developed by GrandDuke Geomatics<sup>2</sup> ([www.granduke.ca](http://www.granduke.ca)) following the sequence of steps outlined in Figures 6 and 7 of the **South Saskatchewan Region Surface Water Quality Management Framework: Statistical Methods Final Report (2011)**.

## WATER QUALITY LIMITS

Surface water quality limits were derived from the Canadian Council of Minister's for the Environment (CCME) and provincial water quality guidelines, for 9 of the 16 primary water quality indicators. Details of the specific water quality limits used for each indicator are given in the SSR SWQMF.

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<sup>2</sup> Now FarmersEdge (<http://www.farmersedge.ca/>)



# Statistically Significant Exceedances of Water Quality Triggers, 2014–2015

Table 3 compares median and 90<sup>th</sup> percentile values from the 2014–2015 seasonal data with the historical record (1999–2009) for these stations and indicators. Trigger exceedances that were statistically significant during 2014–2015 were observed at four stations for three primary indicators. Significant exceedances of median triggers were observed for total nitrogen in the winter at the Bow River (Cochrane) station and for specific conductance during both open and winter seasons at the Oldman River (Hwy 36). Peak trigger exceedances were recorded at Bow River (Carseland) for specific conductance and at Oldman River (Brocket) for pH. For both indicators, peak exceedances occurred during open and winter seasons. There were no exceedances for any of the other stations or indicators (primary or secondary). Summary statistics of 2014–2015 data for the remaining stations and indicators are shown in Appendix A.

**Table 3:** Median and 90<sup>th</sup> percentile values for indicators exhibiting a statistically significant trigger exceedance (shaded in blue) in the South Saskatchewan Region during 2014–2015

STATION	INDICATOR	PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Bow River (Cochrane)	Total Nitrogen (mg/L)	1999–2009 (trigger)	Open	0.18	0.40	70
			Winter	0.17	0.23	50
		2014–2015	Open	0.18	0.27	7
			Winter	0.24	0.38	5
Bow River (Carseland)	Specific Conductance (µS/cm)	1999–2009 (trigger)	Open	346	398	69
			Winter	422	443	50
		2014–2015	Open	380	496	7
			Winter	470	492	5
Oldman River (Brocket)	pH	1999–2009 (trigger)	Open	8.26	8.35	91
			Winter	8.26	8.34	52
		2014–2015	Open	8.39	8.48	7
			Winter	8.44	8.47	5
Oldman River (Hwy 36)	Specific Conductance (µS/cm)	1999–2009 (trigger)	Open	357	425	91
			Winter	414	502	52
		2014–2015	Open	400	424	7
			Winter	450	504	5

## Exceedances of Water Quality Limits, 2014–2015

One single sample exceeded the guideline value for Ammonia on December 16, 2014 in the South Saskatchewan River (Hwy 1). However, this single occurrence did not constitute a seasonal limit exceedance as defined in the SSR SWQMF. No water quality limits were exceeded for any of the primary or secondary indicators at any of the other long-term river network (LTRN) stations.

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# Appendix A – Descriptive Statistics for the Nine Long Term River Network Stations

**Table A1:** Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Brocket)

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.010	0.060	91
		Winter	0.010	0.039	52
	2014–2015	Open	0.025	0.041	7
		Winter	0.025	0.042	5
Chloride (mg/L)	1999–2009	Open	0.9	1.8	70
		Winter	1.2	1.9	50
	2014–2015	Open	1.3	1.7	7
		Winter	1.6	2.0	5
Nitrate (mg/L)	1999–2009	Open	0.078	0.128	91
		Winter	0.092	0.132	52
	2014–2015	Open	0.068	0.130	7
		Winter	0.085	0.099	5
Total Nitrogen (mg/L)	1999–2009	Open	0.23	0.35	70
		Winter	0.19	0.32	50
	2014–2015	Open	0.19	0.35	7
		Winter	0.19	0.29	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.003	0.006	91
		Winter	0.003	0.005	52
	2014–2015	Open	0.003	0.006	7
		Winter	0.002	0.002	5
Total Phosphorus (mg/L)	1999–2009	Open	0.007	0.018	91
		Winter	0.005	0.010	52
	2014–2015	Open	0.010	0.019	7
		Winter	0.005	0.006	5
Sulphate (mg/L)	1999–2009	Open	22.1	29.4	70
		Winter	29.6	36.0	50
	2014–2015	Open	23.0	29.4	7
		Winter	28.0	33.6	5
Sodium Adsorption Ratio	1999–2009	Open	0.16	0.22	70
		Winter	0.18	0.20	50
	2014–2015	Open	0.19	0.21	7
		Winter	0.20	0.24	5

**Table A1: Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Brocket) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	n
Specific Conductance (µS/cm)	1999–2009	Open	276	313	91
		Winter	308	342	52
	2014–2015	Open	300	334	7
		Winter	340	360	5
Total Dissolved Solids (mg/L)	1999–2009	Open	156	181	70
		Winter	179	202	50
	2014–2015	Open	170	184	7
		Winter	180	196	5
Total Organic Carbon (mg/L)	1999–2009	Open	2.0	3.7	70
		Winter	1.6	2.2	50
	2014–2015	Open	2.4	3.5	7
		Winter	1.9	2.2	5
Total Suspended Solids (mg/L)	1999–2009	Open	3	10	84
		Winter	1	6	47
	2014–2015	Open	4	7	7
		Winter	1	2	5
Turbidity (NTU)	1999–2009	Open	4.5	18.8	91.0
		Winter	2.3	8.5	52.0
	2014–2015	Open	7.5	18.6	7.0
		Winter	3.5	5.2	5.0
pH	1999–2009	Open	8.26	8.35	91
		Winter	8.26	8.34	52
	2014–2015	Open	8.39	8.48	7
		Winter	8.44	8.47	5
Escherichia coli (cfu/100ml)	1999–2009	Open	3	14	70
		Winter	2	27	49
	2014–2015	Open	5	12	7
		Winter	1	4	5

**Table A2: Median and 90<sup>th</sup> percentile values for secondary indicators in the Oldman River (Brocket)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
2,4-D (µg/L)	1999–2009	Open	0.0025	0.0032	39
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
Dicamba (µg/L)	1999–2009	Open	0.0025	0.0068	39
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
MCPA (µg/L)	1999–2009	Open	0.0025	0.0025	39
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
Mecoprop (µg/L)	1999–2009	Open	0.0025	0.0025	39
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
Total Mercury (ng/L)	1999–2009	Open	0.30	1.40	18
		Winter	0.33	0.62	8
	2014–2015	Open	0.94	2.71	7
		Winter	0.66	0.80	5
Total Recoverable Selenium (µg/L)	1999–2009	Open	0.52	0.76	14
		Winter	0.73	0.85	7
	2014–2015	Open	0.56	0.58	7
		Winter	0.67	0.74	5

**Table A3: Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Hwy 3 in Lethbridge)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	n
Total Ammonia (mg/L)	1999–2009	Open	0.020	0.070	94
		Winter	0.020	0.059	52
	2014–2015	Open	0.025	0.037	7
		Winter	0.025	0.025	5
Chloride (mg/L)	1999–2009	Open	1.5	3.2	70
		Winter	2.1	3.0	50
	2014–2015	Open	2.1	2.8	7
		Winter	2.3	6.6	5
Nitrate (mg/L)	1999–2009	Open	0.023	0.138	94
		Winter	0.219	0.348	52
	2014–2015	Open	0.087	0.132	7
		Winter	0.240	0.252	5
Total Nitrogen (mg/L)	1999–2009	Open	0.25	0.64	72
		Winter	0.40	0.59	50
	2014–2015	Open	0.34	0.38	7
		Winter	0.42	0.49	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.003	0.009	93
		Winter	0.003	0.006	52
	2014–2015	Open	0.004	0.007	7
		Winter	0.002	0.005	5
Total Phosphorus (mg/L)	1999–2009	Open	0.012	0.151	94
		Winter	0.008	0.022	52
	2014–2015	Open	0.031	0.076	7
		Winter	0.007	0.025	5
Sulphate (mg/L)	1999–2009	Open	35.8	52.1	70
		Winter	45.0	58.0	50
	2014–2015	Open	42.0	46.2	7
		Winter	46.0	61.2	5
Sodium Adsorption Ratio	1999–2009	Open	0.42	0.59	70
		Winter	0.46	0.60	50
	2014–2015	Open	0.42	0.53	7
		Winter	0.49	0.57	5
Specific Conductance (µS/cm)	1999–2009	Open	323	397	91
		Winter	358	437	52
	2014–2015	Open	380	400	7
		Winter	400	448	5
Total Dissolved Solids (mg/L)	1999–2009	Open	182	224	69
		Winter	217	256	50
	2014–2015	Open	210	224	7
		Winter	230	248	5

**Table A3: Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Hwy 3 in Lethbridge) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.4	3.9	70
		Winter	1.7	2.5	50
	2014–2015	Open	2.6	2.9	7
		Winter	1.9	2.0	5
Total Suspended Solids (mg/L)	1999–2009	Open	9	189	93
		Winter	7	34	52
	2014–2015	Open	29	105	7
		Winter	9	33	5
Turbidity (NTU)	1999–2009	Open	10.0	153.0	91
		Winter	6.3	27.5	52
	2014–2015	Open	22.0	82.8	7
		Winter	8.8	28.2	5
pH	1999–2009	Open	8.34	8.57	91
		Winter	8.20	8.28	52
	2014–2015	Open	8.47	8.57	7
		Winter	8.28	8.35	5
Escherichia coli (cfu/100ml)	1999–2009	Open	13	71	72
		Winter	2	13	48
	2014–2015	Open	12	15	5
		Winter	6	39	5

**Table A4: Median and 90<sup>th</sup> percentile values for secondary indicators in the Oldman River (Hwy 3 in Lethbridge)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
2,4-D (µg/L)	1999–2009	Open	0.0060	0.0310	46
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0066	10
		Winter			0
Dicamba (µg/L)	1999–2009	Open	0.0025	0.0100	46
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
MCPA (µg/L)	1999–2009	Open	0.0025	0.0100	46
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0081	10
		Winter			0
Mecoprop (µg/L)	1999–2009	Open	0.0025	0.0028	46
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
Total Mercury (ng/L)	1999–2009	Open	0.30	2.06	18
		Winter	0.30	1.35	8
	2014–2015	Open	2.31	5.45	7
		Winter	0.99	2.27	5
Total Recoverable Selenium (µg/L)	1999–2009	Open	0.61	0.85	14
		Winter	0.90	1.20	7
	2014–2015	Open	0.63	0.80	7
		Winter	0.82	0.88	5



**Table A5: Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Hwy 36)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.020	0.110	91
		Winter	0.030	0.134	57
	2014–2015	Open	0.025	0.038	7
		Winter	0.025	0.063	5
Chloride (mg/L)	1999–2009	Open	4.0	6.1	70
		Winter	6.0	8.1	50
	2014–2015	Open	3.3	3.9	7
		Winter	4.3	4.8	5
Nitrate (mg/L)	1999–2009	Open	0.006	0.140	91
		Winter	0.317	0.495	57
	2014–2015	Open	0.060	0.082	7
		Winter	0.290	0.336	5
Total Nitrogen (mg/L)	1999–2009	Open	0.31	0.75	70
		Winter	0.59	0.96	55
	2014–2015	Open	0.31	0.48	7
		Winter	0.49	0.57	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.003	0.010	91
		Winter	0.003	0.007	57
	2014–2015	Open	0.004	0.005	7
		Winter	0.003	0.005	5
Total Phosphorus (mg/L)	1999–2009	Open	0.015	0.173	91
		Winter	0.009	0.019	57
	2014–2015	Open	0.026	0.097	7
		Winter	0.010	0.021	5
Sulphate (mg/L)	1999–2009	Open	44.8	61.4	70
		Winter	58.1	77.4	50
	2014–2015	Open	50.0	59.6	7
		Winter	59.0	76.4	5
Sodium Adsorption Ratio	1999–2009	Open	0.56	0.78	70
		Winter	0.65	0.80	50
	2014–2015	Open	0.49	0.63	7
		Winter	0.58	0.64	5
Specific Conductance (µS/cm)	1999–2009	Open	357	425	91
		Winter	414	502	52
	2014–2015	Open	400	424	7
		Winter	450	504	5
Total Dissolved Solids (mg/L)	1999–2009	Open	200	243	70
		Winter	246	296	50
	2014–2015	Open	220	240	7
		Winter	250	278	5

**Table A5: Median and 90<sup>th</sup> percentile values for primary indicators in the Oldman River (Hwy 36) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.9	4.4	70
		Winter	2.2	3.0	55
	2014–2015	Open	2.6	2.8	7
		Winter	2.1	2.4	5
Total Suspended Solids (mg/L)	1999–2009	Open	11	200	90
		Winter	3	17	57
	2014–2015	Open	18	116	7
		Winter	5	21	5
Turbidity (NTU)	1999–2009	Open	9.9	180.0	91
		Winter	4.9	19.9	52
	2014–2015	Open	14.0	91.0	7
		Winter	6.6	16.1	5
pH	1999–2009	Open	8.37	8.52	91
		Winter	8.21	8.33	57
	2014–2015	Open	8.43	8.55	7
		Winter	8.25	8.31	5
Escherichia coli (cfu/100ml)	1999–2009	Open	14	151	70
		Winter	3	17	53
	2014–2015	Open	13	42	7
		Winter	5	11	5

**Table A6: Median and 90<sup>th</sup> percentile values for secondary indicators in the Oldman River (Hwy 36)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
2,4-D (µg/L)	1999–2009	Open	0.0135	0.0802	44
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0124	10
		Winter	0		0
Dicamba (µg/L)	1999–2009	Open	0.0025	0.0117	44
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	10
		Winter	0		0
MCPA (µg/L)	1999–2009	Open	0.0025	0.0184	44
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0062	10
		Winter	0		0
Mecoprop (µg/L)	1999–2009	Open	0.0025	0.0070	44
		Winter	0.0025	0.0025	4
	2014–2015	Open	0.0025	0.0025	10
		Winter	0		0
Total Mercury (ng/L)	1999–2009	Open	0.43	2.37	18
		Winter	0.80	1.73	8
	2014–2015	Open	1.72	5.79	7
		Winter	0.95	1.93	5
Total Recoverable Selenium (µg/L)	1999–2009	Open	0.59	1.00	14
		Winter	1.12	1.25	7
	2014–2015	Open	0.65	0.85	7
		Winter	0.87	1.05	5

**Table A7: Median and 90<sup>th</sup> percentile values for primary indicators in the South Saskatchewan River (Medicine Hat-Hwy 1)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	n
<b>Total Ammonia (mg/L)</b>	1999–2009	Open	0.020	0.060	70
		Winter	0.090	0.253	48
	2014–2015	Open	0.025	0.059	7
		Winter	0.060	0.812	5
<b>Chloride (mg/L)</b>	1999–2009	Open	6.4	9.8	70
		Winter	12.6	19.9	48
	2014–2015	Open	9.0	13.0	7
		Winter	14.0	17.6	5
<b>Nitrate (mg/L)</b>	1999–2009	Open	0.103	0.497	69
		Winter	1.015	1.258	48
	2014–2015	Open	0.270	0.560	7
		Winter	0.820	1.080	5
<b>Total Nitrogen (mg/L)</b>	1999–2009	Open	0.55	1.01	70
		Winter	1.33	1.72	48
	2014–2015	Open	0.77	1.42	7
		Winter	1.10	1.42	5
<b>Total Dissolved Phosphorus (mg/L)</b>	1999–2009	Open	0.004	0.009	70
		Winter	0.004	0.010	48
	2014–2015	Open	0.003	0.008	7
		Winter	0.002	0.005	5
<b>Total Phosphorus (mg/L)</b>	1999–2009	Open	0.023	0.098	70
		Winter	0.011	0.042	48
	2014–2015	Open	0.020	0.154	7
		Winter	0.013	0.023	5
<b>Sulphate (mg/L)</b>	1999–2009	Open	56.5	76.9	70
		Winter	62.4	77.6	48
	2014–2015	Open	63.0	72.2	7
		Winter	73.0	85.2	5
<b>Sodium Adsorption Ratio</b>	1999–2009	Open	0.60	0.79	70
		Winter	0.59	0.88	48
	2014–2015	Open	0.62	0.75	7
		Winter	0.61	0.86	5
<b>Specific Conductance (µS/cm)</b>	1999–2009	Open	369	436	68
		Winter	462	519	48
	2014–2015	Open	430	468	7
		Winter	500	536	5
<b>Total Dissolved Solids (mg/L)</b>	1999–2009	Open	221	252	70
		Winter	268	316	48
	2014–2015	Open	240	268	7
		Winter	280	314	5

**Table A7:** Median and 90<sup>th</sup> percentile values for primary indicators in the South Saskatchewan River (Medicine Hat-Hwy 1) (continued)

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.7	4.0	34
		Winter	1.7	3.0	13
	2014–2015	Open	2.7	3.0	7
		Winter	1.9	2.1	5
Total Suspended Solids (mg/L)	1999–2009	Open	19	105	70
		Winter	5	32	48
	2014–2015	Open	14	184	7
		Winter	13	26	5
Turbidity (NTU)	1999–2009	Open	16.4	80.5	70
		Winter	4.0	28.3	48
	2014–2015	Open	8.7	124.0	7
		Winter	10.0	15.0	5
pH	1999–2009	Open	8.32	8.47	70
		Winter	8.14	8.27	48
	2014–2015	Open	8.38	8.53	7
		Winter	8.31	8.39	5
Escherichia coli (cfu/100ml)	1999–2009	Open	13	99	68
		Winter	1	7	48
	2014–2015	Open	12	40	7
		Winter	1	11	5

**Table A8: Median and 90<sup>th</sup> percentile values for secondary indicators in the South Saskatchewan River (Medicine Hat-Hwy 1)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
2,4-D (µg/L)	1999–2009	Open	0.0245	0.1049	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0085	0.0134	4
		Winter			0
Dicamba (µg/L)	1999–2009	Open	0.0025	0.0170	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0057	4
		Winter			0
MCPA (µg/L)	1999–2009	Open	0.0025	0.0168	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0043	0.0074	4
		Winter			0
Mecoprop (µg/L)	1999–2009	Open	0.0025	0.0132	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
Total Mercury (ng/L)	1999–2009	Open	0.55	2.61	18
		Winter	0.30	0.41	5
	2014–2015	Open	1.34	15.48	7
		Winter	2.11	2.54	5
Total Recoverable Selenium (µg/L)	1999–2009	Open	0.57	0.85	14
		Winter	1.00	1.07	4
	2014–2015	Open	0.72	0.86	7
		Winter	0.81	0.92	5

**Table A9: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Cochrane)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.005	0.041	70
		Winter	0.008	0.025	50
	2014–2015	Open	0.025	0.025	7
		Winter	0.025	0.025	5
Chloride (mg/L)	1999–2009	Open	1.9	2.9	70
		Winter	2.0	2.6	50
	2014–2015	Open	2.5	3.2	7
		Winter	2.7	3.1	5
Nitrate (mg/L)	1999–2009	Open	0.074	0.108	69
		Winter	0.109	0.130	50
	2014–2015	Open	0.120	0.124	7
		Winter	0.160	0.172	5
Total Nitrogen (mg/L)	1999–2009	Open	0.18	0.40	70
		Winter	0.17	0.23	50
	2014–2015	Open	0.18	0.27	7
		Winter	0.24	0.38	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.002	0.004	35
		Winter	0.002	0.004	25
	2014–2015	Open	0.002	0.004	7
		Winter	0.002	0.002	5
Total Phosphorus (mg/L)	1999–2009	Open	0.005	0.009	35
		Winter	0.003	0.006	25
	2014–2015	Open	0.004	0.015	7
		Winter	0.003	0.374	5
Sulphate (mg/L)	1999–2009	Open	33.6	40.4	70
		Winter	42.2	45.8	50
	2014–2015	Open	35.0	41.0	7
		Winter	45.0	46.0	5
Sodium Adsorption Ratio	1999–2009	Open	0.07	0.12	70
		Winter	0.07	0.10	50
	2014–2015	Open	0.09	0.16	7
		Winter	0.08	0.10	5
Specific Conductance (µS/cm)	1999–2009	Open	289	317	70
		Winter	330	349	50
	2014–2015	Open	310	344	7
		Winter	350	360	5
Total Dissolved Solids (mg/L)	1999–2009	Open	165	190	70
		Winter	190	200	50
	2014–2015	Open	160	194	7
		Winter	190	196	5

**Table A9: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Cochrane) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	1.0	1.6	34
		Winter	0.8	0.9	14
	2014–2015	Open	0.8	1.3	7
		Winter	0.7	0.7	5
Total Suspended Solids (mg/L)	1999–2009	Open	2	8	70
		Winter	1	2	50
	2014–2015	Open	1	4	7
		Winter	1	2	5
Turbidity (NTU)	1999–2009	Open	1.8	10.1	70
		Winter	0.8	1.7	50
	2014–2015	Open	2.8	7.4	7
		Winter	0.7	0.8	5
pH	1999–2009	Open	8.23	8.38	70
		Winter	8.17	8.30	50
	2014–2015	Open	8.30	8.39	7
		Winter	8.30	8.35	5
Escherichia coli (cfu/100ml)	1999–2009	Open	2	13	70
		Winter	1	2	49
	2014–2015	Open	4	13	7
		Winter	1	12	5



**Table A10: Median and 90<sup>th</sup> percentile values for secondary indicators in Bow River (Cochrane)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>2,4-D (µg/L)</b>	1999–2009	Open	0.0025	0.0025	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
<b>Dicamba (µg/L)</b>	1999–2009	Open	0.0025	0.0100	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
<b>MCPA (µg/L)</b>	1999–2009	Open	0.0025	0.0025	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
<b>Mecoprop (µg/L)</b>	1999–2009	Open	0.0025	0.0025	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	10
		Winter			0
<b>Total Mercury (ng/L)</b>	1999–2009	Open	0.30	0.92	22
		Winter	0.34	0.50	10
	2014–2015	Open	0.62	1.16	7
		Winter	0.28	0.34	5
<b>Total Recoverable Selenium (µg/L)</b>	1999–2009	Open	0.50	0.59	18
		Winter	0.61	0.80	9
	2014–2015	Open	0.42	0.61	7
		Winter	0.55	0.69	5

**Table A11: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Carseland)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.045	0.160	70
		Winter	0.250	0.472	50
	2014–2015	Open	0.025	0.144	7
		Winter	0.066	0.164	5
Chloride (mg/L)	1999–2009	Open	7.6	13.1	70
		Winter	12.7	20.4	50
	2014–2015	Open	9.8	31.2	7
		Winter	19.0	23.6	5
Nitrate (mg/L)	1999–2009	Open	0.601	0.990	69
		Winter	1.130	1.403	50
	2014–2015	Open	0.580	0.796	7
		Winter	1.100	1.200	5
Total Nitrogen (mg/L)	1999–2009	Open	1.02	1.72	70
		Winter	1.68	2.17	50
	2014–2015	Open	0.83	1.24	7
		Winter	1.40	1.56	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.007	0.016	35
		Winter	0.017	0.028	25
	2014–2015	Open	0.003	0.032	7
		Winter	0.007	0.010	5
Total Phosphorus (mg/L)	1999–2009	Open	0.021	0.083	35
		Winter	0.030	0.062	25
	2014–2015	Open	0.010	0.137	7
		Winter	0.011	0.051	5
Sulphate (mg/L)	1999–2009	Open	42.9	51.5	70
		Winter	53.9	58.0	50
	2014–2015	Open	44.0	61.2	7
		Winter	59.0	60.8	5
Sodium Adsorption Ratio	1999–2009	Open	0.30	0.45	70
		Winter	0.39	0.58	50
	2014–2015	Open	0.36	0.81	7
		Winter	0.49	0.56	5
Specific Conductance (µS/cm)	1999–2009	Open	346	398	69
		Winter	422	443	50
	2014–2015	Open	380	496	7
		Winter	470	492	5
Total Dissolved Solids (mg/L)	1999–2009	Open	201	232	70
		Winter	246	260	50
	2014–2015	Open	210	278	7
		Winter	260	272	5

**Table A11: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Carseland) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.0	3.6	34
		Winter	1.5	1.9	14
	2014–2015	Open	1.9	4.0	7
		Winter	1.5	1.7	5
Total Suspended Solids (mg/L)	1999–2009	Open	6	64	70
		Winter	5	14	50
	2014–2015	Open	8	90	7
		Winter	4	41	5
Turbidity (NTU)	1999–2009	Open	4.0	48.4	70
		Winter	2.6	9.3	50
	2014–2015	Open	5.6	62.2	7
		Winter	2.6	4.3	5
pH	1999–2009	Open	8.20	8.39	70
		Winter	8.06	8.20	50
	2014–2015	Open	8.31	8.37	7
		Winter	8.23	8.34	5
Escherichia coli (cfu/100ml)	1999–2009	Open	28	144	67
		Winter	10	25	47
	2014–2015	Open	46	158	7
		Winter	5	14	5

**Table A12: Median and 90<sup>th</sup> percentile values for secondary indicators in Bow River (Carseland)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>2,4-D (µg/L)</b>	1999–2009	Open	0.0075	0.0260	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0183	10
		Winter			0
<b>Dicamba (µg/L)</b>	1999–2009	Open	0.0025	0.0100	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0028	10
		Winter			0
<b>MCPA (µg/L)</b>	1999–2009	Open	0.0025	0.0071	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0036	10
		Winter			0
<b>Mecoprop (µg/L)</b>	1999–2009	Open	0.0050	0.0167	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0036	10
		Winter			0
<b>Total Mercury (ng/L)</b>	1999–2009	Open	0.30	4.81	22
		Winter	0.35	0.69	10
	2014–2015	Open	1.09	6.35	7
		Winter	0.71	2.59	5
<b>Total Recoverable Selenium (µg/L)</b>	1999–2009	Open	0.59	0.88	18
		Winter	0.83	0.98	9
	2014–2015	Open	0.54	0.81	7
		Winter	0.70	0.77	5

**Table A13: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Cluny)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.025	0.120	71
		Winter	0.195	0.372	48
	2014–2015	Open	0.025	0.075	7
		Winter	0.066	0.106	5
Chloride (mg/L)	1999–2009	Open	8.0	13.0	71
		Winter	13.0	20.9	43
	2014–2015	Open	12.0	26.8	7
		Winter	22.0	33.0	5
Nitrate (mg/L)	1999–2009	Open	0.520	0.837	59
		Winter	1.195	1.455	40
	2014–2015	Open	0.670	0.738	7
		Winter	1.000	1.220	5
Total Nitrogen (mg/L)	1999–2009	Open	0.94	1.52	71
		Winter	1.68	2.07	48
	2014–2015	Open	1.00	1.38	7
		Winter	1.30	1.62	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.005	0.014	35
		Winter	0.012	0.020	22
	2014–2015	Open	0.003	0.029	7
		Winter	0.004	0.011	5
Total Phosphorus (mg/L)	1999–2009	Open	0.017	0.128	35
		Winter	0.017	0.025	22
	2014–2015	Open	0.051	0.182	7
		Winter	0.012	0.024	5
Sulphate (mg/L)	1999–2009	Open	47.9	58.1	48
		Winter	57.2	63.1	32
	2014–2015	Open	47.0	68.0	7
		Winter	62.0	66.6	5
Sodium Adsorption Ratio	1999–2009	Open	0.35	0.58	48
		Winter	0.42	0.72	32
	2014–2015	Open	0.37	0.89	7
		Winter	0.58	0.79	5
Specific Conductance (µS/cm)	1999–2009	Open	360	425	47
		Winter	441	490	32
	2014–2015	Open	410	492	7
		Winter	480	536	5
Total Dissolved Solids (mg/L)	1999–2009	Open	211	245	48
		Winter	257	290	32
	2014–2015	Open	230	282	7
		Winter	280	302	5

**Table A13: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Cluny) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.2	4.3	23
		Winter	1.3	1.8	16
	2014–2015	Open	2.1	4.3	7
		Winter	1.8	1.9	5
Total Suspended Solids (mg/L)	1999–2009	Open	11	80	71
		Winter	4	9	48
	2014–2015	Open	46	181	7
		Winter	10	23	5
Turbidity (NTU)	1999–2009	Open	8.5	62.7	48
		Winter	2.8	7.1	32
	2014–2015	Open	35.0	119.4	7
		Winter	5.3	5.5	5
pH	1999–2009	Open	8.30	8.46	48
		Winter	8.00	8.23	37
	2014–2015	Open	8.34	8.47	7
		Winter	8.20	8.36	5
Escherichia coli (cfu/100ml)	1999–2009	Open	8	56	67
		Winter	1	6	48
	2014–2015	Open	25	131	7
		Winter	2	4	5

**Table A14: Median and 90<sup>th</sup> percentile values for secondary indicators in the Bow River (Cluny)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>2,4-D (µg/L)</b>	1999–2009	Open	0.0065	0.0384	32
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0043	0.0060	4
		Winter			0
<b>Dicamba (µg/L)</b>	1999–2009	Open	0.0025	0.0100	32
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>MCPA (µg/L)</b>	1999–2009	Open	0.0025	0.0097	32
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Mecoprop (µg/L)</b>	1999–2009	Open	0.0055	0.0209	32
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0057	4
		Winter			0
<b>Total Mercury (ng/L)</b>	1999–2009	Open	0.30	2.53	17
		Winter	0.30	0.37	5
	2014–2015	Open	4.43	11.39	7
		Winter	0.83	1.44	5
<b>Total Recoverable Selenium (µg/L)</b>	1999–2009	Open	0.70	0.93	10
		Winter	0.79	0.82	4
	2014–2015	Open	0.65	0.69	7
		Winter	0.72	0.82	5

**Table A15: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Ronaldane)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>Total Ammonia (mg/L)</b>	1999–2009	Open	0.020	0.081	70
		Winter	0.130	0.292	49
	2014–2015	Open	0.025	0.056	7
		Winter	0.075	0.094	5
<b>Chloride (mg/L)</b>	1999–2009	Open	8.4	12.0	70
		Winter	13.0	19.7	49
	2014–2015	Open	11.0	22.8	7
		Winter	19.0	20.2	5
<b>Nitrate (mg/L)</b>	1999–2009	Open	0.302	0.747	69
		Winter	1.190	1.440	49
	2014–2015	Open	0.590	0.730	7
		Winter	1.200	1.300	5
<b>Total Nitrogen (mg/L)</b>	1999–2009	Open	0.68	1.26	70
		Winter	1.58	1.91	49
	2014–2015	Open	0.92	1.10	7
		Winter	1.50	1.66	5
<b>Total Dissolved Phosphorus (mg/L)</b>	1999–2009	Open	0.005	0.010	35
		Winter	0.005	0.017	24
	2014–2015	Open	0.003	0.009	7
		Winter	0.004	0.004	5
<b>Total Phosphorus (mg/L)</b>	1999–2009	Open	0.025	0.138	35
		Winter	0.012	0.027	24
	2014–2015	Open	0.020	0.099	7
		Winter	0.010	0.019	5
<b>Sulphate (mg/L)</b>	1999–2009	Open	62.2	78.2	70
		Winter	60.9	70.5	49
	2014–2015	Open	61.0	76.6	7
		Winter	75.0	77.2	5
<b>Sodium Adsorption Ratio</b>	1999–2009	Open	0.55	0.80	70
		Winter	0.48	0.67	49
	2014–2015	Open	0.50	0.86	7
		Winter	0.64	0.70	5



**Table A15: Median and 90<sup>th</sup> percentile values for primary indicators in the Bow River (Ronaldene) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>Specific Conductance (µS/cm)</b>	1999–2009	Open	386	431	70
		Winter	448	499	49
	2014–2015	Open	410	534	7
		Winter	510	522	5
<b>Total Dissolved Solids (mg/L)</b>	1999–2009	Open	228	260	70
		Winter	263	291	49
	2014–2015	Open	240	300	7
		Winter	290	296	5
<b>Total Organic Carbon (mg/L)</b>	1999–2009	Open	3.0	4.8	34
		Winter	1.5	2.5	14
	2014–2015	Open	2.8	3.2	7
		Winter	1.6	1.8	5
<b>Total Suspended Solids (mg/L)</b>	1999–2009	Open	12	72	70
		Winter	6	18	49
	2014–2015	Open	23	87	7
		Winter	10	12	5
<b>Turbidity (NTU)</b>	1999–2009	Open	10.4	73.3	70
		Winter	3.8	17.4	49
	2014–2015	Open	16.0	60.2	7
		Winter	5.2	11.2	5
<b>pH</b>	1999–2009	Open	8.32	8.58	70
		Winter	8.06	8.30	49
	2014–2015	Open	8.44	8.50	7
		Winter	8.35	8.36	5
<b>Escherichia coli (cfu/100ml)</b>	1999–2009	Open	14	77	69
		Winter	1	6	49
	2014–2015	Open	16	59	7
		Winter	4	6	5

**Table A16: Median and 90<sup>th</sup> percentile values for secondary indicators in the Bow River (Ronaldene)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>2,4-D (µg/L)</b>	1999–2009	Open	0.0325	0.1443	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0048	0.0098	4
		Winter			0
<b>Dicamba (µg/L)</b>	1999–2009	Open	0.0095	0.0354	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0050	4
		Winter			0
<b>MCPA (µg/L)</b>	1999–2009	Open	0.0025	0.0629	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Mecoprop (µg/L)</b>	1999–2009	Open	0.0055	0.0160	44
		Winter	0.0025	0.0025	3
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Total Mercury (ng/L)</b>	1999–2009	Open	0.90	4.24	18
		Winter	0.30	0.51	6
	2014–2015	Open	2.16	10.39	7
		Winter	1.15	1.43	5
<b>Total Recoverable Selenium (µg/L)</b>	1999–2009	Open	0.69	0.94	14
		Winter	0.83	1.00	5
	2014–2015	Open	0.70	0.86	7
		Winter	0.85	0.95	5

**Table A17: Median and 90<sup>th</sup> percentile values for primary indicators in the Milk River (Hwy 880)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Ammonia (mg/L)	1999–2009	Open	0.025	0.070	81
		Winter	0.040	0.130	31
	2014–2015	Open	0.025	0.066	7
		Winter	0.025	0.054	5
Chloride (mg/L)	1999–2009	Open	1.3	6.2	81
		Winter	8.0	14.3	31
	2014–2015	Open	4.5	6.8	7
		Winter	6.0	7.7	5
Nitrate (mg/L)	1999–2009	Open	0.031	0.123	81
		Winter	0.382	0.807	31
	2014–2015	Open	0.005	0.022	7
		Winter	0.380	0.634	5
Total Nitrogen (mg/L)	1999–2009	Open	0.32	0.59	78
		Winter	0.82	1.22	31
	2014–2015	Open	0.30	0.49	7
		Winter	0.93	1.26	5
Total Dissolved Phosphorus (mg/L)	1999–2009	Open	0.003	0.006	81
		Winter	0.003	0.010	31
	2014–2015	Open	0.004	0.007	7
		Winter	0.006	0.046	5
Total Phosphorus (mg/L)	1999–2009	Open	0.079	0.193	81
		Winter	0.007	0.039	31
	2014–2015	Open	0.050	0.099	7
		Winter	0.018	0.105	5
Sulphate (mg/L)	1999–2009	Open	22.3	170.0	81
		Winter	197.0	316.0	31
	2014–2015	Open	110.0	160.0	7
		Winter	130.0	174.0	5
Sodium Adsorption Ratio	1999–2009	Open	0.43	2.26	81
		Winter	2.54	3.80	31
	2014–2015	Open	1.43	2.01	7
		Winter	1.78	2.13	5
Specific Conductance (µS/cm)	1999–2009	Open	248	733	81
		Winter	916	1380	31
	2014–2015	Open	640	752	7
		Winter	670	940	5
Total Dissolved Solids (mg/L)	1999–2009	Open	140	488	81
		Winter	606	900	31
	2014–2015	Open	410	458	7
		Winter	400	586	5

**Table A17: Median and 90<sup>th</sup> percentile values for primary indicators in the Milk River (Hwy 880) (continued)**

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
Total Organic Carbon (mg/L)	1999–2009	Open	2.1	4.2	39
		Winter	3.7	4.8	26
	2014–2015	Open	2.3	5.0	7
		Winter	4.5	9.0	5
Total Suspended Solids (mg/L)	1999–2009	Open	107	304	81
		Winter	3	12	31
	2014–2015	Open	80	104	7
		Winter	13	96	5
Turbidity (NTU)	1999–2009	Open	60.0	170.0	81
		Winter	3.7	17.5	31
	2014–2015	Open	54.0	86.0	7
		Winter	7.8	71.6	5
pH	1999–2009	Open	8.23	8.43	81
		Winter	8.30	8.41	31
	2014–2015	Open	8.53	8.57	7
		Winter	8.40	8.49	5
Escherichia coli (cfu/100ml)	1999–2009	Open	57	230	79
		Winter	1	9	30
	2014–2015	Open	45	130	6
		Winter	7	23	5

**Table A18:** Median and 90<sup>th</sup> percentile values for secondary indicators in the Milk River (Hwy 880)

INDICATOR	TIME PERIOD	SEASON	MEDIAN	90 <sup>TH</sup> PERCENTILE	<i>n</i>
<b>2,4-D (µg/L)</b>	1999–2009	Open	0.0025	0.0114	24
		Winter			0
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Dicamba (µg/L)</b>	1999–2009	Open	0.0025	0.0025	24
		Winter			0
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>MCPA (µg/L)</b>	1999–2009	Open	0.0025	0.0030	24
		Winter			0
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Mecoprop (µg/L)</b>	1999–2009	Open	0.0025	0.0025	24
		Winter			0
	2014–2015	Open	0.0025	0.0025	4
		Winter			0
<b>Total Mercury (ng/L)</b>	1999–2009	Open	2.15	9.50	18
		Winter	0.30	0.70	6
	2014–2015	Open	4.64	5.42	7
		Winter	2.04	5.97	5
<b>Total Recoverable Selenium (µg/L)</b>	1999–2009	Open	0.35	0.89	14
		Winter	1.20	1.51	5
	2014–2015	Open	0.26	0.48	7
		Winter	0.57	0.83	5