Annual Report

Balmertown, Cochenour & McKenzie Island Drinking Water System

2023

Prepared by **Northern Waterworks Inc.**
on behalf of the **Municipality of Red Lake**

NORTHERN WATERWORKS INC.

RED LAKE
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Contents

1 Introduction

1.1 Annual Reporting Requirements

This consolidated Annual Report (the Report) has been prepared in accordance with both section 11 (Annual Reports) and Schedule 22 (Summary Reports for Municipalities) of Ontario Regulation 170/03 (Drinking Water Systems Regulation). This Report is intended to inform both the public and Municipal Council about the operation of the system over the previous calendar year (January 1 to December 31, 2023).

Section 11 of O. Reg. 170/03 requires the development and distribution to the public of an annual report summarizing water quality monitoring results, adverse water quality incidents, system expenses and chemicals used in the water treatment process.

Schedule 22 of O. Reg. 170/03 requires the development and distribution to Council of an annual report summarizing incidents of regulatory non-compliance and associated corrective actions, in addition to providing flow monitoring results for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned demand.

1.2 Report Availability

In accordance with section 11 of O. Reg. 170/03, this Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the Red Lake Municipal Office and on the Municipality's website.

In accordance with Schedule 22 of O. Reg. 170/03, this Report must be given to the members of Municipal Council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's *Safe Drinking Water Act* (SDWA) also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system. The examination of this Report is one of the methods by which municipal officials may fulfil the obligations required by section 19 of the SDWA.

System users and members of Council should contact a representative of NWI for assistance in interpreting this Report. Questions and comments may be directed to the local NWI Operations Manager or by email to compliance@nwi.ca.

2 System Overview & Expenses

2.1 System Description

The Balmertown, Cochenour & McKenzie Island (BCMI) Drinking Water System must meet extensive treatment and testing requirements to ensure that human health is protected. The operation and maintenance of the system is governed by Ontario's *Safe Drinking Water Act* and the regulations therein, in addition to requirements within system-specific environmental approvals. Important system information is summarized in Table 1.

Table 1: System information

Drinking-Water System Name:	Balmertown, Cochenour & McKenzie Island (BCMI) Drinking Water System
DWS Number:	210000522
DWS Category:	Large Municipal Residential
DWS Owner:	The Corporation of the Municipality of Red Lake
DWS Operating Authority:	Northern Waterworks Inc.
DWS Components:	• Raw water pumping station • Cochenour Water Treatment Plant • Balmertown Reservoir Pumping Station • Cochenour & McKenzie Island water distribution system • Balmertown water distribution system
Treatment Processes:	• Chemical coagulation, flocculation and clarification • Dual media (rapid sand) filtration • Free chlorine disinfection • pH adjustment

Water production begins as raw water flows by gravity from the intake structure located in Bruce Channel (Red Lake) and into an underground reservoir located at the raw water pumping station. Pumps at the station transfer water from the reservoir and through a transmission line directly to the treatment units at the Cochenour Water Treatment Plant. Aluminum sulphate (coagulant) and sodium carbonate solution (pH/alkalinity adjustment) are injected and rapidly mixed into the raw water immediately upstream from the three package treatment units, which each include a two-stage flocculation tank, clarifier and filter.

To promote floc formation water is gently mixed as it passes through the flocculation basins. Polymer solution (flocculant) is also added to the water at this stage of treatment to form larger and more stable floc aggregates. Process water then enters the clarifier where its velocity is reduced to allow for the separation and settling of floc. Supernatant overflows into the clarifier effluent launders and is directed to the filter unit; settled floc (sludge) is automatically removed from the bottom of the clarifier.

Impurities that were not captured and settled as floc in the clarifier are removed by passing water through a dual media filter composed of anthracite and silica sand. Chlorine gas (disinfectant) and sodium carbonate solution are added to the filtrate as it is directed from the filters to the treated water storage reservoir. The filters are periodically cleaned by using an air scour to agitate the entire media bed and reversing the flow of water through the filter.

A majority of the water produced is transferred through a transmission line from the Cochenour Water Treatment Plant (WTP) to the reservoir at the Balmertown Reservoir Pumping Station (RPS). Primary disinfection is achieved as disinfectant mixes with the water in the reservoirs at both facilities. Pumps located at the Balmertown RPS and Cochenour WTP then transfer treated water from the facility reservoirs to the Balmertown and Cochenour/McKenzie Island water distribution systems, respectively. Secondary disinfection requirements in the distribution systems are achieved by maintaining a free chlorine residual at all locations.

2.2 Water Treatment Chemicals

In accordance with section 11 of O. Reg. 170/03, this Report must include a list of all water treatment chemicals used by the system during the period covered by the report (summarized in Table 2). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

Table 2: Water treatment chemicals used in 2023

Treatment Chemical	Application
aluminum sulphate	coagulant
sodium carbonate	pH/alkalinity adjustment
polymer (Polyfloc CP1160P)	flocculant
chlorine gas	disinfectant

2.3 System Expenses

In accordance with section 11 of O. Reg. 170/03, this Report must describe any major expenses incurred during the reporting period to install, repair, or replace required equipment. This Report also summarizes those expenses related to strengthening equipment inventories and to maintenance activities undertaken by subcontracted service providers. Major expenses incurred in 2023 are summarized in Table 3.

Table 3: Major expenses incurred in 2023

Category	Description	Expense
Maintenance/Repairs	SCADA firmware updates[1]	$9,000
Maintenance	Diesel Water Pump repairs	$5,030
Maintenance	Flow meter calibration verifications	$2,000

1. Total cost for updates in Red Lake, BCMI and Madsen

3 Water Quality

3.1 Overview

Water quality monitoring is conducted to determine and confirm that drinking water delivered to the consumer is safe and aesthetically pleasing. Monitoring is also required to assess

compliance with legislation and to control the treatment process. In accordance with section 11 of O. Reg. 170/03, this Report must summarize the results of water quality tests required by regulations, approvals, and orders. The following sections summarize the results of all required water quality tests and compare the results to applicable water quality standards.

3.2 Microbiological Parameters

Microbiological sampling and testing requirements are provided in Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. In 2023, a total of 298 routine source, treated and distribution water samples were collected for microbiological analysis by an accredited laboratory. Samples were collected on a weekly basis and included tests for E. coli (EC), total coliforms (TC) and heterotrophic plate counts (HPC). Results from microbiological analyses are summarized in Table 4. All results were below the associated Ontario Drinking Water Quality Standards.

Table 4: Results summary for microbiological parameters

Sample Type	# of Samples	EC Results Range[1] (MPN/ 100mL)	TC Results Range[1] (MPN/ 100mL)	# of HPC Samples	HPC Results Range (CFU/mL)
Raw Water	52	0 to 2	0 to 291	---	---
Treated Water (CWTP)	52	absent	absent	52	0 to 1
Balmertown (BRPS)	52	absent	absent	52	0 to 2
Distribution (routine)	142	absent	absent	38	0 to 1
Distribution (nonroutine)	28	absent	absent	---	---

1. The Ontario Drinking Water Quality Standard for E. Coli and Total Coliforms in a treated or distribution sample is 'not detectable'. The presence of either parameter in a treated or distribution sample constitutes an exceedance.

3.3 Operational Parameters

In accordance with Schedule 7 (Operational checks) of O. Reg. 170/03, regulated operational parameters that must be monitored include raw water turbidity, filtrate turbidity and the free chlorine residuals associated with primary and secondary disinfection. Table 5 summarizes water quality results for regulated and selected unregulated operational parameters. In accordance with Schedule 6 (Operational checks, sampling, and testing – general) of O. Reg. 170/03, certain operational parameters are continuously monitored. No Adverse Water Quality Incidents (AWQIs) pertaining to operational parameters occurred during the reporting period.

Table 5: Results summary for operational parameters

Parameter (Sample Type)[1]	Number of Samples	Units	Min. Result	Max. Result	Annual Avg.	Adverse Result
Turbidity (Raw Water)	98	NTU	0.12	2.30	1.04	n/a
Turbidity (Filter 1)	Continuous	NTU	0.024	0.952	0.057	>1.0
Turbidity (Filter 2)	Continuous	NTU	0.011	0.788	0.048	>1.0
Turbidity (Filter 3)	Continuous	NTU	0.039	0.204	0.062	>1.0
Turbidity (Treated)	365	NTU	0.08	0.71	0.16	n/a
pH (Treated)	365	---	6.4	8.4	7.3	n/a
Alkalinity (Treated)	232	mg/L	20	74	47.1	n/a
Aluminum Residual (Treated)	231	mg/L	0.020	0.440	0.042	n/a
FCR (Treated - CWTP)[2]	Continuous	mg/L	0.51	2.19	1.09	n/a
FCR (Treated - BRPS)[2]	Continuous	mg/L	0.39	1.90	1.03	n/a
FCR (CMI Distribution)[3]	350+	mg/L	0.51	2.19	n/a	<0.05
FCR (Balm. Distribution)[3]	400+	mg/L	0.39	1.90	n/a	<0.05

1. FCR = free chlorine residual; CMI = Cochenour & McKenzie Island; Balm. = Balmertown.
2. There is no adverse result corresponding to the treated water free chlorine residual. However, an observation of adverse water quality occurs if the residual is low enough such that water has not been disinfected in accordance with the system's *Municipal Drinking Water Licence*.
3. Free chlorine residuals are tested at various locations in the distribution systems. The free chlorine residual varies with water age and distribution system location, and the values in the table pertain to the minimum and maximum results collected across all locations in the calendar year.

3.4 Conventional Filtration Performance

In accordance with the system's *Municipal Drinking Water Licence*, conventional filtration facilities must meet certain performance criteria in order to claim removal credits for Cryptosporidium oocysts and Giardia cysts. In addition to continuously monitoring filtrate turbidity and other requirements, filtrate turbidity must be less than or equal to 0.3 NTU in at least 95% of the measurements each month. Table 6 summarizes filtrate turbidity compliance against the <0.3 NTU/95% performance criterion. Minimum and maximum values in the table correspond to the proportion of time that filtered water turbidity was less than or equal to 0.3 NTU in a calendar month in 2023. No AWQIs related to conventional filtration performance occurred during the reporting period.

Table 6: Filtration performance summary

Filter	Minimum Result	Maximum Result	Adverse Result
Filter 1	99.9%	100%	<95%
Filter 2	99.9%	100%	<95%
Filter 3	99.8%	100%	<95%

3.5 Nitrate & Nitrite

Treated water is tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Nitrate and nitrite results are provided in Table 7. All results were below the Ontario Drinking Water Quality Standards.

Table 7: Nitrate and nitrite results

Sample Date	Nitrate		Nitrite	
	Result (mg/L)	ODWQS (mg/L)	Result (mg/L)	ODWQS (mg/L)
13-Feb-2023	0.09	10	<0.010	1
15-May-2023	0.084		<0.010	
21-Aug-2023	<0.020		<0.010	
20-Nov-2023	0.065		<0.010	

3.6 Trihalomethanes & Haloacetic Acids

Trihalomethanes (THMs) and haloacetic acids (HAAs) are sampled on a quarterly basis from a distribution system location that is likely to have an elevated potential for their formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Total THM and HAA results are provided in Table 8 and Table 9, respectively. Compliance with the provincial standards for trihalomethane and haloacetic acid concentrations is determined by calculating a running annual average (RAA) each quarter. The 2023 RAAs for THMs were below the Ontario Drinking Water Quality Standards.

Table 8: Total THM results

Sample Date	Result (µg/L)
13-Feb-23	69.5
15-May-23	66.5
17-Apr-23	66.5
21-Aug-23	94.3
20-Nov-23	77.8
Regulatory Average (RAA)	67.3
ODWQS (RAA)	100

Four (4) AWQIs were reported for an HAA exceedance in 2023. Samples were taken monthly instead of quarterly throughout 2023 to monitor the levels more closely. The ongoing AWQIs were resolved at the end of Q4 2023. Refer to the Compliance section of this report for more details. Monthly HAA sampling will continue in 2024 and return to quarterly sampling in 2025 if there are no further exceedances.

Table 9: Total HAA results

Sample Date	Result (µg/L)	Quarterly Average Result (µg/L)
23-Jan-23	76.8	79.3
13-Feb-23	76.6	
13-Mar-23	84.6	
Q1 Regulatory Average (RAA)		82.0
17-Apr-23	82.8	81.3
15-May-23	78.0	
12-Jun-23	83.1	
Q2 Regulatory Average (RAA)		82.9
17-Jul-23	82.8	87.9
21-Aug-23	97.6	
13-Sep-23	83.2	
Q3 Regulatory Average (RAA)		81.8
10-Oct-23	80.6	66.6
13-Nov-23	66.0	
14-Dec-23	53.2	
Q4 Regulatory Average (RAA)		78.8
ODWQS (RAA)		80

3.7 Lead Sampling

Based upon favourable sampling results in the community, the BCMI DWS previously qualified for reduced lead sampling and ultimately became exempt from sampling at plumbing locations in accordance with Schedule 15.1 (Lead) of O. Reg. 170/03. Four (4) distribution system samples must now be collected every year and analyzed for pH and alkalinity. Additionally, these distribution system samples must be analyzed for lead in every third 12-month period after the plumbing sample exemption was activated. Table 10 summarizes the results of community lead sampling and related required tests.

Table 10: Distribution pH, alkalinity, and lead sampling results

Sample Date	Distribution Sampling Location	pH	Alkalinity (mg/L)	Lead Result (µg/L)	Lead ODWQS (µg/L)
10-May-2023	Balmertown Waste Plant	7.4	46.3	---	10
10-May-2023	McMarmac Bleeder	7.3	47.1	---	
22-Aug-2023	Balmertown Waste Plant	6.8	44	---	
22-Aug-2023	McMarmac Bleeder	6.7	40	---	

1. Lead will next be tested in distribution samples during the Winter 2023/24 sampling period.

3.8 Environmental Discharge Sampling

The *Municipal Drinking Water Licence* for the BCMI Drinking Water System requires additional sampling associated with discharges to the natural environment. Specifically, samples must be collected from settling tank effluent on a monthly basis and tested for the parameter total suspended solids (TSS). This effluent is discharged to Bruce Channel and originates from the onsite treatment of the wastewater produced during plant operation. The *Licence* also requires that the effluent discharged to the environment has an annual average TSS concentration below 25 mg/L. Table 11 summarizes 2023 environmental discharge sampling results.

Table 11: Environmental discharge sampling results summary

Number of Samples	Minimum TSS Result (mg/L)	Maximum TSS Result (mg/L)	TSS Annual Average (mg/L)
12	<3.0	33.7	10.1

3.9 Inorganic & Organic Parameters

Most inorganic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 23 (Inorganic parameters) of O. Reg. 170/03. The inorganic parameters sodium and fluoride are sampled every five (5) years in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. The most recent inorganic parameter sampling results are provided in Table 12. All results were below the associated Ontario Drinking Water Quality Standards.

Table 12: Inorganic parameter sampling results

Parameter	Most Recent Sample Date	Units	Result	ODWQS
Antimony	21-Aug-2023	µg/L	<0.60	6
Arsenic	21-Aug-2023	µg/L	<1.0	10
Barium	21-Aug-2023	µg/L	<10	1000
Boron	21-Aug-2023	µg/L	<50	5000
Cadmium	21-Aug-2023	µg/L	<0.10	5
Chromium	21-Aug-2023	µg/L	<1.0	50
Fluoride	13-Feb-2023	mg/L	<0.020	1.5
Mercury	21-Aug-2023	µg/L	<0.10	1
Selenium	21-Aug-2023	µg/L	<1.0	50
Sodium	13-Feb-2023	mg/L	24.3[1]	20
Uranium	21-Aug-2023	µg/L	<2.0	20

1. The parameter sodium is not considered a toxic element and is not associated with a Standard as prescribed in O. Reg. 169/03, although an exceedance of 20 mg/L requires reporting and corrective actions. The result in the table was reported as an Adverse Water Quality Incident. See the *Compliance* section of this report for more information.

Organic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 24 (Organic parameters) of O. Reg. 170/03. These parameters include various organic acids, pesticides, herbicides, PCBs, volatile organics, and other chemicals. Sampling for all organic parameters was conducted on August 21, 2023, and results are provided in Table 13. All results were below the associated Ontario Drinking Water Quality Standards.

Table 13: Organic parameter sampling results

Parameter	Result (µg/L)	ODWQS (µg/L)	Parameter	Result (µg/L)	ODWQS (µg/L)
Alachlor	<0.10	5	Diuron	<1.0	150
Atrazine & Metabolites	<0.20	5	Glyphosate	<0.2	280
Azinphos-methyl	<0.10	20	Malathion	<0.10	190
Benzene	<0.50	1	MCPA	<0.0002	100
Benzo(a)pyrene	<0.005	0.01	Metolachlor	<0.10	50
Bromoxynil	<0.20	5	Metribuzin	<0.10	80
Carbaryl	<0.20	90	Monochlorobenzene	<0.50	80
Carbofuran	<0.20	90	Paraquat	<1.0	10
Carbon Tetrachloride	<0.20	2	Pentachlorophenol	<0.50	60
Chlorpyrifos	<0.10	90	Phorate	<0.10	2
Diazinon	<0.10	20	Picloram	<0.20	190
Dicamba	<0.20	120	Total PCBs	<0.030	3
1,2-Dichlorobenzene	<0.50	200	Prometryne	<0.10	1
1,4-Dichlorobenzene	<0.50	5	Simazine	<0.10	10
1,2-Dichloroethane	<0.50	5	Terbufos	<0.10	1
1,1-Dichloroethylene	<0.50	14	Tetrachloroethylene	<0.50	10
Dichloromethane	<1.0	50	2,3,4,6-Tetrachlorophenol	<0.50	100
2,4-Dichlorophenol	<0.30	900	Triallate	<0.10	230
2,4-D	<0.050	100	Trichloroethylene	<0.50	5
Diclofop-methyl	<0.10	9	2,4,6-Trichlorophenol	<0.50	5
Dimethoate	<0.10	20	Trifluralin	<0.10	45
Diquat	<1.0	70	Vinyl Chloride	<0.50	1

4 Water Production

4.1 Overview

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Annual Report must include certain information for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned uses. Specifically, this Report must include a summary of the quantities and flow rates of the water supplied during the reporting period, including monthly average and maximum daily flows. The Report must also include a comparison of flow monitoring results to the rated capacity and flow rates approved in the system's *Municipal Drinking Water Licence*.

4.2 Flow Monitoring Results

Throughout the reporting period the BCMI DWS operated within its rated capacity and supplied a total of 376,383 m^3 of treated water. On an average day in 2023, 1,031 m^3 of treated water was supplied to the communities of Balmertown, Cochenour & McKenzie Island, which represents 17% of the rated capacity of the Cochenour Water Treatment Plant (6,065 m^3/day). The maximum daily flow in 2023 was 2,773 m^3/day, which represents 46% of the rated capacity of the treatment facility. Flow monitoring results are summarized in Figure 1 and Table 14. The capacity assessments provided in the table compare the average and maximum daily treated water flows to the rated capacity of the treatment facility.

Figure 1: 2023 average and maximum daily treated water flows

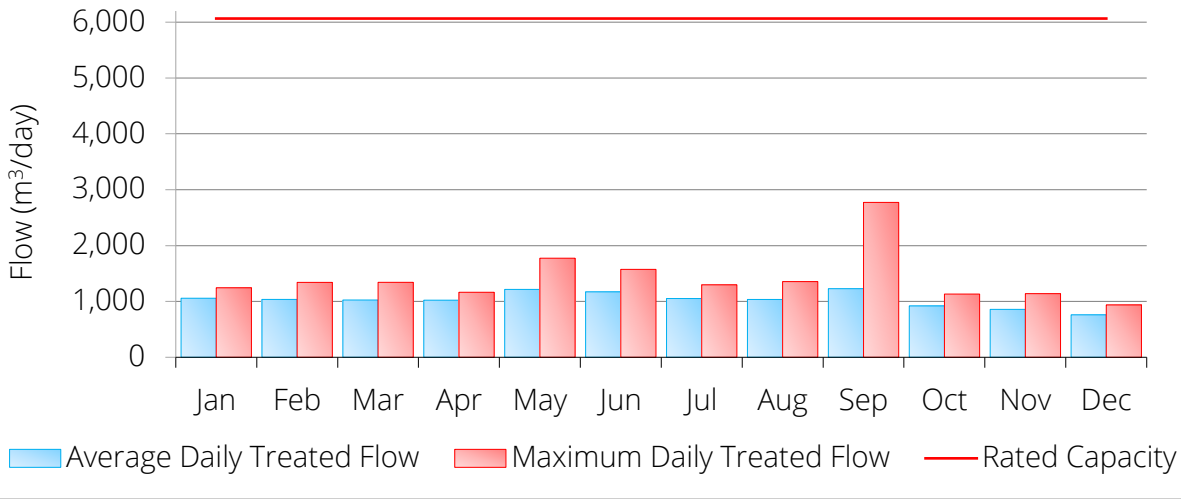

Table 14: 2023 water production summary

Month	Total Volumes (m^3)		Daily Flows (m^3/day)		Capacity Assessments	
	Raw Water	Treated Water	Average - Treated	Maximum - Treated	Average - Treated	Maximum - Treated
Jan	38,384	32,774	1,057	1,244	17%	21%
Feb	33,380	29,009	1,036	1,341	17%	22%
Mar	37,350	31,792	1,026	1,342	17%	22%
Apr	35,830	30,674	1,022	1,164	17%	19%
May	44,380	37,671	1,215	1,774	20%	29%
Jun	41,608	35,138	1,171	1,574	19%	26%
Jul	36,700	32,610	1,052	1,297	17%	21%
Aug	36,598	32,091	1,035	1,355	17%	22%
Sep	42,060	36,841	1,228	2,773	20%	46%
Oct	32,168	28,496	919	1,132	15%	19%
Nov	31,506	25,736	858	1,139	14%	19%
Dec	27,220	23,551	760	937	13%	15%
Total	437,184	376,383	---	---	---	---
Average	36,432	31,365	1,031	---	17%	---

Over the reporting period, 67% (248,961m^3) of the total amount of treated water produced was distributed to the community of Balmertown, with the remaining 33% (124,143 m^3) being distributed to the communities of Cochenour and McKenzie Island. On an average day in 2023, 682 m^3 of treated water was supplied to Balmertown and 340 m^3 was supplied to Cochenour & McKenzie Island. Table 15 provides a summary of flow monitoring results organized by the respective water distribution systems.

Table 15: 2023 water production summary – results by water distribution system

Month	Balmertown			Cochenour & McKenzie Island		
	Total Volume (m^3)	Average Daily Flow (m^3/day)	Proportion of Total (%)	Total Volume (m^3)	Average Daily Flow (m^3/day)	Proportion of Total (%)
Jan	22,610	729	72%	8,897	287	28%
Feb	20,797	743	71%	8,416	301	29%
Mar	21,485	693	69%	9,630	311	31%
Apr	19,715	657	62%	11,905	397	38%
May	20,140	650	67%	9,783	316	33%
Jun	19,607	654	68%	9,372	312	32%
Jul	24,220	781	72%	9,642	311	28%
Aug	23,387	754	71%	9,648	311	29%
Sep	20,439	681	69%	9,257	309	31%
Oct	20,503	661	64%	11,663	376	36%
Nov	19,842	661	59%	13,886	463	41%
Dec	20,068	647	63%	11,985	387	37%
Total	252,813	---	---	124,084	---	---
Average	21,068	693	67%	10,340	296	33%

4.3 Recent Historical Flows

Table 16 summarizes recent historical flow monitoring results for the BCMI DWS. There was a very slight decrease in the volume of treated water supplied in 2023 when compared to 2022, and flows have generally remained stable over the previous decade. Total annual volumes of treated water supplied in the near future may be expected to be between 300,000 m^3 and

450,000 m^3, which represents approximately 14% to 20% of the rated capacity of the Cochenour Water Treatment Plant.

Table 16: Recent historical water production summary

Year	Total Volumes (m^3)		Daily Flows (m^3/day)		Annual % Change	
	Raw Water	Treated Water	Average – Treated Water	Maximum – Treated Water	Raw Water	Treated Water
2009	481,351	406,151	1,113	2,007	-13.8%	-9.3%
2010	515,274	424,549	1,163	2,232	+7.0%	+4.5%
2011	471,032	409,384	1,122	2,240	-8.6%	-3.6%
2012	439,530	389,828	1,065	2,007	-6.7%	-4.8%
2013	443,266	408,492	1,119	2,369	+0.8%	+4.8%
2014	412,234	360,120	987	2,061	-7.0%	-11.8%
2015	439,868	390,982	1,071	1,878	+6.7%	+8.6%
2016	419,949	337,245	921	1,557	-4.5%	-13.7%
2017	436,670	341,391	935	2,015	+4.0%	+1.2%
2018	425,326	358,995	984	1,947	-2.6%	+5.2%
2019	422,149	363,215	995	1,874	-0.7%	+1.2%
2020	473,891	386,712	1,057	2,009	+12.3%	+6.5%
2021	477,708	419,903	1,150	2,213	+0.8%	+8.6%
2022	438,660	376,897	1,033	2,201	-8.2%	-10.2%
2023	437,184	376,383	1,031	2,773	-0.3%	-0.1%

5 Compliance

5.1 Overview

Northern Waterworks Inc. and the Municipality of Red Lake employ an operational strategy that is committed to achieving the following goals:

- Providing a safe and reliable supply of drinking water to the communities of Balmertown, Cochenour & McKenzie Island;
- Meeting or exceeding all applicable legislative and regulatory requirements; and,
- Maintaining and continually improving the operation and maintenance of the system.

The following sections will summarize incidents of adverse water quality and regulatory noncompliance that occurred during the reporting period. NWI is committed to employing timely and effective corrective actions to prevent the recurrence of identified incidents of adverse water quality and noncompliance.

5.3 Regulatory Compliance

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Report must list any requirements of the *Act*, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report (i.e., an incident of regulatory noncompliance). Additionally, this Report must specify the duration of the failure and the measures that were taken to correct the failure.

The most recent inspection by Ontario's Ministry of the Environment, Conservation and Parks was conducted on October 26, 2023 and the final report was received on November 10, 2023. The final inspection rating was 100%, and zero (0) incidents of noncompliance were identified.

5.2 Adverse Water Quality Incidents

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, this Report must summarize any reports made to the Ministry under subsection 18(1) (Duty to report adverse test results) of *the Act* or section 16-4 (Duty to report other observations) of Schedule 16 of O. Reg. 170/03. Additionally, this Report must describe any corrective actions taken under Schedule 17 of O. Reg. 170/03 during the period covered by the report. The five (5) adverse water quality incidents that occurred during the reporting period are summarized below.

- AWQI 161078 (January 3, 2023) & AWQI 161687 (April 4, 2023) & AWQI No. 162456 (July 6, 2023) & AWQI No. 163729 (October 5, 2023)

The calculated running annual average (RAA) for haloacetic acid (HAA) at the end of quarter 4 (2022) was 81.3µg/L which was above the regulatory limit of 80µg/L. The calculated running annual average (RAA) for haloacetic acid (HAA) at the end of quarter 1 was 84.5µg/L. The calculated running annual average (RAA) for haloacetic acid (HAA) at the end of quarter 2 was 87.3µg/L. The calculated running annual average (RAA) for haloacetic acid (HAA) at the end of quarter 3 was 81.8µg/L.
There were no corrective actions required by the Northwest Health Unit. Efforts to minimize HAAs included maintaining optimized treatment processes where possible and reducing water age in the distribution system (i.e., by managing storage levels, using bleeders, recurrent localized flushing, etc.). A Notice of Issue Resolution was submitted to the Ministry on January 9, 2024 when the calculated running annual average (RAA) for haloacetic acid (HAA) at the end of quarter 4 was 78.8µg/L which was below the regulatory limit of 80µg/L.

- AWQI No. 161954 (May 16, 2023)

A sustained loss of pressure in the distribution system occurred due to a catastrophic PLC failure. The failure caused faults to the high lift pumps and as a result the Cochenour McKenzie Island distribution system lost pressure. The municipality issued a Boil Water Advisory to the effected system users.

In response to this event, Northern Waterworks collected two sets of microbiological samples (one in each distribution system), and the Boil Water Advisory was rescinded upon the receipt of sample results absent of E. coli and total coliform parameters.