Annual Report for 2022-23

State of Drinking Water Quality in Saskatchewan

Water Security Agency
Science and Licensing Division

Saskatchewan

Water Security Agency

Contents

Letters of Transmittal

The Honourable Jeremy Cockrill

Minister Responsible for Water Security Agency

Office of the Lieutenant Governor of Saskatchewan

May It Please Your Honour:

I respectfully submit the Annual Report on the State of Drinking Water Quality in Saskatchewan for the fiscal year ending March 31, 2023.

Respectfully submitted,

Jeremy Cockrill
Minister Responsible for Water Security Agency

Shawn Jaques
Interim President and CEO

Water Security Agency

Dear Minister:

I have the honour of submitting the Annual Report on the State of Drinking Water Quality in Saskatchewan for the fiscal year ending March 31, 2023. I acknowledge responsibility for this 2022-23 report and declare the information contained within is accurate, complete and reliable.

Respectfully submitted,

Shawn Jaques
Interim President and Chief Executive Officer
Water Security Agency

Summary

Safe drinking water and effective wastewater treatment ensures the protection of human health and the economic growth and prosperity of Saskatchewan's citizens. The Water Security Agency (WSA) leads the ongoing planning, regulation and reporting associated with drinking water and wastewater governance and management in Saskatchewan.


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Some highlights of ongoing success and progress of safe drinking water management in 2022-23 include:

- 87 per cent of Saskatchewan residents strongly or somewhat agreed that their drinking water was safe to drink.
- Water quality remains above 90 per cent compliance for bacteriological, health and toxicity, disinfection, and turbidity and is improving as upgrades to waterworks address water quality concerns.
- Certified operator compliance remains high and consistent with previous years.
- Inspections were conducted at most waterworks and wastewater systems with results showing overall good compliance with inspection items.
- Over $105 million was spent on water and wastewater programs and activities, including infrastructure government funding provided, which excludes contributions made by municipalities.

How are we doing compared to last year?

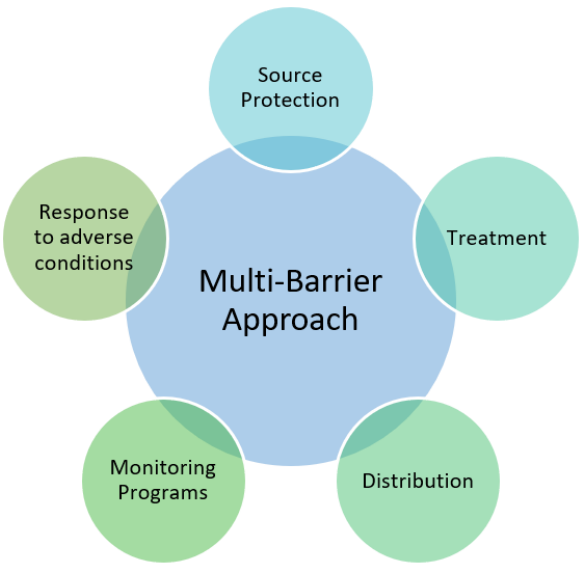
Indicator	State	Trend	Information
Source Water Protection	Fair to Good	Improving	Wastewater inspection compliance remains fair with no change from the previous year. The liquid domestic waste program continues to improve with new permitting requirements. Sewage effluent discharges continue to improve as communities establish funds to upgrade or construct facilities to meet the standards. No major variations were noted with surface water quality in the primary rivers. Source water protection bylaws continue to improve as municipalities establish bylaws.
Drinking Water Treatment and Distribution	Good	No Change	The number of certified operators remains high; however, there are still significant challenges for rural and remote communities. Construction reviews and approvals remain consistent.
Monitoring and Compliance	Good	Improving	Compliance remains high for water quality compliance parameters with some minor fluctuations; waterworks inspection compliance has slightly improved. WSA continues to participate in drinking water quality guidelines review and development.
Response to Adverse Conditions	Good	Not Applicable	Precautionary Drinking Water Advisories and Emergency Boil Water Orders continue to be issued to ensure public safety. Priority remains to work with communities and their operators to correct non-compliance through education and inspections.

Introduction

This is the 21st annual report on the status of drinking water in Saskatchewan for the fiscal year ending on March 31, 2023. The State of Drinking Water Quality Report is a legislated requirement under *The Environmental Management and Protection Act, 2010* to demonstrate the ongoing commitment of the Government of Saskatchewan to ensure safe drinking water.

Several government departments contribute to the governance, protection and provision of drinking water supplies and source water protection including the Ministry of Health, the Saskatchewan Health Authority (SHA), the Ministry of Government Relations, SaskWater, the Ministry of Environment and the Ministry of Agriculture. Partners that provide key services or funding include the federal and provincial governments, the Saskatchewan Urban Municipalities Association, the Saskatchewan Association of Rural Municipalities, the Saskatchewan Water and Wastewater Association (SWWA) and the Saskatchewan Operator Certification Board (OCB).

The **multi-barrier approach to safe drinking water** is outlined in this report and is a key framework for the basis of an effective public water supply as it provides several 'barriers' to contamination from source to tap[1]. In addition, this report evaluates public perception and trust associated with regulated drinking water in Saskatchewan, and investment as it relates to drinking water and wastewater infrastructure and management.



Drinking Water Governance in Saskatchewan

Drinking water management in Saskatchewan is legislated under *The Environmental Management and Protection Act, 2010, The Waterworks and Sewage Works Regulations, The Public Health Act, 1994* and *The Health Hazard Regulations*. WSA and SHA are the primary government agencies responsible for the programs and activities associated with drinking water regulation in the province.

WSA regulates municipal waterworks, private waterworks with greater than 18 m^3 per day design flow, water pipelines connected to municipal waterworks, and water pipelines with 15 or more service connections. In addition, water sampling requirements for limited scope water pipelines, as defined in *The Health Hazard Regulations*, are regulated by the WSA. SHA regulates non-municipal public water systems and private semi-public water systems. Private non-public water systems used for domestic purposes (e.g., private household systems) are not regulated.

Water Security Agency

Saskatchewan Health Authority

[1] Walkerton Inquiry (Ont.), O'Connor, D.R., & Ontario. (2002). *Report of the Walkerton Inquiry.* Toronto: Ontario Ministry of the Attorney General.

Progress and Challenges in 2022-23

Safe drinking water management systems include the legislation, policies, administration and procedures/protocols carried out to ensure safe drinking water from source to tap[2]. Constantly working to identify and improve the system is an important aspect of effective drinking water management.

In June 2022, WSA embarked on an exciting new future and organizational structure to clarify roles, focusing on ensuring workplace safety and better meeting client needs. The drinking water and wastewater programs now reside within the Science and Licensing Division. Development of legislation, policy, guidelines, water quality standards, design standards, operator certification, data management (including Geographical Information Systems) and construction permits are managed by the Standards and Approvals Branch. Operational permits and compliance with permits are managed by the Compliance Promotion Branch.

In 2022, WSA conducted a red tape review of *The Waterworks and Sewage Works Regulations*. Four red tape issues were identified: 1) Heavy regulatory footprint on the regulations associated with operating hygienic use waterworks and industrial systems; 2) Unfamiliarity and accessibility of *The Waterworks and Sewage Works Regulations*; 3) Challenges in meeting regulatory compliance with treated water quality in rural communities; 4) Challenges for communities/municipalities related to regulatory reporting and data management for accredited laboratories in Saskatchewan. WSA is currently working through action items for these issues.

Since 2021-22, information on water and wastewater management has been located on the Government of Saskatchewan website. To help improve accessibility to this information, links to all documents are now available through the Drinking Water and Wastewater pages of the WSA website as well.

Per- and polyfluoroalkyl substances (PFAS) are emerging substances of concern. PFAS are a class of over 4,700 human-made substances. In 2023, Health Canada and Environment and Climate Change Canada (ECCC) released a draft assessment of the science on PFAS for public consultation. WSA represents Saskatchewan on national committees, such as the Federal-Provincial-Territorial Committee on Drinking Water (CDW) and the Canadian Council of Ministers of the Environment (CCME) Water Guideline Working Group, which are developing guidelines and objectives for PFAS in drinking water and surface water. WSA has initiated monitoring of PFAS in Saskatchewan waters.


Saskatoon Water Main Replacement

Asbestos cement drinking water distribution pipes periodically raise drinking water quality concerns for Saskatchewan residents. Health Canada and the World Health Organization have concluded that there is no consistent, convincing evidence that asbestos ingested through water is harmful to your health. If asbestos fibers were present in drinking water, studies have shown that the body eliminates these fibers through excrement. For this reason, Health Canada has not established drinking water guidelines for asbestos. Health Canada is set to review guidelines of asbestos in drinking water in 2023-24.

[2] Bereskie, T. et al. 2018. Drinking-water management in Canadian provinces and territories: a review and comparison of management approaches for ensuring safe drinking water. *Water Policy*. 20(3): 565-596

If asbestos cement pipes break or are in disrepair, they are replaced with nationally certified materials such as iron, steel or plastic. WSA is working with CDW to investigate this further.

Drinking water management remains a significant challenge for smaller communities due to financial limitations that can impact their ability to meet drinking water standards, or difficulty acquiring and maintaining certified operators to run water and wastewater facilities. WSA continues to work closely with these communities to minimize risk to human health and the environment.

In addition, the agency strives to limit present and future risks associated with wastewater effluent by approving and permitting wastewater works, reviewing new technologies, evaluating downstream use and impact studies, and setting effluent quality limits. WSA also works with Health Canada and the Canadian provinces and territories to identify and study new or emerging chemicals of concern. The agency continues to participate in the Ministry of Environment's Compliance Audit Program, which conducted four audits associated with water and wastewater programming in 2022-23.

WSA's association with the OCB (saskocb.ca) and SWWA (swwa.ca) supports the ongoing development of drinking water and wastewater programs delivered by these organizations, including operator certification, ongoing education and networking to promote professional growth in the water industry.

For more information on the roles and responsibilities of WSA, see wsask.ca.

Multi-Barrier Approach to Safe Drinking Water Management

In 2022-23, approximately 81 per cent (983,840) of Saskatchewan residents accessed public drinking water systems regulated by the Water Security Agency (WSA)[3]. An estimated 17 per cent (206,485) of residents in rural and remote areas access privately sourced water (e.g., domestic wells). The remainder of the population is reliant upon drinking water systems on First Nations land or by semi-public systems that serve small or infrequent populations in rural and remote locations.

This report focuses on the state of drinking water quality of waterworks that provide drinking water for human consumption to the people of Saskatchewan and the performance of our drinking water management system from source to tap.

In 2022-23, there were 623 human consumptive water treatment and distribution systems regulated by WSA, including municipal and private waterworks, and treated water pipelines.

For small communities with low or declining populations, or in situations where funding for water treatment is limited, facilities may be permitted and regulated to provide water for hygienic use. Owners of hygienic systems are required to ensure their customers are aware the water is not fit to consume and are required to provide their customers with access to a source of potable water (e.g., central system, bottled water for purchase or emergency circumstances). There are 153 regulated hygienic systems in Saskatchewan.

WSA oversees water sampling compliance for 44 limited scope pipelines under *The Health Hazard Regulations*. Limited scope pipelines distribute water for human consumptive or hygienic purposes servicing a minimum of three but fewer than 15 service connections.

QUICK FACTS

Human consumptive use is water used for drinking, cooking, food preparation and brushing teeth.

Hygienic use is water that can be used for bathing, showering and personal hygiene, but not human consumption. While hygienic water quality may not meet the standards for human consumption, owners are still required to provide water to customers that is free of bacterial contamination. Hygienic systems are not required to have a certified operator.

A ***distribution system*** is the portion of a waterworks that carries water for human consumptive or hygienic use to a service connection (e.g., a household or business). Distribution systems are regulated and inspected to ensure water quality is maintained.

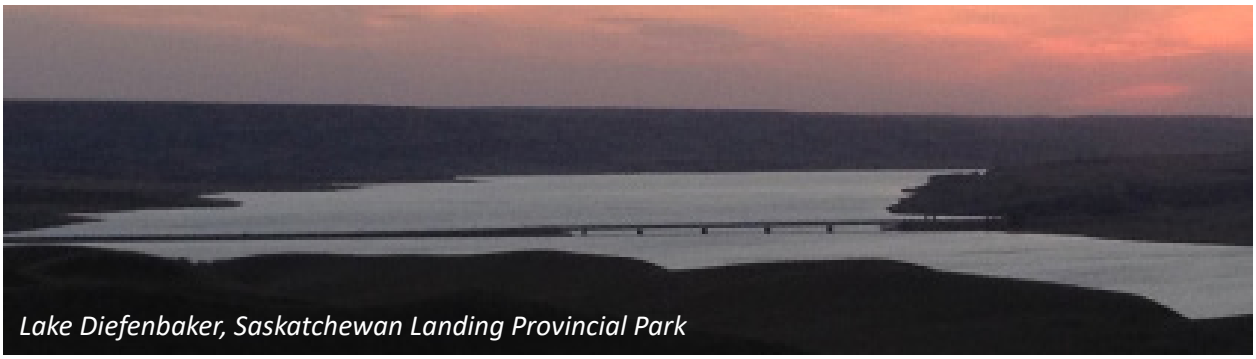
[3] Statistics Canada. Q1 2023 Population of Saskatchewan. Table 17-10-0009-01 Population estimates, quarterly

Source Water Protection

Source water protection is the first barrier in an effective drinking water management system. Protecting drinking water sources helps prevent and reduce contaminants, which in turn, reduces treatment costs. Monitoring the environment and regulating wastewater systems are two of the primary ways to protect current and future drinking water sources, aquatic life and the environment.

In Saskatchewan, drinking water sources include both groundwater wells and surface waters, such as rivers and lakes. Approximately 50 to 60 per cent of the population is served by water treatment operations dependent on a surface water source. Source waters are protected through:

- inspecting wastewater collection and treatment systems;
- regulating liquid domestic waste transport and disposal;
- applying effluent standards and monitoring requirements to operation permits;
- assessing surface water quality in primary rivers; and,
- establishing municipal source water protection bylaws.



Lake Diefenbaker, Saskatchewan Landing Provincial Park

Wastewater Treatment Inspection Compliance

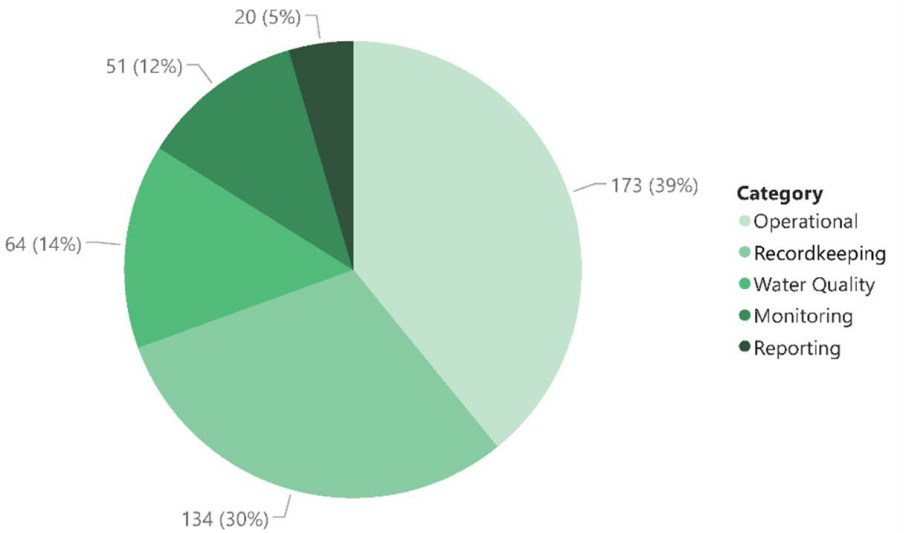
Inspections ensure compliance with *The Waterworks and Sewage Works Regulations* and provide timely feedback on wastewater management. In 2022-23, 622 wastewater operations or collection systems associated with lagoon or mechanical wastewater treatment were permitted by WSA. A total of 600 inspections were conducted in 2022-23 with 55 per cent of inspections found to be fully compliant. Seventy-three per cent of inspections were compliant with 90 per cent of inspection items. Ninety-three per cent of inspections were compliant for wastewater treatment facilities employing a certified operator. Most inspection non-compliance was attributed to operational issues including lagoon design requirements and recordkeeping associated with maintenance and discharges (Figure 1).

QUICK FACTS

Lagoon treatment is the most common method of wastewater treatment in Saskatchewan. It consists of a series of open basins or reservoirs designed to treat and store sewage.

Mechanical treatment uses an artificial environment to process sewage using processes like lagoon treatment but allows for reduced processing time and overall footprint of the facility.

Results of specific wastewater system inspections, sampling and contact information can be found online at waterquality.saskatchewan.ca/WasteWater



QUICK FACTS

Liquid domestic waste means any wastewater, including sewage, created at a household as a part of everyday domestic activities (e.g., wastewater from washing dishes, clothes, showering, toilets, etc.).

Figure 1. Wastewater regulatory inspection non-compliance by category. Per cent from greatest (light) to least (dark).

Transport and Disposal of Liquid Domestic Waste

The transport and disposal of liquid domestic waste requires responsible waste management practices to protect source water supplies, the environment and human health.

Haulers are required to obtain a *Permit to Transport and Dispose of Liquid Domestic Waste* issued by WSA. Disposal at an approved wastewater treatment facility is preferred; however, land spreading may be permitted under certain conditions.

In 2022-23, permits were renewed for most haulers and additional conditions were included for haulers that are land spreading. As of March 31, 2023, there were 223 permitted and active haulers in the province with 19 allowed to land spread as a method of disposal. There are fewer permitted haulers reported in 2022-23 as several haulers have yet to complete the updated permit requirements.

QUICK FACTS

Applying pesticides to control aquatic nuisances in and around surface water requires a permit and an applicator licence according to *The Environmental Management and Protection Act, 2010* and *The Pest Control Products (Saskatchewan) Act, 2003.* In 2022-23, permits were issued to 12 approved entities.

Sewage Effluent Discharges to Surface Water

Regulating and monitoring wastewater effluent is needed to manage and mitigate the potential impacts of wastewater to the environment, aquatic life and source water quality for downstream use.

The *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (MWWE) was developed by provincial and territorial Ministers to ensure that all wastewater facilities achieve a minimum of secondary level treatment that meets National Performance Standards (NPS), and regularly report on the quality and quantity of effluent being discharged to surface waters. Facilities are provided graduated timelines to comply with the standards based on their risk classification.

In Saskatchewan, 98 wastewater systems are required to meet MWWE standards, of which, 47 are low to medium risk facilities working towards compliance. Due to a change in reporting to include facilities that were previously compliant that are no longer consistently meeting the effluent quality standards, this number may appear to have increased but in fact is declining as communities establish funds to upgrade or construct facilities to meet the standards.

In addition to MWWE, wastewater facilities releasing effluent to fish bearing waters are subject to the *Wastewater Systems Effluent Regulations* (WSER) according to the federal *Fisheries Act*. In 2022-23, WSA identified 75 wastewater facilities subject to WSER and works with communities on compliance and reporting through the federal Effluent Regulatory Reporting Information System.

Addressing sewage works capacity and treatment concerns requires planning, financial investment and construction time. This means the reduction in the number of works representing a risk to source waters is expected to decline slowly.

QUICK FACTS

WSA has an administrative agreement with ECCC to ensure facilities captured under WSER are monitoring and reporting as required.

WSA is working with other jurisdictions and the CCME Secretariat to write the 15-year MWWE progress report.

More information on the *Canada-wide Strategy for Management of Municipal Wastewater Effluent* is on the Canadian Council of the Ministers of the Environment (CCME) website.

QUICK FACTS

The plan and design of a wastewater treatment facility may change after the DUIS and EDO are completed to ensure treatment will meet the standards set out in the permit to operate.

The agency represents Saskatchewan on the CCME, Water Management Committee, and Water Guidelines Working Group to oversee development of science-based guidelines for the protection of aquatic life.

Warman Lagoon Upgrades – SAGR Bed Construction

To further protect source water, WSA requires a downstream use and impact study (DUIS) prior to issuing permits for wastewater facilities subject to MWWE and WSER. A DUIS allows for the development of site-specific effluent discharge objectives (EDO) that may be included in the operating permit. In 2022-23, the WSA received and reviewed six DUIS reports from communities that discharge treated effluent into fish-bearing waters.

Surface Water Quality of Primary Rivers in Saskatchewan

WSA monitors water resources to protect water quality and ecosystem function. The Primary Water Quality Monitoring Program monitors 10 primary rivers at 24 sites, four times a year, to assess the state of the water quality. The data is used for reporting and decision-making purposes including issuing permits and licences for water use.

Surface water quality is defined by its physical, chemical and biological characteristics, which are influenced by natural processes and human activities. Water quality is compared with science-based water quality objectives for the protection of aquatic life[4,5,6] to assess river health using a water quality index tool developed by the CCME[7]. Each site or location receives a score from 0 to 100, which classifies water quality as poor, marginal, fair, good or excellent.

Excellent	95 to 100
Good	80 to 94
Fair	65 to 79
Marginal	45 to 64
Poor	0 to 44

QUICK FACTS

For the first time in Canada, WSA conducted a study, in partnership with the Ministry of Agriculture, to evaluate the safety and use of TETON (endothall) to control algae in irrigation canals located near Outlook, SK.

WSA works with ECCC annually to report on the Canadian Environmental Sustainability Indicators for water quality in Canadian rivers. Access to data and information is online canada.ca.

Saskatchewan's naturally nutrient rich prairie soils, as well as human activity, contribute to lake nutrient levels. High flows and transport of sediment in the spring can raise concentrations of metals, while low flow or winter conditions can increase unionized ammonia or lower dissolved oxygen concentrations.

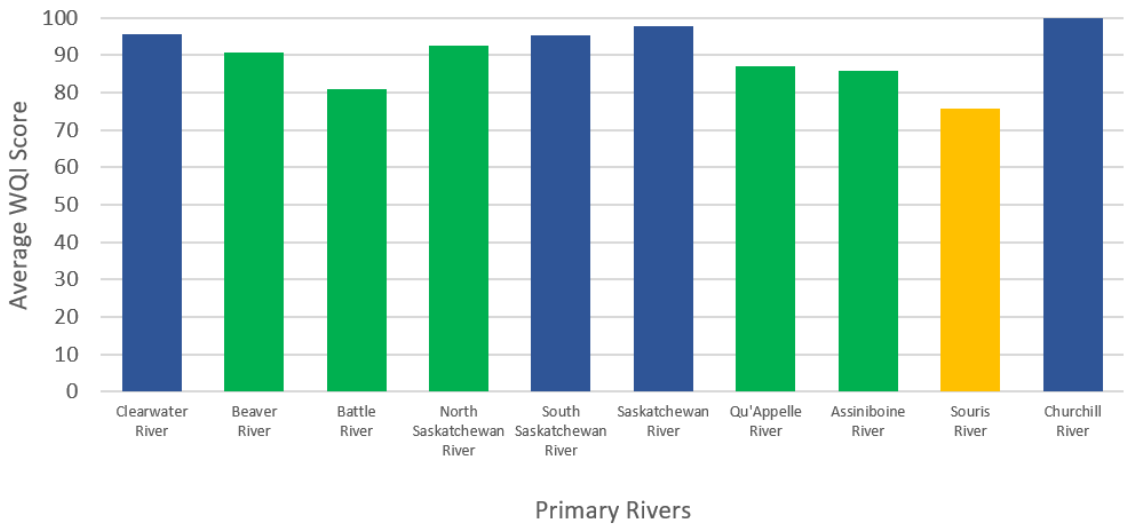


Figure 2. Water quality index (WQI) scores for the primary rivers of Saskatchewan from 2020 to 2022

[4] WSA. 2015. Surface Water Quality Objectives. wsask.ca

[5] Canadian Council of the Ministers of the Environment (CCME). 2020. Canadian Environmental Quality Guidelines for the Protection of Aquatic Life: Summary Table ccme.ca

[6] Prairie Provinces Water Board (PPWB). 2021. 2021 Water Quality Objectives. ppwb.ca

[7] CCME. 2017. CCME Water Quality Index Manual. ccme.ca

The average surface water quality in the primary rivers sampled from 2020 to 2022 overall is classified as good and continues to support aquatic life (Figure 2). It is important to note that the water quality index provides only a snapshot of river health. For more information and the latest water quality trends in Saskatchewan transboundary rivers see *Prairie Provinces Water Board Report #179* (ppwb.ca).


La Ronge Dam

Municipal Source Water Protection Bylaws

Municipal bylaws protect source water and drinking water supplies at the local level. Figure 3 shows an increase over the last decade in the percentage of municipalities with bylaws in place to protect their drinking water supplies. Just over 90 per cent of the population resides in a municipality with source water protection provisions. Municipalities have become increasingly aware of their responsibilities for source water protection through collaboration and education provided by the Ministry of Government Relations.

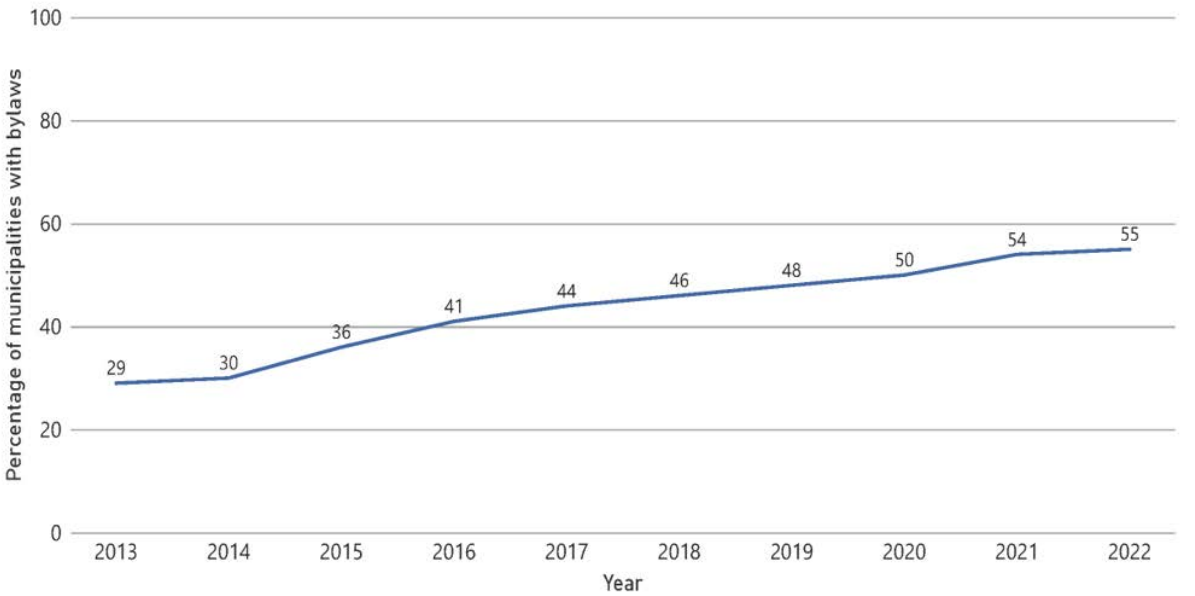


Figure 3. Percentage of municipalities with source water protection bylaws. Source: Ministry of Government Relations

Drinking Water Treatment and Distribution

Providing safe drinking water is highly reliant on the knowledge and capabilities of waterworks operators, infrastructure design and maintenance, and ongoing compliance with regulations. WSA provides professional regulatory oversight, engineering design review and approval services to ensure owners and operators meet regulatory requirements. Effective water treatment and distribution that facilitates the delivery of safe drinking water to consumers requires:

- employment of certified operators to run waterworks, and,
- engineering approvals to construct.

QUICK FACTS

Certification exams are developed by the Water Professionals International (WPI) and are provided to operators across Canada. Saskatchewan's standards for operator certification are consistent with the Canadian Water and Wastewater Operator Certification Best Practices.

Search for certified operators by community online at saskocb.ca.

Operator Certification

Water treatment plant and distribution system operation, maintenance and repair must take place under the direction of a certified operator. Operators are certified by the Saskatchewan Operator Certification Board (OCB) according to the Water and Wastewater Works Operator Certification Standards and the Water and Wastewater Operator Certification Program Guide (EPB 144). All operators require ongoing education to maintain certification.

For the classification of water treatment facilities, a point value is assigned to various components of the operation based on their complexity. The summation of those points indicates the facility classification level and the level of certification the operator(s) of the facility must obtain. Facility classification levels range from a class one (I) facility being the simplest to a class four (IV) facility being the most complex (Table 1).

Table 1. Facility classifications, descriptions and required level of operator certification.

Drinking Water Facility Classification and Description		Operator Level
Class I	Groundwater treatment and distribution serving fewer than 500 people Treated drinking water pipelines serving fewer than 500 people	Small Systems
Class I	Water distribution serving up to 1,500 people Water treatment points up to 30	Level I
Class II	Water distribution serving 1,501 to 15,000 people Water treatment points from 31 to 55	Level II
Class III	Water distribution serving 15,001 to 50,000 people Water treatment points from 56 to 75	Level III
Class IV	Water distribution serving greater than 50,000 people Water treatment points 76 or higher	Level IV

In 2022-23, 94 per cent of inspections for human consumptive treatment facilities met the requirements for a certified operator. Acquiring and retraining certified operators can be difficult, especially in rural and remote communities. In many circumstances, operators working to attain the required level of certification have some level of certification and experience. WSA provides additional guidance through the Regional/Contract Operator Program (EPB 286) so communities without an operator can meet the mandatory certification requirements.

Saskatoon Sewage Lift Station

QUICK FACTS

Municipalities can ensure water quality for human consumption is not compromised by new development by establishing priorities and goals through *The Statements of Provincial Interest Regulations.* The Ministry of Government Relations assists municipalities through the process and provides a Statements of Provincial Interest Handbook.

The Ministry of Environment regulates municipal, industrial and hazardous waste management. For more information: Saskatchewan's Solid Waste Management Strategy, Hazardous Waste Management, and Solid Waste Management.

The Ministry of Agriculture requires waste storage and waste management plans for intensive livestock operations in Saskatchewan. In addition, it provides environmental education and programming, and funding to agricultural producers in Saskatchewan. See the Agriculture Development Fund, Environmental Programs, and Regulation of Intensive Livestock Operations.

Standards and Approvals

QUICK FACTS

Additional WSA permits or licences that may be required to build or operate a treatment facility include:

- Water Rights Licence
- Aquatic Habitat Protection Permit

To ensure waterworks and sewage works will meet the provincial regulatory requirements and to reduce the need for future modifications, construction permits are required to build water and wastewater treatment facilities, and distribution and collection works in Saskatchewan.

A *Permit for Construction of Waterworks or Sewage Works* is issued once WSA's design standards (EPB 501/EPB 503) and regulations are met and approved. Design standards follow nationally-recognized standards and best practices. WSA works closely with communities and consulting engineers to apply site-specific considerations when required. Two new treatment technologies were reviewed and WSA developed standards and guidelines for their implementation in the province.

The Saskatchewan Environmental Code allows communities with at least 5,000 people to follow code requirements for construction of water and sewer mains. In 2022-23, the Ministry of Environment's Compliance Audit Program conducted an audit of water and sewer main construction for 92 projects in the past two years. Submissions of construction drawings improved by approximately 20 per cent compared to a previous audit.

Monitoring and Compliance

Consistent and sustained delivery of safe drinking water requires ongoing monitoring and inspection to ensure effective water treatment. A *Permit to Operate a Waterworks* provides the operational requirements including recordkeeping, reporting, sampling and monitoring requirements, and minimum water quality standards. WSA environment officers (EOs) determine compliance with the operational permit during inspection to ensure the facility and operations meet regulatory requirements. Providing reliable and safe drinking water for consumers is accomplished through:

- research and development to set drinking water quality standards;
- compliance with drinking water quality standards in the plant and distribution system; and,
- inspection of drinking water treatment and distribution systems.

Saskatoon Water Treatment Plant Backup Ammonia Feed System

Guidelines for Drinking Water Quality

WSA represents Saskatchewan on the Federal-Provincial-Territorial Committee on Drinking Water (CDW) and works with other jurisdictions and experts across Canada to develop the science-based drinking water quality guidelines in Canada. Participation in the CDW ensures that Saskatchewan is applying drinking water standards to waterworks that are achievable and protective of human health.

To manage risk, WSA conducts research and exposure studies, evaluates treatment applicability and cost, and consults with the public and provincial stakeholders before adopting the guidelines as drinking water quality standards in the province. The drinking water quality standards are found in *The Waterworks and Sewage Works Regulations* and the Saskatchewan Drinking Water Quality Standards and Objectives (EPB 507). These standards are included in waterworks operational permits.

In 2022, the CDW established maximum acceptable concentrations for two herbicides 4-Chloro-2-methylphenoxyacetic Acid (MCPA) and malathion in drinking water. As per WSA's standard procedure for adopting new parameters, the agency will conduct research on the herbicides' prevalence in our drinking water before adopting into Saskatchewan's drinking water quality standards.

WSA initiated a risk assessment and management study for manganese in drinking water to support drinking water quality standards for manganese in the province. Communities with high concentrations of manganese in their raw water employing different treatment systems were selected for this study.

WSA continues to investigate the concentrations of chemicals or biological contaminants of emerging concern due to their potential impact on human health and the environment. Evaluating emerging substances of concern in Saskatchewan takes place at selected water and wastewater treatment plants, and surface water sources that may be impacted.

QUICK FACTS

WSA concluded a study on boron removal efficiency that found reverse osmosis to significantly reduce concentrations in drinking water. The study results were used by the CDW to establish a maximum acceptable concentration of 2 mg/L for boron.

The current Guidelines for Canadian Drinking Water Quality can be accessed online at canada.ca.

Swift Current Water Treatment Plant

Water Quality Compliance

Operators monitor water quality to ensure treatment is effective and water is safe for human consumption. A *Permit to Operate a Waterworks* outlines the minimum monitoring requirements as determined by the *Municipal Drinking Water Quality Monitoring Guidelines* (EPB 202). The water quality parameters monitored depend on factors associated with source water, treatment method and performance, and the population served. The frequency of sampling for most parameters is primarily based on the type of source water and population served.

Duck Mountain Provincial Park Water Treatment Plant

QUICK FACTS

Water quality samples must be analyzed by an accredited laboratory to ensure quality assurance and control standards were followed, and results are accurate. The Canadian Association for Laboratory Accreditation provides a list of accredited labs online Directory Search (cala.ca)

Dalmeny Water Treatment Plant

WSA monitors results from all human consumptive systems that artificially fluoridate or have high, naturally-occurring fluoride.

Compliance with the regulations and drinking water standards is the responsibility of the owners and operators of waterworks. WSA receives and reviews water quality results from waterworks and follows up with operators/owners who have not submitted samples. For most waterworks, water quality monitoring includes sampling for the following:

Bacteria

The bacteriological quality of water is a critical parameter for drinking water due to the possibility of acute health effects for consumers. Saskatchewan uses total coliform bacteria and *E. coli* bacteria as indicators of the quality of drinking water.

Turbidity

Turbidity is an on-site measurement of water clarity to monitor treatment performance. Low turbidity indicates water treatment was effective in removing suspended particles from the water, while increased turbidity can impair disinfection and provide pathogens with a medium to grow on.

Disinfection

Chlorine disinfects water to eliminate and prevent the spread of waterborne disease. Though waterworks may use other methods of disinfection (e.g., ozone, UV), a chlorine-based residual must be maintained throughout the distribution system.

Health and Toxicity

Health and toxicity parameters include a range of metals naturally occurring in source water. For example, naturally high concentrations of arsenic, uranium and selenium can make water treatment difficult and expensive for communities.

Trihalomethanes and Haloacetic Acids

Trihalomethanes (THM) and haloacetic acids (HAA) are disinfection by-products generated during the water treatment process when chlorine reacts with organic matter in the water. Waterworks with a surface water source are typically more likely to require monitoring.

Figure 4 shows water quality compliance with drinking water standards is high for bacteria and health and toxicity. Failure to send an on-site chlorine residual reading when submitting bacteria samples contributes to lower disinfection compliance. Turbidity compliance is based on the EO's review of turbidity during compliance inspections. Compliance with disinfection by-products is variable and consists of ongoing and assessment type monitoring.

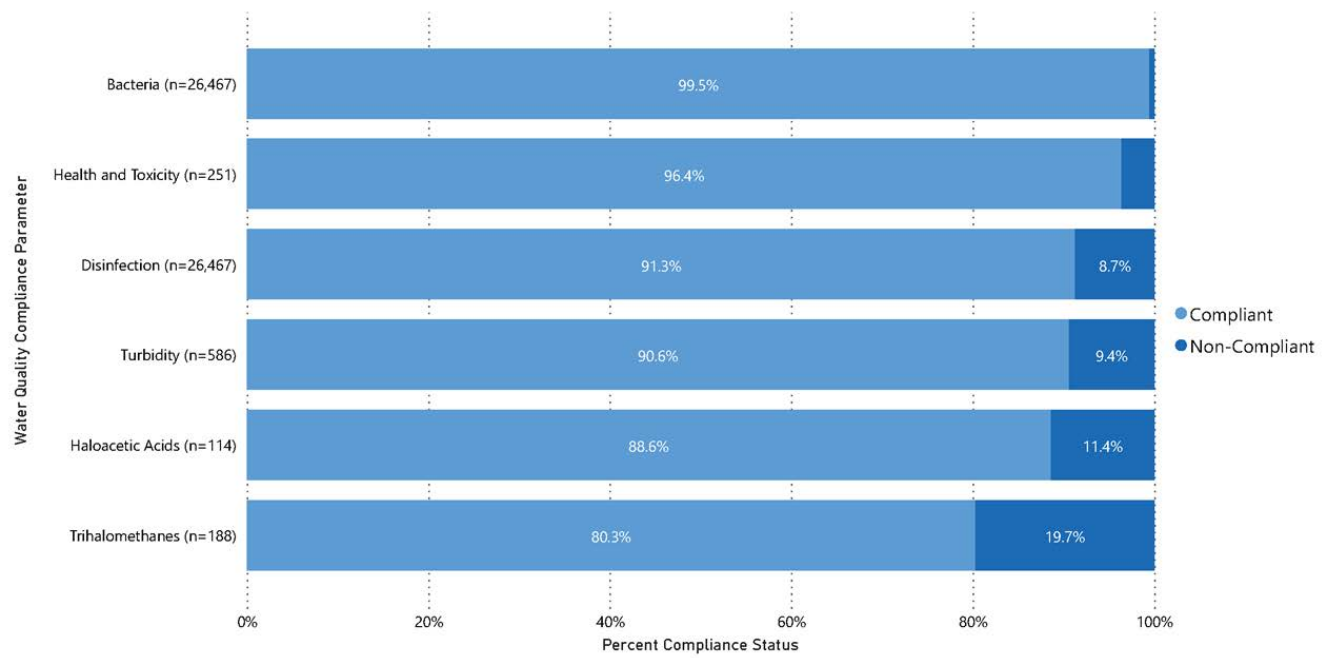


Figure 4. Compliance with required water quality monitoring in 2022-23.[8]

[8] Health and toxicity is considered non-compliant if at least one parameter in a sample exceeds for arsenic, barium, boron, cadmium, chromium, lead, selenium or uranium.

Drinking Water Systems Inspection Compliance

Waterworks inspections provide performance feedback to waterworks owners and operators. Inspections are an essential tool in drinking water management to identify and correct issues before they pose a significant risk. The water source and population served determines the number of inspections per year; every system is inspected a minimum of once or twice per year depending on these parameters.

In 2022-23, EOs inspected 91.3 per cent of human consumptive water treatment and distribution systems. A total of 725 inspections were conducted with 24 per cent of the inspections being fully compliant. Eighty-nine per cent of inspections were compliant with 90 per cent of inspection items. Figure 5 shows non-compliant inspection items were largely due to missed bacteriological sampling, failure to maintain and calibrate test equipment, and failure to maintain continuous chlorine disinfection.

QUICK FACTS

Waterworks inspections for WSA regulated systems can be found online at Drinking Water Quality Search.

Correction of non-compliance issues are the responsibility of waterworks owners and operators.

In 2022-23, the Ministry of Environment's Compliance Audit Program audited recordkeeping as it had been identified as an area of concern. Recordkeeping compliance among systems audited ranged from 47 per cent to 79 per cent. An audit of the start-up procedures for seasonal waterworks was also conducted in 2022-23 that found an encouraging 91 per cent compliance at five waterworks.

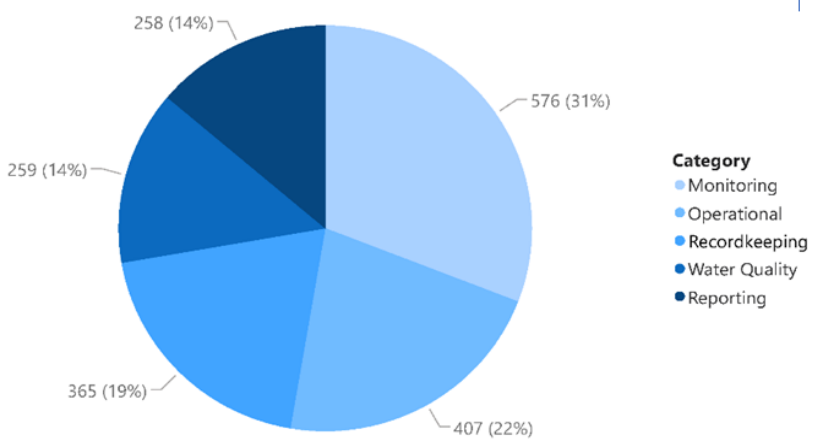


Figure 5. WSA drinking water regulatory inspection non-compliance by category. Per cent from greatest (light) to least (dark).

What about small drinking water systems regulated by the Saskatchewan Health Authority?

SHA regulated 894 drinking water supplies in 2022-23 and conducted a total of 917 inspections of public drinking water systems to monitor compliance with *The Health Hazard Regulations.* Figure 6 shows that non-compliance was primarily related to monitoring and operational inspection items. The percentage of the population served by these systems is small in comparison to those regulated by WSA; however, they still require regulatory oversight for the protection of human health. SHA does not provide permits for public water supplies but does issue approvals and conducts annual inspections.


Saskatoon Waterworks Inspection

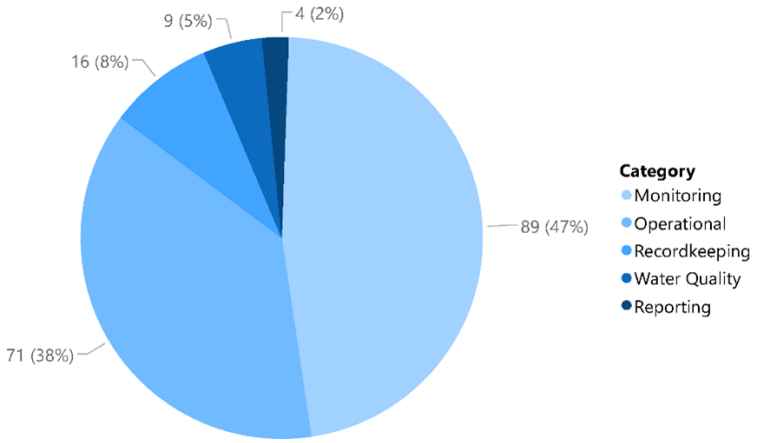


Figure 6. SHA drinking water regulatory inspection non-compliance by category. Per cent from greatest (light) to least (dark).

Response to Adverse Conditions

Protecting public health is the priority when adverse water quality is detected by routine water sampling. A risk-based management approach dictates the response by WSA or SHA that considers the source water, treatment, distribution, cross-connections and the operator's skill level. In most cases, follow-up sampling and monitoring is all that is required to verify the water is safe to consume. When drinking water quality is impacted and poses potential risk, WSA and SHA respond with:

- issuing Precautionary Drinking Water Advisories (PDWA) and Emergency Boil Water Orders (EBWO); and
- abatement and enforcement.

Waterworks owners are responsible for immediately reporting known or anticipated disruptions to the treatment or distribution system. They must act on the direction or advice given by the EO or public health inspector (PHI) to resolve issues and ensure that consumers receive notifications in a timely and effective manner.

For WSA regulated waterworks, EOs receive bacteria detection reports directly from analytical laboratories and work closely with communities, PHIs and medical health officers (MHOs) to ensure appropriate advisories or orders are issued according to the *Adverse Drinking Water Quality Incident and Bacteriological Follow-up Standard* (EPB 505).

QUICK FACTS

Of the 894 public water supplies regulated by the Saskatchewan Health Authority in 2022-23, more than half (491) are located in the northern half of the province.

Examples of SHA regulated public water supplies include water systems serving public eating establishments, campgrounds, and other public or privately owned facilities predominately in rural or remote locations.

Information about water testing and drinking water advisories for the public and SHA regulated water systems can be found at:

Water Testing for the Public

Saskatoon transfer pump

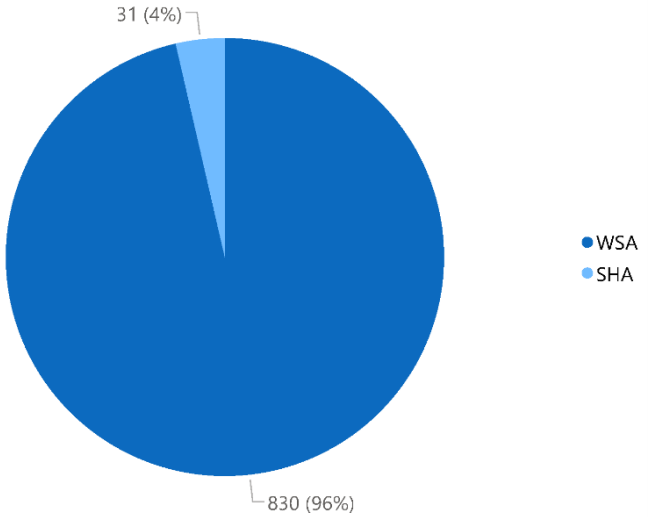


Figure 7. Advisories or orders in effect or issued by WSA and SHA in 2022-23

QUICK FACTS

In 2022-23, eight EBWOs were issued by the MHOs because *E. coli* was detected in water samples for WSA or SHA regulated systems.

See Advisories and Warnings for current PDWAs or EBWOs issued by WSA, Ministry of Environment and SHA.

In 2022-23, there was a combined total of 861 PDWAs and EBWOs in effect or issued by WSA and SHA (Figure 7). All drinking water advisories and orders are entered into the Canadian Network for Public Health Intelligence (CNPHI) advisory application by EOs and PHIs, to ensure real-time notification and information sharing, which enhances communication and response coordination.

Precautionary Drinking Water Advisories are issued when there is a concern that upset conditions, operational problems or start-up of a waterworks may impact drinking water quality. PDWAs will direct users to boil the water prior to use where there is potential microbial contamination. When the risk cannot be eliminated by boiling or presents additional exposure risk, the PDWA will direct users — 'Do Not Drink' or 'Do Not Use'. Under these circumstances, consumers are advised to find an alternate safe drinking water source. The four priority levels in CNPHI are non-critical, important, urgent and emergency, which are intended to signify the level of risk to human health associated with the drinking water event that has led to the advisory/order. PDWAs are issued under the non-critical, important and urgent priority levels.

Emergency Boil Water Orders are issued to mitigate confirmed public health threats due to microbial contamination (e.g., *E. coli*). WSA EOs work closely with SHA under these circumstances as EBWOs are issued by Medical Health Officers (MHOs). All EBWOs have a priority level of emergency in CNPHI.

Kindersley Water Treatment Plant Actiflo System

In 2022-23, 830 advisories were issued to WSA regulated waterworks (Figure 8). Non-critical PDWAs, which are low risk advisories, made up 91 per cent of all advisories issued. These are issued as a precautionary measure associated with water quality concerns due to line breaks or pressure loss in the distribution system and operational issues associated with planned systems maintenance, reservoir cleanings and power loss or failure.

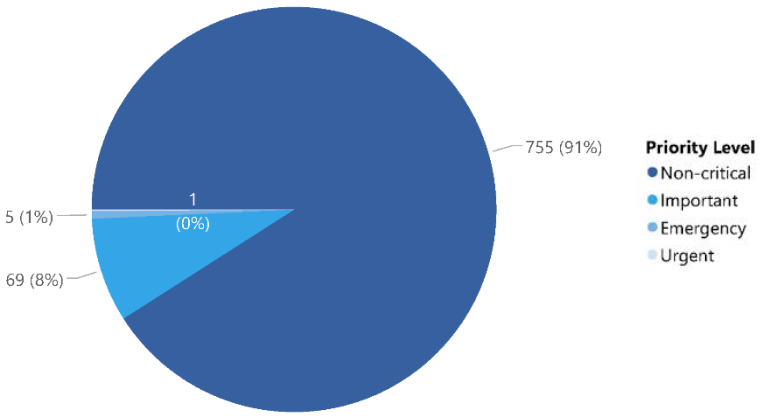


Figure 8. PDWAs and EBWOs issued to WSA regulated waterworks. Source: CNPHI

Important PDWAs, which are higher risk advisories, comprised eight per cent of the advisories issued due to brief disinfection loss, lack of a certified operator, exceedances of water quality standards and high turbidity readings in treated water. Operational reasons for important PDWAs included inadequate disinfection at the treatment plant or distribution system, equipment failure or damage, planned maintenance and inability of treatment to cope with changes to source water quality. There was only one urgent PDWA issued in 2022-23 due to low disinfection levels for a significant period of time.

Five EBWOs were issued to different WSA regulated waterworks in 2022-23. Follow up and adherence to protocols is a priority of WSA and SHA under these circumstances and issues associated with these EBWOs were resolved in a median time of six days (range one to nine days).

QUICK FACTS

EOs and PHIs are professionally trained to interpret the level of risk that determines the communication and response to adverse conditions within the regulatory framework.

To provide safe drinking water to the public, qualified operators and responsible waterworks owners work with the regulators to notify consumers, fix problems and re-instate service.

Non-critical and important PDWAs were in effect for a median length of seven and 11 days, respectively.

Typically, advisories are not lifted until two sets of water sampling for bacteriological analysis, 24 hours apart are conducted and the results are satisfactory.

In 2022-23, 96.6 per cent of WSA regulated waterworks that posted advisories still met the minimum treatment requirements.

Dundurn Rural Water Utility Pumphouse

What about small drinking water systems regulated by the Saskatchewan Health Authority?

Of the 31 advisories issued by the SHA, 23 were PDWAs and eight were EBWOs (Figure 9). PHIs issue PDWAs for a variety of reasons as a precautionary measure including during startup of a seasonal water system, a lack of treatment or maintenance, and in response to equipment or facility failures. SHA adheres to standard operating procedures when issuing PDWAs and, in more serious situations, EBWOs. SHA MHOs are responsible for issuing EBWOs in accordance with *The Public Health Act, 1994* on WSA or SHA regulated water systems. The predominant reason for issuing an EBWO is the presence of bacteria, particularly *E. coli*, in a water sample.

QUICK FACTS

In 2022-23, the Ministry of Environment's Compliance Audit Program audited drinking water advisories for two cities, including a review of follow up bacteriological sampling requirements, and found an average compliance of 79 per cent.

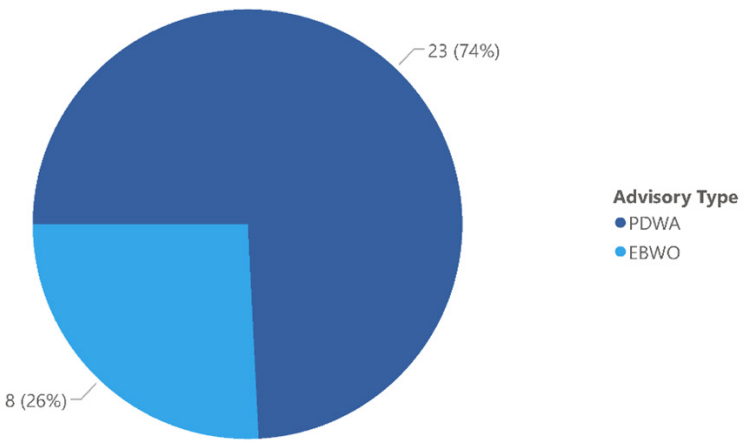


Figure 9. PDWAs and EBWOs issued by SHA. Source: CNPHI

Abatement and Enforcement

WSA prioritizes education and guidance as a primary response to issues of non-compliance. Verbal warnings are issued for minor offences encountered during inspections and are documented on inspection forms to ensure proper follow-up. Written warnings consist of letters of non-compliance and warnings of non-compliance. These are issued for non-compliance detected during inspections, or when follow-up requirements previously identified were not complied with. Waterworks and Sewage Works Protection Orders are issued to the owner of the system with the responsibility to protect human health and the environment.

WSA provides the framework for EOs to ensure that uniform and efficient compliance and enforcement practices are followed when dealing with non-compliance for drinking water and wastewater violations. Protocol requires that compliance be obtained initially through public education and prevention (abatement) with enforcement being a measure of last resort. Compliance-related actions are applied when an issue is causing, or has the potential to cause, a significant risk to public health and safety, or the environment.

Public Perception and Trust

The public's perception of drinking water safety influences water use. Perceptions should be based on accurate information that enables communities and individuals to make informed decisions. Reliable and timely information builds trust between the public, operators and owners of waterworks, and the regulators. Public perception and trust in drinking water systems is fostered through:

- transparent and effective communication of accurate information; and,
- feedback through the annual drinking water survey.

QUICK FACTS

Find water and wastewater management information on advisories and warnings, drinking water quality, operator information, and wastewater and surface water quality here:

Water and Wastewater Management

The annual notification to consumers must contain information about the compliance of the waterworks with water quality standards and sample submission as outlined in the permit. It can be included on water bills or tax notices, published in a local paper or local media, or online.

Transparent and Effective Communication

Information to build a positive perception of Saskatchewan's drinking water must be understandable, current and readily available. When citizens know and understand their drinking water, they can make decisions based on an accurate assessment of risk. WSA and waterworks owners work to build trust with the public by providing:

- annual notification to consumers (EPB 536);
- online water quality and inspection report results;
- online advisories (PDWA/EBWO) currently in place; and,
- annual reporting on the State of Drinking Water Quality in Saskatchewan.

Perceived Drinking Water Safety

WSA conducts an annual survey to gauge the public's perception of drinking water quality and safety in Saskatchewan. For 2022-23, the survey collected data from 801 respondents from May 9 to 12, 2023. Five per cent of survey respondents reported accessing a private well for drinking water.

The survey found 87 per cent of Saskatchewan residents strongly or somewhat agreed their drinking water was safe, which remains consistent over time ranging from 84 to 89 per cent in the past ten years. When looking at the entire province, fewer residents (77 per cent) are confident that everyone in Saskatchewan has safe drinking water.

QUICK FACTS

SaskWater is a commercial Crown water utility that provides drinking water and wastewater services to approximately 117,400 people throughout Saskatchewan. SaskWater provides customers with an Annual Report detailing their performance and delivery of services. See saskwater.com for more information.

Investment

Ensuring the financial sustainability of waterworks is critical to the long-term provision of safe drinking water and environmental protection. Investment in infrastructure comes from provincial and federal governments, municipalities, private waterworks owners and customers. Waterworks and sewage works operations are maintained, upgraded or expanded to sustain growth and prosperity for Saskatchewan residents through:

- government and municipal infrastructure investments;
- sustainable municipal waterworks operations; and,
- consumers' willingness to invest.

Rouleau lagoon

Government and Municipal Infrastructure Investments

The condition, capability and capacity of water treatment and distribution infrastructure is critical in providing drinking water that meets provincial standards and national guidelines. Infrastructure funding and grants are important to help upgrade and expand infrastructure to meet guidelines, standards and the pressure created by growth.

The Canada Community-Building Fund (CCBF), formerly Gas Tax Fund, provides flexible funding to community projects including drinking water and wastewater infrastructure. Saskatchewan municipalities received over $65 million in 2022-23 under the program to be used towards infrastructure projects in 19 eligible categories. In 2022-23, the CCBF allocated a total of $8.7 million to 33 drinking water ($5.2 million) and 18 wastewater ($3.5 million) projects.

In 2022-23, $78 million in federal-provincial funding was provided under the Investing in Canada Infrastructure Program (ICIP) to 39 water and wastewater projects. The federal-provincial Small Communities Fund (SCF) provided $3 million to 12 water and wastewater projects. Under the National Regional Projects (NRPs) program, the province provided $19 million to 14 water and wastewater projects and the federal government provided a similar amount in 2022-23 (Table 2).

Municipalities can find current and future funding opportunities such as the CCBF and ICIP by searching the Canada Community-Building Fund Program and Investing in Canada Infrastructure Program (ICIP).

Lloydminster Wastewater Treatment Plant

QUICK FACTS

The Ministry of Environment performs water-related regulatory activities but does not have a dedicated budget and does not track drinking water-specific expenditures separately as this work is typically undertaken in conjunction with other industrial compliance assurance activities.

SHA does not specifically identify water and wastewater budget allocations as the operating budget is devoted to the delivery of several health-related programs through regional services, the Roy Romanow Provincial Laboratory and public health inspectors.

The New Building Canada Fund had a Provincial Territorial Infrastructure Component that provided 50 per cent funding for projects that support growth in communities through the NRP and SCF. Participating communities have raised matched funding and all projects funded under NRP and SCF are currently underway or complete.

Any revenue related to drinking water and wastewater programming, and source water protection collected by WSA contributes to administration, ongoing communications and regulatory activities.

Table 2. Total municipal drinking water and wastewater programming and infrastructure investment in 2022-23.

Ministry or Agency	Estimated Budget ($000s)	Actual Expenditure ($000s)	Variance Over (Under) ($000s)
Water Security Agency (drinking and wastewater programs and activities)	**6,585**	**5,661**	**(924)**
Ministry of Government Relations* (drinking and wastewater funding programs)			
- Investing in Canada Infrastructure Program (ICIP)[1,3]	36,034	78,074	42,040
- Small Communities Fund (SCF)[2,3]	4,964	2,914	(2,050)
- National Regional Projects (NRP)[2,3]	26,235	18,947	(7,288)
Ministry of Government Relations - Total	**67,233**	**99,935**	**32,702**
Total	**73,818**	**105,596**	**31,778**

*The Ministry of Government Relations budget is determined by program, not by infrastructure category (e.g., water and wastewater). The budget estimate is based on a ratio of the water and wastewater expenses compared to total program expenses multiplied by the total program budget for 2022-23.
[1] Under ICIP, more construction work was undertaken in 2022-23 than originally forecast.
[2] Under SCF and NRP, project delays resulted in less than anticipated expenditures.
[3] Under ICIP, SCF and NRP, costs are reimbursed for eligible project costs incurred and paid by the recipient.

Sustainable Municipal Operations

Municipal infrastructure, such as treatment and distribution or collection facilities, deteriorate over time and may need to be expanded or replaced. Therefore, municipalities need to know the condition of their systems and create pricing and capital investment policies to maintain these systems. Waterworks rates that cover current and future expenditures and debt payments are a direct indicator of waterworks financial sustainability.

Based on an analysis of waterworks financial overviews (unaudited) submitted for 457 municipal waterworks systems, 47 per cent of the municipal waterworks systems were operating at a sustainable level in 2021. From 2020 to 2021, 46 per cent of municipal waterworks systems showed a decrease in their sustainability ratio.

QUICK FACTS

> SaskWater is a Crown Investments Corporation subsidiary, so its financial budgeting approval process is separate from that of the ministries and/or agencies. Its activities are not related to water management but rather the provision of water services to its customers. For full financial information, see SaskWater's annual report at saskwater.com.

Regina Sewage Lift Station

Consumer Investment

The 2023 WSA annual drinking water survey found the proportion of people willing to pay more to improve drinking water remains stable at 64 per cent in Saskatchewan. Consumer willingness to pay for drinking water is an important measure of the value placed on safe drinking water. Communicating accurate information on investment requirements needed to maintain services can build trust and support changes to drinking water fees or services in the future.

Saskatchewan residents unwilling to pay more to improve drinking water quality or safety, identified low concern for drinking water safety (48 per cent), financial stress (45 per cent) and community water is reported to be safe (44 per cent) as the top three reasons. Eighteen per cent identified that improvements had been made, or were underway, to improve drinking water quality, while 10 per cent had their own purification system installed. Waterworks owners should consider these factors to ensure effective drinking water management.

Swift Current CPR Dam

Contact and Information:

For an electronic copy of this report or more information on the status of drinking water in Saskatchewan visit: wsask.ca or saskatchewan.ca.

To provide feedback or comment, please contact the Water Security Agency.

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