Water Security Agency




Annual Report for 2020-21

State of Drinking Water Quality in Saskatchewan

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Government of Saskatchewan

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Note: An electronic copy of this document is available online at: http://www.saskh2o.ca and https://www.wsask.ca/.

Letters of Transmittal

Fred Bradshaw

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, 2021.

The Water Security Agency (WSA) is the prime regulatory agency in the province responsible for ensuring the provision of safe drinking water and protection of water supply sources. The Water Security Agency ensures our drinking water is safe by protecting supplies from the source to the tap. WSA has a critical safety oversight function in the regulation of safe drinking and wastewater facilities for communities across the province – that business function had to continue during COVID-19. WSA's response plan in 2020-21 was a flexible and fluid approach, consistently informed by provincial health guidelines, while prioritizing public and employee safety. Delivery of some programming was restricted to maintain employee and citizen safety.

Safe and sustainable drinking water, effective wastewater treatment and protection of source waters support a growing economy that supports our communities. The Water Security Agency and its partners will continue to work to prevent and reduce risks to the health of people and the environment, and to ensure safe and sustainable drinking water and wastewater. The work is ongoing and this report helps to inform future planning, and brings attention to emerging priorities and resource allocation for upcoming years.

Respectfully submitted,

Fred Bradshaw
Minister Responsible for Water Security Agency

Letters of Transmittal

Shawn Jaques
Interim President and Chief
Executive Officer
Water Security Agency

Honourable Fred Bradshaw

Minister Responsible for Water Security Agency

I respectfully submit the Annual Report on the State of Drinking Water Quality in Saskatchewan for the fiscal year ending March 31, 2021. I acknowledge responsibility for this 2020-21 report and declare the information contained within is accurate, complete and reliable.

The 2020-21 report describes the drinking water-related activities of agencies and ministries involved in drinking water and source water protection activities in Saskatchewan. Key partners in protecting and improving Saskatchewan drinking water supplies and source waters include the Water Security Agency, the Ministry of Environment, the Ministry of Health, the Saskatchewan Health Authority, SaskWater, the Ministry of Government Relations and the Ministry of Agriculture.

On behalf of the key partners and through this report, the Water Security Agency provides information on our collective accomplishments in the protection and conservation of drinking water and related source water resources during 2020-21. In general, performance in addressing drinking water quality and source water protection management in Saskatchewan has paralleled or exceeded performance of other Canadian provinces where similar strategic initiatives are in place.

The provision of safe drinking water is a vital component in the protection of public health and disease prevention, and therefore essential for the health and well-being of Saskatchewan's citizens. High quality water is important to support the provincial growth plan and for maintaining natural ecosystems and the species that depend upon them, ensuring the productivity of industry, sustaining commerce and for sustaining growth in the province.

Respectfully submitted,

Shawn Jaques
Interim President and Chief Executive Officer
Water Security Agency

Summary

Drinking water in Saskatchewan comes either from groundwater or from surface waters, such as lakes and rivers. Most Saskatchewan residents get their drinking water from public water systems, while in rural and remote areas, people may get their drinking water from wells or from surface water sources located on their own private property and are individually responsible for the safety of the drinking water. The quality of drinking water, the condition of systems that produce it and the protection of source waters remains an important public health, environmental and growth-related initiatives in Saskatchewan.

The report outlines the roles, responsibilities and resources of agencies and ministries involved in water management. The report discusses operator certification, drinking water quality monitoring, wastewater management, source protection, information management systems and public education initiatives, which are key actions and indicators of performance in improving drinking water quality in Saskatchewan. The report also covers key measures related to the status of drinking water during the period of April 1, 2020 to March 31, 2021:

- 99.1 per cent of municipal waterworks were operated by or were under the direction of operators that have achieved some level of certification. There were 1,477 certified operators in the province.
- A total of 20,658 routine bacteriological samples were submitted - 1,432 more than required, equating to a sample submission rate of 107.45 per cent.
- 99.6 per cent of municipal systems complied with the bacteriological standards.
- 95.4 per cent of municipal systems complied with the disinfection standards.
- 84.3 per cent of municipal systems complied with the sampling requirements for health and toxicity parameters. 89.7 per cent of the samples submitted complied with health and toxicity standards.
- The Water Security Agency inspected 904 waterworks.
- Saskatchewan Health Authority public health inspectors conducted 682 inspections of public water supplies that fall under *The Health Hazard Regulations*.
- 388 (about 50 per cent) municipalities with municipal waterworks have by-law provisions to protect source water supplies.
- Nine waterworks did not meet the minimum treatment requirements. Precautionary Drinking Water Advisories are in place to protect consumers.
- The agency inspected 589 wastewater works. Inspection of wastewater systems is a way to help protect drinking water supply.
- A total of 758 unexpected water quality reasons affecting waterworks regulated by the Water Security Agency were reported and addressed, including system depressurizations, water main breaks or other failures or upsets that resulted in Precautionary Drinking Water Advisories.
- The Roy Romanow Provincial Laboratory analyzed 33,862 drinking water samples collected from both municipal and private systems.
- The water quality indices for 24 monitoring stations at 10 major surface water sources in Saskatchewan were fair to excellent (excellent – 4, good – 14, and fair – 6).
- On average, a Saskatchewan resident uses about 262 litres of water per day.
- 64.6 per cent of Saskatchewan residents surveyed indicated that they are willing to pay more for their drinking water.
- 88.4 per cent of Saskatchewan residents surveyed indicated that they are very or somewhat confident in the quality of their tap water.

Introduction

Drinking water in Saskatchewan comes either from underground sources (commonly called groundwater) such as aquifers, or from surface waters such as lakes and rivers. Most Saskatchewan residents get their drinking water from public water systems, while in rural and remote areas, people may get their drinking water from wells or from surface water sources located on their own private property and are individually responsible for the safety of the drinking water. Safe drinking water is a vital component in the protection of public health and disease prevention and is therefore essential for the health and well-being of Saskatchewan's citizens. High quality water is important for maintaining natural ecosystems and the species that depend upon them, ensuring the productivity of industry, sustaining commerce and for sustaining growth in the province. The quality of drinking water, the condition of systems that produce it and the protection of source waters remains an important public health, environmental and growth-related issue in Saskatchewan.

This annual report presents the activities and results of various agencies in managing drinking water in Saskatchewan for the fiscal year ending March 31, 2021. It reports to the public on commitments made and other key accomplishments of ministries and agencies engaged in drinking water management in Saskatchewan. This report does not include information on systems located within First Nations or other systems in Saskatchewan that are not under the provincial jurisdiction.

This is the 19th Annual Report on the Status of Drinking Water in Saskatchewan. The report is a legislated requirement under *The Environmental Management and Protection Act, 2010* and demonstrates the commitment of agencies and ministries engaged in drinking water management to effective public performance reporting, transparency and accountability to the public.

The 2020-21 Annual Report covers the same key measures related to the status of drinking water provided in previous years. Some portions of the report have been added to provide greater insight into trends in water quality and related performance measures over time.

An Overview of the Drinking Water Management System and Water Management Agency Roles in Saskatchewan

Since the waterborne disease outbreaks of May 2000 in Walkerton, Ontario and spring 2001 in North Battleford, Saskatchewan, the Government of Saskatchewan has maintained a heightened and focused effort to improve drinking water supplies and protect source waters in the province. The intent of these efforts is to provide safe drinking water. These actions are also intended to reassure the citizens of the province that government is helping to ensure our drinking water is safe.

Several ministries and agencies are involved in the governance, protection and/or provision of drinking water supplies and source waters in Saskatchewan at various times over the 2020-21 fiscal year, including the Water Security Agency (WSA), the ministries of Environment, Health, Government Relations and Agriculture, the Saskatchewan Health Authority (previously Regional Health Authorities), and SaskWater.

WSA is a Treasury Board Crown Corporation created in October 2012 by bringing together:

- ⇨ all programs of the former Saskatchewan Watershed Authority, including drinking and wastewater, aquatic habitat protection permitting, and water quality management programs of the Ministry of Environment;
- ⇨ the M1 Canal and East Side Pump Plant, and water pumping equipment rental program of the Ministry of Agriculture; and
- ⇨ limited scope pipelines from the Ministry of Health.

The agency is currently responsible for managing the water supply, protecting water quality, ensuring safe drinking water, ensuring proper collection and treatment of municipal wastewater, managing dams and water supply channels, reducing flood and drought damage and providing information on water. The agency works to integrate all aspects of provincial water management to ensure water supplies support economic growth, quality of life and environmental well-being.

The following is a summary of the major roles, priorities and actions of each of the government ministries and agencies involved in drinking water management and source water protection.

The Water Security Agency:

- ⇨ leads ongoing planning, implementation and reporting associated with drinking water governance and management to which all participating ministries and agencies contribute;
- ⇨ implements, inspects and regulates compliance for 572 permitted municipal waterworks, 77 permitted pipelines, 33 regional or provincial park waterworks, 136 other permitted waterworks (such as trailer courts, limited scope pipelines, institutions and Hutterite colonies), and 623 wastewater facilities (including 4 sewage works regulated by the Ministry of Environment) under *The Waterworks and Sewage Works Regulations*. There are also 24 industrial waterworks bringing the total to 842 waterworks regulated under *The Waterworks and Sewage Works Regulations*;
- ⇨ issues permits for construction and operation of water and wastewater works;
- ⇨ develops policies, protocols, water quality standards and guidelines to support protection of drinking water and implementation of *The Waterworks and Sewage Works Regulations*;
- ⇨ liaises with the Operator Certification Board (OCB);
- ⇨ manages the Water Security Agency's/Ministry of Environment's drinking water information system, Environmental Management System (EMS) that houses water quality and inspection data for all agency/ministry regulated waterworks and wastewater works in the province;
- ⇨ monitors surface water quality at primary surface water quality stations across the province;
- ⇨ manages the http://www.saskh2o.ca/ website that supplies a broad range of drinking water-related information gathered from water management authorities within the province;
- ⇨ monitors source (surface/ground) water;
- ⇨ regulates agricultural water management practices;
- ⇨ regulates construction in or near water through issuance of Aquatic Habitat Protection Permits;
- ⇨ provides flood forecasting and identifies flood susceptible areas;
- ⇨ leads watershed and aquifer planning;
- ⇨ owns, operates and maintains water management infrastructure;
- ⇨ provides waterworks source water approval (except municipal); and
- ⇨ allocates ground and surface water for use.

The Ministry of Environment:

- implements, inspects and regulates compliance for 24 industrial waterworks and four sewage works facilities under *The Waterworks and Sewage Works Regulations*;
- issues permits for operation of water and wastewater works at industrial facilities;
- develops policies, protocols, and guidelines to support protection of drinking water and implementation of *The Waterworks and Sewage Works Regulations* at regulated industrial facilities; and
- conducts environmental compliance audits on Water Security Agency regulated waterworks and wastewater works.

The Ministry of Government Relations:

- provides financial assistance for water and wastewater infrastructure through the Investing in Canada Infrastructure Program (ICIP), the New Building Canada Fund (NBCF), the Clean Water and Wastewater Fund (CWWF) and the Northern Water and Sewer Program for 2020-21;
- legislates and regulates rate policies and capital investment strategies for municipal waterworks; and
- legislates and regulates municipal protection of water sources through the approval of planning bylaws.

The Ministry of Health/Saskatchewan Health Authority:

- inspects for compliance at semi-public waterworks and certain other waterworks as required by *The Health Hazard Regulations;*
- manages data systems for public health inspectors and laboratory information;
- analyzes water through the Saskatchewan Health Authority's Roy Romanow Provincial Laboratory; and
- provides advice and addresses waterborne illnesses.

The Ministry of Agriculture:

- has responsibility under *The Agricultural Operations Act* for intensive livestock provisions;
- administers *The Irrigation Act, 2019* and provides water-related advice;
- provides pesticide (applicator) licences under *The Pest Control Products (Saskatchewan) Act*;
- conducts research, demonstrations and technology transfer; and
- offers environmental programming under the Canadian Agricultural Partnership.

SaskWater:

- is a commercial Crown water utility, helping communities, First Nations and industry gain access to safe, reliable and sustainable water and wastewater services.
- SaskWater's core lines of business include:
  - potable water supply;
  - non-potable water supply;
  - wastewater treatment and management;
  - certified operation and maintenance (COM) for customer-owned systems;
  - project management;
  - leak detection audits;
  - water and wastewater training; and
  - ROAM remote monitoring services.

The Water Security Agency, the Ministry of Health and the Saskatchewan Health Authority continue to deliver water and wastewater programming and governance through a system of centralized planning, protocol and standards development, and regionalized inspection and compliance services.

At the end of the 2020-21 fiscal year, the Water Security Agency's staff complement totaled 31 full-time equivalents (FTEs), including three FTEs devoted primarily to water information management, for delivery of all aspects of the agency's drinking water and wastewater management activities.

The Saskatchewan Health Authority's Roy Romanow Provincial Laboratory has 18 FTEs dedicated to water testing and the accreditation program in support of the Safe Drinking Water Strategy. Saskatchewan Health Authority public health inspectors, medical health officers and public health nurses also play a role in water related activities (i.e., semi-public water supply inspection, issuance of Emergency Boil Water Orders (EBWO) and waterborne disease investigations).

The Ministry of Agriculture has nine FTEs that deliver intensive livestock inspection and regulatory approval services to ensure protection of water resources from intensive livestock operations and provide technical assistance to address environmental issues related to livestock development. The ministry also develops and distributes management and technology information for conservation, grazing and crop production practices that reduce and/or minimize impacts to water resources. Three FTEs deliver pesticide regulatory services.

The Ministry of Agriculture administers *The Irrigation Act, 2019*. The legislation ensures soils and water are suitable for sustainable irrigation. Irrigation soils, water quality and water tables are monitored for sustainability.

The water-related programming by the Ministry of Government Relations is mainly provided through centralized policy development and program delivery services.

Key partners outside the provincial government include the federal government through the Investing in Canada Infrastructure Program (ICIP), Clean Water and Wastewater Fund, New Building Canada Fund and Gas Tax Fund, municipalities and other waterworks owners, the Municipalities of Saskatchewan (formerly known as the Saskatchewan Urban Municipalities Association), the Saskatchewan Association of Rural Municipalities (SARM), the Saskatchewan Water and Wastewater Association (SWWA) and the Operator Certification Board (OCB). SWWA and the OCB have been instrumental in advancing waterworks operator certification in the province. The OCB is appointed by government but operates at arm's length in considering the qualification and standing of water and wastewater works operators in the province. Key stakeholders are consulted on a periodic basis to aid in the ongoing development and delivery of drinking water and wastewater-related programming and activities of the Government of Saskatchewan.

The following sections of the report provide information on the status of drinking water in Saskatchewan during 2020-21. Further information on drinking water quality is available on the SaskH2O website http://www.saskh2o.ca/ and on WSA's website www.wsask.ca. The following sections also report on the significant actions and the performance levels in achieving key indicators for the improvement in drinking water and related protection and enhancement measures.

Transparency regarding the status of drinking water improves trust in drinking water supplies and the waterworks systems that produce it. Public reporting furthers the accountability of the ministries and agencies that manage and govern drinking water in the province.

Progress in 2020-21

Ministries and agencies engaged in drinking water management in Saskatchewan use performance information to assess overall progress toward improving the safety and management of drinking water in the province. In turn, reviews and assessments each year allow and direct the most effective adjustment of future plans and actions to address priority elements. WSA management affirms that all major external factors that could have an impact on performance results have been identified and explained. Additionally, significant efforts have been made to ensure performance data is valid through ongoing review and validation of data. In general, performance in addressing drinking water quality and source water protection management in Saskatchewan has paralleled or exceeded performance of other Canadian provinces where similar strategic initiatives are in place.

The results for key actions provided below are organized by common activities focusing on various components of drinking water and source water protection and a report on actual progress. The following is a summary of the most significant achievements related to drinking water and source water status and protection in Saskatchewan during 2020-21. Further information is available by contacting the Water Security Agency at 306.694.3900 or visiting http://www.saskh2o.ca.

Assessment of the State of Drinking Water in Saskatchewan

The assessment of the state of drinking water in Saskatchewan is presented in a manner consistent with previous reports so that key measures provide a continuous and ongoing history.

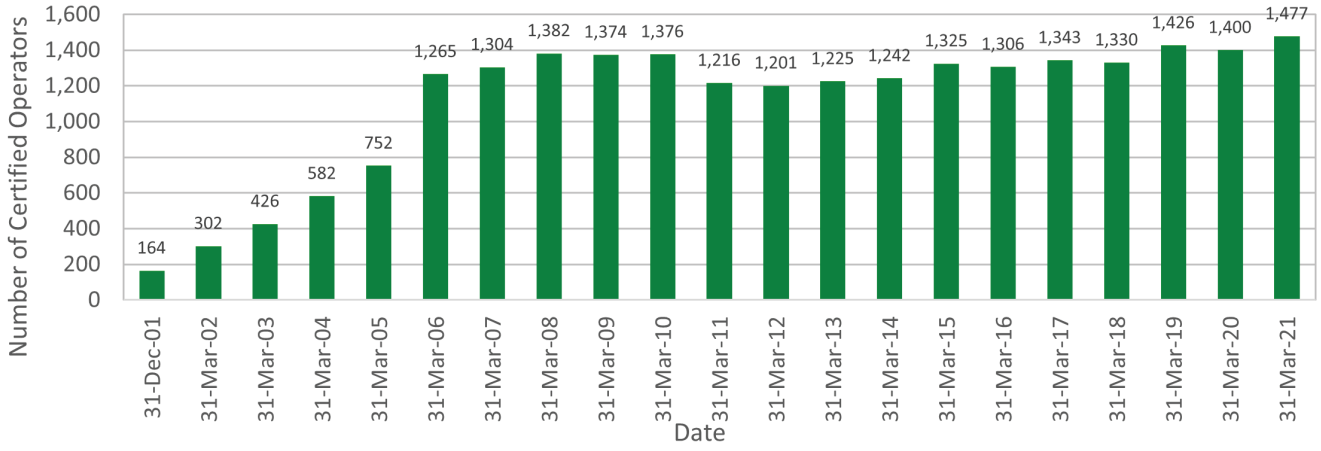
Waterworks systems and operations provide safe, clean and sustainable drinking water

Waterworks staff are capable and well-trained

Provision of safe drinking water is highly reliant on the knowledge and capabilities of waterworks operators and how they apply their skills to produce and monitor the quality of drinking water. Along with source water protection, sound and capable infrastructure, water quality monitoring and knowledgeable operators are some of the elements of a "multi-barrier approach" to ensure safe drinking water. The following reports on statistics and a key measure related to ensuring waterworks operational staff are capable and well trained as of March 31, 2021.

Figure 1 provides a historical summary of the number of operators certified to date. As of March 31, 2021, there were 1,477 active certified operators reported by the Saskatchewan Operator Certification Board (OCB). These are all the certified operators in Saskatchewan, including those who operate waterworks that are not regulated by the Water Security Agency. Indigenous Services Canada requires First Nations operators to become certified by the same criteria of education, experience and examination as operators mandated by WSA. There were 89 First Nations operators certified at the end of this fiscal year. In addition, there are 7 operators working in federal facilities such as parks or correctional centers operators.

Figure 1: Certified Operator Statistics, December 2001 to March 31, 2021



Source: Operator Certification Board certification records database

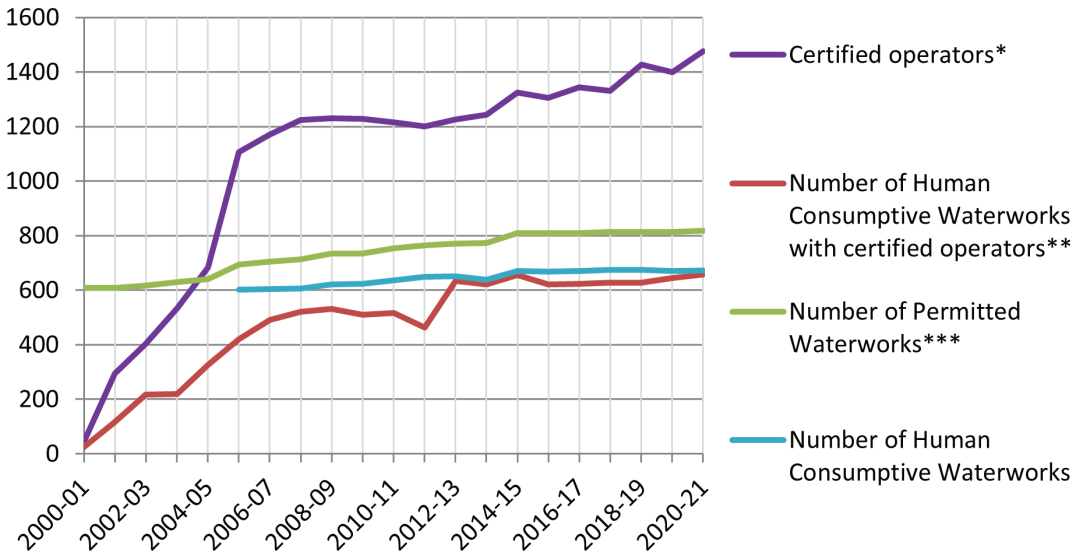
As of March 31, 2021, a total of 3,330 waterworks or sewage works operators had been certified by the OCB since it began formally certifying operators in 2002. Of the total certified operators to date, 1,477 operators retained full active certification as of March 31, 2021.

During 2020-21, approximately 57 per cent of operators receiving renewal notification from the OCB renewed their certification. This is a 22 per cent decrease from 2019-20. There is still an issue with late applications for renewal by operators and a higher rate of retirements by operators. The OCB is following up with operators and waterworks owners to resolve outstanding operator certification requirements.

As of March 31, 2021, there were 818 waterworks permitted by the Water Security Agency, which includes 673 human consumptive waterworks and 145 hygienic waterworks that do not require a certified operator (Figure 2). Some operators continue to take exams and are obtaining certification or upgrading certification levels and categories. Some smaller municipal waterworks do not require a certified operator and instead have a trained operator as required by regulation. Some facilities sought hygienic classification, which does not require a certified operator. WSA continues to work with municipalities, waterworks owners and others to maintain and advance the implementation of operator certification and continuing education in the province. As of March 31, 2021, 657 communities employ at least one certified operator or regional operator to oversee the operation of waterworks. Twenty-one out of 619 wastewater facilities permitted by WSA were not meeting the requirement of employing a certified operator as of March 31, 2021; 19 are lagoon systems and two mechanical wastewater facilities.

Figure 2 provides additional trend information on the number of waterworks with certified operators since 2000-01 for all waterworks regulated by the Water Security Agency.

Figure 2: Certification trends for waterworks since 2000-01



** Operators working in all waterworks including WSA-regulated facilities.*
*** Includes all human consumptive waterworks with certified operators in the province.*
****Permitted works includes municipal water treatment works, municipal water distribution systems, pipelines and large privately- or government-owned waterworks regulated by the Water Security Agency. These values include hygienic waterworks that do not require a certified operator.*
Source: Operator Certification Board database and Water Security Agency, Environmental Management System.

Table 1 provides information on the number of operators certified at various levels in all categories of the water and wastewater treatment industry in Saskatchewan during 2020-21.

Table 1: Distribution of certified operators at water and wastewater works - fiscal year 2020-21*

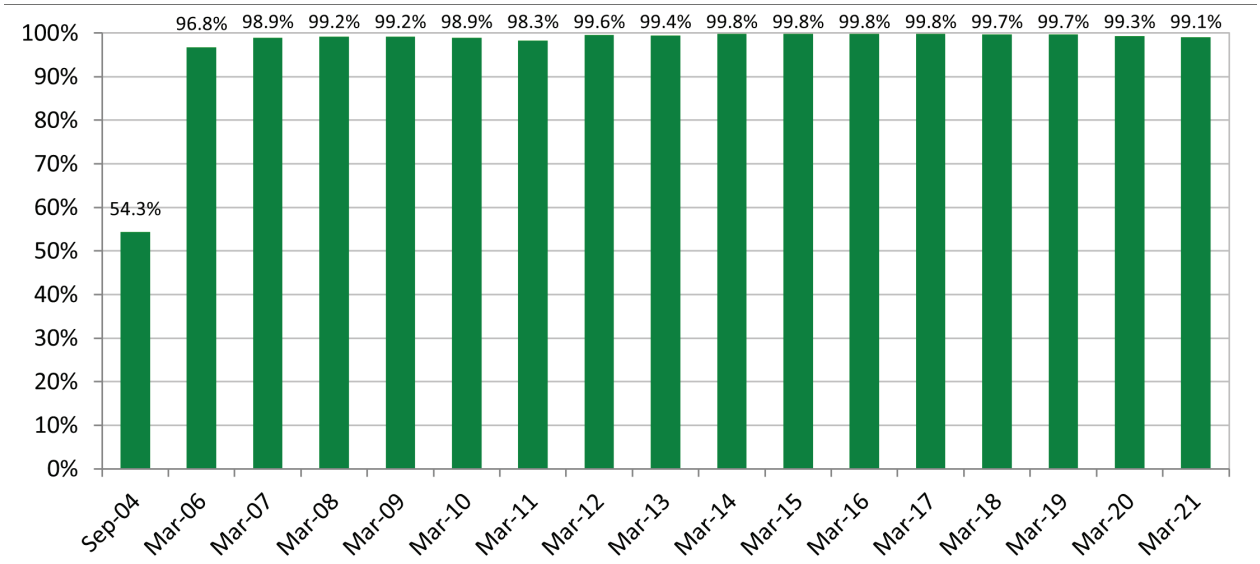
System Classification[1]	Water Treatment	Water Distribution	Wastewater Treatment	Wastewater Collection
Small System[2]	94	75	75	71
Class-1	445	525	590	551
Class-2	394	549	168	304
Class-3	98	65	24	33
Class-4	73	25	39	26
Total	1,104	1,239	896	985

1 Waterworks system classification is defined by the complexity and size of the waterworks in accordance with standard parameters adopted from the Associated Boards of Certification (ABC). More information on waterworks system classification is available from the Operator Certification Standards EPB 539 (see http://www.saskh2o.ca/).
2 There are several types of Small Systems. A Small Water System is defined as a Class-1 groundwater treatment and/or Class-1 distribution system, serving fewer than 500 people. Small, treated drinking water pipelines serving fewer than 500 people can be classified as Small Systems and some of their operators have become certified as Small System operators and are shown only under Water Distribution. A Small Wastewater System is a Class-1 wastewater treatment system (only lagoon systems) and/or a Class-1 collection system serving fewer than 500 people.
**Note: Table 1 does not include operators that are overdue in certificate renewal as of March 31, 2021.*
Source: Operator Certification Board Database

In 2020-21, 134 individuals applied for initial operator certification and 180 certified operators applied to upgrade certification by either increasing level of certification or adding new categories of certification. A summary of communities with certified operators and operator classification, updated after each OCB meeting, is available on the OCB website: http://saskocb.ca/.

As of March 31, 2021, 99.1 per cent of municipal human consumptive waterworks have operators that have achieved some level of certification (Figure 3). This represents a small change in compliance from the previous year when 99.3 per cent of municipal human consumptive waterworks had an operator certified to some level. As of March 31, 2021, only five municipal human consumptive waterworks did not employ a certified operator or regional operator to oversee the operation of their waterworks. Knowledgeable, certified operators help to ensure safe drinking water. No calculation of community-based waterworks operator certification percentage was made in 2005.

Figure 3: Per cent of municipal human consumptive waterworks whose operators have received some level of certification



Source: Water Security Agency – Environmental Management System

Compliance with operator certification is primarily controlled by the owner of the waterworks, but also requires cooperation from the waterworks operator(s). Acceptance and uptake of operator certification is key to ensuring the delivery of safe drinking water. As a point of comparison, Alberta's (population 4.37 million) mandatory certification program took effect on January 1, 1983 and its program currently has approximately 2,731 certified operators. Currently, there is no cost for its certification examinations, applications and renewals. Saskatchewan (population approximately 1.17 million) has 1,477 certified operators. Examinations cost about $80, and certification and renewal fees (every two years) are $150. Compared with Alberta, Saskatchewan's certification program has progressed significantly since its inception in 2000.

Infrastructure produces water that meets the national guidelines

Infrastructure design, capability, condition and maintenance are critical in the production of safe drinking water. Standards, incentives, requirements, compliance measures and implementation plans are also important to ensure that waterworks are operated and monitored to achieve drinking water of a quality that protects human health. The "Guidelines for Canadian Drinking Water Quality – Summary Table" (see: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf) are used in Canada as the definitive measure of science-based safety criteria for drinking water. Saskatchewan has adopted the guidelines as standards (see "Saskatchewan's Drinking Water Quality Standards and Objectives" on http://www.saskh2o.ca/).

The Water Security Agency uses the *Guidelines for Canadian Drinking Water Quality* as the basis for the water quality standards found in *The Waterworks and Sewage Works Regulations*. These standards are included in each new or renewed waterworks permit. A total of 169 municipal waterworks operational permits were issued or renewed in 2020-21. An additional 70 waterworks operational permits were amended during the reporting period. The drinking water quality standards for "chemical-health" included in the former *The Water Regulations, 2002* were mandatory as of December 2010 for existing waterworks and take effect upon the start-up of any new waterworks. Several new or updated drinking water quality standards were included in *The Waterworks and Sewage Works Regulations* which came into force in June 2015 and took effect on July 1, 2020. 214 wastewater works operational permits were also issued, renewed or amended during the reporting period.

The bacteriological quality of water is a critical parameter for drinking water because, when the related standards are exceeded, there is a possibility of acute health effects for consumers. Saskatchewan uses coliform bacteria and E. coli bacteria as indicators of the quality of drinking water. Various accredited laboratories in the province conduct routine analysis for E. coli during the fiscal year to help improve the meaning and speed of monitoring results. Saskatchewan's standards for bacteriological drinking water quality are more stringent than the *Guidelines for Canadian Drinking Water Quality*.

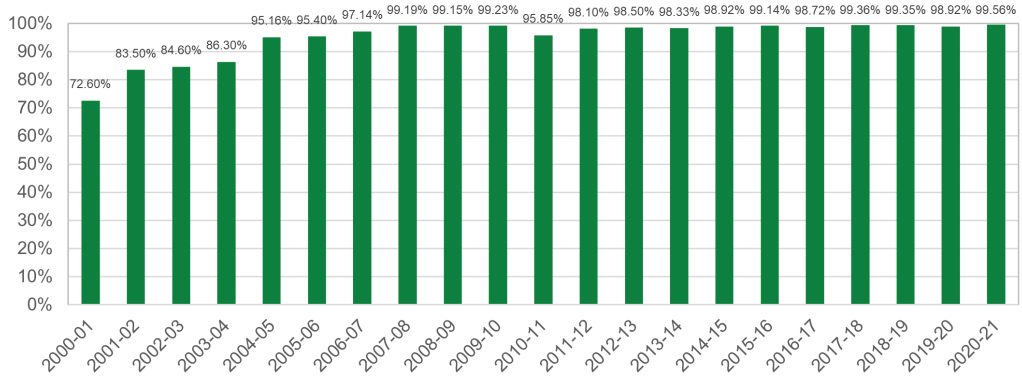
The number of samples required for bacteriological water quality monitoring of a waterworks is based on the number of people served by the system (see "Municipal Drinking Water Quality Monitoring Guidelines" at http://www.saskh2o.ca/). When a routine water sample shows the presence of bacteria, follow-up activities, including repeat sampling, are performed. Typically, the Saskatchewan Health Authority issues Emergency Boil Water Orders (EBWOs) when confirmed bacteriological contaminations or related problems arise at WSA-regulated waterworks. There were four such instances in 2020-21.

During 2020-21, there were 20,658 valid Municipal Human Consumptive Use routine bacteriological water quality samples submitted, of which, 70 samples (0.34 per cent) exceeded the water quality standards of zero total coliforms, zero E. coli or greater than 200 background bacteria per 100 millilitres of water. During 2020-21, 1,432 more routine bacteriological water quality samples were submitted from municipal waterworks regulated by WSA than were required by permit requirements, equating to a sample submission rate of 107.45 per cent.

In 2020-21, there was a 0.64 per cent increase in compliance with bacteriological standards for municipal human consumptive waterworks (90 per cent of the time) when compared with the previous fiscal year. WSA staff continue to work to ensure municipalities and the operators of the community water supplies recognize the importance of meeting bacteriological water quality standards as a means to protect consumer health in the future.

In terms of longer trends, there has generally been a net increase in compliance with bacteriological water quality standards (90 per cent of the time), over the past 20 years with a 26.96 per cent increase in compliance, from 72.6 per cent in 2000-01 to 99.56 per cent in 2020-21 (Figure 4). The increase in compliance is the result of increased inspection and follow-up on water quality sampling results by the Water Security Agency, as well as increased attention to water treatment and monitoring by waterworks owners and operators. In 2020-21, four Emergency Boil Water Orders were issued for four waterworks systems upon detection of E. coli contamination in routine water quality samples submitted by the waterworks.

Figure 4: Bacteriological standards compliance



Source: Water Security Agency - Environmental Management System

Compliance with bacteriological water quality standards was selected as a reportable performance measure since it provides a good indication of drinking water quality, which is important to consumers. Tracking compliance with bacteriological standards over several years indicates a positive trend. Compliance with this measure is primarily controlled by the owner of the waterworks, but also requires cooperation from the waterworks operator(s) in achieving bacteriological water quality compliance. Ongoing inspection and interaction with waterworks owners and operators are conducted to sustain good performance in achieving water that is safe from bacteriological threats.

There were 44 Municipal Human Consumptive Use waterworks in the province that exceeded the bacteriological standards at least one time during 2020-21. During the same period, there were two waterworks that have more than 10 per cent of routine bacteriological water samples show presence of bacteria (Osage and Macoun). This is a decrease from 2019-20, when there were 79 instances.

Turbidity describes water cloudiness and is an indirect measure of the number of suspended particles in water. Turbidity is a good indicator of the effectiveness of a water treatment system; turbid water can harbour disease-causing organisms. If excessive turbidity is present, the effectiveness of disinfection of drinking water can be impaired. Waterworks regulated by the Water Security Agency are required to measure turbidity daily, at a minimum, as a means to track water treatment system performance.

WSA's turbidity standards are consistent with the *Guidelines for Canadian Drinking Water Quality*, *Seventh Editio*n. The provincial turbidity standards presently in effect are: 0.1 Nephelometric Turbidity Units (NTU) for membrane filtration systems; 0.3 NTU or 0.2 NTU for conventional filtration systems, and 1.0 NTU for slow sand filtration and groundwater-based systems. On-site monitoring for turbidity and record keeping is a requirement and these records were checked during site inspections in 2020-21 by environmental project officers. Any turbidity-related upsets were addressed by providing advice on system repairs, reservoir cleaning, distribution system flushing and verification through water quality monitoring.

WSA staff continued to ensure that waterworks owners and operators track turbidity monitoring results and manage turbidity-related water quality problems during 2020-21. There were 27 Precautionary Drinking Water Advisories (PDWAs) issued during 2020-21 when turbidity related problems arose at waterworks which represents 3.9 per cent of all PDWAs issued. Turbidity testing results continue to be reported in conjunction with information submitted with regular bacteriological samples.

The range of turbidity results tested by all agencies (municipal, private, and government owners) in 2020-21 is shown in Table 2.

Table 2: Range of turbidity testing results – 2020-21

Turbidity Range (NTU)	Samples	Per Cent Samples	Systems*
0 – 1	30,070	95.47%	640
1 – 2	768	2.44%	166
2 – 3	350	1.11%	74
3 – 4	140	0.44%	42
4 – 5	60	0.19%	22
5+	110	0.35%	42
Totals	31,498	100%	N/A*

** The total number of systems is not applicable as some systems reported turbidity testing results in more than one range of turbidity values. There is a total of 843 regulated waterworks systems..*
Source: Water Security Agency - Environmental Management System

Disinfection is widely used in Saskatchewan as one of the key methods to prevent the spread of waterborne disease. Most disinfection of drinking water is performed using chlorine-based products. Unless otherwise permitted, waterworks regulated by the Water Security Agency are required to maintain:

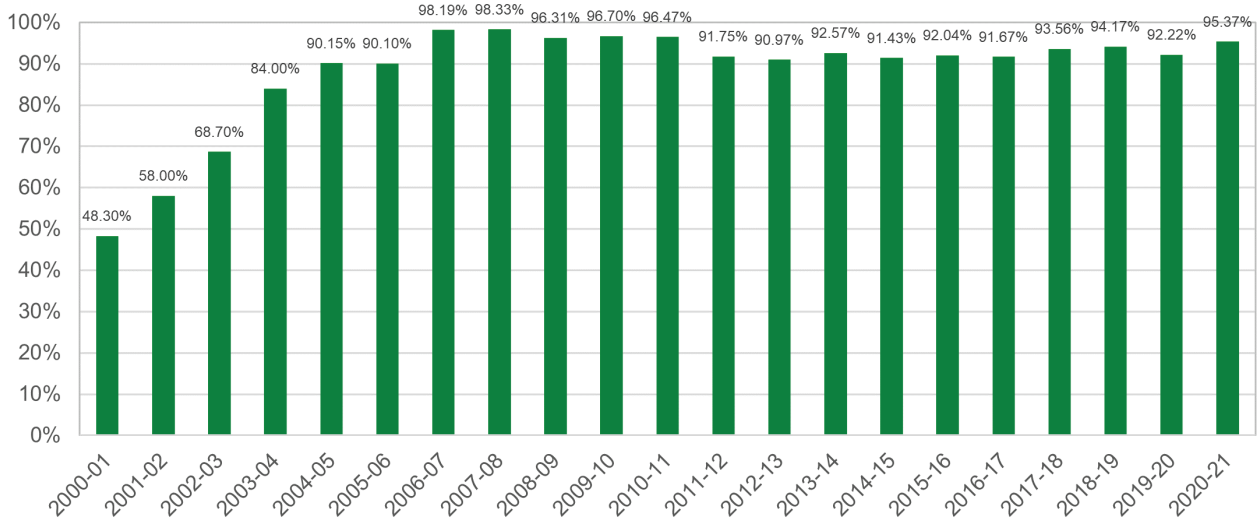
a) a free chlorine residual of not less than 0.1 milligrams per litre (mg/L) in the water entering a distribution system; and

b) a total chlorine residual of not less than 0.5 mg/L or a free chlorine residual of not less than 0.1 mg/L in the water throughout the distribution system.

Chlorine disinfectant monitoring usually includes two tests: total chlorine residual and free chlorine residual that are from samples collected in the water distribution system. Free chlorine residual in drinking water is important in providing lasting protection in water distribution systems. Total chlorine residual is helpful for waterworks operators to understand the effectiveness of disinfection and to judge cleanliness of the water distribution system. On-site monitoring for chlorine residual and associated record keeping is required and these records are checked during site inspections. During 2020-21, the Water Security Agency issued 14 Precautionary Drinking Water Advisories (or 1.6 per cent of all PDWAs issued) as a result of chlorination or disinfection-related concerns at water treatment plants or in drinking water distribution or pipeline systems.

There has been a slight increase in compliance with the disinfection standards over the past fiscal year (see Figure 5). The compliance rate remains significantly above the 2000-01 compliance rates of 48.3 per cent of facilities meeting disinfection requirements. Communities that failed to consistently achieve disinfection compliance this fiscal included Abbey, Alsask, Bankend, Candle Lake (Resort Village of), Carnduff, Chamberlain, Cumberland House, Denare Beach, Dilke, Francis, Glen Ewen, Glenside, Halbrite, Hawarden, Kuroki, Lac Vert, Lampman, Lancer, Macrorie, Marcelin, Semans, Shaunavon, Smiley, Speers, Stony Beach, Theodore, Uranium City, Wollaston Lake and Yellow Creek. In instances where low disinfectant levels were detected and reported, Water Security Agency staff followed up with the waterworks owners/operators to resolve the problems. Failure to report chlorine residuals with bacteriological samples collected from the distribution system are also considered non-compliant for disinfection standards.

Figure 5: Disinfection standard compliance



Source: Water Security Agency – Environmental Management System

Compliance with disinfection standard requirements was selected as a measure for safe drinking water since it provides a good indication of drinking water protection, which is important to consumers. Compliance with this measure is primarily controlled by the owner of the waterworks, but also requires cooperation from the waterworks operator(s) in achieving disinfection standards compliance. The ongoing inspection and interaction with waterworks owners and operators is necessary to ensure that water is safe from bacteriological threats and meets disinfection standards.

Drinking water health and toxicity parameters include a range of naturally occurring substances (aluminum, antimony, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, selenium, silver, uranium and zinc) and other substances, such as trihalomethanes and haloacetic acids, which may be produced during chlorine-based disinfection processes. These substances represent a small potential for adverse health effects over longer time periods. While the safety gains associated with eliminating microbial threats far outweighs any possible adverse health risks associated with disinfection by-products, it is important to monitor to ensure they remain within safe levels. A complete list of the health and toxicity substances monitored at Water Security Agency regulated waterworks is available at http://www.saskh2o.ca/ (see "Municipal Drinking Water Quality Monitoring Guidelines").

Water quality standards are achieved in part through permitting, inspection and following up on monitoring results. For existing waterworks, the initial regulatory phase-in period required that all works meet health and toxicity standards by December 2008 (population of 5,000 or more) or by December 2010 (population of less than 5,000). Table 3 depicts compliance with sample submission requirements and testing compliance for health and toxicity parameters for the last ten fiscal years based on routine samples submitted by Water Security Agency-permitted waterworks.

Table 3: Health and toxicity sample submission and parameter result compliance 2020-21 to 2011-12 fiscal years*

Fiscal Year	Health and Toxicity Sample Submission Compliance Rate (Percentage)	Parameter Standards Compliance Rate (Percentage)
2020-21	84.33	89.72
2019-20	88.34	85.03
2018-19	85.71	93.33
2017-18	89.90	90.18
2016-17	88.38	89.52
2015-16	84.29	87.55
2014-15	86.88	92.20
2013-14	84.27	92.14
2012-13	71.65	90.93
2011-12	70.90	91.14

**Health and Toxicity parameters include aluminum, antimony, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, selenium, silver, uranium and zinc*
Source: Water Security Agency – Environmental Management System

Municipal waterworks sample submission rates decreased by 4.01 per cent in 2020-21 to 84.33 in comparison to the 2019-20 fiscal year for health and toxicity parameters. Parameter standards compliance increased by 4.69 per cent in 2020-21 from 85.03 per cent in 2019-20. Decreased parameter compliance is likely in part attributed to the COVID pandemic. The current drinking water quality standards for health and toxicity parameters took full effect in December 2010. Additional new standards in *The Waterworks and Sewage Works Regulations* took effect in July 2020. The Water Security Agency has and will continue to follow up with waterworks owners who have not submitted the required samples to ensure compliance with monitoring and drinking water quality standards.

In 2020-21, there were 42 of 383 municipal human consumptive waterworks with sampling requirements from the treated water that exceeded at least one health and toxicity related chemical standard resulting in a total of 50 exceedances from the regular required health and toxicity-related testing. Periodically, a municipality will submit voluntary samples beyond the monitoring requirements established in its permit to operate as a means to better define water quality conditions. In total, there were another 16 of 383 municipal human consumptive waterworks with sampling requirements that exceeded at least one health and toxicity-related chemical standard resulting in a total of 879 exceedances from additional voluntary health and toxicity-related testing carried out during the reporting period. When exceedances for health and toxicity parameters, such as arsenic or uranium, were encountered and would represent a short-term health risk, waterworks owners were advised of the results and PDWAs in the form of do-not-drink or do-not-use advisories for the affected water supplies were issued. Of all the testing for arsenic resulting from regular required sampling, there were 32 instances of arsenic exceedances that occurred in samples from 15 human consumptive systems. Additional voluntary arsenic testing was conducted by 10 human consumptive municipal systems, resulting in 66 additional exceedances. The six uranium exceedances occurred in four human consumptive municipal systems from regular required sampling. Additional voluntary uranium testing was conducted by those four systems resulting in an additional four exceedances. Table 4 provides a list of the parameters and number of excursions at all Water Security Agency regulated municipal waterworks.

Table 4: Health and toxicity parameter specific excursion totals for Water Security Agency regulated waterworks during 2010-11 through 2020-21 fiscal years

Year	Arsenic	Barium	Copper	Lead	Selenium	Uranium
2010-11	11 (24*)	0	0	2 (266*)	2	19 (22*)
2011-12	17 (25*)	0	0	2 (290*)	1 (4*)	1 (23*)
2012-13	23 (30*)	0	0	3 (94*)	3 (4*)	5 (34*)
2013-14	15 (59*)	0	0	3 (98*)	5	9 (19*)
2014-15	29 (71*)	0	1	0 (122*)	2	8 (17*)
2015-16	24 (52*)	0	1	1 (96*)	2 (1*)	9 (17*)
2016-17	25 (44*)	1	2	2 (85*)	3 (2*)	12 (19*)
2017-18	24 (43*)	0	2	2 (86*)	2 (2*)	12 (19*)
2018-19	21 (29*)	0	0 (34*)**	0 (894*)**	0	8 (13*)
2019-20	36 (42*)	5	2 (18*)**	7(1*)	0	6 (4*)
2020-21	32 (67*)	5	1 (9*)**	9 (803*)**	0	5 (1*)

**Values in parentheses represent exceedances from additional voluntary sampling performed by municipalities beyond permit-based monitoring requirements.*
***These exceedances are the results of the extensive copper and lead sampling for service connections that were performed by the cities of Melville, Moose Jaw, and Regina.*
Source: Water Security Agency – Environmental Management System

During 2020-21, there were 503 nitrate samples submitted by 240 water treatment facilities. The Water Security Agency monitors nitrate results from all human consumptive systems.

During 2020-21, there were 1,881 fluoride samples submitted by 315 water treatment facilities. Twelve reported samples exceeded the maximum acceptable concentration for fluoride from the community of La Loche. The Water Security Agency monitors results from all human consumptive systems that artificially fluoridate or have high, naturally occurring fluoride.

Implementation of the trihalomethane drinking water quality standard continues with the intent to ensure full compliance with the requirements that took effect December 2010. The standard for trihalomethane is 100 parts per billion based on an average of four seasonal samples.

238 surface water treatment and delivery facilities were required to participate in the trihalomethane monitoring program during the 2020-21 fiscal year, which should have resulted in 976 samples being submitted. Only 216 (90.76 per cent) regulated waterworks did submit results. A total of 1,005 samples were submitted by the waterworks that participated.

During 2020-21, 198 regulated waterworks (83.20 per cent) submitted 857 samples for analysis that met the maximum acceptable concentration for trihalomethanes in drinking water (Table 5). During 2020-21, 205 of 238 regulated waterworks (86.13 per cent) produced water that met the trihalomethane objective of 100 µg/L based on the annual average of seasonal sampling (Table 5). Table 5 presents statistics for the last ten years for Trihalomethane Individual Sample Submission Compliance Rate (Percentage) meeting <100 µg/L Objective and the Trihalomethane Annual Average < 100 µg/L Compliance Rate (Percentage).

Table 5: Individual sample submission and annual average compliance 2020-21 to 2011-12 fiscal years*

Fiscal Year	Trihalomethane Individual Sample Submission Compliance Rate (Percentage) Meeting <100 µg/L Objective	Trihalomethane Annual Average < 100 µg/L Compliance Rate (Percentage)
2020-21	83.20	86.13
2019-20	82.10	88.21
2018-19	78.70	83.04
2017-18	79.40	78.54*
2016-17	78.60	74.24
2015-16	76.11*	71.68*
2014-15	75.89	68.75
2013-14	90.65	70.18
2012-13	86.97	66.67
2011-12	84.33	71.05

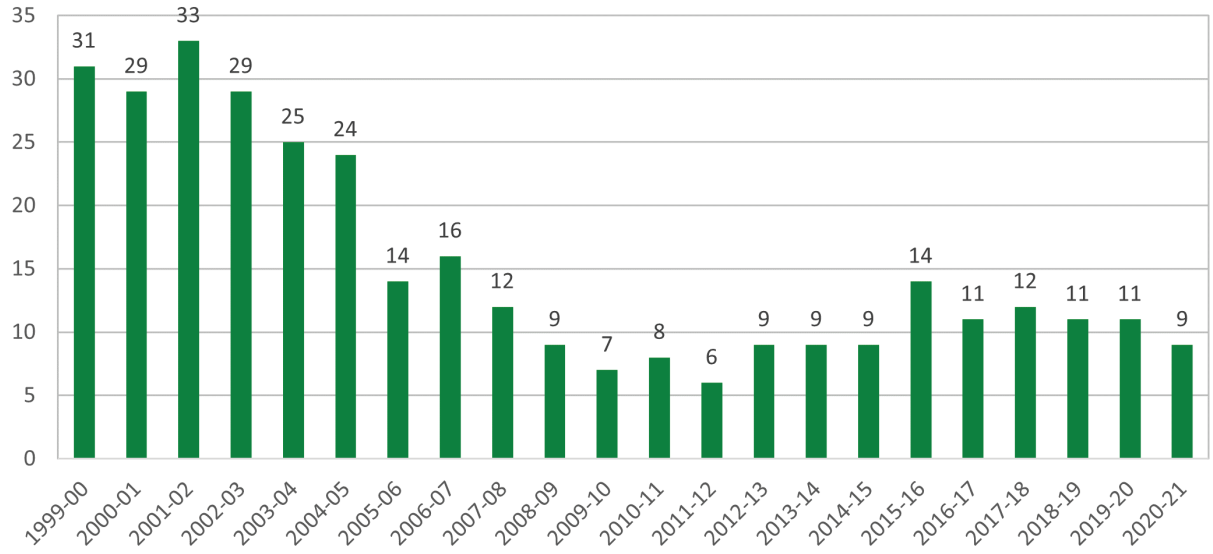
**Restated compliance values as the previously noted values were mis-calculated.*

Haloacetic Acids are another byproduct produced when drinking water is disinfected. Haloacetic Acids (5) (HAA(5)) are comprised of five compounds including: monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. Drinking water quality standards for Haloacetic Acids took effect July 1, 2020 in Saskatchewan. For the 2020-2021 fiscal year, 212 operations have submitted HAA(5) results. 17 of these operations have an average HAA(5) value greater than 80 ug/L. These operations are: Antler, Arborfield, Assiniboia, Candle Lake - Minowukaw Beach, Ceylon, Cole Bay, Copper Sands

(Trailer Court), Eastend, Fleming, Kuroki, Limerick, Mainprize Regional Park, Michel Village, North Weyburn, Osage, Oxbow, and Swift Current Rural Pipeline East.

As of March 31, 2021, there were nine permitted waterworks that did not meet minimum treatment requirements (Figure 6). Educational/compliance efforts and discussion on upgrading options and requirements continue; however, upgrading to meet minimum treatment requirements can be a costly venture. The Water Security Agency's educational and compliance activities will continue in efforts to reduce the number of waterworks not meeting minimum treatment requirements. The owner of the waterworks primarily controls the achievement of this measure; however, the regulator has significant influence through a number of mechanisms such as permit requirements for upgrading, issuance of notices of violation and related compliance actions. Periodically, as newly-regulated or existing regulated waterworks are evaluated, inadequacies in water treatment capability are discovered.

Figure 6: Number of waterworks regulated by Water Security Agency that do not meet minimum treatment requirements*



**Minimum treatment requirements include: an approved form of filtration and disinfection for waterworks reliant on surface water or shallow groundwater sources; and disinfection alone for waterworks reliant on deep, well protected groundwater sources. The measure counts non-compliance with minimum treatment requirements for permitted waterworks.*
Source: Water Security Agency Advisory Tracking Spreadsheet

The number of waterworks that do not meet minimum treatment requirements is a direct indication of potential water quality concerns because of infrastructure inadequacies. The Water Security Agency will place regulated waterworks not meeting minimum treatment on Precautionary Drinking Water Advisories to protect consumers. WSA also provides technical advice to communities not meeting minimum treatment requirements to assist waterworks owners to work toward system improvements. Cost of improvements is the main impediment to progress.

Waterworks systems and operations are financially sustainable

Ensuring the financial sustainability of waterworks is critical to produce safe drinking water long term. Waterworks deteriorate over time and may need to be expanded or replaced. Therefore, municipalities need to know the condition of their waterworks and put in place pricing and capital investment policies for these systems. Public transparency will aid in ensuring that waterworks systems are sustainable.

Waterworks rates that cover waterworks expenditures and debt payments are a direct indicator of waterworks financial sustainability. The public reporting regulations facilitate consumers' understanding of the need for, and possibly acceptance of, waterworks rates that cover costs.

Based on an analysis of waterworks financial overviews (unaudited) submitted by 456 municipalities, 46 per cent of the municipalities were operating their water utility at a sustainable level in 2019. This is an increase of two per cent from 2018. There were 50 municipalities that moved from sustainable to not-sustainable in 2019, while another 66 municipalities changed from not-sustainable to sustainable. From 2018 to 2019, 207 (45 per cent) of municipalities showed a decrease in their sustainability ratio.

Funding overview

In October 2018, Canada and Saskatchewan entered into an agreement under the Investing in Canada Infrastructure Program (ICIP). Under ICIP, Saskatchewan will receive approximately $896 million, as follows: Public Transit - $282.8 million, Green Infrastructure - $416 million, Community, Culture and Recreation - $56 million, Rural and Northern Communities - $116 million, and COVID-19 Resilience Infrastructure - $25.2 million. In 2020-21, 19 water and wastewater project were announced with combined federal/provincial funding of $20.807 million.

The New Building Canada Fund federal-provincial infrastructure funding program was introduced in 2014 and includes the Provincial Territorial Infrastructure Component (PTIC) that provides $10 billion in federal infrastructure funding. PTIC provides funding for projects of national, regional and local significance, with a focus on projects that support economic growth, a clean environment, stronger communities, growth in export and trade, and meeting the opportunities and challenges of growth. PTIC is divided into two sub-components: $9 billion for National Regional Projects (NRP); and $1 billion dedicated to projects located in communities of fewer than 100,000 residents through the Small Communities Fund (SCF). Federal PTIC funding is allocated to each of the provinces and territories over 10 years. Saskatchewan is allocated $436.7 million; 90 per cent ($393.0 million) for NRP and 10 per cent ($43.7 million) is dedicated to the SCF. By matching available federal funding, over $873.4 million in federal and provincial funding will be invested in priority infrastructure projects across the province. All projects funded under NRP and SCF are underway or complete.

Phase one of the Clean Water and Wastewater Fund (CWWF) federal-provincial infrastructure funding program was announced in spring 2016. Under CWWF, Canada will provide $11.9 billion in new funding across the country including $2.0 billion for phase one of CWWF, which will provide up to 50 per cent federal maximum funding for eligible infrastructure projects. Under phase one of CWWF, Saskatchewan will receive $89.3 million for water, wastewater, and storm water projects and Saskatchewan has committed to provide an additional $44.2 million and fund up to 25 per cent of eligible project costs. All projects funded by CWWF are underway or complete. The federal/provincial bilateral agreement was recently amended to extend the end of the program from March 31, 2021 to December 31, 2022. This amendment allows extensions on a project-by-project basis beyond the initial expected completion date of March 31, 2020.

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. In 2020-21, $9.016 million federal-provincial funding was provided under ICIP to 27 water and wastewater projects. In 2020-21, the federal-provincial SCF program provided $17.910 million to 31 water and wastewater projects. Under the NRP program the province provided $37.710 million to 25 water and wastewater projects and the federal government provided a similar amount in 2020-21. The federal-provincial CWWF program provided $455,033 to four projects in 2020-21.

For 2020, the Northern Municipal Trust Account (NMTA) provided $6.99 million under the Northern Water and Sewer program to upgrade 32 water and wastewater infrastructure projects in 20 northern communities, ensuring safe drinking water and enabling the communities to accommodate growth and development. Included in the $6.99 million is $4,923 for general emergency water and sewer services that applies to the Emergency Water and Sewer program.

For all water and wastewater infrastructure projects, the NMTA has a contractual arrangement with Saskatchewan Water Corporation (SaskWater) for provision of project management services. Services consist of general engineering, infrastructure assessment and planning, managing, design, budget control and payment administration, and the construction and commissioning of works. $207,568 of its contract expenditures were integrated into the $6.99 million of Northern Water and Sewer program costs.

SaskWater uses an asset management program to catalogue its assets and to proactively care for its assets to prolong their life. SaskWater has completed condition and criticality assessments to determine the state of assets and prioritize asset replacement as part of capital budgeting. Included in this program is a preventative maintenance program that is used to identify asset protocols for asset inputs and to assign work orders for proactive repairs and maintenance. In 2020-21, SaskWater saw $12.4 million dollars invested into asset renewals and replacements. SaskWater also invested $17.1 million of capital on new growth opportunities, where this capital was put toward developing new water and wastewater facilities in communities in need of safe and reliable water and wastewater services.

The drinking water regulatory system is clear and effective

Regulations are clear and ensure that health and drinking water quality will be protected

Providing safe drinking water requires clear regulations communicated to and understood by the waterworks owners and operators. Additionally, accepted standards and practices are required to ensure requirements are met. Program delivery and related policies are necessary to track and ensure regulatory requirements are being met. Collectively, these measures will help ensure that drinking water is safe and wastewater effluent discharges do not threaten the quality of source waters or adversely impact the environment.

Waterworks inspections, carried out by environmental project officers, are very important for ensuring compliance and proper management of drinking water. During a three-year cycle, at least one inspection will be unannounced. Water sources, such as wells or surface water intakes, are inspected every second year. The results of all waterworks and wastewater system inspections can be found online at http://www.saskh2o.ca/. Having inspection results online is intended to increase transparency and public trust in drinking water supplies and the associated processes. During 2020-21, a total of 904 waterworks inspections were conducted during the reporting period in accordance with the Water Security Agency's inspection protocol and targets.

During the fiscal year, Saskatchewan Health Authority public health inspectors conducted 682 inspections of public water supplies that fall under *The Health Hazard Regulations*. Inspections of public water supplies were approximately 30 per cent lower in the 2020-21 fiscal year due to the public health inspection program being reprioritized to accommodate COVID-19 pandemic response activities.

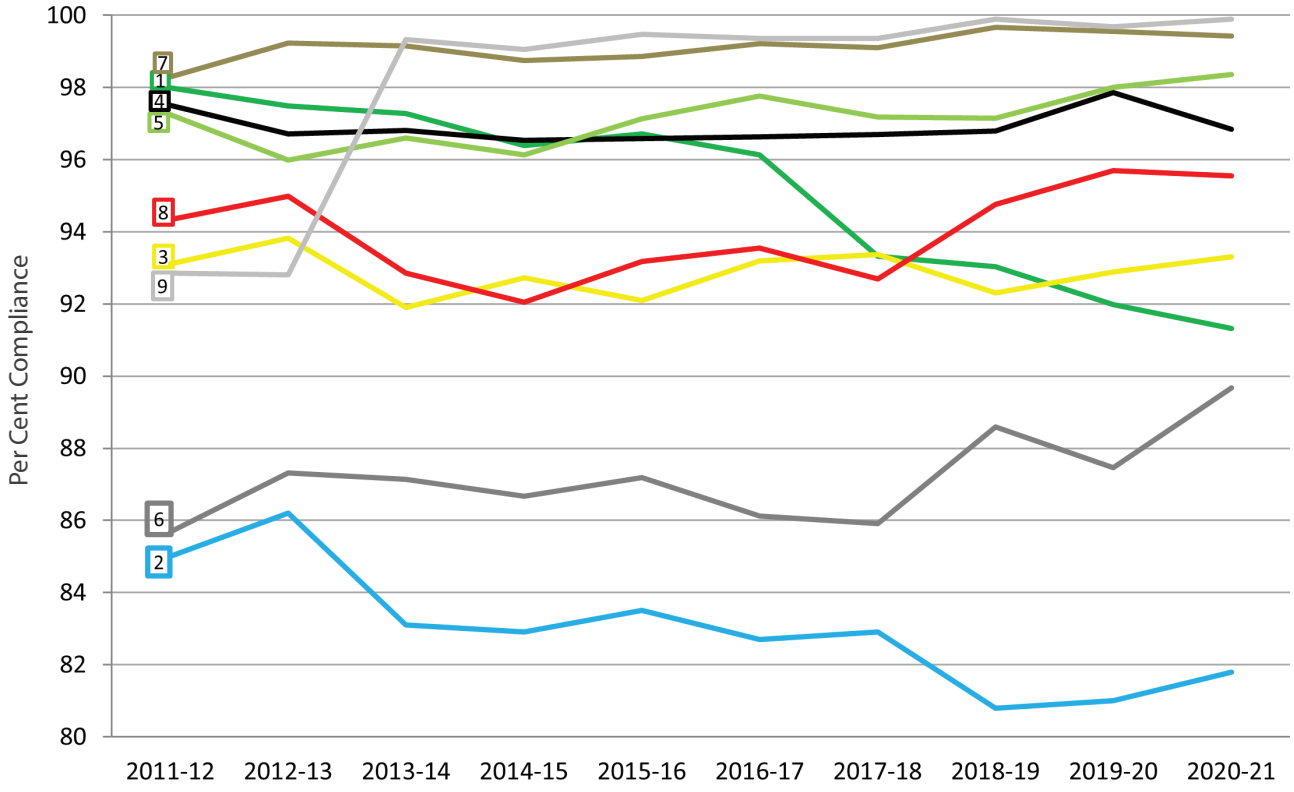
Table 6 summarizes the findings of key elements for the number of inspections conducted during 2020-21 and Figure 7 presents trends in inspection findings over the past ten years.

Table 6: Waterworks inspection finding summary (2020-21)

Inspection Element	Non-Compliant	N/A or No Response*	Compliant
Disinfection continuous at plant	76	29	799
Disinfection free chlorine > or = 0.1 mg/L leaving the plant	148	92	664
Monitoring daily chlorine	60	7	837
Reservoirs in good repair	25	111	768
Water treatment plant in clean and orderly condition	14	50	840
A total chlorine residual not <0.5 mg/l or a free chlorine residual not <0.1 mg/l in the distribution system	90	32	782
Bacteriological testing after completion, alteration, extension or repair	5	38	861
Reporting of chlorine upsets	37	72	795
Record keeping	1	0	903

N/A = Not applicable. Some waterworks inspected do not have a treatment plant such as pipeline systems. These may be recorded as N/A or No response.
Source: Water Security Agency – Environmental Management System

Figure 7: Waterworks Inspection summary finding trends 2011-12 to 2020-21*



Legend:

1 Disinfection continuous at plant 2 Disinfection free Cl > or = 0.1 mg/L leaving the plant 3 Monitoring daily chlorine 4 Reservoirs in good repair 5 Water treatment plant in clean and orderly condition	6 TCl residual not <0.5 mg/L or FCl residual not <0.1 mg/L 7 Bacteriological testing after completion, alteration, extension or repair 8 Reporting of chlorine upsets 9 Record keeping

** Graph has been altered from previous years to exclude N/A or no response data from waterworks inspection reports.*

The Adverse Drinking Water Quality Incident and Bacteriological Follow-up Standard, EPB 505 (see: http://www.saskh2o.ca/) provides guidance on issuing PDWAs by WSA when there is a concern that problems (due to microbial or chemical contamination) may exist. Agency staff members also use a protocol for upset reporting and follow-up to protect consumer health and drinking water quality. Waterworks owners and operators continue to be advised of upset reporting requirements during routine inspections. Emergency Boil Water Orders (EBWO) are issued by Saskatchewan Health Authority officials to deal with confirmed public health threats such as microbial contamination of drinking water. Tables 7 and 8 outline the number of PDWAs and EBWOs issued to waterworks during the 2020-21 fiscal year.

Table 7: EBWO/PDWA Year Summary for 2020-2021 – Water Security Agency Regulated Waterworks

Time	EBWO	PDWA
In effect prior to reporting period	1	51
Added during the reporting period	2	868
In effect at end of reporting period	1	74

Source: Water Security Agency

Table 8: EBWO/PDWA Summary for 2020-21 – Saskatchewan Health Authority Regulated Waterworks

Time	EBWO	PDWA
In effect prior to reporting period	47	78
Added during the reporting period	6	24
In effect at end of reporting period	45	84

Source: Saskatchewan Health Authority

Tables 9 and 10 provide information regarding the reasons for issuing PDWAs and EBWOs. Further information on the nature of a PDWA and EBWO issued by the Water Security Agency is available from the agency or http://www.saskh2o.ca/.

During 2020-21, a total of 758 unexpected water quality reasons affecting waterworks regulated by the Water Security Agency were reported and addressed, including system depressurizations, water main breaks, or other failures or upsets that resulted in Precautionary Drinking Water Advisories (PDWA) (Table 9). Unexpected upsets or events accounted for 87.1 per cent of all PDWAs issued in 2020-21 for water quality reasons, which was 1.0 per cent less than in 2019-20. Line breaks or pressure loss was the most frequent water quality related reason for issuance of a PDWA in 2020-21. From the operational category, planned system maintenance or treatment /distribution equipment failure or damage were the most frequent stated reasons for a PDWA. A total of 287 (33.1 per cent) of all PDWAs during 2020-21 were issued due to anticipated operational events such as planned maintenance activities or startup of seasonal or new waterworks.

Table 9: Reason for issuing PDWAs and EBWOs during 2020-21 – Water Security Agency regulated waterworks

Summary of Reasons for Precautionary Drinking Water Advisories (PDWA) and Emergency Boil Water Orders (EBWO) for Water Security Agency regulated waterworks between April 1, 2020 and March 31, 2021
Note: More than one reason can be identified per PDWA or EBWO

PDWAs by Reasons		
Water Quality Reasons	**Number**	**Percentage**
Line break or pressure loss in distribution system*	714	82.1
No applicable water quality reason	112	12.9
Suspected contamination*	4	0.5
Unacceptable turbidity or particle counts in treated water*	24	2.8
Significant deterioration of source water quality due to environmental conditions*	2	0.2
Exceeds Maximum Acceptable Concentration or drinking water standard*	8	0.9
E. coli detected in drinking water system*	1	0.1
Insufficient quantity*	2	0.2
Total coliforms detected in drinking water system*	1	0.1
Excess disinfection levels*	1	0.1
Intentional contamination of treated water supply suspected or confirmed*	1	0.1
Total	*870*	*100*
Operational Reasons		
Planned system maintenance**	250	28.8
Power outage resulting in system pressure loss or reduced storage of treated water	143	16.4
Treatment or distribution equipment failure or damage	198	22.8
Start-up of waterworks**	37	4.3
No applicable operational reason	197	22.6
Treatment unable to cope with significant deterioration of source water quality	8	0.9
Inadequate disinfection residual in distribution system	11	1.3
Contamination during construction, repair or operation	2	0.2
Does not meet minimum treatment/design requirements	7	0.8
Does not meet monitoring requirements	4	0.5
Damaged well components	1	0.1
No or inadequate disinfection at treatment plant	3	0.3
Undetermined source of contamination	6	0.7
Damaged or inadequately maintained cistern or holding tank	2	0.2
No certified or adequately trained operator as required	1	0.1
Total	*870*	*100*

** Unexpected water quality events.*
***Anticipated operational reason*
Source: Canadian Network for Public Health Intelligence based on Water Security Agency PDWA and EBWO Tracking Records

In 2020-21, the Ministry of Health contracted work with Seeley Engineering and Consulting Inc. to assist in conducting risk assessments of beaches and prioritizing beaches for water quality monitoring. This information helps inform the ministry's Healthy Beach program that samples and determines safe water quality at public swimming areas throughout the province.

Table 10: Reason for issuing EBWOs and PDWAs during 2020-21 – Saskatchewan Health Authority regulated waterworks

Summary of Reasons for Precautionary Drinking Water Advisories (PDWA) and Emergency Boil Water Orders (EBWO) Issued by the Saskatchewan Health Authority between April 1, 2020 and March 31, 2021
Note: More than one reason can be identified per PDWA or EBWO

Number of PDWAs by reasons		
Water Quality Reasons	Number	Percentage
Line break or pressure loss in distribution system	1	4.5
No applicable water quality reason	15	68.2
Total coliforms detected in drinking water system	3	13.6
Unacceptable turbidity or particle counts in treated water	3	13.6
Total	22	100
Operational Reasons		
Damaged or inadequately maintained cistern or holding tank	1	4.5
No applicable operational reason	2	9.1
Start-up of waterworks	15	68.2
Treatment/distribution equipment failure or damage	2	9.1
Undetermined source of contamination	2	9.1
Total	22	100
Number of EBWOs by reasons		
Water Quality Reasons		
E. coli detected in drinking water system	8	100
Total	8	100
Operational Reasons		
Inadequate disinfection residual in distribution system	1	12.5
Undetermined source of contamination	6	75.0
Not applicable	1	12.5
Total	8	100

Source: Saskatchewan Health Authority

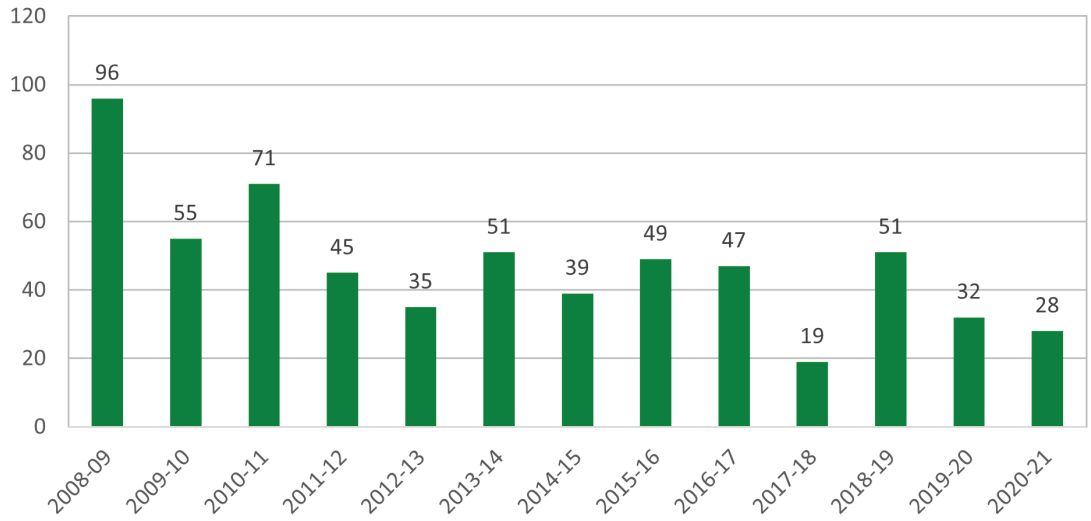
The Water Security Agency's Drinking Water and Wastewater Compliance and Enforcement Protocol, EPB 434 continues to provide direction and guidance for environmental project officers to ensure that uniform and efficient compliance and enforcement practices are followed in dealing with non-compliance for drinking water and wastewater violations. Protecting public health and safety and the environment is the overall purpose. The enforcement protocol requires that compliance be obtained initially through public education and prevention, while enforcement is a last resort. Compliance-related actions might also be applied when an issue is causing, or has the potential to cause, a significant risk to public health and safety, or the environment.

Twenty-four written warnings were issued for waterworks and sewage works infractions and one ministerial order was issued. Three charges were also laid. Most infractions await resolution.

Compliance Mechanisms

Compliance mechanisms consist of verbal warnings, written warnings, protection orders and prosecution actions. Verbal warnings are issued for minor offences encountered during inspection duties. Verbal warnings 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 identified through previous inspections or correspondence was not complied with. Waterworks and Sewage Works Protection Orders are issued to a person responsible for a system to protect human health or the environment. Figure 8 provides the numbers of enforcement and compliance actions taken in drinking water and wastewater in the past 13 years.

Figure 8 – Number of enforcement and compliance actions in drinking water and wastewater 2008-09 to 2020-21



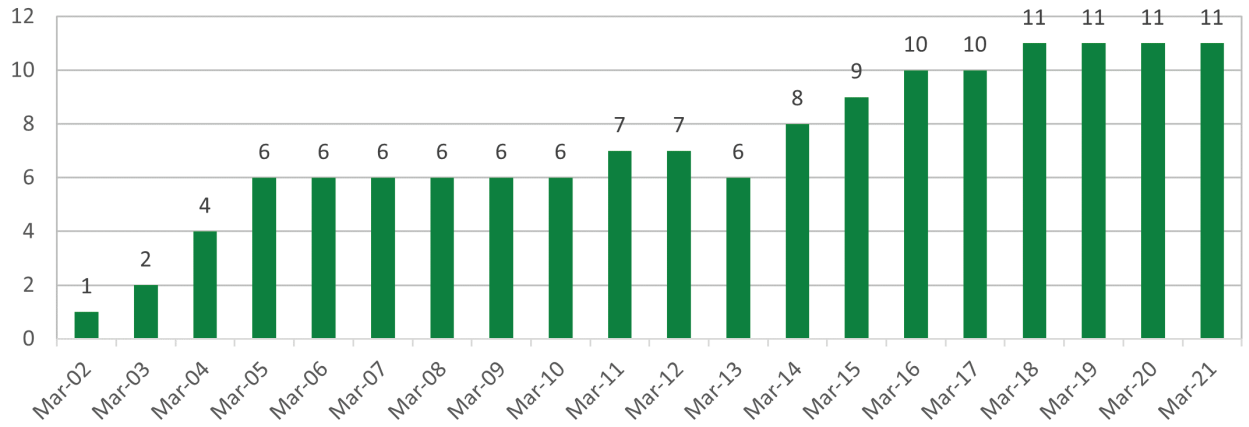
Source: Water Security Agency compliance tracking spreadsheet.

The Water Security Agency issued 169 new or renewed waterworks operational permits and amended 70 waterworks operational permits during 2020-21. A total of 214 wastewater works operational permits were issued, renewed or amended. Renewals and amendments to permits ensure the operational permits reflect the latest drinking water and wastewater standards and requirements that help to protect consumer health and the environment. A total of 119 permits to construct or upgrade waterworks (65) and sewage works (54) were issued over the reporting period. In addition, as of June 1, 2015, water and sewer main extensions within municipalities with a population of at least 5,000 are now covered under Saskatchewan Environmental Code Chapters instead of the permit to construct process. A total of 38 projects proceeded under the code notification process for water mains (22) and sewage mains (16). Of these 38 projects, 9 proceeded as an "Alternative Solution" and 29 proceeded as an "Acceptable Solution". Compared to the previous fiscal year, this is a 3 per cent increase in the number of permits to construct issued and a 39 per cent increase in projects proceeding under the Water Main and Sewage Main Code Chapters. Permit application materials are available online at http://www.saskh2o.ca/. The total estimated value of the construction work for all water and wastewater projects approved by the Water Security Agency or that proceeded under the code notification process is estimated at $322 million ($132 million for water and $190 million for sewer). Compared to last year, this is a 20 per cent increase in the total estimated value of constructed works.

For the 2020-21 time period of this report and during the COVID pandemic, the Roy Romanow Provincial Laboratory continued to analyze drinking water samples as an ongoing means to help ensure water quality. In 2020-21, a total of 33,862 drinking water samples were processed at the Roy Romanow Provincial Laboratory. A breakdown indicated that 80.9 per cent of the samples for water supplies were from Water Security Agency-regulated waterworks, 11.4 per cent were from private customers and 7.7 per cent of the water samples were from Saskatchewan Health Authority-regulated waterworks.

Laboratory accreditation was selected as a measure to help gauge results in ensuring safe drinking water for Saskatchewan residents. Laboratory accreditation shows that the facility has a recognized quality assurance and quality control system that assures representative analytical results. As of March 31, 2021, 11 laboratories in Saskatchewan that perform analysis of drinking water samples retained accreditation to Standards Council of Canada standards by Canadian Association for Laboratory Accreditation (Figure 9).

Figure 9: Number of accredited drinking water testing laboratories (March 31, noted year)



Source: Canadian Association for Laboratory Accreditation web http://www.cala.ca/.

Professional regulatory staff have access to the tools necessary to ensure compliance

Providing safe drinking water requires accessible training and tools for staff. The tools take the form of working agreements, computerized information systems, rugged notebooks for data collection in the field, as well as examples, guidelines and educational information needed to deliver programming.

Staff must keep current with new or evolving water management and information gathering processes. Collectively, these tools help staff ensure that drinking water is safe and that wastewater effluent discharges do not threaten the quality of source waters or adversely impact the environment.

The number and duration of visits to the SaskH2O.ca website is a good measure of the use of tools that help ensure the protection of drinking water. We currently use Google Analytics (https://www.google.com/analytics/) to monitor SaskH2O.ca traffic. Two "views" of data have been established to track site utilization: "All Web Site Data" and "External Traffic". The difference between the two is external traffic is traffic from outside the Water Security Agency's direct computer system domains.

Table 11: Summary of http://www.saskh2o.ca website visitation statistics

Number of Sessions	All Traffic	External Traffic	Per cent Internal Traffic
2017-18*	29,761	19,144	7.79
2018-19	22,853	21,109	7.63
2019-20	24,935	23,031	7.64
2020-21	23,825	22,665	4.87
Average Session Duration	**All Traffic**	**External Traffic**	
2017-18	0:02:52	0:02:53	Not Applicable
2018-19	0:02:38	0:02:37	Not Applicable
2019-20	0:02:30	0:02:30	Not Applicable
2020-21	0:02:32	0:02:33	Not Applicable

**For the 2017-18 fiscal year the number of sessions was extrapolated to a full year as the values reported in that fiscal year were for only 314 days. Source: Google Analytics*

Table 11 presents SaskH2O.ca website utilization in terms of the number of site visits, both internal and external users, as well as the average duration of each visit. Data from Google Analytics indicates that approximately 95 per cent of the SaskH2O.ca traffic is delivered to clients external to WSA. Review of analytical data on daily sessions, which is available on request, indicates that website usage is weekday-centric.

For the fiscal 2020-21, the increase in external traffic can partially be attributed to the number of employees working from home because of Covid-19 pandemic. Google Analytics uses IP addresses to track all traffic and external traffic numbers. With many WSA employees working from home, IP numbers tracked by Google Analytics will be the employee's home IP addresses and not addresses that arise from traffic generated from WSA offices on Community Net.

The Water Security Agency intends to collect and track data via Google Analytics in future years to determine longer-term trends.

During 2020-21, approximately 56,074 samples and 360,076 measurements were updated in the Water Security Agency's Environmental Management System (EMS). These samples/measurements include, but are not limited to, surface water, ground water, distributed water, and effluent.

High quality source waters are protected now and into the future

Risks to source water quality are known

Protecting source water quality is a vital part of providing safe drinking water. Identifying risks to source water quality is the first step in developing actions and strategies to protect it; thereby, minimizing the cost of treating drinking water. The following reports on a key measure and statistics related to ensuring that risks to surface water quality are known.

Inspection of wastewater systems is a way to help to protect drinking water supply. During the 2020-21 fiscal, 589 inspections at wastewater works (560 at lagoons and 29 at mechanical sewage works) were completed by Water Security Agency staff. The results of all wastewater system inspections can be found online at http://www.saskh2o.ca/. Information gained from comprehensive inspection results is useful in protecting source water and aquatic habitat. It will also be used to move towards compliance with the Canada-Wide Strategy for the Compliance of Municipal Wastewater Effluent and advancing wastewater management in the province. Additionally, a total of 214 wastewater works operational permits were issued, renewed or amended in 2020-21. Table 12 summarizes the findings of key elements for facultative lagoon wastewater system inspections conducted during 2020-21and Table 13 summarizes the findings of mechanical wastewater system inspections.

Table 12 : Facultative lagoon wastewater works inspection finding summary (2020-21)

Inspection Element	Non-Compliant	N/A* or No Response	Compliant
Two basins in series	22	33	505
Immediate reporting of upset/bypass condition	8	47	505
Maintenance work and failure of treatment components	20	30	510
Dates of discharge of sewage and volumes of discharge	33	217	310
Locations from which samples are taken	8	178	374
Results of any tests	5	174	381
Approved system	2	1	557
Certified operator	35	52	473
Maintained in appropriate manner	12	17	531
Sampling done as required	39	159	362

** N/A = Not applicable. Some facultative lagoon wastewater works inspected do not discharge effluent and some works serve less than 50 people and therefore compliance measures for those systems do not apply. These may be recorded as "N/A" or "No Response" in the inspection forms.*
Source: Water Security Agency - Environmental Management System

Table 13: Mechanical wastewater works inspection finding summary (2020-21)

Inspection Element	Non- Compliant	N/A* or No Response	Compliant
No interconnection between sanitary sewer and storm sewer	3	7	19
Pumping stations must have mechanically forced air ventilation	3	2	24
Effluent quality demonstrated to meet permit requirements	9	8**	12
Immediate reporting of upset/bypass condition	2	5	22
Disinfection performed as per permit	2	14	13
Immediate reporting of failure of disinfection equipment	1	16	12
Locations from which samples are taken	0	5	24
Results of any tests	2	5	22
Approved system	0	0	29
Certified operator	1	0	28
Reporting of exceedance	3	8	18
On-site testing completed as required	2	6	21
Sampling done as required	5	6	18

*** Five of these systems are collection systems only. One system's results were not completed correctly.*
Results of three mechanical wastewater works inspections (aerated lagoons) are not included in Table 13 as they were recorded as facultative lagoon inspections in Table 12 (Biggar, Kindersley, and Maple Creek).
Source: Water Security Agency - Environmental Protection System

Improper disposal of raw sewage and/or septage originating from sewage holding tanks and septic tanks, particularly those tanks in resort and acreage style developments, may represent a risk to source water supplies. Practices such as the disposal of this waste to waterbodies, watercourses, ditches or permeable ground may result in a direct or indirect risk to surface and/or groundwater. Furthermore, disposal in proximity to built-up areas, on sensitive land, near wells, etc., could present problems with respect to land

use or persons residing nearby. Disposal of raw sewage or septage to an approved facultative lagoon or mechanical sewage works is preferred and is the best method because it eliminates the risk or potential risk associated with land spreading of waste. As of June 1, 2015, the Water Security Agency assumed responsibility regulating those operations engaged in the business of liquid domestic waste (sewage) hauling and disposal in Saskatchewan. Between October 2012 and May 2015, WSA and the Ministry of Environment shared responsibility for regulation of those operations. Since the agency has been involved in regulating liquid domestic waste hauling and disposal, a number of revisions to the regulatory program have been made including: amending legislation in order to impose fees for permits, revision and renewal of all waste hauler permits, provision of 24 hauler education and training sessions, developing waste management plan templates, assisting haulers seeking a plan as a means to dispose of waste during winter months, as well as increased compliance, enforcement and vigilance. As of December 31, 2020, there were 244 permitted liquid domestic waste haulers in Saskatchewan. Table 14 provides a summary of liquid domestic waste disposal method statistics for 2017 to 2020 calendar years.

Table 14: Summary of Liquid Domestic Waste Disposal Statistics for 2017 to 2020 Calendar Years

Liquid Domestic Waste Disposal Method	Dec 31, 2017	Dec 31, 2018	Dec 31,2019	Dec 31, 2020	Change
Disposal to approved sewage works only	210 (79.5%)	230 (83.6%)	217 (85.1%)	212 (86.9%)	↓5 (↑1.8%)
Disposal by land spreading only	12 (4.6%)	8 (2.9%)	8 (3.0%)	5 (2.0%)	↓3 (↓1.0%)
Disposal by land spreading subject to an approved waste management plan[1]	23 (8.7%)	24 (8.7%)	17(6.6%)	12 (4.9%)	↓5 (↓1.7%)
Disposal to approved sewage works and land spreading.	19 (7.2%)	14 (4.8%)	14(5.3%)	15 (6.1%)	↑1(↑0.8%)
Total Permitted Haulers	264	275	255	244	↓11

[1] The disposal method for some of the septic hauler in this category is by land spreading with an approved waste management plan as well as to approved sewage works

Source: Water Security Agency.

Improperly designed or non-compliant landfills can pose a high level of risk to surface or groundwater. The Ministry of Environment's compliance plan identifies landfills as one of the high-risk activities regulated by the ministry. Industrial operations and mines along with hazardous materials storage also have the potential to impact surface and groundwater through unplanned discharges or spills at operational sites. Ministry Environmental Protection Branch personnel carry out annual inspections at extreme and high-risk facilities to reduce the risk of environmental impacts from these types of operations. Additional inspections and compliance activities are carried out at other industrial sites as required to ensure environmental risks are minimized.

Discharges of hazardous materials to the environment threatens surface and groundwater sources (e.g., Husky Energy oil spill, 2016). The ministry maintains a team of individuals that are specially trained and equipped to respond to environmental emergencies. The provincial hazmat coordinators provide direction in the response and recovery phases for all discharges/spill incidents that are reported to the ministry.

The Ministry of Environment's Compliance Audit Program conducted nine environmental compliance audits related to water management. The audits covered landfills, industrial sites, sewage works, liquid domestic waste haulers and aquatic habitat protection. These audits generated 75 findings of regulatory non-compliance requiring corrective actions.

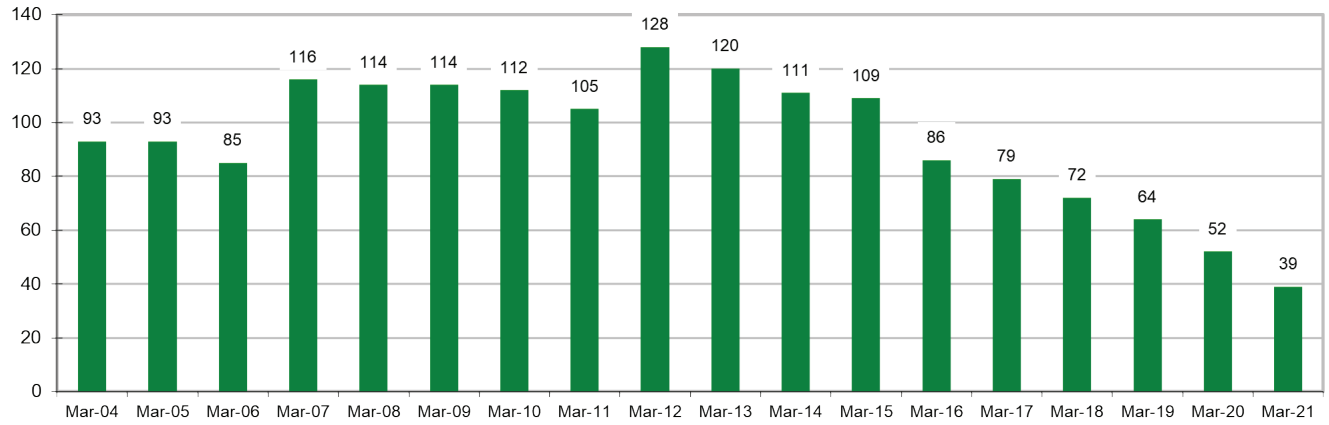
Improper application of pesticides may also represent a threat to source waters. Proper application of pesticides is an important means to protect drinking water and source water supplies. Under *The Pest Control Products (Saskatchewan) Act*, 2,003 pesticide applicator licences, 602 service (businesses) licences and 387 pesticide vendor licences have been issued for the 2020-21 fiscal year. Each vendor maintains an approved storage facility registered and approved by the industry and the Ministry of Environment. An applicant for a pesticide applicator licence must pass a recognized pesticide applicator course. The applicator training is valid for a five-year period; however, the applicator licence is renewed annually. An applicator licence can also be valid for five years if this term is requested at the successful completion of training. Licensing of these operations is an important means in protecting water quality.

Permitting the application of pesticides for use in or near water is an important means to protect source waters. Forty-six permits were issued in 2020-21 for chemical control of aquatic nuisances in and/or near surface water in accordance with regulatory requirements. These permits aid in protecting surface water from contamination with pesticides. During the same period, WSA worked with the Ministry of Agriculture (Agriculture) and the Pest Management Regulatory Agency (PMRA) of Health Canada in issuing support letters for emergency use registration of pesticides in the province. WSA issued support letters to address the requests from Agriculture for emergency registration for the use of 1) Emergency Use Registration of Hoggone (sodium nitrite) for the management of feral pigs, 2) Emergency Use Registrations of Capture 240 (bifenthirn) for treatment of potatoes to control wireworm, 3) Emergency Use request for Clean Up II for the control of Lice on beef and dairy cattle (including lactating), and 4) Emergency Use Registration of Biox-M as a sprout inhibitor for organic potatoes.

The number of sewage effluent discharges that represent a risk to source waters is a measure and direct indication of the potential for source water contamination due to poor wastewater treatment. This measure incorporates the need for compliance with the Canada-Wide Strategy for the Compliance of Municipal Wastewater Effluent standards and federal *Wastewater System Effluent Regulations* requirements. This is the most direct measure of the number of potential significant contamination point sources. Work to resolve problematic wastewater systems will continue in the foreseeable future.

As of March 31, 2021, 39 wastewater systems have been identified as having a discharge that may reach a surface water body and represent a risk to source waters or the surrounding environment under certain conditions (Figure 10). This represents a reduction of 13 sewage works that represent a risk to source waters since March 2020. Water Security Agency staff review the quality of effluent from each regulated sewage works annually. Growth in Saskatchewan communities, as well as installation of membrane-based drinking water treatment systems that generate a significant amount of reject water, places additional pressure on sewage infrastructure as some communities were near, at, or beyond treatment and/or storage capacity. Addressing sewage works capacity or other treatment capability issues typically involves significant planning, investment and construction. Availability of project funding is cited by many communities as a major impediment to moving forward with improvements. Therefore, it can be expected that reductions in the number of works that represent a risk to source waters is expected to take time.

Figure 10: Number of sewage effluent discharges that represent a risk to source waters (as of March 31, for noted year)



Source: Water Security Agency – File Information and Environmental Management System

The Water Security Agency has evaluated all wastewater systems in the province to determine if they are subject to various applicable national-based or federal regulatory-based effluent quality requirements. As of March 31, 2021, approximately 96 systems may require compliance with Canada-Wide Strategy for the Compliance of Municipal Wastewater Effluent (MWWE). As of March 31, 2021, 72 communities are subject to regulation in accordance with the federal *Wastewater System Effluent Regulations (WSER)* passed into law in July 2012 pursuant to the federal *Fisheries Act*. The final number of wastewater systems that must be managed to the WSER standard will be finalized once ongoing work on the administrative agreement between WSA and ECCC is completed. That agreement was signed and came into effect in July 2015. This administrative agreement was renewed in 2020-21 and will remain in effect for 5 additional years.

Watersheds are protected, natural purification and protection processes are maximized, and potential for contamination is minimized

Protection of source waters can reduce the cost of water treatment and improve water quality while helping to sustain the resource for other uses. Sound water resource management means the processes responsible for breaking down wastes must be protected, as must the land use practices responsible for protecting water from contamination. Actions in terms of both organizational structure and watershed/water management are improving source water protection in the province.

Established water quality guidelines and effluent quality standards, and implementation of such standards, are an important means to manage and protect watershed and source water quality. The Water Security Agency represents the province on national committees that establish guidelines, objectives and standards for water quality. Two examples are the Canadian Council of Ministers of the Environment, Water Management Committee and the Guidelines Project Team that oversees the development of science-based water quality, sediment, and tissue residue guidelines (Canadian Environmental Quality Guideline-CEQG) for the protection of aquatic life and other beneficial water uses in the province.

Monitoring effluent quality is needed to understand the potential impacts on receiving streams and advance protection of watersheds and source water quality. Monitoring, mass balance studies and modelling activities are required as part of Downstream

Use and Impact Studies (DUIS) and to support the development of site-specific Effluent Discharge Objectives (EDOs) for wastewater treatment plants in the province that are affected by the Municipal Wastewater Effluent (MWWE) Strategy, the federal *Wastewater System Effluent Regulations (WSER)* and that discharge into fish-bearing waters. Site-specific requirements are being included in sewage works operational permits upon renewal to achieve requirements of the MWWE strategy and *The Waterworks and Sewage Works Regulations* that came into effect on June 1, 2015. During 2020-21, the Environmental and Municipal Management Services (EMMS) division of WSA received seventeen DUIS reports from communities that discharge treated effluent into fish-bearing waters and continue to review these reports to approve the recommended site-specific EDOs. The EMMS division continues to work with other provinces/territories and the CCME Secretariat to provide a 10-year progress report of the MWWE strategy to the CCME ministers and the public.

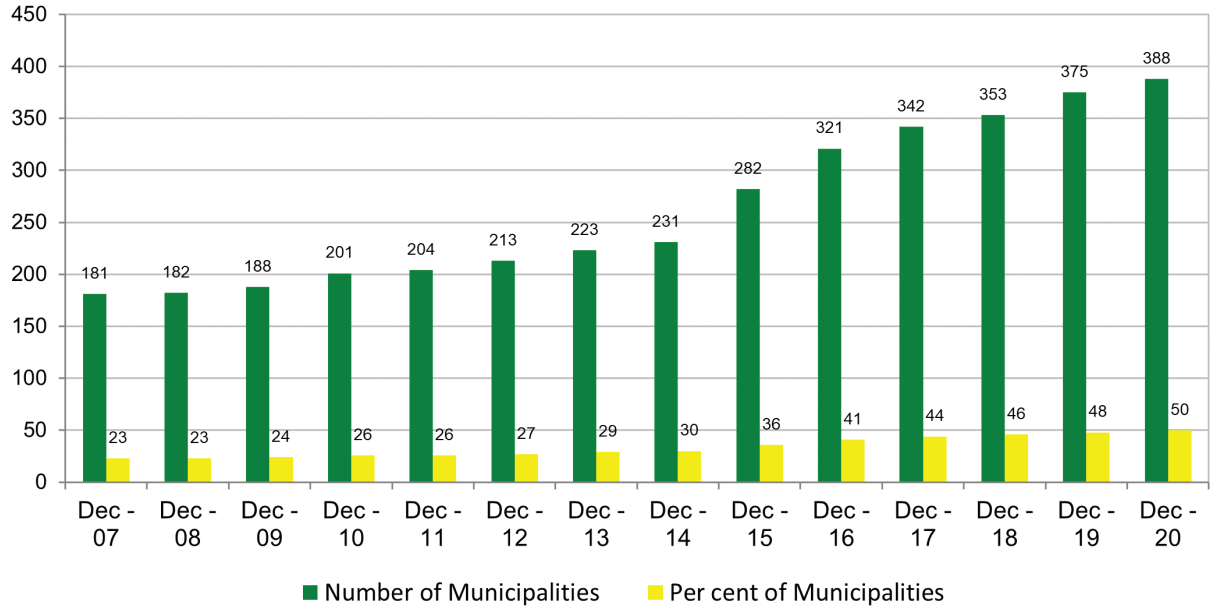
The Statements of Provincial Interest Regulations (SPI) were adopted on March 29, 2012. The SPI contains an interest specifically for source water protection of resources used for human hygienic use and further addresses the importance of water under interests relating to public works, sand and gravel, biodiversity and natural ecosystems, shorelands and water bodies, and public safety.

The SPI require the water interests of the province be reflected in local and regional planning documents such as official community plans and zoning bylaws. The SPI are implemented through the local development permit approval process and the subdivision review process. The Ministry of Government Relations, Community Planning Branch, has developed training to assist municipal administrators, municipal councillors, and professional planners when preparing official community plans. As well, Community Planning reviews municipal planning bylaws and subdivision applications for compliance with the SPI.

The Ministry of Agriculture requires that intensive livestock operations develop waste storage and management plans that will mitigate impacts to water resources. The review and approval of these plans and the inspection of these works aid in protecting watersheds and source water. In 2020-21, 24 plan approvals were issued for intensive operations. Some approvals were for expansions and/or modifications to existing operations. Approximately 130 site inspections or audits were completed.

The Ministry of Agriculture is responsible for the delivery of the Environmental Sustainability and Climate Change component of the Canadian Agricultural Partnership. It includes Environmental Farm Plans (EFPs), the Farm Stewardship Program (FSP), Agri-Environmental Technical Services, Irrigation Program, and the Farm and Ranch Water Infrastructure Program (FRWIP). An EFP is a voluntary, self-assessment tool that can help producers become aware of, and improve, the environmental conditions of their operations. The FSP provides financial assistance for producers to implement Beneficial Management Practices (BMPs) that enhance sustainability and resilience in the sector. Agri-Environmental Technical Services are delivered on a watershed basis and provide extension and producer targeted Agri-environmental programming. FRWIP supports the development of secure and sustainable water sources for agricultural use, mitigates drought impacts, improves public safety and reduces potential groundwater contamination through well decommissioning. The number of new, endorsed EFPs in 2020-21 was 14, with 12,276 plans produced since 2005. In the 2020-21 fiscal year, over $2.85 million was spent on 504 BMP applications under the FSP, $916,000 was spent on the delivery of Agri-Environmental Technical Services and over $6.9 million was spent on 1,447 FRWIP projects.

Figure 11: Number and percentage of municipalities with bylaws in place to protect their drinking water supplies



Source: Ministry of Government Relations

The number of municipalities with bylaws in place to protect drinking water supplies is a direct indication of the level of municipal protection of water sources. The portion of urban and rural municipalities with some form of water management policy contained in their community planning bylaws increased to 50 per cent (Figure 11). In addition, approximately 87 per cent of the population living in municipalities reside in a municipality with source water protection provisions. As a result of ongoing collaboration and education, municipalities are becoming increasingly aware of their responsibilities for source water protection.

River water quality is an important aspect of habitat for all aquatic life in Saskatchewan. The Water Quality Index (WQI; Table 15) is a tool applied by the Water Security Agency to summarize and communicate the surface water quality based on its physical and chemical properties. Ten major rivers are monitored by WSA using 24 stations and water quality variables are compared to surface water quality objectives for the protection of aquatic life, livestock watering and recreation.

The WQI is a composite measure that incorporates three elements:

- ⇨ scope – the number of variables that do not meet the water quality objectives;
- ⇨ frequency – the number of times that variables do not meet the objectives; and
- ⇨ amplitude – the amount by which the objectives are not being met.

From these elements, the WQI produces a rating using a score between zero and 100. While the government regulates point source pollution, many human and natural processes can affect constituents within the water including nutrients, dissolved oxygen, trace metals and salts.

The following descriptive ratings are used to further explain the WQI results:

- ⇨ Excellent: (value 95-100) - water quality is protected with a virtual absence of threat or impairment; conditions very close to desirable levels. These index values can only be obtained if all measurements are within objectives virtually all of the time.
- ⇨ Good: (value 80-94) - water quality is protected with only a minor degree of threat or impairment; conditions rarely depart from desirable levels.
- ⇨ Fair: (value 60-79) - water quality is usually protected, but occasionally threatened or impaired; conditions sometimes depart from desirable levels.
- ⇨ Marginal: (value 45-59) - water quality is frequently threatened or impaired; conditions often depart from desirable levels.
- ⇨ Poor: (value 0-44) - water quality is almost always threatened or impaired; conditions usually depart from desirable levels.

The WQI ratings provide an annual measure of the quality of water in Saskatchewan's rivers which allows for comparison over time. However, annual changes in the WQI may be highly variable due to the limited number of samples collected (4 per year) and changes in water levels and flow from year-to-year. To provide a more meaningful picture of long-term change, the WQI for rivers has been presented as a three-year running average. The latest WQI ratings show no deviations of concern when compared to previous years with only slight changes taking place from one reporting period to another.

Table 15: Water quality index ratings for rivers (three-year average water quality index values and ratings for rivers)

Location	2015-17	2015-17 Rating	2016-18	2016-18 Rating	2017-19	2017-19 Rating	2018-20	2018-20 Rating
Assiniboine River (Highway 5)	80	Good	67.3	Fair	80.4	Good	80.4	Good
Battle River (Battle Rapids)	87.8	Good	78.9	Fair	78.4	Fair	66.6	Fair
Beaver River (Beauval)	72.4	Fair	81.2	Good	85.4	Good	85.3	Good
Beaver River (Dorintosh)	81.5	Good	74.6	Fair	78.5	Fair	78.3	Fair
Churchill River (Otter Rapids)	100	Excellent	100	Excellent	100	Excellent	95.5	Excellent
Clearwater River (Highway 955)	100	Excellent	100	Excellent	95.5	Excellent	91.1	Good
North Saskatchewan River (Upstream Highway 16 Bridge)	93.5	Good	90.8	Good	90.6	Good	89.4	Good
North Saskatchewan River (Borden Bridge)	95.4	Excellent	95.1	Excellent	95	Excellent	94.2	Good
North Saskatchewan River (Prince Albert)	90.9	Good	90.4	Good	90.5	Good	85.8	Good
North Saskatchewan River (Cecil Ferry North Bank)	90.5	Good	85.5	Good	90	Good	93.4	Good
North Saskatchewan River (Cecil Ferry South Bank)	95.1	Excellent	89.3	Good	94.1	Good	89.3	Good
Qu'Appelle River (below Qu'Appelle Dam)	95.3	Excellent	90.5	Good	90.7	Good	90.2	Good
Qu'Appelle River (at Highway 2)	79.2	Fair	85.5	Good	90.2	Good	90.5	Good
Qu'Appelle River (above Wascana Creek)	77.3	Fair	76	Fair	78	Fair	79.3	Fair
Qu'Appelle River (Highway 11 at Lumsden at rock dyke)	63.1	Marginal	57.8	Marginal	68.5	Fair	72	Fair
Qu'Appelle River (Highway 56)	79.2	Fair	73.5	Fair	73.6	Fair	73.1	Fair
South Saskatchewan River (Leader)	89.3	Good	83.7	Good	89.1	Good	80.6	Good
South Saskatchewan River (near Outlook)	100	Excellent	100	Excellent	100	Excellent	100	Excellent
South Saskatchewan River (near Queen Elizabeth power station)	100	Excellent	95.3	Excellent	95.2	Excellent	95.2	Excellent
South Saskatchewan River (west Clarkboro)	95.5	Excellent	89.4	Good	90.8	Good	90.9	Good
South Saskatchewan River (near Muskoday)	91	Good	86.4	Good	95.5	Excellent	95.5	Excellent
Saskatchewan River (Highway 6)	91	Good	89.1	Good	89.2	Good	89.2	Good
Souris River (Highway 39)	77.8	Fair	64	Marginal	75.7	Fair	73.9	Fair
Tobin Lake (at E.B. Campbell Dam)	86.3	Good	86.2	Good	90.1	Good	86.1	Good

Source: Water Security Agency surface water quality monitoring results

Citizens and consumers trust and value their drinking water and the operations that produce it

Consumers value quality water and are willing to pay for it

Consumer willingness to pay for drinking water is an important measure of the value placed on safe drinking water. Awareness campaigns and consumer polling are tools used to improve and understand how consumers value water.

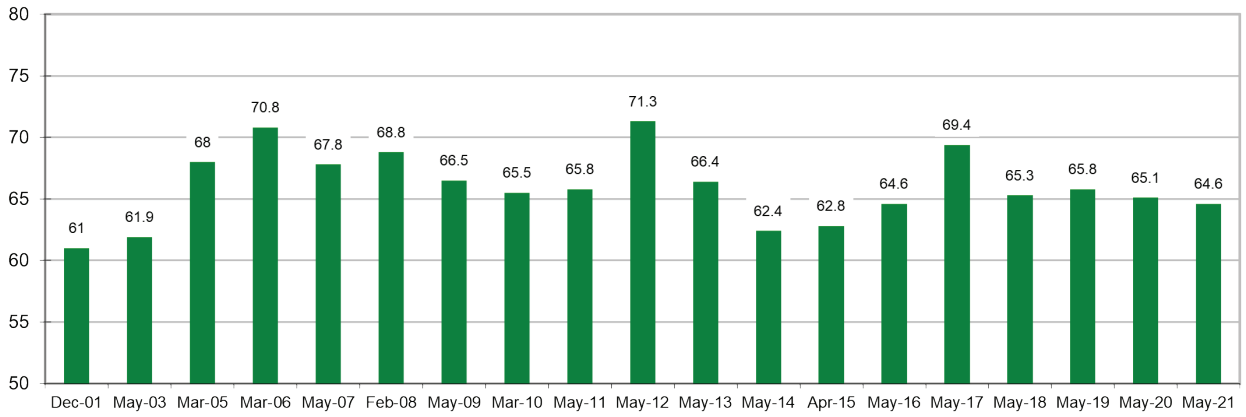
SaskWater launched its brand project in 2020-21. The brand project will help SaskWater promote the value of water to customers and will reiterate the value that SaskWater can provide as a water and wastewater service provider.

Every two years, SaskWater polls customers on key customer satisfaction measures including water quality, the importance of water services and perceptions about cost. In 2019, SaskWater conducted its customer satisfaction survey and found that the overall satisfaction with SaskWater is strong, with an average satisfaction score of 8.66 out of 10. Respondents stated that SaskWater is successful in the areas of service reliability, water safety and customer service. The overall average satisfaction rating increased from a score of 8.54 in 2016. SaskWater's next scheduled customer survey will be conducted in 2021.

Based on a poll conducted by the Water Security Agency in May 2021, 64.6 per cent of people polled are willing to pay more to improve their drinking water (strongly agree or agree) (Figure 12). This value is 0.5 per cent less than the previous poll in May 2020 and is 3.6 per cent greater than the December 2001 poll results. This decrease is not considered a significant change since May 2020. May 2021 polling results generally continue to show ongoing public recognition of the value of water and some willingness to pay for it. The May 2021 polling results indicate that the majority of those who somewhat or strongly disagreed with willingness to pay more for their drinking water believed that there was no concern with their community drinking water (57.0 per cent), their

community drinking water was reported as safe (39.0 per cent), and it being a stress on their financial situation (40.2 per cent). Others cited that improvements have been or are being made to their community drinking water system (20.9 per cent) and they use bottled water (15.3 per cent). Relatively few respondents to the May 2021 poll noted they are served by a private well (8.4 per cent) or have a water purification system installed in their residence (12.0 per cent). Table 16 provides a summary of the regional differences.

Figure 12: Per cent of survey respondents indicating that they are willing to pay more for their drinking water



Source: Water Security Agency Polling Results – May 2021

Table 16: Summary of regional polling results on survey respondents indicating that they are willing to pay more for their drinking water

% Somewhat Agree or Strongly Agreeing	May 2020				May 2021			
	North	Regina	Saskatoon	South	North	Regina	Saskatoon	South
I am willing to pay more to improve the safety or the qualityof my drinking water.	62.8%	72.4%	62.4%	64.2%	70.3%	62.4%	63.8%	63.6%

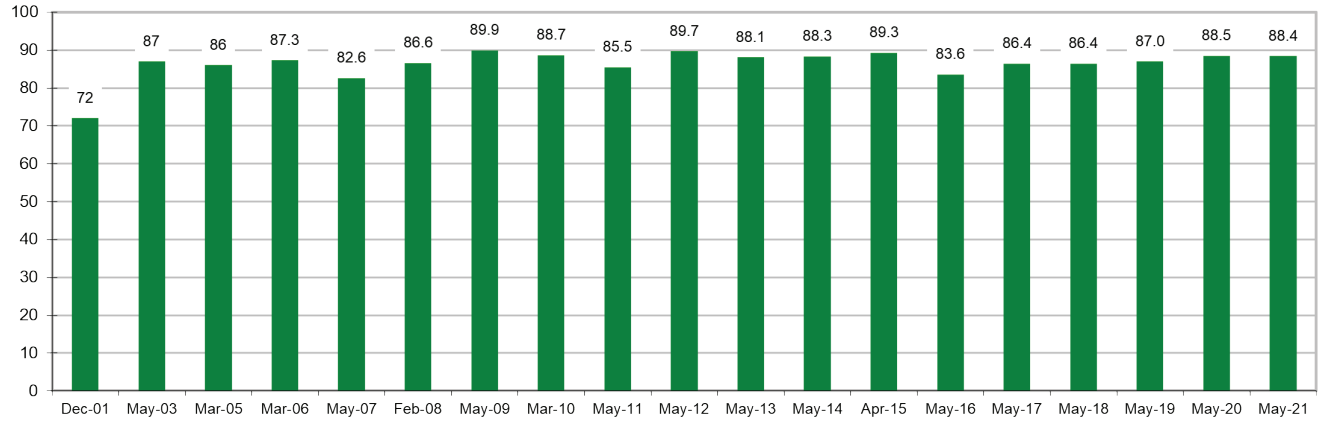
Source: Water Security Agency Polling Results – May 2021

Citizens and consumers trust the quality and reliability of their drinking water systems and are confident in the regulatory system

Consumers' trust in drinking water and in the regulatory systems that govern water-related activities is vital to ensuring the long-term sustainability of waterworks. Consumers who trust the quality and reliability of their water supplies are more willing to support the production of safe drinking water in the future. Releasing polling results bolsters transparency and public trust.

Each year, the Water Security Agency conducts polling to determine public opinion associated with drinking water safety. Since public polling was initiated in the wake of the North Battleford water crisis in 2001, it has remained an important mechanism in determining the level of success in attaining government's safe drinking water goals.

Figure 13: Per cent of survey respondents indicating that they are very or somewhat confident in the quality of their tap water (month of year noted)



Source: Water Security Agency Polling Results – May 2021

Based on a poll conducted by WSA in May 2021, 88.4 per cent of people polled strongly agreed or agreed they are confident in the safety of their own drinking water (Figure 13). These polling results continue to show a high level of confidence and are only 0.1 per cent lower than the May 2020 polling results. The results are 16.4 per cent greater than December 2001, when 72 per cent of people surveyed were very or somewhat confident in the quality of their tap water. Ongoing actions such as waterworks inspections, implementation of water quality standards, water-related workshops, consumer education efforts, media coverage of water contamination events affecting larger centres, and consumer notification help maintain confidence in the safety of drinking water at a relatively high level, in the mid-to-high 80 per cent range since 2003. Ongoing attention to these elements of drinking water protection will help to maintain the high level of public confidence in safety of drinking water in the future. The measure is important since it provides an indication of how efforts to ensure safe drinking water are progressing.

Table 17: Summary of regional polling results on survey respondents indicating that they are very or somewhat confident in the quality of their tap water

% Somewhat Agree or Strongly Agreeing	May 2020				May 2021			
	North	Regina	Saskatoon	South	North	Regina	Saskatoon	South
Saskatchewan residents have safe drinking water.	84.6%	80.1%	87.1%	83.9%	80.4%	77.0%	88.6%	81.3%
I am confident that my drinking water is safe.	89.1%	86.5%	91.6%	87.3%	85.1%	83.0%	97.3%	87.5%

Source: Water Security Agency Polling Results – May 2021

Table 17 provides a summary of the regional differences. Confidence in the safety of individual resident drinking water was relatively high across the province with polling results ranging from 83.0 per cent in Regina to 97.3 per cent in Saskatoon.

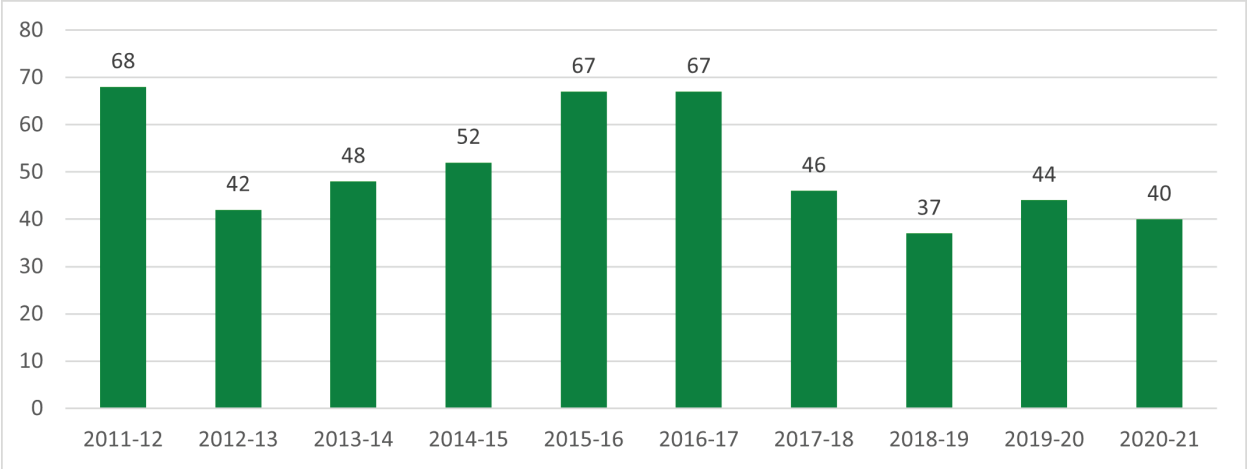
SaskWater tracks water quality (in accordance with provincial regulations) on all its systems to ensure the water supplied is safe for human consumption. To ensure its services are also reliable SaskWater tracks the reliability of the waterworks system through a Service Reliability Index, which is verified quarterly. This index incorporates four equally weighted factors: unplanned service interruption, length of interruption, planned service interruption and water loss. These factors provide a good indication of the reliability of services delivered to customers. SaskWater achieved its corporate target, and corresponding results can be found in SaskWater's 2020-21 annual report.

Citizens have meaningful access to information about their water quality

Information on water quality is important in building public trust in water systems. It must be understandable, current and readily accessible. To build full trust, information needs to be available both from the waterworks owner and the regulator.

System owners that publicly release water quality results is a good way to determine if consumers have direct, meaningful access to information about the quality of their water. In 2020-21, there were only 40 waterworks that failed to publicly released water quality results to the consumers they serve as required (Figure 14). Notification to consumers is required on an annual basis for waterworks regulated by the Water Security Agency. Additional waterworks specific information on drinking water quality is also available at: http://www.saskh2o.ca/.

Figure 14: Number of system owners that failed to publicly release water quality results from 2011-12 to 2020-21



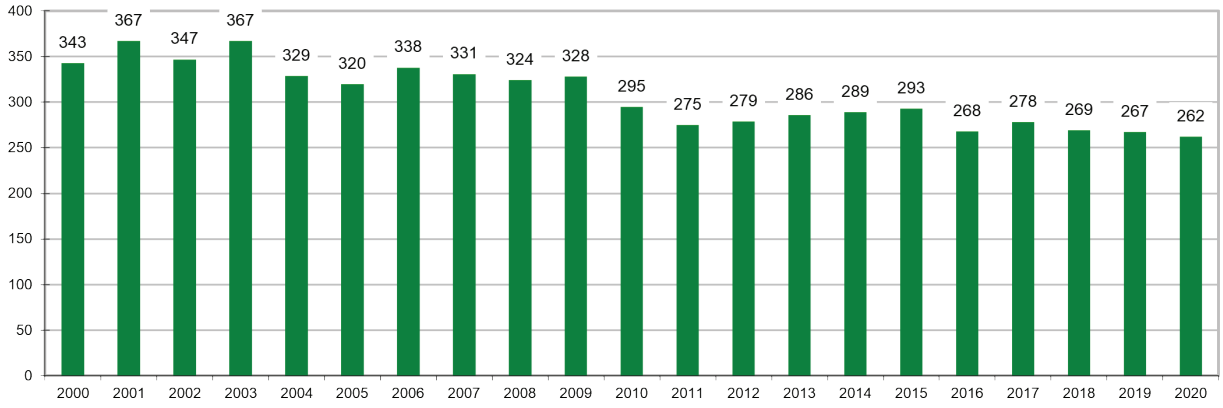
Source: Water Security Agency - Environmental Management System

Reduced consumption of water

Reduced consumption of water is important in minimizing costs and, thereby, properly valuing water. Water conservation is also necessary to protect water source quality and abundance, particularly in time of increased demand.

Measuring municipal per capita water consumption provides for total annual urban water use (in-home, business and municipal irrigation) within communities (Figure 15). Annual consumption is affected by summer irrigation demands, which vary between wet and dry years causing the performance measure to vary between years. The Water Security Agency does not have direct control over this measure but, through water conservation programs, does influence the measure.

Figure 15: Average per capita consumption [litres per capita per day]



Note: Commencing with the 2009 year, water consumption values are reported in metric units. Water use for previous years have also been converted to metric units using a more precise conversion factor that accounts for slight differences reported for 2008-09, and previously.
Note: Average per capita consumption is restated for the 2000 to 2014 reporting years to properly account for double counting of water use by major pipeline clients near major cities and towns. These revisions resulted in a very small reduction in stated water use for affected reporting years.
Source: Saskatchewan Community Water Use records for 2020, queried May 2021.

This measure is computed by summing the Litres per Capita per Day (LCD) for each community and dividing by the number of communities. The weighted LCD is computed by summing the yearly water consumption for each community and dividing by the total population and 365 days. The Saskatchewan Community Water Use Records maintained by WSA is the dataset used in this determination. The change in the water consumption rate is attributed to the natural annual variability found in water consumption records and climatic, technological and behavioral influences on water use.

The reported value of 262 LCD is based on the data available on May 19, 2021. A complete dataset for 2020 was not available at the time this report was prepared. The database source of the performance results for this measure has a time lag of about six months; January 1 to December 31, 2020 data will be available in July 2021.

Over the 2005 to 2020 period, the Water Security Agency has promoted responsible water use through public education, partnerships and a variety of programs. Although now completed, the previous Provincial Toilet Replacement Rebate Program is one example of how water conservation has been promoted within the province. Water rates set by waterworks owners that recognize the true and full cost of system design, construction, operation and maintenance also promotes water conservation.

Financial Overview

Actual expenditures relating to drinking water management in 2020-21 were $71.199 million, which was $9.556 million higher than the budgeted expenditures of $52.627 million. Due to the estimated budget for the Investing in Canada Infrastructure Program (ICIP) not being available, the expenditures over or under budget are not reported for this program. Therefore, the $9.556 million higher than the budget expenditures does not include any expenditure variance from the Investing in Canada Infrastructure Program (ICIP).

The Saskatchewan Health Authority FTE utilization for the Roy Romanow Provincial Laboratory was below complement, utilizing 17 of the 18 FTEs for the period August 2020 to September 2020 and 16 of 18 FTEs from September 2020 to November 2020. For the remaining part of the reporting period, the full level of 18 FTEs were used. In addition to the laboratory, funding is provided to the Saskatchewan Health Authority for water-related programs and surveillance. It is not possible to state the actual number of Saskatchewan Health Authority FTEs that are dedicated to water as a number of different disciplines (i.e., Medical Health Officers, Public Health Inspectors and Public Health Nurses) can become involved in water and/or water-related disease surveillance, and issue-specific time is not tracked.

Under the Investing in Canada Infrastructure Program (ICIP), New Building Canada Fund – Small Communities Fund (SCF) and National and Regional Projects (NRP) program and the Clean Water and Wastewater Fund (CWWF), the Ministry of Government Relations provides financial support to municipalities for priority drinking water and wastewater infrastructure improvements. In 2020-21, $9.016 million in federal-provincial funding was paid under ICIP, $17.910 million in federal-provincial funding was paid under SCF, $37.710 million in provincial funding and a similar federal amount was paid under NRP, and $455,033 in federal-provincial funding was paid under CWWF for water and wastewater projects.

Expenditures

The following table outlines information on the budgeted and actual expenditures based on original 2020-21 and revised estimates relating to water management. Funding for water management activities comes from various government ministries and agencies and is contained in their respective budgets. Explanations have been provided for all variances greater than $5,000.

Ministry or Agency	Estimates Budget ($000s)	Actual Expenditure ($000s)	Variance Over (Under) ($000s)
Ministry of Environment*	-	-	-
Water Security Agency**	5,395	4,499	(896)
Ministry of Government Relations ***			
- ICIP	N/A	9,016	N/A
- SCF	16,600	17,910	1,310
- NRP	28,400	37,710	9,310
- CWWF	597	455	(142)
Ministry of Government Relations - Total	45,597	65,091	10,478[1]
Ministry of Health			
- Saskatchewan Health Authority Base Operating Funding (Grants, Salary, Operations)	1,605[2]	1,605	0
- Regional Targeted Programs and Services	30	4	(26)[3]
Ministry of Health – Total	1,635	1,609	(26)[3,4]
Total	52,627	71,199	9,556[5]

**The Ministry of Environment performs some water-related work but does not have a dedicated budget for this activity and does not track drinking water specific expenditures separately as this work is typically undertaken in conjunction with other industrial compliance assurance activities.*
***Expenditures shown are for drinking water and wastewater related programs and activities within the Water Security Agency.*
****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 2020-21.*

[1] Under SCF and NRP, more construction work was undertaken in 2020-21 than originally forecasted. Under both SCF and NRP, costs are reimbursed for eligible project costs incurred and paid by the recipient. Under CWWF, a program extension was issued by Canada which allowed for project completion to extend into 2021. Project delays and savings resulted in lesser than anticipated expenditures.

[2] This amount does not include additional funding provided to the Saskatchewan Health Authority to offset increases to salaries and benefits through collective bargaining agreements. Roy Romanow Provincial Laboratory is now included in SHA base operations.

[3] Contracted work in 2020-21 did not require the full expenditure of the budget. Internal resources were primarily focused on COVID-19 issues.

[4] Under expenditure is due to the resource reallocation to COVID-19 pandemic response in 2020-21.

[5] Due to the estimated budget for the Investing in Canada Infrastructure Program (ICIP) not being available, the expenditures over or under budget are not reported for this program. Therefore, the $9.556 million higher than the budget expenditures does not include any expenditure variance from ICIP.

Note: As SaskWater is a Crown Investments Corporation subsidiary, 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 www.saskwater.com.

Revenues

There are no revenues that arise specifically in relation to delivery of drinking water activities for the ministries of Government Relations and Agriculture. Any revenues that arise from government commitments and activities relating to drinking water and source water protection within the Ministry of Health or SaskWater are reported within their respective annual reports.

For More Information

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

https://www.wsask.ca/ or

http://www.saskh2o.ca/

Or contact:

Environmental and Municipal Management Services
Water Security Agency
111 Fairford Street East MOOSE JAW SK S6H 7X9
Telephone: 306.694.3900

Feedback on the key actions and results may also be provided to the Water Security Agency through the contact information.

Appendix A: List of Acronyms Contained in this Document

ABC	Association of Boards of Certification
BMP	Beneficial Management Practices
CCME	Canadian Council of Ministers of the Environment
CES	Consulting Engineers of Saskatchewan
CEU	Continuing Education Units
COM	Certified Operations and Maintenance
CWWF	Clean Water and Wastewater Fund
DUIS	Downstream Use and Impact Studies
EBWO	Emergency Boil Water Order
EDO	Effluent Discharge Objectives
EFP	Environmental Farm Plans
EMS	Environmental Management System
EMMS	Environmental and Municipal Management Services
EPO	Environmental Project Officer
FRWIP	Farm and Ranch Water Infrastructure Program
FSP	Farm Stewardship Program
FTE	Full Time Equivalent
GUDI	Groundwater Under Direct Influence
HAA(5)	Haloacetic Acids
ICIP	Investing in Canada Infrastructure Program
LCD	Litres per Capita per Day
MWWE	Canada-Wide Strategy for the Compliance of Municipal Wastewater Effluent
NBCF	New Building Canada Fund
NRP	National and Regional Projects
NTU	Nephelometric Turbidity Units
OCB	Operator Certification Board
OCP	Official Community Plans
PDWA	Precautionary Drinking Water Advisory
PTIC	Provincial Territorial Infrastructure Component
SARM	Saskatchewan Association of Rural Municipalities
SARWP	Saskatchewan Association of Rural Water Pipelines
SCF	Small Communities Fund
SHA	Saskatchewan Health Authority
SPI	The Statement of Provincial Interest Regulation
SUMA	Saskatchewan Urban Municipalities Association
SWWA	Saskatchewan Water and Wastewater Association
WQI	Water Quality Index
WSER	Wastewater System Effluent Regulations