



Canadian Council  
of Ministers  
of the Environment    Le Conseil canadien  
des ministres  
de l'environnement

# **Canada-wide Strategy for the Management of Municipal Wastewater Effluent**

## Executive Summary

Wastewater from households, industrial, commercial and institutional sources typically contains a broad range of substances that may pose risks to human and environmental health. In some cases, urban runoff or storm water is collected with sanitary waste in combined sewers, adding different pollutants to wastewater and increasing the volume of water to be treated. Treating wastewater before it is discharged to the environment reduces the risks posed to human and environmental health. Regulation by various levels of government sets limits on substances and imposes management actions on effluent treatment. Interested parties have consistently indicated the need for all levels of government to develop a harmonized approach to better manage wastewater being discharged from more than 3,500 wastewater facilities in Canada, many of which are currently in need of repair and upgrading.

The Canadian Council of Ministers of the Environment (CCME) has developed a *Canada-wide Strategy for the Management of Municipal Wastewater Effluent*. The Strategy articulates the collective agreement reached by the 14 ministers of the environment in Canada to ensure that wastewater facility owners will have regulatory clarity in managing municipal wastewater effluent under a harmonized framework that is protective of human health and the environment.

The Strategy requires that all facilities achieve minimum National Performance Standards and develop and manage site-specific Effluent Discharge Objectives. The National Performance Standards address pollutants common to most wastewater discharges. The site-specific Effluent Discharge Objectives will address specific substances that are of concern to a particular discharge or environment. These objectives will provide additional human health and environmental protection where needed and cover pollutants such as pathogens, nutrients and metals. Implementation of these standards and objectives will be based on risk over a maximum time period of 30 years. High-risk facilities will meet the National Performance Standards first, followed by medium- and low-risk facilities.

The Strategy also outlines risk management activities to be implemented to reduce the risks associated with combined and sanitary sewer overflows. The Strategy requires that overflow frequencies for sanitary sewers not increase due to development or redevelopment. Similarly, combined sewer overflow frequencies also should not increase due to development or redevelopment, unless occurring as part of an approved combined sewer overflow management plan. Both combined and sanitary sewer overflow discharges should not occur during dry weather, except during spring thaw and emergencies.

Where combined sewers are present, the risks posed by combined sewer overflows will be assessed against the risks posed by the effluent from the wastewater facility. Action to address combined sewer overflows or address Effluent Discharge Objectives as priorities prior to achievement of the National Performance Standards may be possible through the submission and approval of an action plan. Under this process, the owner will still need to address the National Performance Standards within 30 years.

Pollution prevention measures are also important in reducing the pollution entering a wastewater facility. In some cases, these pollutants cannot be removed from the effluent. It will be important for jurisdictions to implement and coordinate source control activities. When a national risk management instrument is required, the authority of the *Canadian Environmental Protection Act* (1999) will be considered for chemicals that are not treatable and to control the use of substances or products. The applicability of these approaches to reduce pollutants from wastewater effluent will be examined following the completion of site-specific Environmental Risk Assessments. A Model Sewer Use Bylaw is another tool that has been developed to provide guidance for facility owners in source control. The establishment of a sewer-use bylaw is recognized as a best management practice. All wastewater facility owners with

appropriate legislative authority should give serious consideration to establishing such a bylaw to control what is discharged to their wastewater systems.

The Strategy requires that facilities regularly monitor and report on the quality of the effluent being discharged. Where effluent discharge is determined to be toxic to fish because of ammonia, reductions of ammonia may be required.

To ensure that regulatory clarity is achieved through a one-window approach, the requirements of the Strategy will be incorporated into federal, provincial and territorial regulatory frameworks. Agreements will be negotiated between the federal and provincial governments and the Yukon. In the Northwest Territories and Nunavut, agreements will be developed, taking into account the respective roles of the regulatory bodies.

The total cost over 30 years to implement the Strategy, including capital and non-capital costs, is at least \$10 to \$13 billion, depending on inflation. It is estimated that approximately 50 per cent of the estimated costs will be expended in the first 10 years of implementation, primarily to address high-risk facilities. The initial cost estimates do not include all costs associated with implementing the Strategy, in particular those costs associated with managing combined sewer overflows and meeting site-specific Effluent Discharge Objectives. The Strategy's economic plan identifies that implementation of the Strategy is affordable if governments make wastewater infrastructure an investment priority. For many small and very small communities, with limited fiscal capacity, it will be a challenge to implement the Strategy without senior government assistance.

The economic plan identifies a number of funding principles intended to assist jurisdiction funding programs. A range of funding mechanisms are also evaluated in the economic plan. Economic tools have been established by some jurisdictions and will assist in implementing the Strategy. Among the tools available are full cost recovery, government service partnerships, strategic budget allocations, debt financing and public-private partnerships. Use of full cost recovery and own-source financing tools will be encouraged to the fullest extent possible, keeping in mind the challenges of small and very small communities. Once the extent of these tools is determined, other complementary forms of funding could be sought from provincial and federal governments. Gas Tax and Building Canada Funds are possible funding mechanisms to supplement funding needs for risk assessments and capital costs.

It is recognized that for especially small and declining communities, investment in wastewater treatment infrastructure may not be economically feasible. For these communities, alternatives to wastewater treatment infrastructure investment will be determined on a case by case basis in order to give these communities the flexibility to meet the new standards.

CCME will regularly assess progress on implementation of the Strategy. Progress towards meeting the requirements of the Strategy will be reported to CCME Ministers and Canadians every five years. At this time, an assessment will be also completed to determine whether revisions to the Strategy are necessary. A coordinating committee will be established under CCME to monitor implementation with a focus on continuous improvement.

The requirements contained within the Strategy are considered a minimum to be adhered to; jurisdictions may maintain or impose more stringent requirements. Jurisdictions may also include additional requirements in their legislation, regulations or policies for existing, upgraded and new facilities. Strategy deliverables and timelines are indicated throughout the Strategy. Implementation timelines begin once jurisdictions sign off on the Strategy unless otherwise noted.

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## Introduction

Wastewater from households, industrial, commercial and institutional sources typically contains a broad range of substances that may pose risks to human and environmental health. In some cases, urban runoff or storm water is collected with sanitary waste in combined sewers, adding different pollutants to wastewater and increasing the volume of water to be treated. Treating wastewater before it is discharged to the environment reduces the risks posed to human and environmental health. Regulation by various levels of government sets limits on substances and imposes management actions on effluent treatment. Interested parties have consistently indicated the need for all levels of government to develop a harmonized approach to better manage wastewater being discharged from more than 3,500 wastewater facilities across Canada, many of which are currently in need of repair and upgrading.

The Canadian Council of Ministers of the Environment (CCME) has developed, in consultation with interested and affected parties, the *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* for effluent discharged to surface water from wastewater facilities. Supported by an economic plan, the Strategy focuses improving protection of human health and environmental protection, and regulatory clarity in the management of wastewater.

The Strategy addresses municipal wastewater facilities (owned by municipalities, communities, federal and other government entities, and facilities on federal and aboriginal lands) discharging effluent into surface water, including combined and sanitary sewer overflows. It does not cover discharges from separate storm water facilities, septic tank discharges to infiltration facilities, air emissions, effluent reuse or the management of biosolids.

The Strategy aims to ensure that owners will have regulatory clarity in managing municipal wastewater effluent under a harmonized framework that is protective of human health and the environment. To achieve this goal, the Strategy focuses on two outcomes, supported by an economic plan:

1. Improved human health and environmental protection.
2. Improved clarity about the way municipal wastewater effluent is managed and regulated.

The Strategy addresses issues related to governance, wastewater facility performance, effluent quality and quantity and its associated risk and economic considerations in a way that provides consistency and clarity to the wastewater sector across Canada.

Specifically, the Strategy identifies effluent quality standards which includes minimum National Performance Standards and a process to conduct site-specific risk assessments and develop site-specific effluent discharge objectives and monitoring and reporting requirements. The Strategy also includes an economic plan, an assessment of the state of wastewater science and research and a compendium of technical documents, which will provide guidance to regulators and wastewater facility owners in implementing the Strategy. Implementation of the Strategy will take place over time using a risk-based approach. As the Strategy is implemented, a coordinating committee will be established under CCME to monitor implementation of the Strategy with a focus on continuous improvement.

The requirements contained within the Strategy are considered a minimum to be adhered to; jurisdictions may maintain or impose more stringent requirements. Jurisdictions may also include additional requirements in their legislation, regulations or policies for existing, upgraded and new facilities. Strategy deliverables and timelines are indicated throughout the Strategy and summarized in Appendix B. Implementation timelines begin once jurisdictions sign off on the Strategy unless otherwise noted.

## Outcome 1

# Improved human health and environmental protection

Municipal wastewater effluent typically contains human and other organic waste, nutrients, pathogens, microorganisms, suspended solids and household and industrial chemicals that may pose risks to human health and the environment. To prevent or minimize these risks, management of effluent quality (National Performance Standards and Effluent Discharge Objectives), reduction of pollutants at their source, management of toxicity, consideration for combined and sanitary sewer overflows and compliance monitoring and reporting are addressed.

### National Performance Standards

National Performance Standards are the minimum performance requirements for effluent quality from all municipal, community and government wastewater facilities that discharge municipal wastewater effluent to surface water. The National Performance Standards are:

- Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>) – 25 mg/L;
- Total Suspended Solids (TSS) – 25 mg/L<sup>1</sup>; and
- Total Residual Chlorine (TRC) – 0.02 mg/L.

Implementation of the National Performance Standards will be based on risk, available funding and financial sustainability of communities. New or upgraded facilities will be required to meet or exceed these Standards when they start operating. Existing facilities that already meet current jurisdictional regulatory requirements will continue to do so.

For those existing wastewater facilities that do not meet the National Performance Standards, jurisdictions will determine the risk level for each facility and therefore the timeline required to implement the National Performance Standards.

The National Performance Standards do not apply to sanitary or combined sewer overflows or to facilities located in geographic areas (Canada's Far North) where extreme climatic conditions impede treatment.

Action to address combined sewer overflows or Effluent Discharge Objectives prior to achievement of the National Performance Standards may be possible through the submission and approval of an action plan. Under this process, the owner will still need to address the National Performance Standards within 30 years.

Where the owner of a facility is subject to the *Notice Requiring the Preparation and Implementation of Pollution Prevention Plans for Inorganic Chloramines and Chlorinated Wastewater Effluents* under the *Canadian Environmental Protection Act, 1999*, the implementation timeline for the National Performance Standard of 0.02 mg/L total residual chlorine will be December 31, 2010; notwithstanding the timeline calculated by the risk criteria.

#### Timelines and Deliverables for National Performance Standards

Within one year, jurisdictions will determine the initial risk level for facilities that do not meet the National Performance Standards to determine high-, medium- or low-risk and thereby determine the timelines to meet the National Performance Standards.

<sup>1</sup> Total suspended solids may exceed the National Performance Standard of 25 mg/L if exceedance is caused by algae.

All new and upgraded facilities will meet National Performance Standards immediately. Existing facilities that meet or exceed the National Performance Standards will continue to do so.

For existing facilities that do not meet the National Performance Standards:

- high-risk facilities will meet the National Performance Standards within 10 years;
- medium-risk facilities will meet the National Performance Standards within 20 years; and
- low-risk facilities will meet the National Performance Standards within 30 years.

Within seven years, facilities will submit action plans where prioritization of actions is required.

## Effluent Discharge Objectives

An Effluent Discharge Objective is a concentration or load of a substance that should be achieved in the effluent discharge in order to adequately protect human health and the receiving environment. Effluent Discharge Objectives are established through site-specific Environmental Risk Assessments that includes initial characterization of the effluent and considers the characteristics of the receiving environment and mixing that occurs in an allocated mixing zone.

The environmental risk assessment process considers, at minimum, the Canadian Environmental Quality Guidelines or jurisdictional equivalents, to establish site-specific Environmental Quality Objectives for the receiving environment. A one-year initial characterization of the quality of the effluent discharged will determine which substances within that effluent are of potential concern. An assessment of the receiving environment is then conducted to determine whether or not the levels of substances being discharged are protective of the receiving environment. For levels of a particular substance that are not protective of human health or the receiving environment, an Effluent Discharge Objective is established for that substance. The resulting Effluent Discharge Objectives may relate to more stringent limits for the National Performance Standards or for additional substances of concern. The minimum requirements for completing initial characterization can be found in Table A1 in Appendix A.

If Effluent Discharge Objectives are not achieved, actions need to be taken and a risk management decision must be made to improve the quality of the effluent discharge. Initial actions should look for opportunities to reduce the discharge of substances at the source and/or look for opportunities to improve the wastewater facility or its operation.

Site-specific Environmental Risk Assessments will be conducted for all facilities. Jurisdictions will determine who will complete initial characterization and establish Effluent Discharge Objectives. Jurisdictions will develop and implement their own Effluent Discharge Objectives where necessary (e.g., bacteria, nutrients, metals). Effluent Discharge Objectives may be established either for a single discharge or at a watershed level for all discharges.

### Timelines and Deliverables for Effluent Discharge Objectives

Within 8 years, an Environmental Risk Assessment will be completed for all facilities and site-specific Effluent Discharge Objectives established where necessary.

A one-year initial characterization will be completed as part of the Environmental Risk Assessment.

## Reduction at Source

Reduction at source refers to the elimination or reduction of pollutants in a manner that prevents or reduces their release to any media (air, water, soil). As part of this Strategy, reduction at source focuses on the elimination or reduction of pollutants entering the wastewater sewer system from households and industrial, commercial and institutional sources. While wastewater facilities can treat some substances, many more can only be partially treated or cannot be treated at all.

Achieving National Performance Standards and Effluent Discharge Objectives may require reduction at source. In this regard, the Model Sewer Use Bylaw (available at [www.ccme.ca](http://www.ccme.ca)) provides guidance to owners of wastewater facilities, municipalities and the industrial, commercial and institutional sector. The establishment of a sewer-use bylaw is recognized as a best management practice. All wastewater facility owners with appropriate legislative authority should give serious consideration to establishing such a bylaw to control what is discharged to their wastewater systems. Following completion of Environmental Risk Assessments, the need for national risk management instruments using the authority of *Canadian Environmental Protection Act (1999)* to manage the risks associated with chemicals that are not treatable and to control the use of substances or products will be assessed.

## Toxicity

Wastewater facilities that are medium in size or larger are required to conduct whole effluent toxicity testing. If a facility fails a toxicity test, a toxicity reduction and evaluation process will be initiated to identify and correct the cause of the toxicity. If an acute toxicity test failure is due to ammonia, then the need for ammonia reduction will be determined on the basis of the assimilative capacity of the receiving environment. This determination will include an evaluation of the chronic toxicity, based on the *Canadian Environmental Quality Guidelines*, at the edge of a specified mixing zone (not exceeding 100 metres in length and not exceeding 33 per cent of the stream or river flow).

## Combined and Sanitary Sewer Overflows

Currently, no Canadian jurisdiction allows the construction of new combined sewers, although existing ones may be replaced or rehabilitated. The primary objective of overflow management is to reduce the impact of existing combined sewer and sanitary sewer overflows on surface waters by meeting the national standards for overflows. Further, since sanitary sewer overflows should not occur, the objective for sanitary sewer overflows is elimination through corrective measures. Jurisdictions may determine site-specific objectives.

The national standards for combined sewer overflows are:

- no increase in combined sewer overflow frequency due to development or redevelopment, unless it occurs as part of an approved combined sewer overflow management plan;
- no combined sewer overflow discharge during dry weather, except during spring thaw and emergencies; and
- removal of floatable materials where feasible<sup>2</sup>.

The national standards for sanitary sewer overflows are:

- sanitary sewer overflow frequencies will not increase due to development or redevelopment; and

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<sup>2</sup> Where feasible, every combined sewer overflow structure should at least be equipped with a baffle or a screen that can separate floatable materials from discharge.



- sanitary sewer overflows will not occur during dry weather, except during spring thaw and emergencies.

For wastewater facilities with combined sewers, the risks posed to human health and the environment by overflows can, in some cases, be greater than those posed by the continuous release of the main effluent. Management of overflows are integrated with the management of wastewater effluent from wastewater facilities. Risk level criteria determine the risk level of the overflow location, which can then be compared with the risk level of the main effluent discharge. If the risk level of an overflow location is the same as, or higher than the main effluent, the implementation timeline for the National Performance Standards may be delayed to a maximum of 30 years, provided that comparable efforts to reduce the overflows is undertaken. The site-specific details will be approved in an action plan submitted by the owner.

### **Timelines and Deliverables for Combined and Sanitary Sewer Overflows**

Effective immediately, jurisdictions will ensure that combined sewer overflows and sanitary sewer overflows will not increase in frequency due to development, unless it occurs as part of an approved long-term management plan.

Within seven years the national overflow standards for combined sewer overflows and sanitary sewer overflows must be met.

Within seven years, long term plans to reduce combined sewer overflows and capture substances will be in place and based on achieving jurisdictional overflow objectives.

## **Monitoring and Reporting**

### **Compliance Monitoring**

All wastewater facilities will be required to regularly monitor their effluent discharge for compliance with the National Performance Standards and toxicity in accordance with the requirements outlined in Tables A2 and A3 in Appendix A. Where Effluent Discharge Objectives have been established, monitoring for the objectives will be required at the frequency set by the jurisdiction.

Jurisdictions will determine who is responsible for conducting compliance monitoring. All sample analyses for both the National Performance Standards and all Effluent Discharge Objectives will be completed by an accredited laboratory.

Effluent discharged as a result of a sanitary or combined sewer overflow will not be subject to these monitoring requirements. Jurisdictions will determine the requirements for monitoring the effluent from combined and sanitary sewer overflows on a site-specific basis.

### **Environmental Monitoring**

Environmental monitoring at a watershed level is important as the results provide confirmation that the environment is protected. The nature and extent of environmental monitoring will be determined within five years.

### **Reporting**

All facilities will report the results of monitoring activities to jurisdictions. The results of monitoring related to the National Performance Standards, Effluent Discharge Objectives and Combined Sewer Overflows applicable to the facility will be reported to the public on at least an annual basis. The federal government will develop a national database to house the regulatory reporting information. A

coordinating committee will develop the details of the reporting mechanisms (e.g., direct access through an internet portal) (see Moving Forward below, page 8).

### **Timelines and Deliverables for Compliance Monitoring and Reporting**

Within three years, all facilities will begin to monitor effluent quality. Wastewater facilities must monitor for compliance with the National Performance Standards and with any Effluent Discharge Objectives.

Within five years, a mechanism will be developed under CCME for jurisdictions to monitor the receiving environment at a watershed level.

Within three years, all owners of facilities will meet public reporting requirements as per the requirements established by the jurisdiction.

## **Outcome 2 Improved clarity about the way municipal wastewater effluent is managed and regulated**

Harmonization of the regulatory requirements will be important in order to establish a one-window approach to governance so operators and facility owners deal with a single regulatory agency. Regulatory clarity will be achieved through consistent implementation by jurisdictions and/or other regulators of the performance standards in a harmonized regulatory framework.

### **Governance**

The principles governing harmonization include:

- the regulatory authorities and responsibilities of each jurisdiction are recognized and respected;
- the elimination of overlaps and filling of gaps are achieved through a consistent approach;
- the best placed jurisdiction is the primary point for service delivery and reporting; and
- the importance of continuous improvements in managing municipal wastewater effluent is recognized.

Jurisdictions will amend applicable regulatory frameworks to include all the required elements of this Strategy. The federal government will develop regulations under the authority of the *Fisheries Act* that will include the same standards.

Agreements will be established between the federal and provincial governments and the Yukon to clarify the roles and responsibilities of jurisdictions and regulated entities. In the Northwest Territories and Nunavut, agreements will be developed, taking into account the respective roles of the regulatory bodies. These agreements will address the implementation of the standards over time, one-window regulatory reporting, public reporting and other management activities such as inspections and enforcements.

### **Timelines and Deliverables for Governance**

Within three years, jurisdictions will incorporate requirements into their respective regulatory frameworks and develop implementation plans.

Within three years, jurisdictions will establish federal-provincial and federal-Yukon agreements. For the

Northwest Territories and Nunavut, an agreement in each of these territories will be developed among the jurisdictions clarifying the roles and responsibilities of the various regulatory bodies in the respective territory.

## Economic Plan

All orders of government will need to recognize wastewater infrastructure as a priority if the Strategy is to be implemented successfully. The total cost to implement the Strategy, including capital and non-capital costs, is at least \$10 billion to \$13 billion, depending on inflation, over 30 years. Not included in the initial estimated costs are those costs associated with managing combined sewer overflows and meeting the Effluent Discharge Objectives. These will be significant costs in addition to the estimated costs to implement the Strategy. Costs to regulatory agencies to implement a one-window approach are also excluded. A summary of costs over 30 years and accounting for inflation is included in Tables A3 and A4 of Appendix A.

The Economic Plan demonstrated that the Strategy could be affordable if wastewater is made a priority for investment by governments. For many small and very small communities, with limited fiscal capacity, it will be a challenge to implement the Strategy without senior government assistance. The economic plan also indicated that approximately 50 per cent of the costs of the Strategy would be expended in the first 10 years of implementation to address high-risk facilities. Existing funding programs can be accessed to help with support costs associated with the environmental risk assessment and capital investment.

### Funding

The economic plan identifies a number of funding principles and mechanisms including funding from provincial and federal governments. For example, many jurisdictions in Canada have put in place tools such as full cost recovery, government service partnerships, strategic budget allocations, debt financing (bonds, loans, revolving loan funds, securitization funds), public private partnerships, among others. A full list of these types of funding mechanisms is included in the economic plan.

In order to deal with infrastructure deficit, the Government of Canada announced in Budget 2008 that the Gas Tax Fund is to be extended at \$2 billion per year beyond 2013-2014 to become a permanent measure. It also introduced the Building Canada Fund in 2007.

Implementation of full cost recovery and own-source financing tools will be encouraged to the fullest extent possible, keeping in mind the challenges of small and very small communities. Once the extent of these tools is determined, other forms of funding to complement them could be sought from provincial and federal governments. Possible funding mechanisms for risk assessment, capital and ongoing operation and maintenance are listed below. Table 1 summarizes these tools.

**Table 1.** Potential Funding Mechanisms

<b>Element</b>	<b>Potential Funding Mechanisms</b>
Environmental Risk Assessments	<ul style="list-style-type: none"> <li>– Own source revenue (e.g., full cost accounting, full cost recovery, revolving funds)</li> <li>– Federal infrastructure funding programs and initiatives</li> <li>– Other innovative funding mechanisms (e.g., public private partnerships)</li> </ul>
Capital Costs	<ul style="list-style-type: none"> <li>– Own source revenue</li> <li>– Provincial Funding (e.g., typically revolving funds such as low interest loans)</li> <li>– Federal infrastructure funding programs and initiatives</li> <li>– Other innovative funding mechanisms</li> </ul>
Ongoing Operation and Maintenance (including monitoring)	<ul style="list-style-type: none"> <li>– Own source revenue</li> <li>– Other innovative funding mechanisms</li> </ul>

### Financial Sustainability

In some cases, there may be especially small, declining communities for which a large investment in wastewater treatment infrastructure is neither warranted, nor economically feasible. For these communities of 250 people or less whose populations are declining at rates of 10 per cent or more over the two previous census observations (e.g., 2006 and 2001 censuses), determining alternatives to wastewater treatment infrastructure that still allow them to meet the requirements of the Strategy will be crucial. Therefore, during the development and implementation of the regulations alternative approaches will be examined including how to incorporate alternatives to large infrastructure investments in the proposed regulations, in order to give these communities the flexibility to meet the new standards. The development of this approach will follow these general principles:

- there will be an objective means to determine what communities will qualify for different treatment under the regulation;
- these communities will still be required to monitor the effluent being discharged and to report under the regulation; and
- there will be a process in place to determine what treatment or measures should be put in place to mitigate discharges not meeting national performance standards.

## Moving Forward

### Implementation

CCME recognizes that time is needed to meet the requirements outlined above. Implementation will require long-term planning on the part of jurisdictions and owners. While implementation timelines and deliverables are identified, each jurisdiction will determine how it will proceed.

As part of the implementation process, there will be a number of activities requiring further work. Guidance on implementation will also be needed. As such, a coordinating committee will be established under CCME to monitor implementation of the Strategy with a focus on continuous improvement. Its activities will include: establishing a group to track research, disseminate information and propose future research priorities; and addressing issues related to facilities in Canada's far north.

For very small declining communities during the implementation of the Strategy, it will be necessary to examine how to incorporate alternatives to large infrastructure investments in the proposed regulations in order to give small and declining communities some flexibility, while at the same time protecting human health and the environment and taking into account the specific circumstances of the community. The

coordinating committee will also consider how to treat incorporated versus unincorporated small and declining communities in the development and implementation of these alternatives.

## Considerations for Canada's Far North

Due to the extreme climatic conditions and remoteness of Canada's Far North, a viable means to improve human and environmental health protection needs to be carefully considered. Therefore, a window of up to five years is provided to undertake research into factors that affect performance of wastewater facilities in northern conditions. During this period of time, the governments of the Northwest Territories, Nunavut, Quebec, Newfoundland and Labrador and the federal government will work collaboratively to:

- assess the performance of existing wastewater facilities and factors affecting these;
- develop northern performance standards;
- develop initial risk level criteria and timelines for implementation of northern performance standards with due consideration of the economic implications in the short, medium and long-term;
- adapt the environmental risk assessment approach as appropriate for the Far North; and
- adapt monitoring and reporting requirements.

The following interim measures for Canada's Far North wastewater facilities will apply:

- effluent quality requirements in existing authorizations will continue to apply; and
- for compliance, monitoring and reporting requirements referenced in current authorizations will be retained.

## Science and Research

Currently in Canada, a significant amount of research is being conducted on municipal wastewater effluent issues. To promote coordinated research and disseminate information within the municipal wastewater effluent sector, a committee is needed. Such a committee would track who is researching what, what has already been done and what the key research priorities should be in the future. For instance, persistent organic pollutants, bioaccumulative substances, pharmaceuticals and personal care products are introduced into source water through wastewater discharges of wastewater effluent. Scientific research has been undertaken to link these substances with human health or environmental effects. There is a need to further investigate these compounds, their cumulative impacts, anti-biotic resistance and the different treatment types including source control. Similarly, research into the performance of existing northern wastewater facilities and environmental factors affecting these will help to identify potential improvements or modifications to treatment processes. The proposed committee would publicize projects and results to prevent duplication and to promote collaboration among researchers. It would neither conduct nor fund research.

## Review

CCME will regularly assess progress on the implementation of the Strategy to determine whether revisions are needed to the Strategy. At a minimum, the assessment will include a review of economic issues, develop a policy and process on environmental monitoring, integrate the research completed for Canada's Far North and examine the latest science, especially on emerging substances associated with municipal wastewater effluent.

## Reporting on Progress

Jurisdictions will regularly report progress towards meeting the requirements of the Strategy to CCME Ministers and Canadians.

## Administration

The Strategy will be implemented by each jurisdiction upon signing of the Strategy by that jurisdiction's representative.

### Timelines and Deliverables for Moving Forward

Within one year, a coordinating committee will be established to coordinate implementation of the Strategy.

During the first two years of implementation, the coordinating committee will work with stakeholders to establish a research coordination and information dissemination committee.

Within five years:

- the coordinating committee will help develop a targeted research program which will encompass biosolids, the north, emerging substances, treatment technology and source control;
- CCME will assess implementation of and review the Strategy, and every five years thereafter;
- the Northwest Territories, Nunavut, Quebec and Newfoundland and Labrador and the federal government will work collaboratively to complete research to develop, at a minimum, performance standards for wastewater facilities in Canada's Far North;
- jurisdictions will provide a progress report to CCME ministers and Canadians, and every five years thereafter.

## Appendix A: Monitoring Requirements and Estimated Costs

**Table A1.** Monitoring for Substances and Test Groups for Initial Characterization (monitored over one year), Continuous Discharge

Facility Size <sup>1</sup>	TRC <sup>2</sup> (or dechlorination agent)	CBOD <sub>5</sub> , TSS, Pathogens and Nutrients <sup>3,6</sup>	Substances and Test Groups <sup>4</sup>	Acute Toxicity	Chronic Toxicity
Very Small <sup>5</sup>	Daily	Monthly	n/a	n/a	n/a
Small <sup>5</sup>	Daily	Monthly	n/a	Quarterly	Quarterly
Medium	Daily	Every two weeks	Quarterly	Quarterly	Quarterly
Large	Twice per day	Weekly	Quarterly	Monthly	Monthly
Very Large	Three times per day	5 days/week	Quarterly	Monthly	Monthly

1. Facilities that discharge less than 10 m<sup>3</sup>/day are not required to complete initial characterization.
2. Only required if chlorine is used in the wastewater facility.
3. Nutrients include total ammonia nitrogen, TKN (ammonia + organic N) and total phosphorus. Temperature and pH must also be measured to determine the level of toxicity of ammonia. Pathogens could include *E.Coli*.
4. Substances and test groups will include the following: Fluoride, Nitrate, Nitrite, Total Extractable Metals and Metal Hydrides (full range), COD, Organochlorine Pesticides, PCBs, PAHs, Cyanide (total), pH, Volatile Organic Compounds, Mercury, Phenolic compounds, Surfactants, plus other substances specifically associated with industrial or commercial activities that discharge into the sewer system.
5. Small and very small facilities with industrial input must meet the requirements for a medium sized facility.

Note: For intermittent discharges in each size classification, two samples should be taken during each discharge period: one sample near the start of the discharge period and one near the end. For facilities with more than one discharge per year, each discharge should be sampled but the number of tests required need not be more than that required for continuous discharges for the same size facility.

**Table A2.** Compliance Monitoring and Toxicity Testing Requirements for Continuous Discharge Facilities

Facility Size	Flow (m <sup>3</sup> /day)	TRC <sup>1</sup> (or dechlorination agent)	TSS and CBOD <sub>5</sub>	Acute Toxicity	Chronic Toxicity
Very Small	≤ 500	Daily	Monthly <sup>2</sup>	n/a	n/a
Small	> 500 – 2,500	Daily	Monthly <sup>2</sup>	n/a	n/a
Medium	> 2,500 – 17,500	Daily	Every 2 weeks	Quarterly	Quarterly
Large	> 17,500 – 50,000	Twice per day	Weekly	Quarterly	Quarterly
Very Large	> 50,000	Three times per day	Five days per week	Monthly	Monthly

1. Only required if chlorine is used in the wastewater facility.
2. May be reduced to quarterly for lagoons and any facility with an average daily flow of less than 100 m<sup>3</sup>/day.
3. Very small and small wastewater facilities which have industrial input associated with municipal wastewater are to be treated as medium wastewater facilities.

Note: Facilities that discharge intermittently or not every year will be required to monitor their effluent for compliance with the National Performance Standards once during each discharge period or every two weeks for discharges exceeding one month.

**Table A3.** Compliance Averaging Periods for CBOD<sub>5</sub>/TSS

Facility Size	Annual Average Daily Flow (m <sup>3</sup> /day)	Averaging Period for CBOD <sub>5</sub> /TSS
Very Small <sup>1</sup>	≤ 500	Quarterly <sup>1</sup>
Small	> 500 – 2,500	Quarterly <sup>1</sup>
Medium	> 2,500 – 17,500	Quarterly
Large	> 17,500 – 50,000	Monthly
Very Large	> 50,000	Monthly

1. Lagoons and any facility with an average daily flow < 100 m<sup>3</sup>/day, that are testing quarterly, must meet an annual average.

**Table A4.** Estimated Costs in Millions Over a 30-Year Implementation Period with 4 per cent Inflation

	Years 1-5	Years 6-10	Years 11-20	Years 21-30	30 year Subtotal
Capital Investment	\$0	\$4,313	\$4,962	\$36	\$9,311
Environmental Risk Assessment	\$190	\$0	\$0	\$0	\$190
Annual Monitoring	\$320	\$389	\$1,049	\$1,552	\$3,310
Environmental Monitoring	\$0	\$37	\$100	\$147	\$284
<i>Total</i>	<i>\$510</i>	<i>\$4,739</i>	<i>\$6,111</i>	<i>\$1,735</i>	<i>\$13,095</i>

**Table A5.** Estimated Costs in Millions Over a 30-Year Implementation Period with 2 per cent Inflation

	Years 1-5	Years 6-10	Years 11-20	Years 21-30	30 year Subtotal
Capital Investment	\$0	\$3,760	\$3,727	\$22	\$7,509
Environmental Risk Assessment	\$190	\$0	\$0	\$0	\$184
Annual Monitoring	\$307	\$339	\$788	\$960	\$2,394
Environmental Monitoring	\$0	\$32	\$75	\$91	\$188
<i>Total</i>	<i>\$491</i>	<i>\$4,131</i>	<i>\$4,590</i>	<i>\$1,073</i>	<i>\$10,285</i>



## Appendix B: Summary of Deliverables and Timelines of the Canada-wide Strategy

Deliverables & Timelines (years)	2009 – 2011			2012 – 2021										2022 – 2031	2032 – 2041
	1	2	3	4	5	6	7	8	9	10	11	12	13	14-23	24-33
<b>Risk Level</b> – Within one year, jurisdictions will determine the initial risk level for facilities that do not meet the National Performance Standards to determine high, medium- or low-risk and thereby determine the timelines to meet the National Performance Standards.															
<b>Coordinating Committee</b> – Within one year, a coordinating committee will be established to coordinate implementation of the Strategy.															
<b>Science and Research</b> – During the first two years of implementation, the coordinating committee will work with stakeholders to establish a research coordination and information dissemination committee.															
<b>Harmonization</b> – Within three years, jurisdictions will incorporate Strategy requirements into their respective regulatory frameworks and develop implementation plans.															
<b>Harmonization</b> – Within three years, jurisdictions will establish federal-provincial and federal-Yukon agreements. For the Northwest Territories and Nunavut, an agreement in each of these territories will be developed among the jurisdictions, clarifying the roles and responsibilities of the various regulatory bodies in the respective territory.															
<b>Reporting</b> – Within three years, all owners of facilities will meet public reporting requirements as per the requirements established by the jurisdiction.															
<b>Monitoring</b> – Within three years, all facilities will begin to monitor effluent quality. Wastewater facilities must monitor for compliance with the National Performance Standards and with any Effluent Discharge Objectives.															
<b>Science and Research</b> – Within five years, the coordinating committee will help develop a targeted research program including biosolids, the north, emerging substances, treatment technology and source control.															

Deliverables & Timelines (years)	2009 – 2011			2012 – 2021										2022 – 2031	2032 – 2041
	1	2	3	4	5	6	7	8	9	10	11	12	13	14-23	24-33
<b>Canada's Far North</b> – Within five years, the Northwest Territories, Nunavut, Quebec and Newfoundland and Labrador and the federal government will work collaborative to complete research to develop performance standards for wastewater facilities in the Canada's Far North.															
<b>Environmental Monitoring</b> – Within five years, a mechanism will be developed under CCME for jurisdictions to monitor the receiving environment at a watershed level.															
<b>Review</b> – Within five years, CCME will assess implementation of and review the Strategy, and every five years thereafter.															
<b>Reporting</b> – Within five years, jurisdictions will provide a progress report to CCME ministers and Canadians, and every five years thereafter.															
<b>Combined/Sanitary Sewer Overflows</b> – Within seven years, long term plans to reduce combined sewer overflows and capture substances will be in place, and based on achieving jurisdictional overflow objectives.															
<b>Action Plans</b> – Within seven years, facilities will submit action plans where prioritization of actions is required.															
<b>Combined/Sanitary Sewer Overflows</b> – Within seven years the national overflow standards for combined sewer overflows and sanitary sewer overflows must be met.															
<b>Effluent Discharge Objectives</b> – Within eight years, an Environmental Risk Assessment will be completed for all facilities and site-specific Effluent Discharge Objectives established where necessary. A one-year initial characterization will be completed as part of the Environmental Risk Assessment.															
<b>Combined/Sanitary Sewer Overflows</b> – Effective immediately, jurisdictions will ensure that combined sewer overflows and sanitary sewer overflows will not increase in frequency due to development, unless it occurs as part of an approved long-term management plan.															
<b>National Performance Standards</b> - Existing high-risk facilities meet the National Performance Standards.															
<b>National Performance Standards</b> - Existing medium-risk facilities meet the National Performance Standards.															

Deliverables & Timelines (years)	2009 – 2011			2012 – 2021										2022 – 2031	2032 – 2041
	1	2	3	4	5	6	7	8	9	10	11	12	13	14-23	24-33
<b>National Performance Standards</b> - Existing low-risk facilities meet the National Performance Standards.															
<b>Reduction at Source</b> – Following completion of Environmental Risk Assessments, the need for national risk management instruments using the authority of the Canadian Environmental Protection Act (1999) to manage the risks associated with chemicals that are not treatable and to control the use of substances or products will be assessed.															
<b>National Performance Standards</b> – All new and upgraded facilities will meet National Performance Standards immediately. Existing facilities that meet or exceed the National Performance Standards will continue to do so.															

## Appendix C: Key Definitions

### Canada's Far North

Far North is defined as all of the Northwest Territories and Nunavut, and the Nunavik region of Quebec and Nunatsiavik region of Newfoundland/Labrador.

### Combined Sewer

A sewer intended to receive both wastewater and storm water.

### Combined Sewer Overflow

A discharge to the environment from a combined sewer system that occurs when the hydraulic capacity of the combined sewer system has been exceeded, usually as a result of rainfall and/or snow melt events.

### Dry Weather

Any time where flows in combined sewers are not affected by runoff generated by storm events.

### Effluent Discharge Objectives

The establishment of concentrations and load limits at the end of the wastewater discharge pipe in order to protect all water uses in the receiving water. Concentration, load or toxicity units that should be met at the municipal wastewater effluent discharge to adequately protect the receiving environment. Effluent Discharge Objectives are obtained through an environmental risk assessment methodology using the principles of assimilative capacity and mixing zone, in conjunction with Environmental Quality Objectives.

### Environmental Risk Assessment

A procedure that will enable the establishment of Effluent Discharge Objectives for substances of concern. This process will take into account the characteristics of the site-specific receiving environment. The environmental risk assessment includes a one-year period where a facility will characterize its effluent (initial characterization).

### Existing Facility

Existing municipal wastewater infrastructure, on or before the signing of the Strategy, with a discharge to a surface water body.

### Facility Size

Wastewater Facility Size	Flow (m <sup>3</sup> /day) <sup>2</sup>	Estimated Population (for reference only)
Very Small <sup>1</sup>	≤ 500	≤ 1,000
Small <sup>1</sup>	> 500 – 2,500	> 1,000 – 5,000
Medium	> 2,500 – 17,500	> 5,000 – 35,000
Large	> 17,500 – 50,000	> 35,000 – 100,000
Very Large	> 50,000	> 100,000

1. Very small and small wastewater facilities which have industrial input associated with municipal wastewater are to be treated as medium wastewater facilities.
2. Flow is the annual average daily flow of a wastewater facility.

### Jurisdiction

All provincial, territorial and the federal governments in Canada.

### **Municipal Wastewater Effluent**

Wastewater discharged to a surface water body from a collection or treatment system by an owner. Wastewater is a mixture of liquid wastes composed primarily of domestic or sanitary sewage that may also include wastewater from industrial, commercial and institutional sources. Overflows of combined and sanitary sewers are included. Separate storm water and septic tank discharges to infiltration systems are not included.

### **Owner**

A municipality, a community or a federal or other government entity, that owns a wastewater facility. It also includes owners of wastewater facilities situated on federal or aboriginal land.

### **Sanitary Sewer**

A sewer intended to receive wastewater.

### **Sanitary Sewer Overflow**

A discharge to the environment from a sanitary sewer system.

### **Storm Sewer**

A sewer intended to receive only storm water.

### **Substance**

Chemical substance or any other parameter associated with wastewater, including carbonaceous biochemical oxygen demand, total suspended solids, temperature, pH, pathogens, etc.

### **Upgrade**

Further development of existing infrastructure that results in expanded throughput capacity. Does not include the addition of disinfection.

### **Wastewater Facility**

Any works for the collection or treatment and release of wastewater or any part of such works. Includes engineered wetlands and those with natural elements considered as design components.

### **Wastewater Lagoon**

A wastewater treatment system that consists of one or more engineered surface impoundments, including enhancement of natural features, where biological and physical treatment of wastewater occurs, but does not include mechanical aeration systems to keep all solids in suspension.

**Canada-wide Strategy  
for the Management of Municipal Wastewater Effluent**

Signed by:

Alberta	Honourable Rob Renner
British Columbia	Honourable Barry Penner
Environment Canada	Honourable Jim Prentice
Manitoba	Honourable Stan Struthers
New Brunswick	Honourable Roland Haché
Northwest Territories	Honourable J. Michael Miltenberger
Nova Scotia	Honourable David M. Morse
Ontario	Honourable John Gerretsen
Prince Edward Island	Honourable Richard E. Brown
Saskatchewan	Honourable Nancy Heppner
Yukon	Honourable Elaine Taylor

Note: To date, Newfoundland and Labrador, Nunavut and Québec have not endorsed the Canada-wide Strategy for the Management of Municipal Wastewater Effluent.