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# Data Sources and Methods for the First Nations Water and Wastewater System Risk Indicator

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# 1 Introduction

The First Nations Water and Wastewater System Risk indicator ([www.ec.gc.ca/indicateurs-indicators/default.asp?Lang=En&n=EA902CF7-1](http://www.ec.gc.ca/indicateurs-indicators/default.asp?Lang=En&n=EA902CF7-1)) is part of the Canadian Environmental Sustainability Indicators (CESI) program ([www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1](http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1)), which provides data and information to track Canada's performance on key environmental sustainability issues. This indicator is also used to measure progress towards the goals and targets of the Federal Sustainable Development Strategy ([www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1](http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1)).

## 2 Description and rationale of the First Nations Water and Wastewater System Risk indicator

### 2.1 Description

The First Nations Water and Wastewater System Risk indicator tracks the risk associated with First Nations management of on-reserve systems that are funded by Aboriginal Affairs and Northern Development Canada (AANDC). The risk rating is a measure of the overall risk associated with the system and identifies the system's deficiencies and its ability to produce clean water or effectively treat wastewater should a problem arise. When a system is assessed as low risk, it indicates the system is managed and operated in a manner that is at a low risk of producing unsafe drinking water or poorly treated wastewater in the event of a problem. By contrast, although some systems identified as high risk are providing safe water to communities, they are more likely to be overwhelmed by extreme conditions.

### 2.2 Rationale

Human and ecosystem health in First Nations communities rely on effective water and wastewater treatment. In this regard, AANDC aims for improvements to First Nations water and wastewater systems, such that 50% of water systems and 70% of wastewater systems are characterized as low risk by 2015.

## 3 Data

### 3.1 Data source

The National Assessment data for this indicator are taken from the National Assessment of First Nations Water and Wastewater Systems ([www.aadnc-aandc.gc.ca/eng/1313770257504](http://www.aadnc-aandc.gc.ca/eng/1313770257504)) conducted from 2009 to 2011. The 2011–2012 and 2012–2013 data sets were extracted from their respective Water and Wastewater Infrastructure Investment Reports, while the 2013–2014 data were extracted from AANDC's 2013–2014 Departmental Performance Report (the 2013–2014 Water and Wastewater Infrastructure Investment Report has not yet been published).

### 3.2 Spatial coverage

This indicator reports results for AANDC-funded First Nations water and wastewater systems on reserves across Canada, which exclude systems belonging to individuals, self-governing and modern-treaty First Nations, municipalities that provide services to First Nations communities, and systems in Nunavut and the Northwest Territories.

### 3.3 Temporal coverage

Data cover the 2009–2011 period and annual inspections from 2011–2012 to 2013–2014.

### 3.4 Data completeness

Each year, all AANDC-funded water and wastewater systems are subject to an Annual Performance Inspection (API). However, the overall number of systems actually inspected varies slightly from year to year due to eligibility criteria or conditions that determine if, or to what extent, a system is subject to an inspection. For example, brand-new systems or freshly renovated systems may not be subject to an inspection. This section describes system inspections coverage over the past four years.

The National Assessment of First Nations Water and Wastewater Systems:<sup>1</sup>

Of Canada's 587 First Nations communities on reserves, 571 (approximately 97%) participated in the National Assessment. Four First Nations communities chose not to participate; and 12 have no active infrastructure on reserve lands, due to recent or on-going land-claim settlements.

In 2009–2011, there were 807 water systems serving 560 of the participating First Nations communities, while 11 communities were serviced by individual water supplies. Similarly, there were 532 wastewater systems serving 418 participating First Nations communities, with the remaining 153 communities serviced by individual septic systems.

A number of the water and wastewater systems inspected during the National Assessment are no longer included in this indicator, because they are:

- systems for which AANDC does not provide direct funding;
- systems owned by self-governing and modern-treaty First Nations;
- private systems; or
- small septic systems.

As a result, the National Assessment baseline includes 771 water systems and 519 wastewater treatment systems. Of these, 52 water systems and 37 wastewater systems were less than two years old and did not require inspection. In total, the risk ratings for 719 water and 482 wastewater systems requiring inspection were included.

2011–2012 Annual Performance Inspection Cycle:<sup>2</sup>

In 2011–2012, AANDC conducted APIs of First Nations water and wastewater systems as required under its protocols for federally funded water and wastewater systems.

A total of 771 water systems and 519 wastewater treatment systems were identified for inspection in 2011–2012. Of these systems, 31 water systems and 17 wastewater systems were less than two years old, thus not requiring inspection. In total, the risk ratings for 740 water systems and 502 wastewater systems requiring inspection were included.

2012–2013 Annual Performance Inspection Cycle:<sup>3</sup>

During the 2012–2013 API, 691 water systems and 449 wastewater treatment systems were identified for inspection. Of these systems, one water system and two wastewater systems were less than two years old, thus not requiring inspection. In total, the risk ratings for 690 water systems and 447 wastewater systems requiring inspection were included.

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<sup>1</sup> Department of Indian Affairs and Northern Development (2011) National Assessment of First Nations Water and Wastewater Systems. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1313770257504](http://www.aadnc-aandc.gc.ca/eng/1313770257504).

<sup>2</sup> Aboriginal Affairs and Northern Development Canada (2012) Water and Wastewater Infrastructure - Investment Report April 2010 - March 2012. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1352820960474/1352822705434](http://www.aadnc-aandc.gc.ca/eng/1352820960474/1352822705434).

<sup>3</sup> Aboriginal Affairs and Northern Development Canada (2014) Water and Wastewater Infrastructure Investment Report: April 2012 - March 2013. Retrieved on 30 July, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1403198954861/1403199074561](http://www.aadnc-aandc.gc.ca/eng/1403198954861/1403199074561).

2013–2014 Annual Performance Inspection Cycle:<sup>4</sup>

During the 2013–2014 API, 698 water systems and 449 wastewater treatment systems were identified for inspection. Of these systems, one water system and one wastewater system were less than two years old, thus not requiring inspection, and four water systems and four wastewater systems were not inspected. In total, the risk ratings for 693 water systems and 444 wastewater systems requiring inspection were included.

### 3.5 Data timeliness

The First Nations Water and Wastewater System Risk indicator was calculated using the most recent data available at the time of this report's production.

## 4 Methods

The indicator presents the number of AANDC-funded First Nations water and wastewater systems, and their risk ratings in relation to the number of systems requiring inspection. The same risk assessment tool was used for inspections carried out in other years.

A risk assessment was completed for each water and wastewater system according to AANDC's risk level guidelines for water and wastewater systems ([www.aadnc-aandc.gc.ca/eng/1313687144247](http://www.aadnc-aandc.gc.ca/eng/1313687144247)). In the risk assessments, scores from 1 (lowest risk) to 10 (highest risk) were given for each of the following components, weighted according to the percentages listed in the table below:

#### Weighting applied to each component in calculation of system management risk scores

Component	Percentage weighting for water systems	Percentage weighting for wastewater systems
Quality and quantity of water source	10%	n/a
Ability of receiving water body to handle wastewater discharge	n/a	20%
Design of the system	30%	25%
Operation of the system	30%	25%
Recording and reporting of data	10%	10%
Training and certification of operators	20%	20%

**Note:** n/a = not applicable.

Systems were rated as low-, medium- or high-risk based on their scores:

- Low-risk (scores 1.0–4.0): Minor or no deficiencies observed for the system or its management. Should a problem occur, it is likely the system and associated management would react properly and would continue to provide safe water or wastewater services while the issue is being resolved.

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<sup>4</sup>Aboriginal Affairs and Northern Development Canada (2014) 2013–2014 Departmental Performance Report — Aboriginal Affairs and Northern Development Canada and Canadian Polar Commission. Retrieved on 7 November, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1403268280586/1403268381797#SP3\\_3\\_1](http://www.aadnc-aandc.gc.ca/eng/1403268280586/1403268381797#SP3_3_1).

- Medium-risk (scores 4.1–7.0): Minor deficiencies observed in several components or major deficiencies observed in one or two components. Should a problem arise, the system and associated management could be sufficient to address the problem, but the noted deficiencies could also hinder a proper response, and thus there is a medium probability that any problem could lead to unsafe water or wastewater. Issues need to be addressed.
- High-risk (scores 7.1–10): Major deficiencies observed in most of the components. Should a problem arise, the system and associated management would unlikely be able to properly respond, and thus there is a high probability that any problem could result in unsafe water or wastewater. Management and operation issues should be addressed as soon as possible.

## 5 Caveats and limitations

The risk referred to in this indicator is based on overall risk associated with system management and operation. Water or wastewater quality is included in the overall system management risk under the operation and maintenance component. A high-risk system might produce water or wastewater of equal quality to that of a low-risk system, but might not be capable of responding adequately in the event of a problem. For example, if short-term source water contamination were to occur due to flooding, the operation of a low-risk system should be able to tackle the problem with minimal service interruption, whereas a high-risk system may not.

## 6 References and further reading

### 6.1 References

Department of Indian Affairs and Northern Development (2011) National Assessment of First Nations Water and Wastewater Systems. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1313770257504](http://www.aadnc-aandc.gc.ca/eng/1313770257504).

Aboriginal Affairs and Northern Development Canada (2011) Fact Sheet - Risk Assessment of Water and Wastewater Systems in First Nation communities. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1313687144247](http://www.aadnc-aandc.gc.ca/eng/1313687144247).

Aboriginal Affairs and Northern Development Canada (2011) Water and Wastewater Infrastructure - Investment Report April 2006 - March 2010. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1314039137100](http://www.aadnc-aandc.gc.ca/eng/1314039137100).

Aboriginal Affairs and Northern Development Canada (2012) Water and Wastewater Infrastructure - Investment Report April 2010 - March 2012. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1352820960474/1352822705434](http://www.aadnc-aandc.gc.ca/eng/1352820960474/1352822705434).

Aboriginal Affairs and Northern Development Canada (2014) Water and Wastewater Infrastructure Investment Report: April 2012 - March 2013. Retrieved on 30 July, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1403198954861/1403199074561](http://www.aadnc-aandc.gc.ca/eng/1403198954861/1403199074561).

Aboriginal Affairs and Northern Development Canada (2014) 2013–2014 Departmental Performance Report — Aboriginal Affairs and Northern Development Canada and Canadian Polar Commission. Retrieved on 7 November, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1403268280586/1403268381797#SP3\\_3\\_1](http://www.aadnc-aandc.gc.ca/eng/1403268280586/1403268381797#SP3_3_1).

### 6.2 Further reading

Aboriginal Affairs and Northern Development Canada (2011) First Nations Water and Wastewater Action Plan. Retrieved on 14 March, 2014. Available from: [www.aadnc-aandc.gc.ca/eng/1313426171775](http://www.aadnc-aandc.gc.ca/eng/1313426171775).

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