

A Guide for Water Utilities and Municipalities

DEVELOPING A

# Municipal Source Water Protection Plan



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Protecting the sources of our drinking water is a cornerstone of *A Drinking Water Strategy for Nova Scotia*. Without source protection, delivering a sustainable supply of the highest quality drinking water becomes much more difficult to achieve.

Nova Scotia Environment has published a five-part guide to implementing source protection for water supplies. This booklet summarizes these technical documents so that all Nova Scotians can become familiar with the need to have diligent, technically valid protection plans for water sources.

# Table of Contents

Introduction . . . . .	2
Background . . . . .	3
Need for Commitment . . . . .	4
How to Design a Plan for Source Water Protection . . . . .	4
Step 1: Form a Source Water Protection Advisory Committee . . . . .	4
Step 2: Delineate the Source Water Protection Area Boundary . . . . .	5
Step 3: Identify Potential Contaminants and Assess Risks . . . . .	5
Step 4: Develop and Adopt a Source Water Protection Management Plan . . . . .	6
Step 5: Monitor and Evaluate the Plan . . . . .	7
Developing A Source Water Protection Plan: Summary Chart . . . . .	8
For More Information . . . . .	12
Glossary . . . . .	13

# Introduction

The vast majority of Nova Scotians already enjoy high-quality, safe drinking water. However, even the most remote, and seemingly pristine, water source may contain some impurities. In October 2002, the province released *A Drinking Water Strategy For Nova Scotia*, which provides the framework for managing drinking water supplies across the province. It describes a multiple-barrier approach to clean, safe drinking water.

Nova Scotia Environment (NSE) has published a five-part series of technical documents that provide detailed guidance for those who have to deliver effective source water protection plans. This booklet summarizes the protection process and the solutions offered by the technical documents.

# Background

The most cost-effective way to ensure a safe source water supply is to prevent drinking water problems from developing in the first place. This is best achieved with an effective source water protection plan. Source water is untreated water from streams, rivers, lakes, or underground aquifers that is used to supply private wells and public drinking water supplies.

Although water is a renewable resource, there are limits to its quality and quantity. The quality of our drinking water sources is threatened by land development, runoff from agricultural, commercial, and industrial sites, and aging wastewater infrastructure, to name a few. To protect our source water we must manage the human activity that creates these threats. Protecting source water makes good sense in three ways. It makes good public health sense, good economic sense, and good environmental sense. Protecting drinking water sources also protects the water resource for many uses.

Nova Scotia's multiple barrier approach has three lines of defence:

- **Keeping Clean Water Clean**—We must select the highest quality sources of water and protect these sources to prevent contamination.
- **Making It Safe**—We must treat water to remove natural and man made impurities.
- **Proving It's Safe**—We must consistently monitor water quality and take swift, corrective action when deficiencies are identified. The success of these barriers relies on the involvement and vigilance of us all: government, business, landowners, public interest groups, and individual citizens.

# Need for Commitment

Source water protection requires a strong commitment at the local level. The process we have developed employs a combination of management approaches but above all it is a consensus-driven process. Its success depends upon the collaboration of all stakeholders. The cooperation of multiple stakeholders allows communities to carry out mutually beneficial, locally developed and administered source water protection programs that achieve the long-term goal of providing high quality drinking water.

## How to Design a Plan for Source Water Protection

Communities must learn about the risks and threats to their drinking water supply so they can make informed choices about protecting them from contamination. The following pages provide a summary of the steps necessary to develop a source water protection plan for a drinking water supply area. Detailed guides for each step in the process are also available.

### Step 1

#### **Form a Source Water Protection Advisory Committee**

The municipality or water utility is responsible for forming an advisory committee to champion source water protection. The composition of the committee should reflect the jurisdictional make-up of the source water supply area. The committee may include municipal councillors, municipal and water utility engineers, landowners, and residents living within the source water supply area. You may also need to hire specialized technical consultants to complete some steps.

The advisory committee must understand its roles and responsibilities and, more importantly, the consensus-based approach to addressing issues that relate to water quality. Consequently, in Step One the mandate of the advisory committee must be clearly defined. Specifically, all of the following should be clearly stated in the plan: roles of the committee members, their responsibilities, whom they report to, and their length of term. NSE can help you to choose the composition of the committee and to clarify its roles and responsibilities.

## Step 2

### **Delineate the Source Water Protection Area Boundary**

The second step is to identify and delineate the boundary of the source water supply area, which may be either a surface water or groundwater supply. The Step Two booklet provides detailed technical information on recommended delineation procedures. During this step, the advisory committee may solicit public input to ensure that there are no gaps in the information that describes the source water supply area.

## Step 3

### **Identify Potential Contaminants and Assess Risks**

The third step is to identify and document potential sources of contamination and to assess the risk they pose to the source water supply area. Once you have identified potential sources of water contamination, conduct an assessment of the level of risk they pose to the source water supply area. This may include identifying ecologically sensitive sites within the source water supply area. The intent of Step Three is to provide the advisory committee with an understanding of the types of activities and associated contaminants that have the potential to impair water quality. This forms the basis for management planning (Step Four).

## Step 4

### Develop and Adopt a Source Water Protection Management Plan

By this time the advisory committee should have a good working knowledge of the source water supply area. It must now develop management goals and objectives, and prepare the overall source water protection plan. It is critical that the committee set goals that are both technically sound and achievable. To be achievable, the goals must recognize the need to protect a water supply source, while also considering economic activity within the protection area and the way of life enjoyed by residents and landowners.

The source water protection plan is often based on a combination of the most appropriate management practices for the source water supply area. The plan may incorporate a range of available options and techniques known as the ABCs of source water protection:

- (A)cquisition of land. The direct ownership of land in the source water supply area affords one of the highest levels of water quality protection.
- (B)ylaws. Adopt or amend land-use bylaws or develop a new municipal planning strategy. These instruments allow regulation of land uses permitted in source water supply areas. You can find more information in the Department of Municipal Affairs Local Government Resource Handbook: *Municipal Water Supply Watershed Planning Model*, section 5.7.
- (B)est Management Practices. Use best management practices and guidelines to manage activities that take place in the source water supply area.
- (C)ontingency Plans. If there's a spill or other event that threatens the quality or quantity of the source water, a well-prepared contingency plan will allow continued protection of public health.
- (D)esignation. The Environment Act allows for the designation of Protected Water Areas. Designation allows a water utility or municipality to regulate activities like swimming, fishing and logging within a delineated area. You can find more information in Nova Scotia Environment technical document, *Designation of a Protected Water Area*.



- (E)ducation. Work with stakeholders in the source water supply area to teach them about drinking water and water resource stewardship.

Once the advisory committee has identified the range of options available to manage the drinking water supply, Nova Scotia Environment can review the plan. We will review the plan with respect to the Department's programs and policies. If a municipal planning strategy and land-use bylaws are used as a mechanism to protect the source water supply area, Municipal Affairs (DMA) should also be consulted.

The proposed plan should be presented to the public for comments prior to final submission to NSE.

## Step 5

### **Monitor and Evaluate the Plan**

Once you have implemented your source water protection plan, you will need to set up procedures for continuous evaluation. One of the key components of evaluation is to monitor for water quality contaminants entering the source water supply. Besides water quality monitoring, you will need to put into place a formalized source water protection plan review process. This procedure will evaluate the performance of the plan and ensure that it is updated thus ensuring that the plan remains current with changing conditions and priorities in the source water supply area.

Both the water utility or municipality and the advisory committee will need to continue to work with stakeholders to ensure that the management mechanisms incorporated into the source water protection plan are contributing to the maintenance of water quality or quantity. Note that the advisory committee's role is on-going. The protection plan may continue to develop and change to reflect changes within the source water supply area over time.

# Developing A Source Water Protection Plan: Summary Chart

<p><b>Step 1</b> <b>Advisory Committee</b></p>	<ol style="list-style-type: none"><li>1) The committee should reflect the jurisdictional make-up of the water supply area. It is important to include municipal councillors, water utility engineers, planners, landowners, and residents from the area</li><li>2) In addition, the committee may also include stakeholders from sectors such as agriculture, forestry, and other commercial operations</li></ol>
<p><b>Step 2</b> <b>Delineate Boundary</b></p>	<ol style="list-style-type: none"><li>1) Use maps and land-use information to delineate the boundary of the watershed area or groundwater capture zone</li><li>2) Mark the water supply boundary on a 1:50,000 scale (or less) map</li><li>3) The committee may solicit public input during this step in order to provide information about the watershed</li></ol>
<p><b>Step 3</b> <b>Assess Risks</b></p>	<ol style="list-style-type: none"><li>1) Conduct a comprehensive assessment of all land-use activities within the water supply area</li><li>2) Determine what activities impact or impair water quality</li><li>3) Identify potential future sources of contamination</li><li>4) Assess the risk that each activity or source of contamination will have on the source water</li><li>5) The committee may solicit public input at this step</li></ol>

<p>NSE can provide input into the composition of the committee and advise on roles and responsibilities</p>	<p><b>DELIVERABLES</b></p>	<p>Formation of Watershed or Wellfield Advisory Committee</p>
<p>The boundary of the water supply area may be submitted to NSE for review and comments</p>		<p>Delineation of Source Water Protection Area Boundary</p>
<p>NSE can review the committee's risk assessment of their water supply and provide input</p>		<p>Assessment of Vulnerability to Contamination</p>

## Summary Chart *continued*

### Step 4 Management Plan

- 1) Compile all information and set goals and objectives
- 2) Evaluate options
- 3) Develop management strategies to reduce negative impacts to water quality. Management options may include the following:
  - (A) Acquisition of land
  - (B) Bylaws – municipal planning for land-use
  - (B) Best Management Practices
  - (C) Contingency planning for emergency situations
  - (D) Designation
  - (E) Education
- 4) Public consultation

### Step 5 Monitor and Evaluate

- 1) Develop a monitoring program and schedule
- 2) Continue to evaluate the effectiveness of the management plan
- 3) Develop a mechanism for the committee to respond to impairment or changes in water quality
- 4) Modify the plan if necessary

NSE can provide input into the development of management practices and will review the final plan

Comprehensive Source Water Protection Plan

DELIVERABLES

NSE can provide technical assistance. Contact NSE in the event of contamination

Monitor Water Quality to Evaluate the Effectiveness of the Plan

## For More Information

This document briefly outlines the process for developing and implementing source water protection plans. Companion booklets give more detail about each step in the process:

**Step 1:** Form a Source Water Protection Advisory Committee

**Step 2:** Delineate a Source Water Protection Area Boundary

**Step 3:** Identify Potential Contaminants and Assess Risk

**Step 4:** Develop a Source Water Protection Management Plan

**Step 5:** Develop a Monitoring Program to Evaluate the Effectiveness of a Source Water Protection Plan

This series is part of Nova Scotia's Drinking Water Strategy.

For a copy of the strategy document, visit our website at

[www.novascotia.ca/nse/water/](http://www.novascotia.ca/nse/water/) or contact:

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Web address: [www.novascotia.ca/nse](http://www.novascotia.ca/nse)

For information about municipal planning and land-use bylaws, contact:

Department of Municipal Affairs

Planning & Advisory Services Section

P.O. Box 216

Halifax, B3J 2M4

Phone: (902) 424-6642

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Web address: [www.novascotia.ca/dma](http://www.novascotia.ca/dma)

# Glossary

## **Aquifer**

Any water-bearing stratum of rock, earth, or gravel that has sufficient porosity and permeability to yield ample supplies of groundwater in the form of wells or springs.

## **Best Management Practices (BMPs)**

Methods, measures, or practices to prevent or reduce water pollution. BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

## **Groundwater**

Water beneath the ground that is stored in an aquifer from which wells, springs, and groundwater runoff are supplied.

## **Source Water Protection**

An approach to managing drinking water supplies based on (1) the formation of an advisory committee to guide the development of the plan, (2) an inventory of land-uses and activities within the source water supply area, (3) determination of existing and potential threats to the drinking water supply, (4) the development of management strategies designed to reduce and eliminate threats to the drinking water supply, contingency planning, and (5) monitoring program to evaluate the effectiveness of the overall plan. This approach encourages collaboration with all stakeholders within the source water supply area.

## **Source Water Supply Area**

Refers to the area from which a water supply utility withdraws its drinking water. A source water supply area may consist of surface water, known as a watershed, or may be a groundwater supply area, known as an aquifer and delineated as a wellfield.

## **Surface Water**

Water that exists on the surface of the earth in the form of lakes, rivers, streams, brooks, and ponds.

## **Watershed**

A geographic area of land and surface water within the confines of a topographical drainage divide.



