Source Assessment Report

Introduction

the goal of the assessment is to help small water suppliers identify hazards and vulnerabilities to the water system, and then provide recommendations on risk management action steps. To conduct the assessment, the Comprehensive Drinking Water Source-To-Tap Assessment Guideline is used to provide guidance during the assessment process. From the guideline four modules were completed: Module 1, 2, 7 and 8. Module 1 delineates and characterizes the drinking water source, module 2 provides an inventory of any containment sources within water system, module 7 characterizes the risks identified during module 1 and 2, and module 8 will recommend action steps that can protect/improve the water system.

Module 1 – Characterization of Water Source

Name of your water supplier:_____

Name of the water source:_____

Water license number:_____

The following pages are a summary of the important information related to the water source and system. This information will help give a clearer understanding and characterization to the water source, which can then be used to identify any applicable hazards. The location of hazards as well as the intake location are to be recorded on the map(s) provided in Appendix A, using a numerical identifier associated with the numbering system from Table 2.

Water demand has been allowed to grow for centuries because the benefits of using water are so great. The greatest advances in human longevity arrived when we figured out how to bring clean water to our homes and take dirty water away. We found many other ways to enjoy water's blessing and encouraged people to enjoy those blessings by giving water away, for free.

Administrative Info

Name of Watershed:

Health Authority /Name of DWO :

Water license number:

Community Watershed Code:

Delineation of Water Source Area Info

Source water body name:

Latitude & longitude or UTM coordinates of intake:

Intake Elevation:

Mapped location of intake:

Intake Location and Integrity Info

Describe intake location and depth:

Describe the accessibility for inspection and cleaning of intake:

Sediment Build-up? Yes / No

Comments:

How often do you clean out the build-up?

Do you have protection from animals and vandalism?

- Is the intake fenced?
- Is there signage?

Does ice form at the intake? Yes / No

Comments:

Describe intake integrity and sanitary features:

- Do you have a fish-bearing stream? Yes / No
- Do you have a screen on the intake? Yes / No
- What material is your piping? (PVC, ABS , Copper, Concrete) Yes / No
- Do you use a diversion ? (Include a photo) Yes / No
- Is your intake on private or crown land? Yes / No

Intrinsic Vulnerabilities of Source Area Info

Watershed area

Terrain stability:

- Have there been landslides? Years? Frequency? _____
- Have there been mudslides? Years? Frequency? _____
- Have there been avalanches? Years? Frequency? _____

Runoff direction (map?)

_____

Vegetation type and cover: Circle any applicable types of forests found in watershed

Interior cedar-hemlock / Englemann spruce-subalpine fir / Montaine Spruce / Interior Douglas fir

Wildlife:

Are there any beaver dams or log jams present in your stream/river? Yes / No
If yes, where are they located? (Mark on map)

% crown land _____ % privately owned land _____

Source Water Quality and Volume Info

Water Quality (physical, biological and chemical)

- Do you test your water? Yes / No
- What do you test for?_____

  _____
- How is your sampling preformed? Inline / manual
- Frequency of testing? weekly / monthly / annually

License quantity and type of use: Residential / Commercial / Agriculture / Other

_____

Do you track your water use? i.e –metered used at intake or individual users: Yes / No

_____

Source Water Quality and Volume Info

Climate data (from environment Canada)

- Precipitation _____
- Mean monthly and annual temperature _____
- Annual monthly and annual humidity _____
- Average date of spring freshet for water source _____
- Has this system suffered from low flows due to drought in the past? Specific years? _____

_____

- Has flash flooding occurred in the past? Specific years? _____
- Likelihood and susceptibility of extreme weather (drought, flood, etc) _____

_____

Module 2 – Inventorying Contaminant Sources

Circle any applicable hazards in your watershed and mark on the map in the appendix with an associated number:

Natural Hazards

1. Landslides
2. Wildfires
3. Low Flows/Drought
4. Wildlife
5. Algae Blooms
6. Avalanches
7. Sediment / Coarse material
8. Floods

Human Caused Hazards

9. Mines
10. Major Roads (highways)
11. Logging/Forestry
12. Culverts/bridges
13. Agriculture (herbicides/ pesticides)
14. Forest Service Roads
15. Recreation (hiking, ATV, camping,horseback, mountain biking, etc.)
16. Septic Fields
17. Gasoline/Diesel Storage
18. Range Animals (cattle/horses)

Note: Please refer to Appendix B for information on the above hazards and the potential contaminants associated with them. Keep in mind that this is not a complete list, just a starting point for some typical hazards.

All source waters are vulnerable to contamination. Microbial pathogens are the most pervasive (widespread) contaminants and definitely the most certain to cause human illness if they are allowed to breach your water treatment processes.

Table 1 – Hazard Identification Table

	Drinking Water Hazard	Possible Effects	Distance from source	Description of existing barrier *	Owner	Map Number
	e.g. Coarse material	e.g. Plug intake	e.g. Directly upstream	e.g. Screen on intake	e.g. water supplier	#??
Physical						
Chemical						
Biological						

*Preventative measures

Examples of Existing Preventative Measures:

- Source Protection Plan
- Treatment/disinfection I.e. - chlorination, UV, filtering, settling pond
- Fence and locks around intake
- Signage (e.g. drinking water source, community watershed)
- E.g. - Gas station as a hazard a double walled storage tank would be an existing preventative measure

Module 7 – Characterize Risks From Source-to-Tap

After completing Modules 1 and 2 the hazards are assigned and prioritized using a risk analysis matrix. First the likelihood of a hazard is determined (Table 2), then the consequence if that hazard occurred is determined (Table 2). Based on this information each hazard is assigned a risk ranking (Table 3).

Table 2: Likelihood Table

Likelihood is an estimate of the probability the event, condition, action or inaction will occur and that negative impacts would result.

Level	Descriptor	Description	Probability in Next 10 Years
A	Almost Certain	Is expected to occur in most circumstances	>90%
B	Likely	Will probably occur in most circumstances	71-90%
C	Possible	Will probably occur at some time	31-70%
D	Unlikely	Could occur at some time	10-30%
E	Rare	May only occur in exceptional circumstances	<10%

Table 3: Consequence Table.

Consequence is the nature and degree of impacts if a hazard does occur.

Level	Descriptor	Description
1	Insignificant	Insignificant impact, no illness, little disruption to normal operation, little or no increase in normal operating costs
2	Minor	Minor impact for small population, mild illness moderately likely, some manageable operation disruption, small increase in operating costs
3	Moderate	Minor impact for large population, mild to moderate illness probable, significant modification to normal operation but manageable, operating costs increase, increased monitoring
4	Major	Major impact for small population, severe illness probable, systems significantly compromised and abnormal operation if at all, high level monitoring required
5	Catastrophic	Major impact for large population, severe illness probable, complete failure of systems

Table 4. Risk Analysis Matrix = Likelihood x Consequence

Likelihood	Consequence				
	1 Significant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A (Almost Certain)	Moderate	High	Very High	Very High	Very High
B (Likely)	Moderate	High	High	Very High	Very High
C (Possible)	Low	Moderate	High	Very High	Very High
D (Unlikely)	Low	Low	Moderate	High	Very High
E (Rare)	Low	Low	Moderate	High	High

For each Hazard identified in Table 2 assign a likelihood of occurrence, consequence rating and overall risk level. Provide any assumptions about why you chose that level of likelihood or consequence or if measures have been put in place to reduce the impact of the hazard on water quality or quantity.

Table 5 – Risk Characterization Table

Drinking Water Hazard	Likelihood Level	Consequence Level	Risk Level	Assumption/ Comments

Module 8 – Management Plan and Implementation Strategy

The foundation for delivering safe drinking water is the use of multiple barriers to limit the exposure of drinking water to a particular hazard. This starts with barriers in the source water and source protection is the first barrier in the multi-barrier approach to protecting drinking water quality and quantity.

The intent of the Source Water Assessment is to recommend a process to address the hazards that are a threat to drinking water safety and sustainability of a drinking water supply. Based on the risks to drinking water quality and quantity presented in Table 5, there may or may not be a need for protection of the source water quality through the implementation of strengthened and additional barriers in the watershed area. In Table 6 list the hazards based on their risk ranking, the associated risk ranking, existing barriers in place to mitigate the hazard, if there are management actions that can be taken to address the risk and whom would carry out the action.

Table 6 – Recommended Risk Management Actions

Risk Ranking (highest to lowest)	Drinking Water Hazard	Existing Management Actions or barriers	Proposed Management Actions	By whom?

We built cities in floodplains with the assumption that walls and levees could defend them. We built reservoirs with the assumption that precipitation would fill them. Some of these assumptions were wrong, and we lost lives, property and money. Climate change will increase the rate of assumption failure and the suffering of people depending on infrastructure that is too weak to resist nature's might. Since 2012, "Superstorm" Sandy has hit America's east coast, floods have submerged Brisbane, Calgary and central Europe, and Typhoon Haiyan has devastated the Philippines. These events will become more common and their damage more painful. We need to reduce our exposure to risk.