Halifax Regional Water Commission

COLLINS PARK
Small System

SOURCE WATER PROTECTION PLAN

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2.0 Introduction

The Halifax Regional Water Commission (HRWC) operates 7 small systems (4-groundwater, 3-surface supplies), in smaller communities outside the urban core, that are independent from the major distribution systems associated with the Pockwock Lake, Lake Major and Bennery Lake water supply areas. The Plant Operations department operates these systems with each having their own water source, use a variety of treatment technologies and have from 9 to 300 customers.

The following Source Water Protection Plan is specific to the Collins Park Subdivision Small System that is located north of Fall River on the northeast side of Lake Fletcher.

3.0 HRWC Management of Small System

The Halifax Regional Water Commission will make customer education and awareness a priority in management of this small system. With the number of small systems HRWC manages and the limited number of customers served at these locations, forming individual committees at the same scale as the larger systems is not practical. In the long term customers may become aware of the importance of a source water protection plan and may request that a committee be formed to tackle issues as they arise. If this occurs HRWC will strive to meet the needs of its customers.

4.0 Overview of Collins Park Small System (*taken from*, CBCL Limited Consulting Engineers, Collins Park System Assessment Report, 2003)

Collins Park was developed in the early 1970s using on-site water and sewage services. Elevated arsenic concentrations were found in a considerable number of drilled wells in the late middle to late 1970's, and in 1984/85 the Municipality of the County of Halifax constructed a water treatment and distribution systems to service the area.

Although developed to service the "Collins Park Subdivision", the water distribution system also services a section of the adjacent Kendalmark Estates subdivision.

4.1 Watershed (taken from, CBCL Limited Consulting Engineers, Collins Park, System Assessment Report, 2003)

The water supply for Collins Park is Fletchers Lake. The lake is part of the Shubenacadie River Watershed "corridor", which includes the following:

- Lake Charles;
- Lake William;
- Lake Thomas;
- Fletchers Lake;
- Grand Lake; and
- Shubenacadie River.

The Shubenacadie River Watershed is heavily developed and ownership is a mixture of private and public land.

Appendix 1 shows the location of the treatment facility on the edge of Fletchers Lake as well as the general serviced area.

4.2 Overview of Existing Watershed Management and Control (taken from, CBCL Limited Consulting Engineers, Collins Park System Assessment Report, 2003)

The HRWC does not have management control within the Shubenacadie River Watershed. Development is controlled by the Halifax Regional Municipality (HRM) Municipal Planning Strategy (MPS), which is currently under review for unserviced areas.

The Shubenacadie Watershed Environmental Protection Society (SWEPS) was formed in 1993 with a mission to maintain lake water quality to at least 1990 standards (if not to improve the quality) for economic, environmental, recreational, and life supporting purposes.

SWEPS has partnered with other community interest groups and government departments such as the Shubenacadie River Grand Lake Watershed Advisory Board, the Shubenacadie Canal Commission, the Riverlake Environmental Association, the Lockview Ratepayers Association, the Halifax County Lakes Advisory Board, the Nova Scotia Department of Health, the Nova Scotia Department of Environment and Labour, and the HRM, to help achieve their goal. Some of the work completed since 1999 includes:

- Testing of 45 raw water sites within the Shubenacadie watershed;
- A septic pumping awareness program;
- Sanitary survey to identify the location and condition of on-site sewage disposal systems;
- Established a registry of on-site sewage disposal system; and
- Promote awareness of sources pollutant loading to the lakes.

5.0 Potential Contaminants and Assessed Risk

Development within the watershed consists of residential, small commercial, industrial and recreational. The development is controlled by the HRM MPS. The MPS identifies the type of development for all areas of HRM.

In general, potential sources of contamination include natural biological degradation of organic material, industrial/commercial operations, wastewater treatment plants, septic effluent, surface runoff, and inappropriate uses of the watershed.

Specific sources of contamination in the Shubenacadie River Watershed, at the Collins Park location, include the following:

- Wastewater Treatment Plants discharging to Fletchers Lake:

  - Fort Scenic Apartments; and
  - Lockview Road Wastewater Treatment Facility.
- Wastewater treatment plants discharging upstream of Fletchers Lake;
- Malfunction on-site sewage disposal systems;
- Discharges from individual wastewater sloping sand filters; and
- Impacts directly near the intake.

Intake

Uses of the lake directly around the intake include boat launching, two highway drainage system discharge points, and recreational activities such as swimming and motorized boating.

A surface water drainage ditch discharges into the lake adjacent to the boat-launching ramp. The drainage ditch has the potential to transport contamination from Highway 2, and from the adjacent residential properties, directly to the intake location.

There have been reports of oil slicks in the area of the intake.

5.1 Contaminants and Risk

Table 1 identifies the current activities known to occur within the Source Water Protection Area and summarizes the potential contaminants involved, point or non-point source pollutant, and potential impact.

Wastewater management: Management of wastewater upstream of the intake is critical to minimizing risks to the raw water supply. Municipal owned treatment facilities have the potential to harm the raw water supply if there are overflows or mechanical failures that direct untreated wastes to the river / lake system. Private on-site sewage disposal systems are considered a risk to the water supply if improperly installed, wrong materials enter the system, there is surface damage to the drainage field, or field is leaching contaminants to groundwater through bedrock fissures.

Surface Runoff: Drainage ditches from Route 2 empty in to Lake Fletcher on either side of the treatment facility intake. All substances from residential properties, upslope of the treatment facility that can be transported by runoff during storm events or spring snowmelt can potentially affect the raw water quality. Spills from traffic accidents within the vicinity of the treatment facility can flow in the ditches, enter Lake Fletcher and potentially contaminate water near the intake.

Recreational activities: Lake Fletcher is used during the summer for boating and swimming, with the boat launch next to the intake used on a regular basis. These activities are a direct risk to the water supply as hydrocarbons and bacteria from human presence in the lake may enter the intake.

Accumulative Residential pollutants: Non-point source pollutants in residential areas can migrate to the water supply from areas upstream by way of leaching through bedrock fissures and then entering groundwater and eventually the lake/river system, or from direct

surface runoff to the lake. Home heating oil, lawn and garden fertilizers, automobile leaks, household products, industrial chemicals, road salting, etc. are a few sources of chemicals that can eventually impair the raw water quality.

Table 1: Summary of current activities known to occur within the source water protection area.

Activity	Potential Contaminant	Point Source	Non-Point Source	Potential Impact
Wastewater Management	Bacteria and other materials from municipal or septic systems.	X	X	Above acceptable heterotrophic plate counts.
Surface Runoff	Runoff from neighbouring roads and ditches.		X	Storm ditches enter lake near intake. Path for contamination.
Recreational Activity	Hydrocarbons from boats or when vehicles used to launch boat:s: bacteria from human presence in water		X	Hydrocarbons, vehicle fluids and sediment entering lake near intake from boating or boat launch. Many people swimming near intake may increase likelihood for bacteria entering supply.
Accumulative Residential Pollutants	Home heating oil, lawn and garden pesticides and fertilizers, household products, industrial chemicals, road salt		X	Migration to lake near intake.

5.2 Identified Issues Prioritized

Table 2: Scale of Problem and Priority Rank of activities within the protected water area.

Activity	Contamination Issue	Scale of Problem*	Priority Rank**
Wastewater Management	Untreated waste entering source water from municipal or septic systems.	4	3
Surface Runoff	Hydrocarbons, vehicle fluids, siltation	4	2
Recreational Activity	1) boating 2) boat launch 3) swimming	1) 4 2) 2 3) 5	1) 2 2) 1 3) 3
Accumulative Residential Pollutants	1) home heating oil 2) streets, vehicle fluids, salts 3) household products	1) 4 2) 4 3) 5	1) 4 2) 5 3) 5

**Scale of Problem rank: 1=severe, 3=moderate, 5=minimal*
***Priority rank: 1=high, 3=moderate, 5=low*

<u>Recreational</u>

Boat Launch: The boat launch next to the intake is an unnecessary risk to the water supply that can lead to immediate contamination due to hydrocarbons or sediments being stirred up.

Boating: Lake Fletcher and other lakes in the water supply area are used on a regular basis during the summer months by motorized watercraft. This recreational activity can lead to contamination if an incident occurs in proximity to the intake.

Swimming: Swimming occurs near the intake, and people entering the water at this point may release human wastes or release of human borne disease or bacteria that can enter the intake.

Wastewater Management

Sewage Failure: HRM managed sewage treatment facilities that can discharge directly to or immediately upstream of Lake Fletcher can have an impact on the raw water quality depending on amounts discharged, stage of treatment prior to discharge, and whether lake current carries effluent to intake. High bacteria counts can shutdown water supply.

Septic Failure: Multiple failing septic systems upstream of Lake Fletcher or immediately uphill from the intake can have a negative impact on the raw water supply over time as material is carried towards the intake.

Surface Runoff

Storm runoff: Two storm ditches that carry runoff accumulated along Route 2 adjacent to the treatment facility, discharge on either side of the intake and directly impact water quality.

Adjacent road Route 2: A traffic accident in proximity to the treatment facility may lead to vehicle fluids entering Lake Fletcher and contaminating water supply.

Accumulative Residential pollutants:

Home Heating Oil: Home heating oil tanks that are either exposed to weather or the possible shifting of their base from frost action, if not built properly, can be an environmental problem. Condition of storage tanks in the protection area is not known; however some are observed with no protective shield over line connections which are a current requirement of insurance companies. As well these tanks are directly exposed to the weather that may limit their operating time.

Household Products: The majority of lawn care and garden products become bound by the soil and plant material following application, limiting the amount leaching to the ground water table that is dependent on concentrations used and weather conditions following applications.

6.0 Management Plan

The following plan for the Collins Park Small System details the Goals and Objectives, Management Recommendations for identified risks, Implementation Strategy, Contingency plan, and Evaluation and Updating.

In 2005 the original copy of the Source Water Protection Plan was drafted and submitted by HRWC to NSDEL. The original management plan provided a formal overview of the issues encountered by HRWC on the watershed and steps taken to ensure a safe, sustainable drinking water supply to HRWC customers.

The Source Water Protection Plan is reviewed annually to ensure proper implementation is being followed. A major review is completed every five years to make necessary changes to the plan.

6.1 Goals and Objectives

Goal: To provide high quality water and service to valued customers, at the best possible price, by fostering teamwork and innovation.

Objective: To gain customer support for source water protection plan through education and stewardship.
Objective: Garner support from the recreational community to protect raw water quality by instituting a 100 meter radius zone from the intake where boating, boat launching and swimming is restricted.

6.2 Management Recommendations

Issues to be addressed in the source water protection area are: (1) recreational, (2) wastewater management, (3) Recreational activities, and (4) accumulative residential pollutants.

<u>Recreational</u>

Boat Launch: Unauthorized vehicle access near the treatment facility and intake needs to be stopped to prevent people from launching boats or using the access as a parking space.

Boating: Banning watercraft on the lake would assist the protection of the source water but would lead to animosity within the community. Directing boating away from a portion of the lake near the intake may reduce risk to the water supply.

Swimming: Similar to the issue of boating, direct people away from the intake to other areas may minimize risk to water supply.

<u>Wastewater Management</u>

Sewage Failure: HRWC should be informed when there are mechanical failures or flow problems at the HRM sewage treatment plants that direct untreated waste upstream of the intake.

Septic Failure: Homeowners are responsible for the condition and functioning of their septic systems so that they do not fail and discharge sewage and contaminants on the surface or allow leaching to shallow groundwater. To ensure the risks to the water supply from septic fields is reduced HRWC should inform homeowners (customers and adjacent homes upstream) of the consequences of failing septic systems on the water supply and what action they can take to ensure their septic field functions correctly.

Surface Runoff and ditching at Route 2

It is assumed the current intake and treatment facility was established after ditching along Route 2 and drainage to Lake Fletcher was engineered. The HRWC to investigate options to reengineer these drainage features so that risk of contamination of water supply is minimized.

Accumulative Residential pollutants:

Home Heating Oil: Homeowners immediately "upstream" of the intake are responsible for the condition of their heating oil tanks and most insurance companies require that tanks be replaced every 10 years and measures be taken to protect tank from the elements. HRWC is not responsible for the condition of heating oil tanks within the SWPA; however it would be prudent that homeowners immediately upstream of the intake (customers and others) be informed of the consequences of leaking oil tanks on this small system and ways they can avoid such a problem. It is recommended HRWC provide homeowners with information to consider in maintaining their oil tanks.

Household Products: Not all homeowners are aware that products used around their home, such as lawn and garden fertilizers can seep to the ground water and their drinking supply (depending on concentrations used and rainfall following application). It is recommended that HRWC inform homeowners immediately upstream of the intake of consequences of using harmful chemicals within the SWPA.

6.3 Implementation Strategy

Recreational

Boat Launch: Gating and barriers to be placed at the entrance to the treatment facility to prevent people from launching boats next to the intake.

Boating: Signage near the intake will be used as a method to keep motorized boats away by up to 100 meters (330 feet).

Swimming: Signage near the intake will also require swimming to be at least 100 meters (330 feet) away.

Wastewater Management

Sewage Failure: HRM notification to HRWC in HRM SOP's and emergency plan. HRWC sampling for bacteria counts.

Septic Failure: HRWC to prepare information package for homeowners in the vicinity of the intake on proper maintenance for septic systems and the potential impacts of a failed system on a ground water supply. This can accompany information on oil tanks, and also be presented in such a way that encourages homeowners to recognize the importance of a wellhead protection plan. Contact SWEPS to learn about their program in the rest of the Shubenacadie watershed upstream from the intake.

Surface Runoff and ditching at Route 2

With the goal of protecting the raw water supply from potential upslope contaminants or runoff from Route 2, HRWC will approach HRM to have flows redirected significantly downstream from the intake.

Accumulative Residential pollutants:

Home Heating Oil Tanks: HRWC to prepare general letter to customers within the SWPA and other nearby homeowners upstream of the intake that have oil tanks to inform them of the potential impact of leaks to surface water supplies and recommend measures they can take to prevent such events from happening. Letter should be in such a tone that it encourages homeowners to buy in to protect their water supply through some easy steps. Other documentation will accompany letter to support HRWC intent. Letter and documentation are to be hand delivered and only given to homeowners that have an oil tank; therefore, contacting residents door to door would be required to find out if they have an oil tank and if so they will receive a package.

Household Products: Similar procedure as with notice regarding oil tanks, however package is to be delivered to all customers within the Collins Park system and other homeowners immediately upstream of intake, and can be distributed from door to door without direct contact with resident.

6.4 Contingency (Mitigation, Preparedness and Response)

Contingency planning consists of: 1) Mitigation – eliminate, prevent or reduce probability/impact of a disaster or emergency, 2) Preparedness – keeping systems in operation & minimize damage, and 3) Response – reduce property damage and enhance effectiveness of recovery.

Mitigation: Steps will be taken to mitigate risks to the raw water supply through education and awareness in the subdivision and residences neighbouring and upstream from the intake. There will be continued monitoring of the raw water according to the Water Quality Sampling and Permit Compliance Manual (see 7.0).

Preparedness: HRWC has plant operations staff dedicated to maintenance of the treatment plant facility on a weekly basis (or more often) in order to keep systems operating and treated water to meet guidelines.

Response: There is currently a contingency plan in place if there is a mechanical failure at the treatment facility that prevents water from being supplied or if there are problems found with the raw water supply.

The Supervisory Control and Data Acquisition system (SCADA) monitors the mechanics of the treatment process and if a problem is detected a message is relayed to HRWC Plant Operations staff via cell phones for a person to correct the mechanical problem.

If raw water samples reveal that the water is contaminated (non-pathogen), the subdivision can be supplied with trucked treated bulk water from the Pockwock system that is pumped in to the clear well and then enters the system. If the clear well is found to be contaminated it must first be flushed and cleaned and determined to be safe before bulk water is added.

6.5 Evaluation and Updating

HRWC Plant Operations employees responsible for small systems will evaluate the source water protection plan at the end of the fiscal year (March 31) in any year, to identify any new risks in the SWPA or lessons learned over the last year. Updates that may be required in the wellhead protection plan will be initiated and completed by the Superintendent of Plant Operations. In addition, the Superintendent of Plant Operations will be responsible to oversee the investigation of events that had potential to impact the source water, and document findings. The source water protection plan will be updated accordingly.

7.0 Monitoring Program

The HRWC currently follows the Water Quality Sampling and Permit Compliance Manual that details sampling and reporting procedures for each of the systems HRWC manages. In addition, to this regular monitoring to maintain operating permits, HRWC needs to meet provincial regulations that specify quality standards for water produced, and needs to meet or exceed the Guidelines for Canadian Drinking Water Quality.

Three additional items will be added to the regular testing procedures, analysis for (1) chlorides, (2) hydrocarbons and (3) heterotrophic plate counts. These will be tests to determine influence from (1) road salts, (2) hydrocarbons either from heating oil

tanks, watercraft, or spills on neighbouring roads, and (3) effects of malfunctioning on-site septic systems or municipal sewage overflows.

Sampling procedures will be amended to accommodate the additional tests.