

1.0 Executive Summary

Based on the analysis of available information, this spring source is rated as having a medium susceptibility to protozoa contamination. This rating is due primarily to the high percentage of pasture land cover in the assessment area and the associated potential for contamination. No permitted discharges or other regulated facilities have been identified in the assessment area using GIS, however, other potential threats to water quality noted during site inspections may be listed in Appendix 1.

2.0 Introduction

This report was completed under the NYS DOH's Source Water Assessment Program (SWAP). The purpose of this program is to compile, organize, and evaluate information regarding possible and actual threats to the quality of public drinking water sources (PWSs). The information contained in assessment reports will assist the State in overseeing public water systems and help local authorities in protecting their source water quality. It is important to note that source water assessment reports estimate the potential for untreated drinking water sources to be impacted by contamination. These reports do not address the safety or quality of treated finished tap water.

The source water assessment reports are based on reasonably available information, primarily from statewide databases. Although efforts have been made to check these reports for accuracy, the nature of the available data makes the elimination of all error from these reports nearly impossible.

The following steps were performed for each assessment of each drinking water source:

Delineation of the source water assessment area(s) – A topographic assessment area border was created defining the land area that contributes water to the drinking water source. In most cases the overall assessment area contains only one zone. However, a second zone was created where flow barriers and/or large geographic distances decrease the likelihood of contaminants in portions of the overall assessment area from impacting drinking water quality at the intake. A drinking water source's natural sensitivity ratings are also assigned during the delineation phase. These rating are conceptually based on water body size and flow characteristics, along with general fate and transport characteristics of contaminant categories. Ultimately, natural sensitivity ratings are used along with contaminant prevalence ratings (described below) to define a drinking water source's susceptibility to contamination.

Inventory of Potential Contaminant Sources (PCSs) – This inventory compiles the areal land cover percentages and a listing of specific facilities, (e.g. landfills, Superfund sites) within the assessment area(s). In additions to data on specific facilities, the contaminant inventory includes SWAP rating values (i.e. Major/Minor/NP ratings). Information contained in contaminant inventories is used to create Contaminant Prevalence ratings in the next step.

Susceptibility Determination – SWAP susceptibility ratings are defined using the drinking water source's sensitivity and contaminant prevalence ratings. Sensitivity is defined using the water body type classification during the delineation phase. Contaminant prevalence values are assigned based on the nature of the potential contaminant sources (i.e. Major/Minor/NP ratings described in Appendix 3) present in the assessment area and the location (Zone1 Vs Zone 2) of these potential contaminant sources relative to the drinking water intake.

3.0 The Assessment Area

3.1 Delineation and Basic Assessment Area Attributes

The topographic assessment area delineation for this drinking water source is presented in Figure 1. Details on the overall SWAP delineation methodology is presented in Appendix 3. Some additional identification information and general assessment area information is presented in Table 1.

It is important to note that a topographic drainage boundary may not accurately depict a spring's actual recharge area. While the SWAP delineations are a good starting point, it is recommended that more advanced hydrogeologic delineation methods should be considered.

One of the biggest dangers of using springs as source of drinking water is that they have a relatively high likelihood of being ground water under the direct influence of surface water (GWUDI). Basically, this means they collect water that has not passed through enough fine grained soil to filter out the large diameter pathogens that are commonly found in surface waters. Springs have a tendency to be GWUDI because they generally collect water from shallow depths that has not spent much time in the ground.

While making GWUDI determinations is beyond the scope of SWAP, all spring sources need to undergo a formal evaluation to determine if they are under the direct influence of surface water. In some cases the topographic assessment area delineations used in SWAP includes stream watersheds. This is not intended to suggest this drinking water source is under the direct influence of surface water.

Ongoing spring recharge area protection programs are the best way to identify, understand, manage, and control water quality problems. While the SWAP program is useful in identifying and describing potential threats to drinking water quality, it cannot replace a local management program. It is also important to state that all management programs are not equal, active programs with regulatory authority are generally best at protecting water quality.

Additional information on this water system and sources is contained in the NYS DOH SWAP Database in Appendix 1. In addition to information on local protection efforts, The NYS DOH SWAP Database may contain information and contamination concerns noted during sanitary surveys of public water systems, and in some cases, information provided by the public water system. Furthermore, the water supplier and/or the local health unit may have additional information not contained in the NYS DOH SWAP database.

3.2 Assessment area SWAP Sensitivity Rating

This drinking water source's water body type and SWAP natural sensitivity rating are presented in Table 2.

SWAP natural sensitivity ratings are assigned using the table presented in Appendix 3. The rationale for these ratings are based on the size and flow characteristics of the water body types, along with the fate and transport characteristics of the contaminant categories in each contaminant type classification.

Springs have SWAP natural sensitivity rating of medium for all contaminant types. However, these ratings assume that the spring is not under the direct influence of surface water. If this spring is determined to be GWUDI, this drinking water source should be re-evaluated using the natural sensitivity ratings of the influencing surface water body.

4.0 Contaminant Inventories and Susceptibility

Once an assessment area for a particular water supply has been delineated and natural sensitivity ratings are assigned, contaminant inventories and contaminant prevalence and susceptibility ratings are created. To simplify these analyses and the presentation of results, these tasks are treated separately for the different types of available data.

The overall contaminant inventory task in the assessment for surface drinking water sources consists of the compilation of land cover and discrete facilities within delineated assessment area(s). First, the percentages of land cover types within the assessment area(s) are calculated. Next, contaminant inventories are created separately for those facilities with permitted discharges (Permitted Discharge PCSs) and other potential contaminant sources (Other GIS PCSs). This distinction was made because facilities with permitted discharges tend to be more important potential sources of contamination for surface waters, and these facilities have more useful information contained in their GIS databases. Additional PCSs are the final category of potential contaminants included in this report. This category includes potential sources of contamination that are depicted as lines in GIS (e.g. roads, pipelines) and those potential sources of contamination in the NYS DOH SWAP Database (or other available data, e.g. AEM data, PWL list, etc) that are not accounted for in the Other GIS PCSs inventories.

In order to simplify the process, and allow for the clear presentation of results, contaminant inventories utilize contaminant categories, rather than individual contaminant names. These contaminant categories are based on similarities in origin, fate and transport in the environment, and consequences in drinking water. The contaminant categories that have been identified as important to surface drinking water sources are presented in the Glossary in Appendix 4.

Once contaminant inventories are compiled, Susceptibility ratings are separately created for each of the above mentioned data types. This is done by first creating contaminant prevalence ratings for each contaminant category based on the types of land cover discrete PCSs present in the assessment area. These values are then used along with natural sensitivity ratings to assign susceptibility ratings for each contaminant category.

4.1 Land Cover

Land cover within the assessment area is inventoried and compiled to calculate contaminant prevalence ratings, and these ratings are used along with the assessment area's natural sensitivity ratings to create the drinking water source's susceptibility ratings. More details on this methodology are presented in the SWAP plan and Appendix 3.

The MRLC data set is used to obtain land cover data in the SWAP. This data set was derived using Landsat images obtained between 1988 and 1993. The images used were primarily collected during the spring leaves-off period, but fall leaves-off images, and various leaves-on images were also used. While this data set is generally considered to be a very good general land cover classification product, some inaccuracies still exist. The major problem with this data set's use in SWAP is that it sometimes does not make accurate distinctions between row crops and pasture.

4.1.1 Contaminant Inventory

Land cover percentages within this assessment area are presented in Table 3. These percentages were compiled using the MRLC land cover data, and specific details on the SWAP Landuse methodology is presented in Appendix 3.

4.1.2 Contaminant Prevalence and Susceptibility

Contaminant prevalence and susceptibility ratings based on land cover are presented in Table 4. The

contaminant prevalence and susceptibility ratings for this assessment area have been rated medium for protozoa due to the high percentage of pasture land cover in the assessment area.

4.2 Discrete Potential Contaminant Sources (PCSs)

The purpose of this section of the SWAP report is to describe and rate potential sources of contamination associated with individual facilities, rather than land cover. There are no permitted discharges or other GIS PCSs located in this assessment area. Additional information on PCSs may be listed in the NYS DOH SWAP Database (see Appendix 1).

5.0 Overall Susceptibility Discussion

Based on the analysis of available information, this spring source is rated as having a medium susceptibility to protozoa contamination. This rating is due primarily to the high percentage of pasture land cover in the assessment area and the associated potential for contamination. No permitted discharges or other regulated facilities have been identified in the assessment area using GIS, however, other potential threats to water quality noted during site inspections may be listed in Appendix 1.

SUMMARY SIGNIFICANT FINDINGS		
Potential Sources of Contamination	Potential Impacts to Water Source	Contaminants of Concern
Agricultural Land Cover - row crops	MEDIUM	Protozoa
Agricultural Land Cover - row crops	MEDIUM	Protozoa

Table 1: System and Source Information

System Information			
System Name:	CRYSTAL WATER CO (WEST VALLEY)		
Federal ID	NY0400352	System Type	Community
County Served	CATTARAUGUS		
Source Information			
TINWSF Number:	2585704		
External System Number	65418		
Source Name	#3 - INDIAN CRE		
Assessment Area Size*	1.66	(Sqr. miles)	
	1064.2075	(Acres)	
Source Water Body Size*	-99.0	(Acres)	

* -99 means area could not be calculated in GIS

Table 2: Natural Sensitivity Ratings

Waterbody Type	Spring
Contaminant Types and Categories	Sensitivity Rating
Organics =	High
Halogenated Solvents	
Petroleum Products	
Other Industrial Organics	
Other Chemicals =	Medium
Pesticides Herbicides	
Metals	
Nitrates	
Sediments Turbidity	
Disinfection Byproduct Precursors	
Phosphorus =	Low
Phosphorus	
Microbials =	Medium
Protozoa	
Enteric Bacteria	
Enteric Viruses	

Table 3: Land Cover Percentages

Land Use Class	Zone 1	Zone 2
Water	1.42	0.00
Low Intensity Residential	0.00	0.00
High Intensity Residential	0.00	0.00
High Intensity Commercial	0.00	0.00
Pasture	15.74	0.00
Row Crops	1.32	0.00
Other Grasses	0.00	0.00
Evergreen Forest	6.85	0.00
Mixed Forest	10.49	0.00
Deciduous Forest	64.18	0.00
Woody Wetland	0.00	0.00
Emergent Wetland	0.00	0.00
Barren; Quarries, Strip Mines, and Gravel Pits	0.00	0.00
Barren; Bare Rock and Sand	0.00	0.00
Barren; Transitional_including clear cut areas	0.00	0.00

Table 4: Land Use Susceptibility Analysis Summary

Contaminant Categories	CP Rating	Dominant land cover causing rating Z1	Dominant land cover causing rating Z2	Land cover notes	Susceptibility Rating
Organics					
rptSWAP_AddOn Halogenated Solvents	NEGLIGIBLE				
Petroleum Products	NEGLIGIBLE				
Other Industrial Organics	NEGLIGIBLE				
Other Chemicals					
Pesticides Herbicides	LOW				
Metals	NEGLIGIBLE				
Nitrates	LOW				
Sediments Turbidity	NEGLIGIBLE				
Cations/Anions Salts, Sulfate	NEGLIGIBLE				
DBP Precursors	LOW				
Phosphorus					
Phosphorus	LOW				
Microbials					
Protozoa	MEDIUM	Pasture			MEDIUM
Enteric Bacteria	LOW				
Enteric Viruses	LOW				

Appendix 1

NYS DOH SWAP Database

NY0400352 CRYSTAL WATER CO (WEST VALLEY) #3 - INDIAN CREEK SPRING

I. System Level Info

A. Protection

1. *Watershed Rules and Regulations?* No *Details:*
2. *Existing Protection Description*
3. *Jurisdiction of Source?* CWC owns 19.54 acres around the Pine Tree and Maple Springs and 1.9 acres around the Indian Springs.

B. Water Quality Concerns

1. *Concerns of LHU* No
2. *SWTR/DBP Issues* No
3. *System Treatment Concerns?* No
4. *Significant Public Concern - Water Quality* No
5. *Significant Public Concern - Contaminants* No

C. Other Info Available

1.

II. Source Information

A. Delineation

1. *Delineation Description* The spring intake is located in a rock outcrop in a ravine. The recharge area is delineated by the topographic drainage divide.
2. *Zones*
3. *Date* 2/28/2002
4. *Intake to Shore* *Depth* *Units*

B. Potential Contamination

1. *Significant Sum Survey Finding* Vehicular traffic on Rosick Hill
Road systems Off-site sewage disposal
2. *Water Quality Concerns* No
3. *Existing Contaminant Inventory Date*
4. *Surface Water Body Influence* No *Distance* 50
Description Indian Creek flows from north to south.

5. Waterbody Quality

6. *Source Structural or Locational Concerns* The spring consists of a concrete water collection box which is perilously attached to a rock outcrop on the side of a ravine.