

Appendix G
Source Water Assessment Program

The Source Water Assessment Program (SWAP) in the Cayuga Lake Watershed

NYS DOH

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Statewide Program Overview

Congress amended the Safe Drinking Water Act in 1996 and added the Source Water Assessment Program (SWAP) that requires states to evaluate the sources of water that are used to supply public drinking water. The New York State Department of Health (DOH) is implementing the program for New York State. With help from the New York State Department of Environmental Conservation, County Health Departments, other state and federal government agencies as well as private and public interest groups, the DOH developed a plan to carry out this new program (New York State Department of Health, (1999)).

The Safe Drinking Water Act requires that each source of water (e.g. well, stream, lake, reservoir) used by a public water system be evaluated to identify possible contaminant threats to the source water quality. This evaluation is called a Source Water Assessment and the elements that will be completed for each source water assessment are described below.

- X **Delineate the source water assessment area.** This involves determining where the public drinking water originates. In New York, most public drinking water systems draw water from wells. However, some of New York's largest systems use water from streams, lakes and reservoirs. The assessments will identify an area of land surrounding the well, stream or other water body that likely contributes water to each source of public water.
- X **Complete the contaminant inventory.** This involves identifying and listing potential sources of contamination that could adversely affect the quality of the source of water.
- X **Conduct a susceptibility analysis.** This involves evaluating the likelihood that a source of public drinking water could become contaminated.

The Source Water Assessment Program is designed to compile and organize information for making better decisions regarding source water protection. The information compiled for the assessments will assist the State in overseeing public water systems and the completed assessments will provide a rational basis to support future local and state source water protection activities. The Source Water Assessment Program does not impose any new mandates or regulations on owners or operators of public water systems.

Ultimately Source Water Assessment Reports will be developed for every drinking water source in New York. In order to facilitate this enormous task, this program emphasizes the use of reasonably available existing information. Consequently, this program relies heavily on statewide GIS data coverages to define the hydrogeological sensitivity of public water supply sources and create contaminant inventories. This information will then be used to extent practical to define water supplies' overall susceptibility to contamination. While these efforts will be valuable in identifying potential contamination threats, it is hoped that SWAP will serve as a catalyst to the development of more extensive local source water protection efforts.

Specific roles and responsibilities in the SWAP are split between numerous different parties. The NYS DOH and local health units are currently putting source water information (e.g. locations, water quality data, system design features) into a statewide information database (called SDWIS). Also, DOH personnel are working with a variety of other parties to secure GIS databases and finalizing data analysis and management procedures. The best available information will be used by the DOH to complete SWAP reports for the water supplies in the state which use surface water sources. SWAP reports for groundwater systems will be completed by contractors using information provided by the DOH. These contractors can also use other sources of information when quality control criteria are met.

SWAP in the Cayuga Lake Watershed

SWAP efforts have not yet been completed in the Cayuga Lake Watershed. Some local records (e.g. well geocoded locatioal data) and statewide GIS databases (e.g. Hazmat spill locations) still need to be compiled and checked. These data will then be used by the DOH to complete SWAP reports for the drinking water supplies which draw from surface waters. The DOH will supply these data to contractors who will complete SWAP reports for the groundwater supplies. In all cases these reports will be subject to local health department reviews before the are presented to the public.

The current SWAP effort in the Cayuga Lake Watershed described in this document focuses on defining the landuse based contaminant prevalence for the surface water intakes. In addition, statewide GIS layers have been used to characterize some of the groundwater wells as being located in highly sensitive hydrogeological settings. The purpose of this work is to begin the SWAP effort in this watershed so that this program can be included in the ongoing management activities in the watershed. While SWAP is far from being complete, the efforts to date should serve to identify drinking water concerns that need to be addressed in the overall watershed management plan that is being developed. The framework established in the overall watershed management plan, along with the information in SWAP reports, can provide and excellent beginning for local source water (and other environmental) protection efforts.

SWAP delineations for each of the surface water supplies were created by combining sub-watersheds presented in Genesee/Finger Lakes Regional Planning Council and Ecologic (2000) and/or by taking topographically derived subsections from 11 digit HUCs delineated using USGS topographic maps. For each of the surface water intakes located on Cayuga Lake, the overall watershed was divided into two zones. Zone 1 (primary importance) comprises those sub-watersheds nearest the intake, and the remainder of the watershed (including the lake area) was

defined as Zone 2 (secondary importance). The determinations of which subwatershed should be included in Zone 1s were made qualitatively based on the assumption that the predominant flow in lake is from south to north with recirculation cells being about as wide as the lake.

It is important to note here that contaminant transport differs between lake and stream settings. Stream intakes are vulnerable to spills and other contamination events at great distances due to the fast direct nature of flow in these settings. For this reason, only single zones were established for the systems which use stream intakes (City of Ithaca and Cornell University).

Only those sources with locational data in SDWIS were considered in this analysis and the existing source location data has yet to undergo the final quality control check. Figure 1 depicts the watershed borders presented in Genesee/Finger Lakes Regional Planning Council and Ecologic (2000), with those portions of the designated as Zone 1 (for at least one water system) highlighted. It should be noted that after locational data are finalized, the inclusion of subwatersheds on the north eastern section of the Bolton Point Zone 1 delineation may need to be reconsidered (i.e. Big Salmon Creeks, Little Salmon Creek, Salmon Creek, Locke Creek, potentially others).

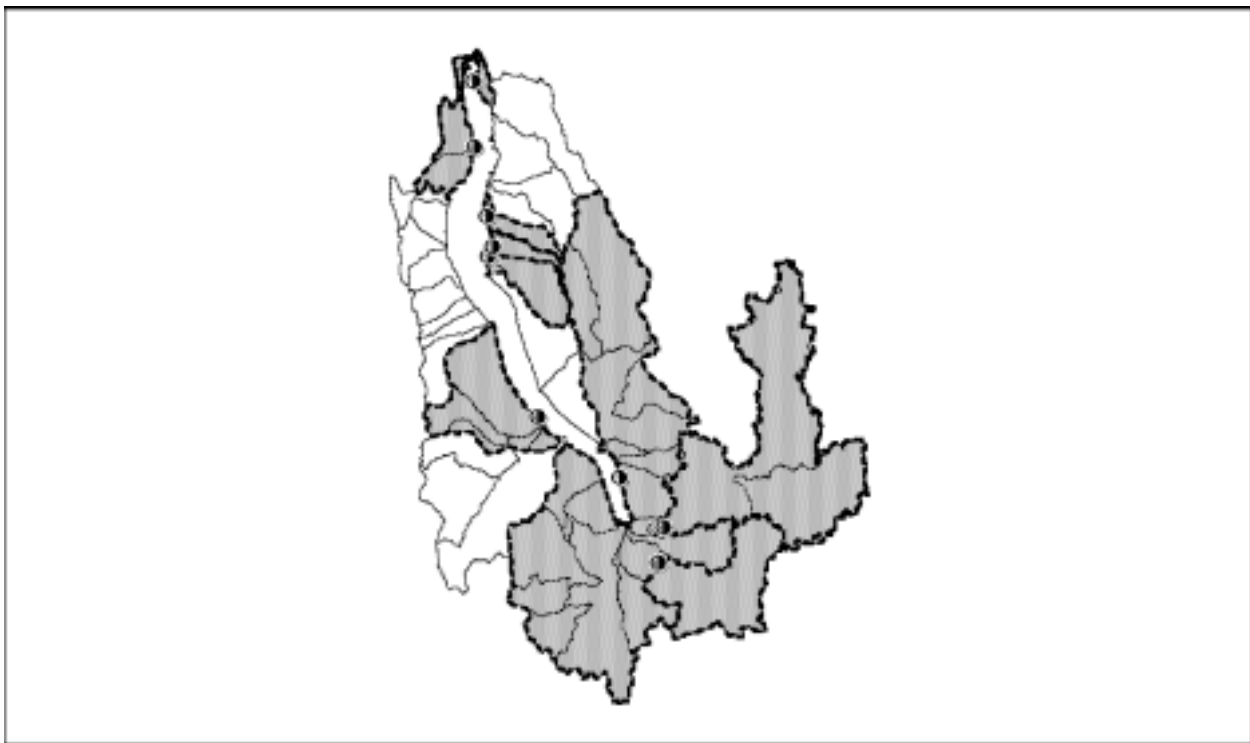


FIGURE 1: Cayuga Lake Watershed with SWAP Zone 1 areas highlighted. Points represent surface water intakes. The fine lines depict subwatersheds from Genesee/Finger Lakes Regional Planning Council and Ecologic (2000), and the heavy dashed lines represent individual Zone 1 boundaries.

Aerial landuse data were then compiled for each of these zones using Landsat data(** FILL IN LAYER ID). It was necessary to use these data rather than the landuse data presented in Genesee/Finger Lakes Regional Planning Council and Ecologic (2000), because of differences in

geographic boundaries considered and the classification category requirements of the SWAP methodology. These landuse data for each intake's zone(s) were then converted to percentages and used to calculate landuse based contaminant prevalence as described in the SWAP Plan. It should be noted that the default Landuse Contaminant Potential Rating (SWAP Plan ,Table 5) were used in all cases.

These analyses indicate that landuse based drinking water concerns in the Cayuga Lake Watershed are associated with the following contaminant categories: Protozoans, Enteric Viruses, Enteric Bacteria, Pesticides and Herbicides, Phosphorus, and Disinfection Byproduct Precursors. The two water systems with stream intakes showed the lowest prevalence ratings with only a "medium" for Protozoans and "lows" for all the other categories. All drinking water sources which draw from Cayuga Lake had a contaminant prevalence rating of "medium" for all the categories listed above.

The only discreet facility data considered here is a SPDES permit GIS layer compiled by the DOH in 1994. Newer SPDES data was not used, because all the information needed to make the distinctions between major and minor facilities (as described in the MAJ/MIN Supplemental Guidance) is not currently available elsewhere. While this data layer may not represent current conditions in the watershed, it is still useful in this preliminary analysis to make some general statements.

Numerous SPDES facilities exist in the Cayuga Lake watershed, and only those facilities which discharge to surface waters were considered in the compilation of this contaminate inventory. A total of 30 facilities (16 majors and 14 minors) were located in the overall watershed, and 23 (12 majors and 11 minors) were located in Zone 1 designated areas (see Figure 1). Overall, more of these sites were located in the southern portion of the watershed. However, relatively few facilities were identified in the stream intake assessment areas (City of Ithaca- none; Cornell University- 4 major and 2 minor). Based on a qualitative analysis only, these facilities (major SPDES discharges) likely represent a significant continual source of protozoa. Therefore, the overall susceptibility of drinking water intakes in this watershed is relatively high. This assessment will be reviewed taking into account drinking water regulations and ambient water quality criteria being developed by the U. S. Environmental Protection Agency.

Preliminary analysis of hydrogeologic sensitivity for the located groundwater sources was performed. Four wells in the Genoa-king Ferry Water district were designated as having high sensitivity due to being located in zone of high hydraulic conductivity (>100 gpm), and a total of 9 subsurface collectors were given a high rating for being located in areas with bedrock located less than three meters below the ground's surface.

It is also important to note that a large number of "groundwater" sources in this watershed are at risk for being under the direct influence of surface water. Basically, this means the water moves through the ground too quickly and does not undergo enough natural filtration before it gets to collection device. Therefore, large diameter pathogens (such as *Cryptosporidium* and *Girardia*) may be present, and this water should undergo filtration (as is done with surface waters) before it is consumed.

There are certain types of “groundwater” collection devices that are particularly vulnerable to surface water influence, these include: springs, infiltration galleries, shallow horizontal collectors, beach wells, dug wells, crib intakes. In addition shallow wells and wells located near surface waters are also at risk. It is very important that potential for surface water influence be tested for all the “groundwater” collectors identified as being at risk.

Reference:

Genesee/Finger Lakes Regional Planning Council and Ecologic. 2000. Cayuga Lake Watershed: Preliminary Watershed Characterization. CD rom.

New York State Department of Health. 1999. Source Water Assessment program Plan: Final.

New York State Department of Health. 1999. Major/minor SWAP Supp. Guidance