

Northwestern Lancaster County Authority
Manheim Area Water & Sewer Authority
Lancaster County, PA
Source Water Protection Plan

Executive Summary

Clean, safe drinking water is often taken for granted. Many people have no idea where their water comes from, how it is purified, or how it arrives at their sink. Protecting the raw water supply has been increasingly recognized as a critical element in the overall mission of delivering a safe and reliable supply of drinking water to consumers. Comprehensive source water protection not only benefits the water supply, but ultimately the economic, social, and environmental well-being of a community.

Project Background

In 2012, Northwestern Lancaster County Authority (NWLCA) applied for assistance from the Pennsylvania Department of Environmental Protection (DEP) Source Water Protection Technical Assistance Program (SWPTAP). In February 2013, DEP approved the work plan and initiated the NWLCA SWPTAP project. During plan development in 2013, neighboring Manheim Area Water and Sewer Authority (MAWSA) expressed interest in becoming a partner in source water protection. Because of the proximity of their sources and overlapping protection zones, it was determined that it would be best to develop and implement a combined SWPTAP plan as a team.

NWLCA and MAWSA wish to preserve and improve the safety of their drinking water supply for their customers today and into the future. They are concerned about the possibility of contamination from various sources including agricultural operations, auto related businesses, industrial sites, and former industrial and brownfield sites.

The objective of this project is to develop a source water protection plan that delineates the recharge areas for the NWLCA and MAWSA water sources, determines the transport times and pathways of potential contaminants, identifies potential sources of contamination, educates the public on the

importance of source water protection, plan for potential pollution events, and complies with Pennsylvania Department of Environmental Protection's (DEP) Chapter 109 regulations (see Section 1.3).

The importance for source water protection is further bolstered by the experiences of this community with source water contamination. In the case of the Northwestern Lancaster County Authority, such experiences include the contamination of Well No. 1, which ultimately led to its abandonment as a public drinking water source and a positive test result for cryptosporidium for Well No. 2 in June 2010. The latter event resulted in the need for NWLCA to implement costly temporary filtration during the design and permitting of its permanent water treatment facility.

Description of Study Area

Due to their sources' proximity, Northwestern Lancaster County Authority and Manheim Area Water and Sewer Authority share a study area for this project, which is located mostly in Lancaster County, with the northern portion extending into Lebanon County. It spans portions of 13 municipalities including West Cornwall Township, Cornwall Borough, and South Lebanon Township in Lebanon County; and Rapho Township, Penn Township, Manheim Borough, Elizabeth Township, Lititz Borough, Warwick Township, Manheim Township, East Hempfield Township, East Petersburg Borough, and West Hempfield Township in Lancaster Township.

Overview of Water System

Today, the Northwestern Lancaster County Authority water system consists of two groundwater wells located in Penn Township. NWLCA owns the property on which both wells are located. Water from the wells is treated using membrane filtration and ion exchange to remove nitrates. In addition, the treated water is chlorinated prior to distribution to customers. The water system includes a 500,000 gallon storage tank. The Susquehanna River Basin Commission has approved a Total System Withdrawal Limit of 167,000 gallons per day (0.167 mgd) for the system. The Pennsylvania Department of Environmental Protection (DEP) has permitted the system at a combined delivery of 504,000 gallons per day (0.504 mgd). Currently, the water system serves as average demand of 158,000 gallons per day (0.158 mgd) and a peak demand of about 314,000 gallons per day (0.314 mgd). Additionally, NWLCA owns and maintains a separate booster pumping station and water distribution system on Fruitville Pike from which water is supplied through bulk purchase from the City of Lancaster.

The Manheim Area Water and Sewer Authority also consists of two groundwater wells, which are located in Manheim Borough, off Rettew Lane. MAWSA owns the property on which one of its wells lie, and Manheim Borough owns the property where the second well is located. Raw water is treated using diatomaceous earth filters, volatile organic carbon air strippers, chlorination and fluoridation. In addition to its wells, the system includes a water treatment plant, two booster stations, a transfer/booster station, and three storage tanks capable of holding 2 million, 1 million and 0.5 million gallons of water. The MAWSA wells are capable of producing 650 gallons per minute. This is the safe yield for each well, as well as a combined safe yield for the system. MAWSA provides water to approximately 6,000 customers in Manheim Borough, and Penn and Rapho Townships through 2,744 domestic, commercial, and industrial connections. Currently, the system delivers an average daily demand of 648,000 gallons per day (0.648 mgd) and a peak demand of 936,000 gallons per day (0.936 mgd).

Source Water Protection Zone Delineations

A significant purpose of the source water protection program is to delineate protection zones around each well. Source water protection zones for the water sources were delineated using a steady-state hydrogeologic computer model and other calculations based on well information, groundwater flow patterns and watershed configuration. The most protective zone, Zone I, is a circle around each well with a radius ranging from 100 to 400 feet (DEP, 2005). The second most protective zone, Zone II, represents the 10-year time of travel – the area from which groundwater has a high probability of reaching the well in fewer than ten years. Zone III is the upgradient extent of the subbasin that can contribute water to the capture zone. The extent of the protection zones is confined to Lancaster County in Penn and Rapho Townships and Manheim Borough, and is approximately 20.33 square miles.

Potential Sources of Contamination (PSOCs)

After the protection zones were delineated, numerous sources were used to identify potential sources of contamination (PSOCs) in the zones. Both point sources and non-point sources were identified. All of the PSOCs were ranked from A to F, with A posing the greatest potential threat and F the least potential threat.

Non-point PSOCs were identified through land use data, aerial photographs, and input from the DEP and water system. The most significant non-point sources of pollution include runoff from state roads

in Zone II, which received an A ranking. Agricultural lands comprise the largest portion of land use in the zones and is B ranked when located in Zones I and II.

Publicly-available environmental databases, field surveys, and input from the steering committee and DEP were all used to identify point source PSOCs. A total of 103 point source PSOCs were identified for the water systems. There were no PSOCs in Zone I for any of the wells. The most significant PSOCs identified include 46 in the various Zone II and III protection zones; of which 11 received an A ranking and 35 received a B ranking.

Management Options

NWLCA and MAWSA will use a variety of management options to develop a comprehensive approach to source water protection and protect its water supplies from the PSOCs. They will work cooperatively with surrounding municipalities and municipal officials to implement this source water protection plan.

Contingency Planning

In the event of an accident or spill that has the potential to impact NWLCA and/or MAWSA's water supplies, the water system will initiate emergency response plans to minimize any potential impacts. NWLCA and MAWSA maintain an emergency response plan (ERP) and update it regularly. The plan includes emergency contacts and provisions for alternate sources of water. NWLCA and MAWSA will work closely with local and county first responders in the event of a spill or accident that may threaten the water supply.

New Sources

As part of an approved source water protection plan, the community water supplier must review steps that would be taken to replace their sources in the event that an existing source becomes unusable. If a contamination event occurred that results in NWLCA and/or MAWSA not being able to use any of their sources, they would work with DEP and other partners to identify, develop, and permit additional sources.