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Lake Ontelaunee and Maiden Creek Watershed Source Water Protection Plan

Reading Area Water Authority

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SPOTTS | STEVENS | McCOY

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Executive Summary

The Reading Area Water Authority (RAWA) currently provides drinking water to approximately 88,000 people in Reading, Pennsylvania and several surrounding communities. RAWA is able to serve more than 125,000 people through interconnections with other water systems. The water source is Lake Ontelaunee in the Maiden Creek Watershed, located northeast of Reading in Berks and Lehigh Counties. Lake Ontelaunee is a 1,082-acre man-made lake that was created in the 1920s, and holds approximately 3.3 billion gallons of water. Surface water enters the lake primarily from Maiden Creek and its main tributary Sacony Creek, with inputs from numerous other streams, including several small tributaries that flow directly into the lake. The reservoir is impaired by sediment and phosphorus, and EPA had developed total maximum daily loads (TMDLs) for the lake for both these parameters.

The time-of-travel delineation completed for this study shows that the entire 216-square-mile watershed is within the 25-hour time-of-travel for RAWA's water supply intake. Thus, watershed activities that occur seemingly far from Lake Ontelaunee can impact the reservoir within a very short time. The most critical potential sources of contamination are bridge crossings of major roads over Maiden Creek and its tributaries. A truck accident at or near one of these bridges could spill contaminants (*e.g.*, fuel oil or any bulk chemical) directly into the water supply.

To assess the sedimentation problem in Lake Ontelaunee, Spotts, Stevens & McCoy, Inc. completed a detailed bathymetric survey in 2004. Based on this study, it is estimated that approximately 512 million gallons of storage capacity have been lost in the reservoir due to accumulated sediment, which is a 15% loss of water storage. Most of the sediment has accumulated in the upstream reaches of the lake, downstream of the Route 662 bridge. Sedimentation has also occurred in shallow littoral areas and the original stream channel. The survey results showed that very little of the main, deep part of the reservoir has filled with sediment. However, because the upstream reaches are basically sediment-filled, future sediment deposits will occur in the main reservoir.

In the absence of a management plan, sediment will start to fill the main area of the lake, contribute nutrients, and may contribute to flooding of the area north of PA Route 662. Watershed best management practices (BMPs) represent the best solutions to minimize sediment from ever getting to Lake Ontelaunee. An interim plan to manage sediment in Lake Ontelaunee includes (1) dredging the neck of Lake Ontelaunee to prevent migration of sediment into the main lake and minimize upstream flooding, completed with onsite dewatering, and (2) negotiation with the nearby Lehigh Cement Quarry for long-term disposal.

The municipal ordinances in the Maiden Creek Watershed vary widely in their ability to protect water resources. Several municipalities have strong ordinances that are highly protective of natural resources; others have barely any protection at all; and still others have a stated intent to protect natural resources (through their non-binding comprehensive plans) but their ordinances have weak protective language. Both previous studies and the steering committee for this project have identified stronger municipal ordinances as critical for protecting the water supply.

Protecting and restoring riparian buffers throughout the watershed may be one of the most effective management actions that RAWA can take to protect Lake Ontelaunee and to reduce potential treatment costs. Healthy, vegetated buffers remove nutrients and sediment from surface runoff, slow runoff before it enters a stream, ameliorate the effects of some pesticides, and improve the stream ecology. RAWA is assisting with ongoing projects to restore and protect riparian buffers throughout the Maiden Creek Watershed.

Other concerns for the water supply include livestock with direct access to streams; erosion from disturbance/development of steep slopes; excessive erosion from row crop tilling; groundwater contamination in karst/limestone geology; stormwater runoff from development; and septic system failures.

Although RAWA conducts routine monitoring for water treatment, it does not collect any samples from the watershed or the lake itself. Both the Maiden Creek Watershed Association and the Schuylkill Action Network conduct limited sampling programs throughout the watershed. The three programs will share data in the future for everyone's mutual benefit.

If RAWA needed to find a long-term new source of water to replace Lake Ontelaunee, the most likely candidate would be either an intake on the Schuylkill River or discharge water from the nearby Berks

Products quarry. Other possible sources include interconnections from other water suppliers, Willow Creek, and Antietam Lake, although none of these sources could supply the entire RAWA demand.

Table ES-1 presents the source water protection implementation plan. The recommendations are organized around a schedule that recognizes:

- A three-year schedule for major activities
- Capital improvements centered around dredging the upper neck of Lake Ontelaunee
- Ongoing activities that have already been started by either RAWA or project partners
- Partnership activities for which RAWA would not necessarily take the lead, but could support with staff or supplemental funding if the activity furthered the goals of the source water protection plan.
- Future activities that can likely be deferred until beyond the initial three-year plan.

Table ES-1 also identifies whether RAWA will play the lead (or only) role, where other organizations can likely be key partners, and where consulting services may be necessary. Costs are presented with potential funding sources, which may include RAWA funds, grants, and other sources of funds.

Table ES-1: Source Water Protection Implementation Plan

	Activity	RAWA BOD	RAWA Staff	Potential Partners								Cost	Possible Funding Sources	Primary Funding Sources
				BCCD	BCC	BCPC	BOK	PWD	MCWA	CFCL	Consultan			
YEAR 1														
1.1	Adopt Source Water Protection Plan	X												
1.2	Appoint Source Water Protection Manager	X										Salary for position	RAWA	
1.3	Develop Recognition Program for Participants	X		X	X							$1,000/year	RAWA, WREN grant	
1.4	Develop Committee to Implement Recommendations	X	X											
4.2	Cooperate with the Borough of Kutztown in Maintaining a Water Quality Sonde on Sacony Creek						X					$10,000 plus $500/year	RAWA	
4.3	Install and Maintain a Water Quality Sonde on the Maiden Creek Mainstem		X		X			X			X	$15,000 plus $500/year	RAWA	
4.4	Cooperate with the Maiden Creek Watershed Association to Collect Water Quality Data		X						X				Growing Greener	
4.5	Develop a Central Database for Water Quality Data										X	$3,000	RAWA, Growing Greener	
4.6	Implement Biosolid Monitoring Program		X	X					X		X		RAWA	BCCD program
4.7	Develop a Watershed Model for Phosphorus Loading (Data Collection, with 8.6)		X						X		X	$5,000 (with 8.6)	RAWA, Growing Greener	
5.1	Install a Streamflow Gage		X					X			X	$20,000	RAWA, PWD	
8.2	Negotiate Use of the Lehigh Cement Company Quarry for Long-term Sediment Disposal										X	$8,000	RAWA	
8.6	Develop a Sediment Model to Better Understand Sediment Dynamics (Data Collection, with 4.7)		X	X					X		X	$5,000 (with 4.7)	RAWA, Growing Greener	
8.8	Conduct Aerial Survey of Lake Ontelaunee		X	X									State Police Helicopter	
9.4	Coordinate with Berks County Emergency Management Agency		X											
9.5	Meet with Lehigh County Emergency Management Agency		X											

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YEAR 2														
4.7	Develop a Watershed Model for Phosphorus Loading (Data Collection, with 8.6)		X	X					X		X	$5,000 (with 8.6)	RAWA, Growing Greener	
8.3	Evaluate Use of a Diversion Area at the Entrance to Lake Ontelaunee										X	$30,000	RAWA	
8.6	Develop a Sediment Model to Better Understand Sediment Dynamics (Data Collection, with 4.7)			X					X		X	$5,000 (with 4.7)	RAWA, Growing Greener	
9.1	Conduct Detailed Analysis of Interconnections With Other Water Suppliers for Flows to RAWA		X								X	$30,000	RAWA	
10.1	Conduct Detailed Analysis of Developing a Schuylkill River Intake										X	$25,000	RAWA	
YEAR 3														
3.3 8.1	Provide assistance for BCCD's Sediment Control Programs Provide Funding for Streambank Fencing, Cattle Crossings, and Native Plantings			X	X							budget $15,000 to $20,000 per year	RAWA, Growing Greener	Estimate $20,000 per farm; BCCD programs
4.7	Develop a Watershed Model for Phosphorus Loading										X	$20,000	RAWA, Growing Greener	
6.2	Develop Education Program for School Children in the Maiden Creek Watershed			X								$5,000	WREN, DEP, Env. Ed grants	BCCD programs
8.6	Develop a Sediment Model to Better Understand Sediment Dynamics										X	$20,000	RAWA, Growing Greener	
CAPITAL IMPROVEMENTS														
8.4	YEAR 1 - Dredge the Upper Neck of Lake Ontelaunee to Create an In-stream Sediment Trap (Planning, Design, and Permitting)										X	$50,000	RAWA	
8.4	YEAR 2 - Dredge the Upper Neck of Lake Ontelaunee to Create an In-stream Sediment Trap (Planning, Design, and Permitting)										X	$100,000	RAWA	
8.4	YEAR 3 - Dredge the Upper Neck of Lake Ontelaunee to Create an In-stream Sediment Trap										X	$1,350,000	RAWA	
8.7	Evaluate Control of Purple Loosestrife in Upper Neck with Dredging									X	X	$15,000	RAWA, habitat grants	

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ONGOING ACTIVITIES														
2.1	Monitor Watershed For New PSOCs		X	X	X				X					
2.2	Enlist Volunteer Help to Monitor the Watershed		X	X	X				X				RAWA, Growing Greener	
2.3	Maintain the PSOC Database		X											
2.6	Continue Targeted Outreach to High-Risk PSOCs		X	X	X						X	$1,000/yr	WREN	
2.7	Monitor Goose Population and Implement Control Measures if Necessary		X											
3.1	Develop a Map and Summary of Previously Completed Riparian Projects in the Watershed with BCCD			X	X							$3,000	RAWA, William Penn Fdn	BCCD program
3.2	Provide Streambank Maintenance for Farmers		X	X										
3.5	Work with Golf Courses to Protect Streambanks			X	X	X						$1,000	RAWA, WREN, BCCD	
4.1	Participate in the Delaware Valley Early Warning System		X					X						
6.1	Partner with Other Agencies to Continue Education Program for Reading Area School Children			X								$5,000	WREN, DEP, Env. Ed grants	
9.2	Discuss Emergency Plans with Berks Products Quarry		X								X			
10.2	Conduct Detailed Evaluation of Using Berks Products Quarry Water for Emergency/Long-term Supply										X			
PARTNERSHIP ACTIVITIES														
3.6	Hold Educational Workshops about Riparian Buffers		X	X	X				X				Growing Greener	BCCD, BCC
3.7	Work with Municipalities to Adopt Stream Buffer Ordinances		X			X				X				BCPC
6.3	Attend Community Festivals with Educational Materials		X	X	X				X			$500/yr for materials	WREN	BCCD, BCC, MCWA
6.4	Develop Press Releases and Newspaper Articles About Source Water Protection		X	X	X	X			X					
7.1	Help Municipalities Strengthen Their Natural Resource Protection Ordinances					X				X		Budget $4,000/year		BCPC CZIP program; reimburses $10,000 per municipality
7.2	Educate Officials to Limit Granting Exceptions to Natural Resource Ordinances		X	X	X	X				X				
7.3	Support Sewerage Plans that Eliminate Failing Septic Systems and Septic System Education and Maintenance Programs		X			X						Letters of support		
8.5	Work with Watershed Municipalities to Adopt Sediment Control Measures During Construction			X										

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FUTURE ACTIVITIES														
2.4	Install Highway Signs Where I-78 Crosses Maiden Creek													
2.5	Develop Partnership with PennDOT													
3.4	Establish Program For Protecting Stream Buffers on Row-crop Agricultural Land													
6.5	Provide Funding for General Educational Programs in the Maiden Creek Watershed													
9.3	Conduct a Detailed Analysis for Developing an Emergency Intake on Willow Creek													
10.3	Discuss Long-term Water Needs with Western Berks Water Authority													
10.4	Investigate Possibility of Reactivating Antietam Lake													

Notes:
BCCD = Berks County Conservation District
BCC = Berks County Conservancy
BCPC = Berks County Planning Commision
BOK = Borough of Kutztown
PWD = Philadelphia Water Department
MCWA = Maiden Creek Watershed Association
CFCL = Center for Community Leadership, Albright College