FINAL REPORT

Spring Lake Atrazine Total Maximum Daily Load (TMDL)

IEPA/BOW/13-001

August 2014

Illinois EPA High Priority TMDL Watershed

Public Water Supply Designated Use Impairment

Illinois EPA/ Bureau of Water/Watershed Management Section/Planning Unit

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 29 2014

REPLY TO THE ATTENTION OF:
WW-16J

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OCT - 7 2014
Surface Water Section
BUREAU OF WATER

Marcia Willhite, Chief
Bureau of Water
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, Illinois 62794-9276

Dear Ms. Willhite:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for Spring Lake and Lake Glenn Shoals, including supporting documentation and follow up information. The lakes are located in southern and western Illinois. The two atrazine TMDLs submitted by the Illinois Environmental Protection Agency address the impaired designated Public and Food Processing Water Supply Use in the two lakes.

These TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Illinois's two TMDLs for atrazine in Spring Lake and Lake Glenn Shoals. The statutory and regulatory requirements, and EPA' s review of Illinois's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Illinois's effort in submitting these TMDLs and look forward to future TMDL submissions by the State of Illinois. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch at 312-886-0236.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Abel Haile, IEPA
Jennifer Clarke, IEPA

Contents

Section 1. Goals and Objectives for Spring Lake Watershed

1.1 Total Maximum Daily Load (TMDL) Overview

A Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. TMDLs are a requirement of Section 303(d) of the Clean Water Act (CWA). To meet this requirement, the Illinois Environmental Protection Agency (Illinois EPA) must identify water bodies not meeting water quality standards and then establish TMDLs for restoration of water quality. Illinois EPA lists water bodies not meeting water quality standards every two years. This list is called the 303(d) list and water bodies on the list are then targeted for TMDL development.

In general, a TMDL is a quantitative assessment of water quality problems, contributing sources, and pollution reductions needed to attain water quality standards. The TMDL specifies the amount of pollution or other stressor that needs to be reduced to meet water quality standards, allocates pollution control or management responsibilities among sources in a watershed, and provides a scientific and policy basis for taking actions needed to restore a water body.

Water quality standards are laws or regulations that states authorize to enhance water quality and protect public health and welfare. Water quality standards provide the foundation for accomplishing two of the principal goals of the CWA. These goals are:

- Restore and maintain the chemical, physical, and biological integrity of the nation's waters
- Where attainable, to achieve water quality that promotes protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water

Water quality standards consist of three elements:

- The designated beneficial use or uses of a water body or segment of a water body
- The water quality criteria necessary to protect the use or uses of that particular water body
- An antidegradation policy

Examples of designated uses are recreation and protection of aquatic life. Water quality criteria describe the quality of water that will support a designated use. Water quality criteria can be expressed as numeric limits or as a narrative statement. Antidegradation policies are adopted so that water quality improvements are conserved, maintained, and protected.

1.2 TMDL Goals and Objectives for Spring Lake Watershed

The Illinois EPA has a three-stage approach to TMDL development. The stages are:

- Stage 1 – Watershed Characterization, Data Analysis, Methodology Selection
- Stage 2 – Data Collection (optional)
- Stage 3 – TMDL Analysis, TMDL Scenarios, Implementation Plan

The impaired water body in the watershed is Spring Lake (RDR) and is part of the East Fork LaMoine River watershed. This impaired water body segment is shown on Figure 2. Table 1 lists the water body segment, water body size, and potential causes of impairment for the water body (IEPA 2014).

Table 1. Impairments in Spring Lake

Water Body Segment ID	Water Body Name	Size	Causes of Impairment with Numeric Water Quality Standards	Causes of Impairment with Assessment Guidelines
RDR	Spring Lake (McDonough)	277 acres	Total phosphorus*, Atrazine	TSS*, Aquatic Algae

*TMDLs are approved for these parameters

A previous TMDL for total phosphorus and total suspended solids was approved in September of 2007. The final TMDL for the East Fork LaMoine River Watershed is available at http://www.epa.state.il.us/water/tmdl/report/lamoine-east-fork/lamoine-east-final-tmdl.pdf. Information from the approved TMDL was used for this TMDL. This current TMDL report will focus on atrazine only. Atrazine has been listed in the 2014 Integrated Report as a potential cause of impairment in Spring Lake.

The TMDL for the segments listed above will specify the following elements:

- Loading Capacity (LC) or the maximum amount of pollutant loading a water body can receive without violating water quality standards
- Waste Load Allocation (WLA) or the portion of the TMDL allocated to existing or future point sources
- Load Allocation (LA) or the portion of the TMDL allocated to existing or future nonpoint sources and natural background
- Margin of Safety (MOS) or an accounting of uncertainty about the relationship between pollutant loads and receiving water quality

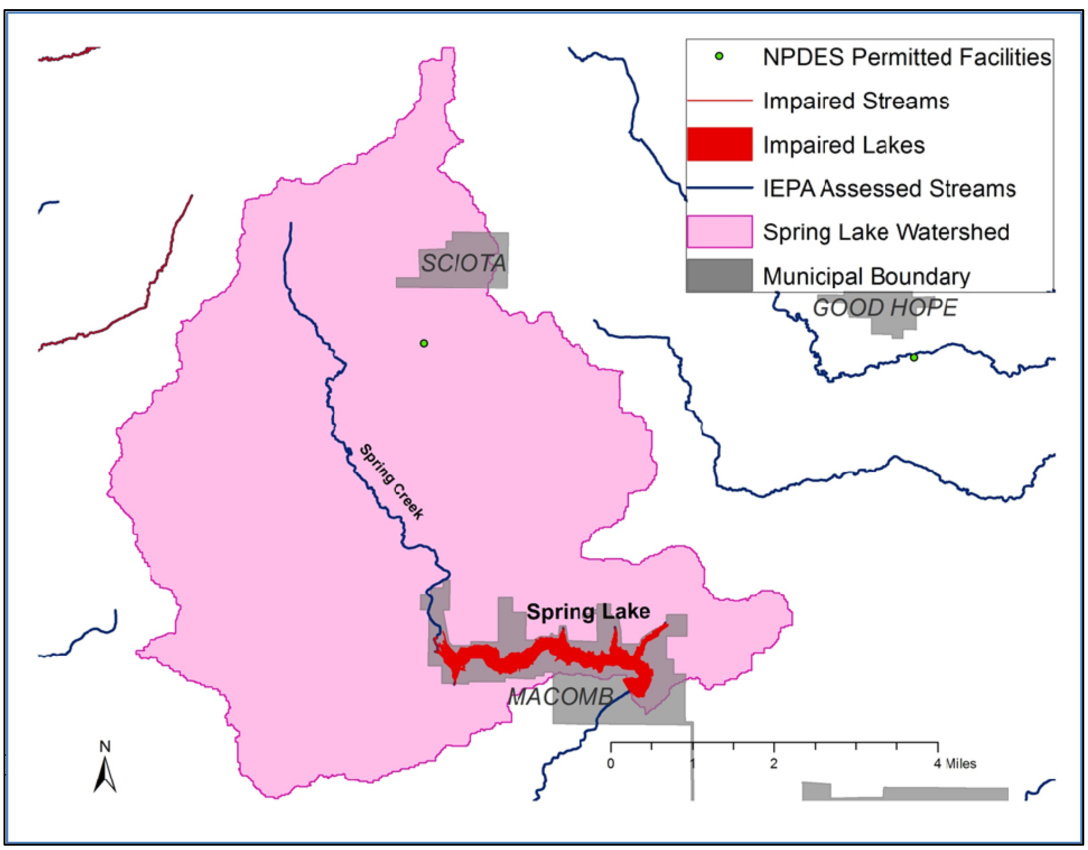
These elements are combined into the following equation:

$$\text{TMDL} = \text{LC} = \Sigma\text{WLA} + \Sigma\text{LA} + \text{MOS}$$

The TMDL developed must also take into account the seasonal variability of pollutant loads so that water quality standards are met during all seasons of the year. An allowance for increased atrazine loading (reserve capacity) was not included in this TMDL. Spring Lake is a drinking water source and atrazine is a chemical of concern; therefore, it is unlikely that changes to Spring Lake would result in an increased assimilative capacity of the lake capacity. Reasonable assurance that the TMDL will be achieved is described in the implementation plan. The implementation plan for Spring Lake watershed describes how water quality standards will be attained. This implementation plan includes recommendations for implementing best management practices (BMPs) and cost estimates.

Figure 1. Spring Lake Park Sign

Figure 2. Spring Lake Watershed



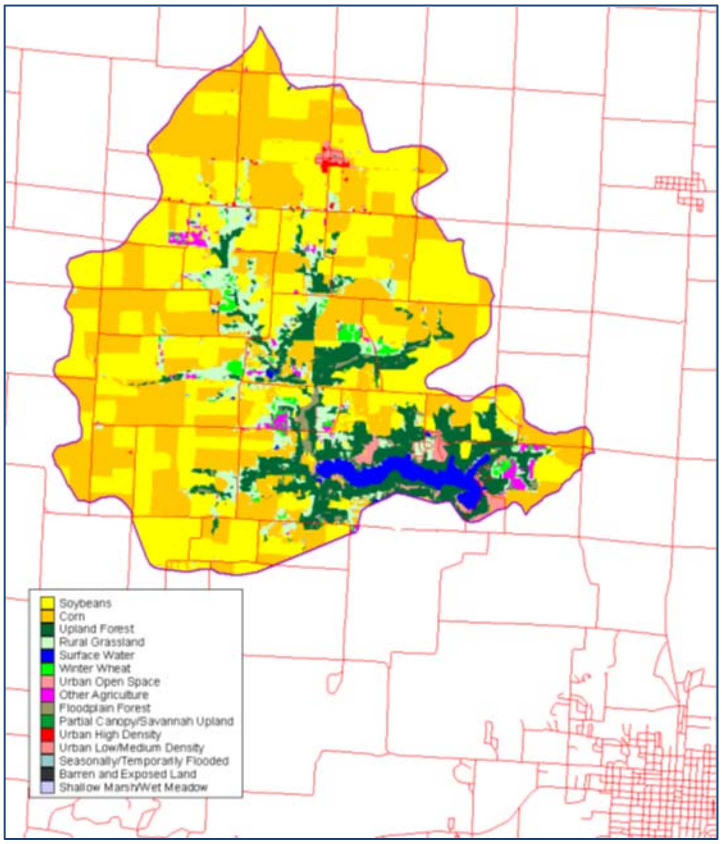
Section 2. Spring Lake Watershed Description

2.1 Spring Lake Watershed Location

The Spring Lake watershed is located in western Illinois, trends in a southeasterly direction, and drains approximately 13,700 acres within the state of Illinois. The watershed covers land within McDonough County.

2.2 Land Use

Figure 3. Landuse in the Spring Creek Watershed (Moorehouse 2008)



Land use information was taken from the Spring Lake Watershed Plan (Moorehouse 2008). The land cover data reveal that approximately 76 percent are devoted to agricultural activities. Rural grassland accounts for approximately 9 percent. Upland forests occupy about 11 percent of the total watershed area. Other land cover categories represent 4 percent of the total watershed area.

Tillage practices can be categorized as conventional till, reduced till, mulch-till, and no-till. The percentage of each tillage practice for corn, soybeans, and small grains by county are generated by the Illinois Department of Agriculture from County Transect Surveys. The most recent survey was conducted in 2011. Data specific to Spring Lake watershed were not available; however, the McDonough County practices were available and are shown in the following table.

Table 2. Corn Tillage Practices in McDonough County

Tillage System	2004	2006	2011
Conventional	43%	36%	66%
Reduced - Till	29%	32%	25%
Mulch - Till	16%	20%	2%
No - Till	12%	13%	6%

Estimates on tile drainage were provided by the McDonough County NRCS office (NRCS 2004). It is estimated that approximately 75 percent of the portion of the East Fork LaMoine River Watershed within McDonough County (the majority of the watershed) is estimated to be drained by field tiles.

2.4 Soils

Soil information was taken from the Spring Lake Watershed Plan and the County Soil Survey (Moorehouse 2008 and Prologer 2005). The dominant soil types in the watershed include, Ipava, Sable, Osco, Rozetta and Hickory. Ipava Silt Loam makes up 27 percent of the watershed and is level to gently sloping, somewhat poorly drained loess soil developed under prairie vegetation. This is a poorly drained soil and potential for runoff is low to medium. Sable Silty Clay Load makes up 16 percent of the watershed and is nearly level, poorly drained soil developed under prairie vegetation. It is well suited for farming with seasonal wetness with ponding being the most common management problem. This soil is poorly drained, moderately permeable and the potential for runoff is negligible. Osco Silt Loam makes up 12 percent of the watershed. Osco soils are gently sloping well drained prairie soils found on loess covered ridges and knolls. This soil is well drained and moderately sloping.

The K-factor of soils in the watershed range from 0.24 to 0.43. The factor signifies a relative index of susceptibility of bare, cultivated soil to particle detachment and transport by rainfall and is utilized in the Revised Universal Soil Loss Equation (RUSLE). Soil K-factors of 0.4 or greater indicate soils that have high silt content and are the most erodible while soils from 0.25 to 0.4 tend to be moderately erodible. Seventeen percent of the soils in the watershed have a K-factor of > 4 and are primarily located in the forested areas adjacent to Spring Lake and Spring Creek (figure 4).

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. Hydrologic soil groups B, C, and D are found within the East Fork La Moine River/

Spring Lake watershed, with the majority of the watershed falling into category B. Category B soils are defined as "soils having a moderate infiltration rate when thoroughly wet." B soils consist "chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture." These soils have a moderate rate of water transmission (NRCS 2005).

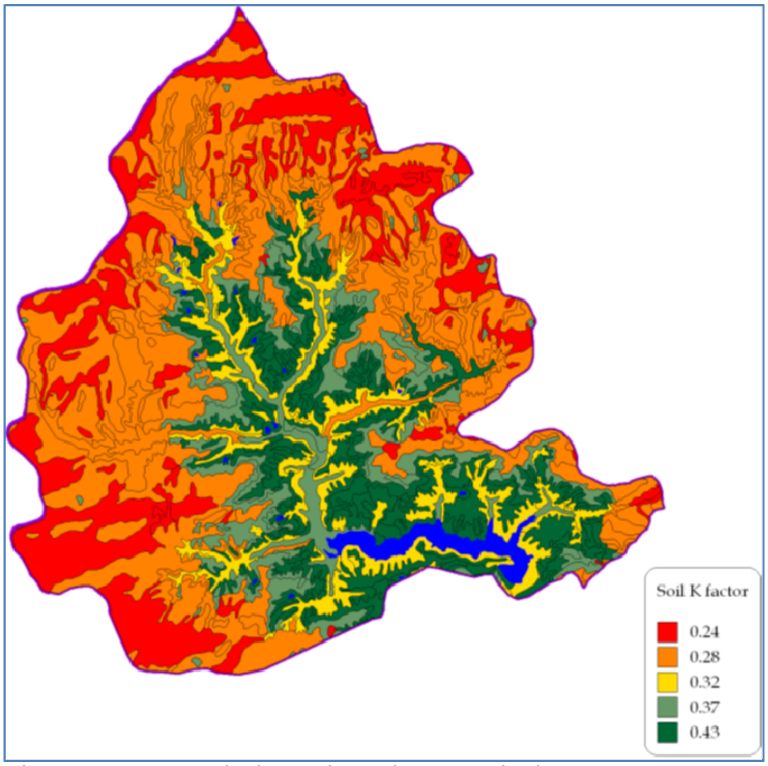


Figure 4. K Factors in the Spring Lake Watershed

Section 3. Public Participation and Involvement

3.1 Spring Lake Watershed Public Participation and Involvement

Public knowledge, acceptance, and follow through are necessary to implement a plan to meet recommended TMDLs. It is important to involve the public as early in the process as possible to achieve maximum cooperation and counter concerns as to the purpose of the process and the regulatory authority to implement any recommendations.

Illinois EPA held a public meeting to present the TMDL for Spring Lake watershed on August 15, 2013 at the Macomb City Hall (232 East Jackson in Macomb). Approximately 18 people attended the meeting.

Section 4. Spring Lake Watershed Water Quality Standards

4.1 Illinois Water Quality Standards

Attainment of public and food processing water supply use is assessed only in waters in which the use is currently occurring, as evidenced by the presence of an active public-water-supply intake. The assessment of public and food processing water supply use is based on conditions in both untreated and treated water. By incorporating data through programs related to both the federal Clean Water Act and the federal Safe Drinking Water Act, Illinois EPA believes that these guidelines provide a comprehensive assessment of public and food processing water supply use.

Assessments of public and food processing water supply use recognize that characteristics and concentrations of substances in Illinois surface waters can vary and that a single assessment guideline may not protect sufficiently in all situations. Using multiple assessment guidelines helps improve the reliability of these assessments. When applying these assessment guidelines, Illinois EPA also considers the water-quality substance, the level of treatment available for that substance, and the monitoring frequency of that substance in the untreated water.

One of the assessment guidelines for untreated water relies on a frequency-of-exceedance threshold (10%) because this threshold represents the true risk of impairment better than does a single exceedance of a water quality criterion. Assessment guidelines also recognize situations in which water treatment that consists only of "*...coagulation, sedimentation, filtration, storage and chlorination, or other equivalent treatment processes*"(35 Ill. Adm. Code 302.303; hereafter called "conventional treatment") may be insufficient for reducing potentially harmful levels of some substances. To determine if a Maximum Contaminant Level (MCL) violation in treated water would likely occur if treatment additional to conventional treatment were not applied (see 35 Ill. Adm. Code 302.305), the concentration of the potentially harmful substance in untreated water is examined and compared to the MCL threshold concentration. If the concentration in untreated water exceeds an MCL-related threshold concentration, then an MCL violation could reasonably be expected in the absence of additional treatment.

Compliance with an MCL for treated water is based on a running 4-quarter (i.e., annual) average, calculated quarterly, of samples collected at least once per quarter (Jan.-Mar., Apr.-Jun., Jul.-Sep., and Oct.-Dec.). However, for some untreated-water intake locations sampling occurs less frequently than once per quarter; therefore, statistics comparable to quarterly averages or running 4-quarter averages cannot be determined for untreated water. Rather, for substances not known to vary regularly in concentration in Illinois surface waters (untreated) throughout the year, a simple arithmetic average concentration of all available results is used to compare to the MCL threshold. For substances known to vary regularly in concentration in surface waters during a typical year (e.g., atrazine), average concentrations within the relevant sub-annual (e.g., quarterly) periods are used.

Table 3 present the MCL for the cause of impairment for Spring Lake. EPA has set an enforceable regulation for atrazine at 0.003 mg/L or 3µg/L. MCLs are from 35 Ill. Adm. Code 611, Subpart F: MCLs and Maximum Residual Disinfectant Levels (MRDLs). The MCL is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. If a facility exceeds the MCL, the facility must immediately investigate treatment options to reduce the level of the contaminant in the water supply. The MCLG or maximum contaminant level goal is the level of a contaminant in drinking water below which there is no known or expected risk to health. Some people who drink water containing atrazine well in excess of the MCL for many years could experience problems with their cardiovascular system or reproductive difficulties. For more information see the EPA website at http://water.epa.gov/drink/contaminants/basicinformation/atrazine.cfm. One of the primary ways that atrazine can affect your health is by altering the way that the reproductive system works (ATSDR 2003). Data regarding the health effects of atrazine in humans are limited and the bulk of the available toxicity data is from oral exposure studies in animals (ATSDR 2003).

Table 3. MCL for Spring Lake Impairment

Parameter	**Units**	**Public and Food Processing Water Supplies**
Atrazine	µg/L	3 µg/L (Maximum Contaminant Level)

µg/L = micrograms per liter

4.2 Designated Uses

The waters of Illinois are classified by designated uses, which include: General Use, Public and Food Processing Water Supplies, Lake Michigan, and Secondary Contact and Indigenous Aquatic Life Use. The designated use applicable to the Spring Lake Watershed is the Public and Food Processing Water Supplies Use.

The Public and Food Processing Water Supplies Use is defined by IPCB as standards that "are cumulative with the general use standards of Subpart B and must be met in all waters designated in Part 303 at any point at which water is withdrawn for treatment and distribution as a potable supply or for food processing."

4.3 Potential Pollutant Sources

In order to properly address the conditions within Spring Lake watershed, potential pollution sources must be investigated for the pollutants where TMDLs will be developed. Table 4 shows the potential source associated with the listed cause for the 303(d) listed segment in this watershed.

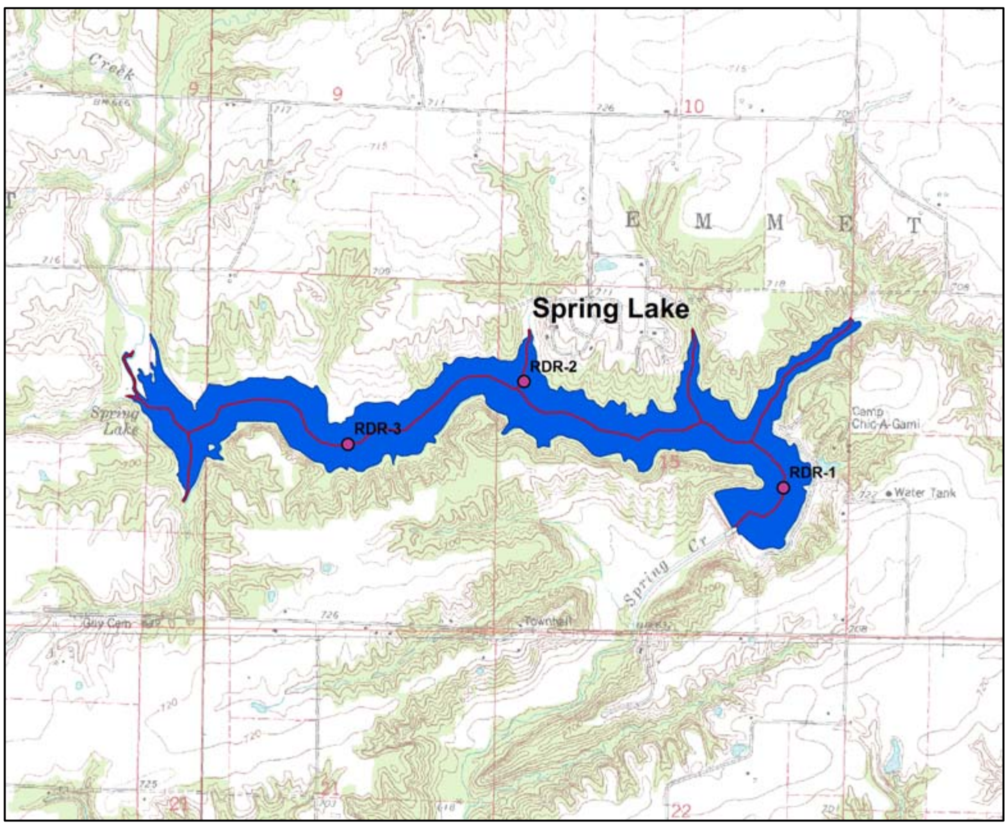
Table 4. Summary of Potential Sources for Spring Lake Watershed

Segment ID	Segment Name	Potential Causes	Potential Sources
RDR	Spring Lake (McDonough)	Atrazine	Crop production

Section 5. Spring Lake Watershed Characterization

Data were collected and reviewed from many sources in order to further characterize Spring Lake watershed. Data has been collected in regards to water quality, reservoirs, and both point and nonpoint sources. This information is presented and discussed in further detail in the remainder of this section. There are three monitoring stations for Spring Lake. Public water supply use data is taken from station RDR-1 (Figure 5).

Figure 5. Water Quality Sampling Stations in Spring Lake- RDR- 1, RDR- 2 and RDR-3.



5.1 Water Quality Data

Water quality data from station RDR-1 was analyzed for atrazine (Table 5). Data is summarized by impairment and discussed in relation to the maximum contaminant level.

Table 5. Inventory of Impairment Data for Spring Lake

RDR-1	Period of Record	Number of Samples	Exceedences
Atrazine	2003-2009	18	6

The maximum contaminant level for atrazine is 3 ug /L. Six out of 18 individual samples exceed 3 ug/L. Illinois EPA assessment for public water supply use considers both the raw and finished water quality data for the last three years of data. No more than 10 percent of the raw water samples exceed the MCL or there can be no exceedences of the MCL for the quarterly average concentration. For the finished water, no sample can be over the MCL. Spring Lake is assessed with raw water data from Station RDR-1 (see Table 6). Twenty percent of the raw water samples exceeded the MCL in 2009. Data from the last assessment is used for TMDL load calculations. The exceedance of 14 ug/L is used to calculate the current load.

All community water supplies are required to conduct periodic self-monitoring. Use of a cetified laboratory to analyze for the presence of microorganisms and chemicals in the finished drinking water provides information to enable facilities to comply with established maximum contaminant levels. For more information, please go to http://www.epa.state.il.us/water/compliance/drinking-water/index.html. Macomb Community Water Supply provides quarterly finished water quality data. Those four samples per year are in compliance with the finished water regulations. As explained in Section 4.1, both raw and drinking water samples are used for the assessment of public water supply designated use. In this case, only the raw samples exceeded the MCL.

Table 6. Atrazine Data at Station RDR-1

Date	Atrazine ug/L
06/11/2003	**3.3**
06/11/2003	**3.6**
07/15/2003	2.7
07/15/2003	**3.2**
08/21/2003	2.2
08/21/2003	2.7
10/01/2003	2
10/01/2003	2.4
5/1/2006	0.21
6/13/2006	**4.6**
8/9/2006	**3.1**
8/29/2006	2.2
10/25/2006	0.49
4/28/2009	0.058
6/9/2009	**14**
7/22/2009	0.72
8/12/2009	0.58
10/14/2009	0.28

5.2 Reservoir Characteristics

Spring Lake is an impoundment of Spring Creek which was originally constructed in 1927 as a municipal water supply for the town of Macomb. At that time, the lake had a surface area of 84.3 acres. By 1947, its surface area had been reduced to 42.7 acres by sedimentation (Sefton 1979). In 1968, the lake surface area was increased to 277 acres by construction of a new dam downstream of the original.

Table 7. Spring Lake Dam information (U.S. Army Corps of Engineers)

Dam Length	525 feet
Dam Height	45 feet
Maximum Discharge	NA
Maximum Storage	5,611 acre-feet
Normal Storage	3,363 acre-feet
Spillway Width	511 feet
Outlet Gate Type	U

Spring Lake is located north of Macomb in McDonough County. The lake has a surface area of 277 acres and a shoreline length of approximately five miles. In conjunction with the East Fork La Moine River and two wells near Spring Lake, Spring Lake provides drinking water to the city of Macomb. Table 7 shows dam information for the lake while Table 8 contains depth information for each sampling location on the lake. The average maximum water depth is 26.6 feet.

Table 8. Average Depths (ft) for Spring Lake

Year	RDR-1	RDR-2	RDR-3
1990	28.2	7.5	3.6
1991	27.2	6.6	3.7
1992	27.7	7.5	4.8
1993	25.6	7.8	4.9
1994	25.4	5.1	3.5
1995	27.2	5.6	4.7
1996	24.8	4.9	4.8
1997	26.6	5.4	4.2
1998	26.7	5.5	4.0
Average	**26.6**	**6.2**	**4.2**

5.3 Point Sources

Permitted facilities must provide Discharge Monitoring Reports (DMRs) to Illinois EPA as part of their NPDES permit compliance. DMRs contain effluent discharge sampling results that are then maintained in a database by the state. There is one point source located within the Spring Lake watershed. Figure 2 shows the permitted facility whose discharge potentially reaches impaired segments. Table 9 contains a summary of available DMR data for this point source. Prairie High School discharges treated sewage. It is assumed that this facility does not use atrazine and is not a source.

There is one other point source that does not discharge to the watershed but is relevant to the TMDL. The Macomb Water Treatment Plant (ILG640189) uses groundwater and water pumped from Spring Lake as the source for the community water supply. The next section contains more information on the water plant's treatments.

Table 9. Effluent Data from Point Sources Discharging to Spring Lake Watershed

Facility Name Period of Record Permit Number	Receiving Water/ Downstream Impaired Waterbody	Constituent	Average Value	Average Atrazine Loading (lb/d)
Prairie High School STP- CUSD #103 IL0053619	Unnamed Tributary of Spring Creek/ Spring Lake Segment RDR	Average Daily Flow	.002 mgd	NA

5.4 Water Plant Information

Information from this section was provided by the Macomb Water Plant (McIlhenny 2014). The plant is somewhat unique in that it blends treated water from two separate treatment systems for both groundwater and surface water. A deep well provides groundwater that is processed by a Reverse Osmosis (RO) system and Spring Lake (RDR) provides lake water treatment where it is processed by either a conventional dual media or microfiltration process.

The ground (well) water is pretreated with an antiscalant chemical before entering the RO system. The RO uses high pressure to push the cleaner water through a physical membrane. After the water leaves the RO system it is treated with Fluoride to maintain the IEPA required residual before the degasification of hydrogen sulfide, etc. The RO water is then conditioned for alkalinity and pH by adding calcium chloride and sodium hydroxide. It is also treated with an orthopolyphosphate for corrosion control and chlorine for disinfection as it is sent to the clearwell as finished water.

The lake water is dosed with powdered activated carbon (PAC) and copper sulfate as it begins to travel 3 miles to the water plant. Upon entering the plant, the water is treated with a coagulant and flocculation algicide before it enters a claricone for coagulation and removal of about 90% of its impurities. The water is supersaturated with slaked lime in the 1st portion of this structure in order to soften the water by removing iron, manganese, etc. After the claricone, the pH of the water is adjusted by adding carbonic acid (Carbon dioxide gas mixed with water before injection).

Next, the water is treated by either the low pressure microfiltration system or the conventional dual media gravity filters. The microfiltration system uses low pressure to push the cleaner water through a physical membrane. After the water leaves the microfiltration system, it is treated with an orthopolyphosphate for corrosion control and chlorine for disinfection before it enters the clearwell as finished water.

The water to be treated by the dual media gravity filters is dosed with a sodium hexametaphosphate to prevent calcium carbonate precipitation on the filter media and a cationic polymer to enhance the cleaning efficiency of the filters. The filters allow gravity to push the cleaner water through a layer of granular activated carbon and then a layer of fine sand. Next the water is dosed with orthopolyphosphate for corrosion control and chlorine for disinfection before it enters the clearwell as finished water.

5.5 Nonpoint Sources

Atrazine is an herbicide that is widely used to kill weeds mostly on farms. It is used on crops such as sugarcane, corn, pineapples sorghum and macadamia nuts. Out of the 60-80 million pounds of atrazine used annually in the United States, 85% are used for corn fields (Sass and Colangelo 2006). It is a Restricted Use Pesticide (RUP) and can only be purchased or used by certified herbicide users. Atrazine is usually used in the spring and summer months (ATSDR 2003). Atrazine adsorbs into the leaves and roots when applied postemergence and stops photosynthesis. The corn plant can detoxify atrazine and are able to grow. The application of atrazine to crops as an herbicide accounts for almost all of the atrazine that enters the environment, but some may be released from manufacture, formulation, transport and disposal (ATSDR 2003). In most cases atrazine will be broken down in the soil over one growing season but if carried by runoff into waterways, the breakdown is slowed. The more moisture in soil, the longer it takes to degrade. The approximate half-life in aerobic soil is 146 days but in water the half-life is 742 days. Atrazine weakly adsorbs to soil particles. Refer to section 6.2 for pollutant sources and linkages.

5.6 Watershed Planning Information

Previous planning efforts have been conducted within the East Fork La Moine River/Spring Lake watershed. The Spring Lake Watershed Protection Plan was developed in 1983 to reduce soil erosion and delivery into the lake. The major problems noted in the plan are sheet and rill erosion on cropland and sedimentation in the lake. Practices in the plan include conservation tillage, grassed waterways, terraces, field borders, conversion from cropland and critical area treatment. According to the Spring Lake Watershed Committee, 59 landowner contracts were implemented as a result of this study and actions included grassed waterways, terraces and conservation tillage.

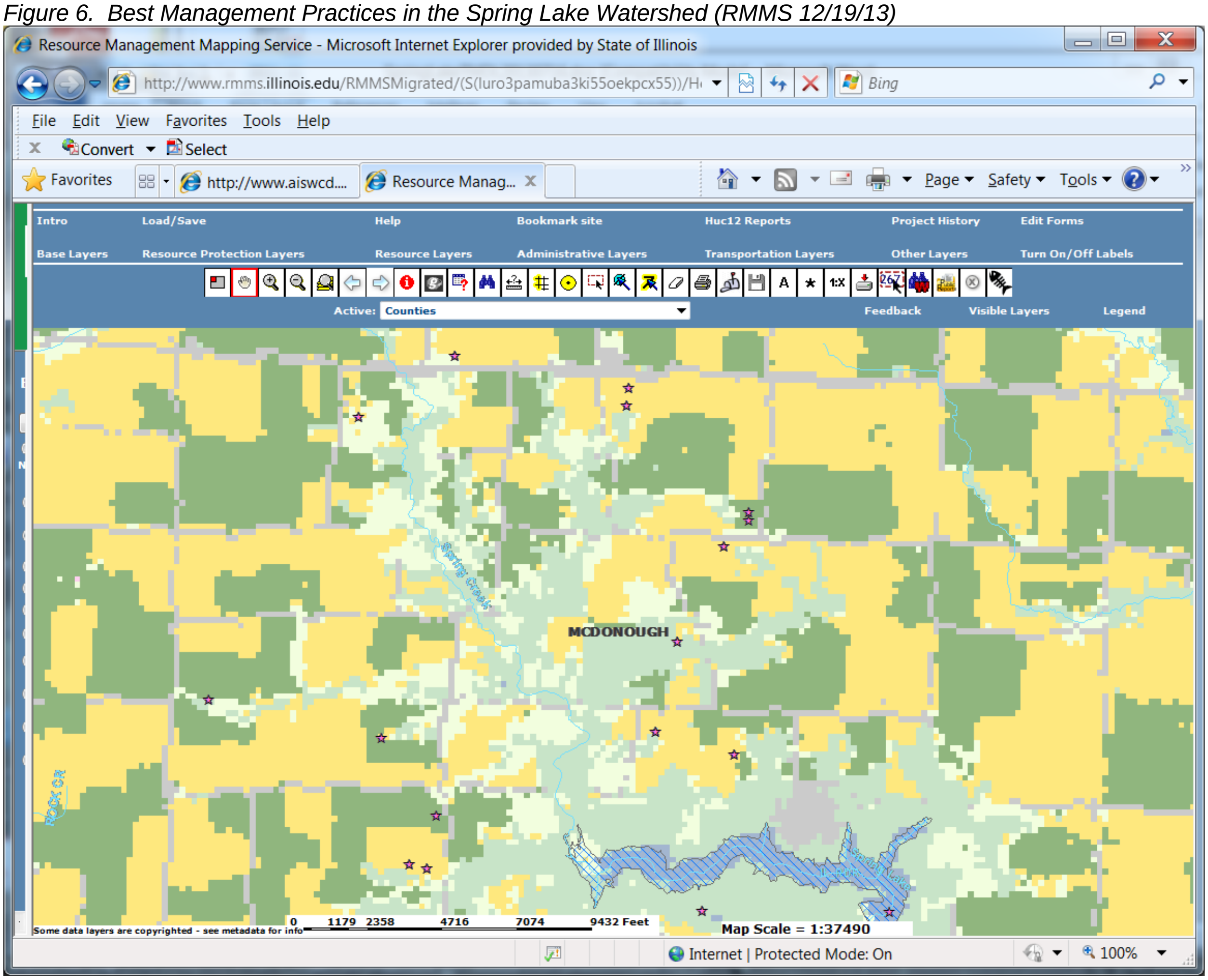
In 1993, the Illinois EPA conducted a survey on Spring Lake which included mapping shoreline erosion and surrounding land use as well as identification and coverage of aquatic macrophytes.

The La Moine River Ecosystem Partnership (http://www.lamoineriver.org/) was created with a mission to "preserve, protect, and enhance the natural resources of the La Moine River watershed area as a sustainable ecosystem." The final watershed plan includes subwatershed prioritization and recommended Best Management Practices for targeted areas. Many organizations are involved in the partnership and various projects have been completed. Hutchins Ecosystem Restoration Project includes restoration on over 120 acres of pasture on Kepple Creek and includes stream bank stabilization, wetland restoration, tree planting along and other habitat restoration. The La Moine River Livestock Initiative included fencing several miles of stream, restore wetlands and install erosion control practices in the upper La Moine watershed.

The Spring Lake Watershed Committee (http://springlakewatershed.org/) developed a watershed plan in 2008. One of the main focuses of the plan is reducing phosphorus in the lake. Some of the practices with largest potential of erosion reduction are stream bank stabilization, water and sediment control basins (WASCOBs), terraces and conversion to no-till (highest reduction).

In 2012, the McDonough County SWCD developed the Spring Lake TMDL Plan Implementation through the IEPA 319 Program. Twelve landowners participated in the cost-share program to reduce sediment and nutrients to the lake. Implementation actions included installing 60 water and sediment control basins, one grade stabilization structure, 2,850 feet of terrace systems and 5.1 acres of waterways. Figure 6 displays the locations of best management practices installed by the landowners in the Spring Lake watershed.

Figure 6. Best Management Practices in the Spring Lake Watershed (RMMS 12/19/13)



Section 6. TMDL Development

6.1 TMDL Calculations

TMDL atrazine loads are based on the atrazine maximum contaminant level of .003 mg/L. Normal level of the lake is 3363 acre feet or 1096 MG and maximum is 5611 acre feet or 1829 MG.

6.2 Pollutant Sources and Linkages

Atrazine is a widely used product for selective control of broadleaf weeds in crops, specifically corn for this watershed. Atrazine is an inexpensive, effective herbicide for weeds and no alternative herbicide is as economical. Transport mechanisms include controlling overland runoff, discharge from drainage tiles and as atrazine contaminated dust that is delivered to the lake through wet and dry atmospheric deposition. No known point sources of atrazine occur within the watershed and point source discharges of atrazine are assumed not to occur. Using landuse data from the 2007 TMDL, corn accounts for 37% of the agricultural use in the Spring Lake watershed. Water from Spring Lake is used by the water plant for human consumption. This water is impaired for public water supply use with atrazine as a cause.

6.3 TMDL Allocations for Spring Lake

As explained in Section 1, the TMDLs for Spring Lake address the following equation:

$$\mathbf{TMDL = LC = \Sigma WLA + \Sigma LA + MOS}$$

where	LC	=	Maximum amount of pollutant loading a water body can receive without violating water quality standards
	WLA	=	The portion of the TMDL allocated to existing or future point sources
	LA	=	Portion of the TMDL allocated to existing or future nonpoint sources and natural background
	MOS	=	An accounting of uncertainty about the relationship between pollutant loads and receiving water quality

Each of these elements will be discussed in this section as well as consideration of seasonal variation in the TMDL calculation.

Loading Capacity

The loading capacity (LC) of the waterbody is the amount of atrazine that can be allowed in the lake and still meet the water quality standard of 0.003 mg/L atrazine. The allowable atrazine loads that can be generated in the watershed and still maintain water quality standards were determined to be 27 pounds at normal water level and 46 pounds at maximum storage. At normal storage, the lake capacity is 1096 million gallons and the maximum capacity is 1829 million gallons. Using conversion factors, the loads were calculated.

Normal Storage- 1096 MG * 0.003 mg/l atrazine * 2.2 lb/mg * 3.785 l/gal = 27 lbs atrazine

Maximum Storage- 1829 MG * 0.003 mg/l atrazine * 2.2 lb/mg * 3.785 l/gal = 46 lbs atrazine

Seasonal Variation

A season is represented by changes in weather; for example, a season can be classified as warm or cold as well as wet or dry. Since the pollutant source can be expected to contribute loadings in different quantities during different time periods (e.g., various portions of the growing season resulting in different runoff characteristics), the loadings for these TMDLs will focus both on normal and maximum storage. Atrazine runoff from upstream is expected in spring and early summer when flows are higher. This critical period corresponds with normal to maximum water levels.

Margin of Safety

A margin of safety (MOS) is required in a TMDL to account for uncertainty about the relationship between pollutant loads and attainment of water quality standards. The margin of safety (MOS) can be implicit (incorporated into the TMDL analysis through conservative assumptions) or explicit (expressed in the TMDL as a portion of the loadings).

The Illinois EPA public water supply assessment methodology guidelines takes into account the water-quality substance, the level of treatment provided for finished water (conventional treatment, per 35 Ill. Adm. Code 302.303) for that substance, and the monitoring frequency of that substance in the untreated water, and this approach provides a conservative assumption for the implicit margin of safety. To determine if a Maximum Contaminant Level (MCL) violation in treated water would likely occur if treatment additional to conventional treatment were not applied (see 35 Ill. Adm. Code 302.305), the concentration of the potentially harmful substance in untreated water is examined and compared to the MCL threshold concentration (IEPA 2014). With this conservative approach, lower levels of atrazine in raw water will reduce the cost of extra treatment in finished water.

The MOS for the Spring Lake TMDL is implicit. The load calculation is based on exceedances during the months of June and July when exceedances were highest. This timeframe represents the critical condition when runoff and exceedances of atrazine are likely to occur. The source of atrazine, which is an herbicide applied onto agricultural land, is known with certainty. The implementation plan contains best management practices for source reductions.

Additional MOS is provided by how the TMDL is calculated. The loading capacity is calculated as the lake volume multiplied by the MCL of 0.003 mg/L which results in a daily load of atrazine. However, the public water supply assessment process uses a rolling annual average of quarterly samples for raw water (as does the EPA for finished water compliance). Use of an average will by definition have some values above the mean. By using the daily load calculation, the TMDL loading capacity is more protective.

Waste Load Allocation

There are no point sources within the Spring Lake watershed that discharge atrazine. Therefore, the waste load allocations (WLA) were set to zero for point sources.

Load Allocation and TMDL Summary

Table 10 shows a summary of the TMDL for Spring Lake. On average, a total reduction of 79 percent of atrazine loads to Spring Lake would result in compliance with the water quality standard of 0.003 mg/L atrazine. The 79 percent reduction would need to come from nonpoint sources. The load was calculated using the most recent exceedance data from Table 6. The exceeded value is 14 micrograms per liter or 0.014 mg/L. This is used for calculating the current load.

Table 10. TMDL Summary for Spring Lake

Load Source	LC (lb/day)	WLA (lb/day)	LA (lb/day)	MOS (lb/day)	Current Load (lb/day)	Reduction Needed (lb/day)	Reduction Needed (percent)
Normal	27	0	27	Implicit	128	101	79
Maximum	46	0	46	Implicit	213	167	78

Section 7. Implementation Plan for Spring Lake

According to the TMDL summary in Table 10, there needs to be a 79 percent reduction of atrazine in the lake. Implementation actions, management measures, or best management practices (BMPs) in the watershed are used to control the generation or distribution of pollutants. BMPs are either structural, such as filter strips; or managerial, such as conservation tillage, public outreach and education. The remainder of this section will discuss implementation actions and management measures for atrazine sources in the watershed.

7.1 Nonpoint Sources of Atrazine

Atrazine is applied to agricultural land, specifically corn in this watershed. Surface runoff, tile drainage and atmospheric deposition deliver atrazine to the lake. BMPs evaluated that could be utilized to treat these nonpoint sources are careful pesticide application practices and controlling runoff. Fields closer to surface water can be targeted for BMPs. Another option is filtering water at the treatment plant.

Pesticide Application Practices

Delay herbicide application if heavy rain is forecast. Pesticides are most susceptible to runoff during the first several hours after application. Atrazine is highly soluble in water and applications should be delayed as long as the soils are saturated and more rain is predicted (Purdue 2004). Atrazine should not be applied within 50 feet of abandoned/current wells, drainage wells or sinkholes. This applies to drinking water wells, irrigation wells, livestock water wells, abandoned wells and agricultural drainage wells. Figure 7 displays the wells in the Spring Lake watershed. Sinkholes refer to surface depressions that permit direct runoff of surface water into groundwater. Atrazine should not be applied within 66 feet of the points where field surface water runoff enters streams or rivers. This applies to both perennial and intermittent streams. The USGS topographic maps show perennial streams as solid blue lines and intermittent streams as dashed blue lines. You should not apply within 200 feet around a lake or reservoir. Filter strips are recommended around lakes. Atrazine should not be mixed or loaded within 50 feet of any waterbody. Also, atrazine cannot be applied within 66 feet of a tile inlet in terraced fields unless atrazine is incorporated and or greater than 30 percent residue is present. A 66 foot filter strip is recommended around the outlet.

For pre-emergent application in highly erodible soils, a maximum of 2 pounds per acre of atrazine can be sprayed on fields with 30 percent or more of plant residue or 1.6 pounds where there is less than 30 percent plant residue. For pre-emergent application on soils not highly erodible, a maximum of 2 pounds of atrazine can be used. For post-emergent application, if there was no pre-application, a maximum of 2 pounds can be used per acre. The total amount of atrazine applied to a field may not exceed 2.0 pounds of active ingredient in a single pre- or post-emerge application or 2.5 pounds (pre- and post-

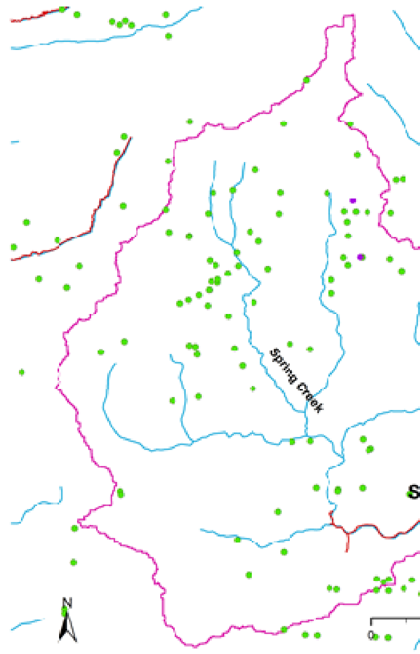
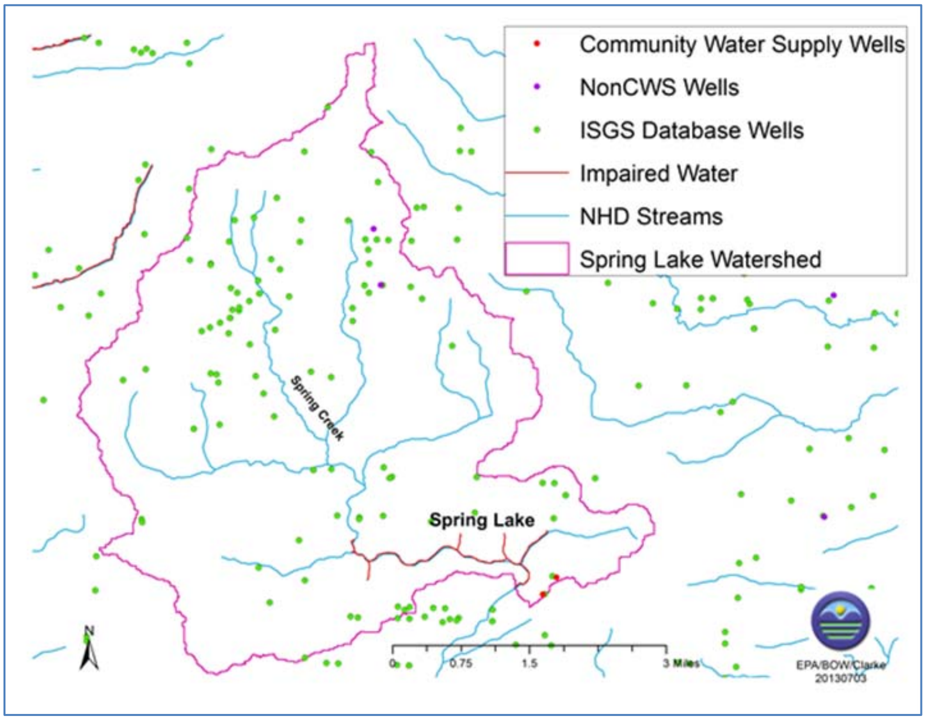


Figure 7. Wells in the Spring Lake Watershed



emergence combined) per acre per calendar year. Applying post emergent can reduce rates up to 75 percent (McKenna and Czapar 2009). Atrazine rates are reduced 30 to 75 percent if application is delayed until the weeds emerge because the herbicide can be placed directly on the weed foliage, which is preferable to relying on uptake from the soil (Purdue 2004). Because there is a narrower window of opportunity for application, fields with greatest runoff potential can be targeted for postemergence application. For more information on atrazine application information, refer to *Using Atrazine and Protecting Water Quality* (http://www.atrazine.com/Atrazine/images/using_atrazine_protecting_water.pdf).

Controlling Runoff

Leaving crop residue on the fields and No-till agriculture can reduce pesticide runoff over conventional tillage. The residue slows the movement of water across the field and can increase infiltration. According to county wide statistics, almost half of the corn crops are farmed conventionally. The Spring Creek Watershed Plan estimates changing from conventional to no- till will have the largest reduction in phosphorus for the watershed. So this practice could not only reduce phosphorus and total suspended solids, but atrazine also. This practice has the lowest costs of any practice in the watershed. Other practices to control runoff are terraces, contour farming and grade stabilization. The Spring Lake Watershed plan has details on these practices along with costs- http://springlakewatershed.org/plan.htm. Also allowing soils to dry before tilling or other operations can help reduce compaction and allow better infiltration.

Conservation practices such as buffers and riparian corridors can be used to control runoff (see figures 9 and 10). The ground has the filtering capacity to drain water and absorb atrazine. Buffers implemented along stream segments and around waterbodies slow and filter nutrients, pesticides and sediment out of runoff. Greater biological activity in a soil improves its ability to effectively deal with pesticides and pollutants, and that is more prevalent in a soil rich in plant roots and organisms (Grismer 2006). A recent study in Iowa indicated a 28 to 35 percent removal for the pesticide atrazine for a 15-foot long filter, compared to a 51 to 60 percent removal for a 30-foot filter (Leed et all 1994).

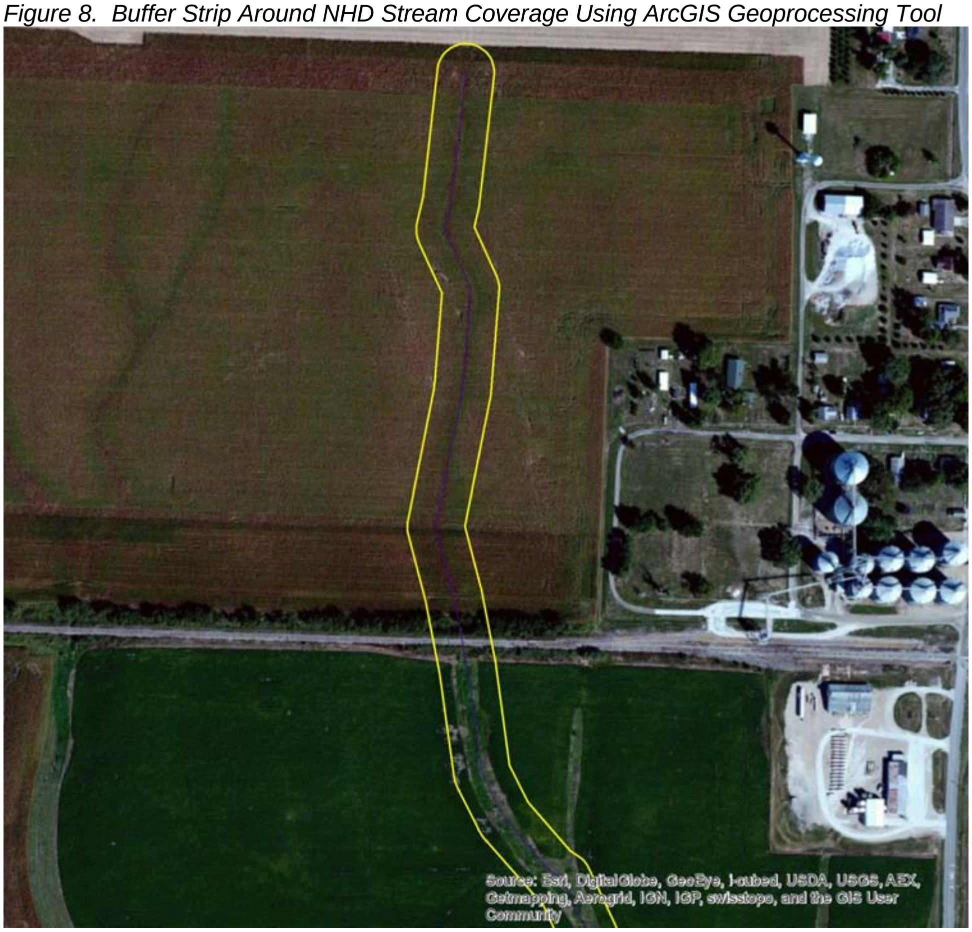
Riparian buffers, including both the stream channel and adjacent land areas, are important components of watershed ecology. Preserving natural vegetation along stream corridors and around waterbodies can effectively reduce water quality degradation associated with development. The root structure of the vegetation in a buffer enhances infiltration of runoff and subsequent trapping of nonpoint source pollutants. However, the buffers are only effective in this manner when the runoff enters the buffer as a slow moving, shallow "sheet;" concentrated flow in a ditch or gully will quickly pass through the buffer offering minimal opportunity for retention and uptake of pollutants.

Table 11. Filter Strip Flow Lengths Based on Land Slope

Percent Slope	**0.5%**	**1.0%**	**2.0%**	**3.0%**	**4.0%**	**5.0% or greater**
Minimum (feet)	36	54	72	90	108	117
Maximum (feet)	72	108	144	180	216	234

Table 11 above outlines the guidance for filter strip flow length by slope (NRCS 1999). There are areas within the watershed that could be converted to buffer strips. Landowners and property managers should evaluate the land near tributaries and surrounding the lakes and consider installation of filter strips according to the NRCS guidance. Programs available to fund the construction of these filter strips are discussed in Section 7.2. According to the atrazine label, atrazine should not be applied within 66 feet of where field surface water runoff enters streams or rivers or within 50 feet of a waterbody. Using GIS, a buffer can be geoprocessed around the stream shapefile. Figure 8 is an example of using the buffer tool to put a 66 foot buffer around the NHD streams in the Spring Creek watershed. This buffer area could be used as a filter strip or riparian corridor.

Figure 8. Buffer Strip Around NHD Stream Coverage Using ArcGIS Geoprocessing Tool



The following information is taken from a the website- *The Value of Buffers for Pesticide Stewardship and Much More* (http://pesticidestewardship.org/Documents/Value%20of%20Buffers.pdf).

Permanent within-field buffers include grassed waterways, contour buffer strips and wind buffers. Grassed waterways are strategically placed where they intercept the water and slow it down, thus preventing gully and rill erosion. Contour buffer strips are planted to perennial vegetation alternated with cultivated strips and placed along the contour. These reduce the risk of concentrated flow, gully erosion and pesticide runoff. Wind buffers are a single or multiple rows of trees to protect crops from winds. They can also reduce pesticide drift and reduce runoff if they are planted dense enough. Wind buffers can also consists of tall grasses planted in thin rows perpendicular to prevailing winds.

Permanent edge-of-field buffers include field borders, filter strips and riparian forest buffers. Field borders are permanent perennial vegetation established on the edge of a crop field. It reduces the movement of pesticides and nutrients, traps eroding soils and reduces pesticide drift. Filter strips are areas of grass or other permanent vegetation located between crop field and a body of water and intended to reduce runoff. Riparian forest buffers are areas planted in trees and shrubs and located adjacent to waters.

Constructed wetlands provide additional benefits when implemented in combination with buffers. In fields that are tile drained, runoff bypasses buffers and may deliver subsurface drainage directly to streams. Wetlands can effectively degrade pesticides and denitrify nitrates when strategically located at tile outlets.

Buffers also provide streambank protection along with their filtering capacity. This is relevant to this waterbody since it is impaired for phosphorus and total suspended solids, for which a TMDL was developed (IEPA 2007). The rooting systems of the vegetation serve as reinforcements in streambank soils, which help to hold streambank material in place and minimize erosion. Due to the increase in stormwater runoff volume and peak rates of runoff associated with agriculture and development, stream channels are subject to greater erosional forces during stormflow events. Thus, preserving natural vegetation along stream channels minimizes the potential for water quality and habitat degradation due to streambank erosion and enhances the pollutant removal of sheet flow runoff from developed areas that passes through the buffer. The increased organic matter in these corridors should increase degradation of atrazine.

Converting land adjacent to waterbodies for the creation of riparian buffers will provide stream bank stabilization, stream shading, and nutrient uptake and trapping from adjacent areas. Minimum buffer widths of 25 feet are required for water quality benefits. Higher removal rates are provided with greater buffer widths. Riparian corridors typically treat a maximum of 300 feet of adjacent land before runoff forms small channels that short circuit treatment. In addition to the treated area, any land converted from agricultural land has the potential to reduce the amount of atrazine needed.

Figure 9. Erosion Prone Areas

Figure 10. Buffer Strips in Watershed

Treatment Plant Upgrade

Removal of atrazine at the water treatment plant requires expensive chemical absorption procedures. Filters with activated carbon are used to absorb the atrazine. At most water plants, sand filters are used because they are cheaper and last longer, but they do not remove organics such as PCBs, pharmaceuticals and pesticides.

As discussed in Section 5.4, the Macomb Water Plant treats the lake water with powder activated carbon (PAC) as it exits the lake.

Atrazine Reduction Success Stories

Following high atrazine levels in 1994, the local watershed committee for Lake Springfield encouraged practices such as buffer zones of plants and vegetation along stream banks, taking farmland out of production, rotating corn and soybeans and improved chemical-application practices. The treatment plant spent more than $600,000 on powdered activated carbon from 1994 to 2003 to reduce atrazine. The yearly amount for treatment has decreased since atrazine levels in the watershed have decreased. The Lake Springfield Watershed Resources Planning Committee is made up of water treatment plant staff, farmers, conservation and environmental advocates, business people and lake residents.

Atrazine Settlement Fund

On May 30, 2012, District Judge J. Phil Gilbert of the United States District Court for the Southern District of Illinois approved a $105 million class-action settlement the City of Greenville brought against Syngenta Crop Protection, Inc., and Syngenta AG (collectively, Syngenta) for the alleged contamination of community water supplies with atrazine. Information from the settlement is available in the court order-
http://www.ilsd.uscourts.gov/opinions/ilsd_live.3.10.cv.188.2065985.0.pdf. Through the agreement between the parties, a Settlement Fund was created to allocate a fixed payment to the 2,000 U.S. Community Water Systems and then allocates the remainder of the Settlement Fund on a *pro-rata* basis based on evidence of the significance of the history of atrazine detection, size, and the age of each claim. The settlement ensures that each class member receives a portion of the settlement, while providing a proportionally larger share to those who are most affected by the presence of atrazine. The Settlement Fund is intended to be used to cover the costs associated with the purchase and operation of appropriate filtration systems to properly treat atrazine. Illinois' 143 water supplies that were part of the class-action settlement received a total of $15 million (http://www.huffingtonpost.com/huff-wires/20130125/us-herbicide-settlement-money/). The $15 million was not allocated to all Illinois water supplies to share, but that the total of each Illinois public water supply claim added up to $15 million, per the settlement agreement. The settlement does not interfere with the jurisdiction of any regulatory agency, and it preserves any claims from future point-source contamination and off-label use. Syngenta acknowledges no liability and continues to stand by the safety of atrazine. Settlement funds have been used for water treatment plant upgrades to reduce atrazine. In one small community, the funds were used to install a water pipe to a nearby non-impaired source, which was more cost effective than a plant upgrade.

7.2 Reasonable Assurance

Reasonable assurance means that a demonstration is given that nonpoint source reductions in this watershed will be implemented. It should be noted that all programs discussed in this section are voluntary and some may currently be in practice to some degree within the watershed. The discussion in Section 7.1 provided information on suggested BMPs for nonpoint sources. The remainder of this section discusses programs available to assist with funding.

Available Cost-Share Programs

There are several voluntary conservation programs established through the 2008 U.S. Farm, which encourage landowners to implement resource-conserving practices for water quality and erosion control purposes. These programs would apply to agricultural land and rural grasslands in the watershed. In addition, Illinois EPA has grant programs that can assist in implementation of nonpoint source controls. Each program is discussed separately in the following paragraphs.

Conservation Reserve Program (CRP)

http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp

The CRP is a voluntary program for agricultural landowners. Through CRP, landowners can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland.

The Commodity Credit Corporation (CCC) makes annual rental payments based on the agriculture rental value of the land, and it provides cost-share assistance for up to 50 percent of the participant's costs in establishing approved conservation practices. Participants enroll in CRP contracts for 10 to 15 years.

CRP protects millions of acres of American topsoil from erosion and is designed to safeguard natural resources. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country.

The Farm Service Agency (FSA) administers CRP, while technical support functions are provided by NRCS, USDA's Cooperative State Research, Education, and Extension Service, State forestry agencies, local soil and water conservation districts, and private sector providers of technical assistance. Producers can offer land for CRP general sign-up enrollment only during designated sign-up periods. Environmentally desirable land devoted to certain conservation practices may be enrolled at any time under CRP continuous sign-up. Certain eligibility requirements still apply, but offers are not subject to competitive bidding. Further information on CRP continuous sign-up is available in the FSA fact sheet "Conservation Reserve Program Continuous Sign-up."

To be eligible for placement in CRP, land must be either:

- Cropland (including field margins) that is planted or considered planted to an agricultural commodity 4 of the previous 6 crop years, and which is physically and legally capable of being planted in a normal manner to an agricultural commodity; or

- Certain marginal pastureland that is suitable for use as a riparian buffer or for similar water quality purposes.

In addition to the eligible land requirements, cropland must meet one of the following criteria:

- Have a weighted average erosion index of 8 or higher;
- Be expiring CRP acreage; or
- Be located in a national or state CRP conservation priority area.

FSA provides CRP participants with annual rental payments, including certain incentive payments, and cost-share assistance:

- Rental Payments – In return for establishing long-term, resource-conserving covers, FSA provides annual rental payments to participants. FSA bases rental rates on the relative productivity of the soils within each county and the average dry land cash rent or cash-rent equivalent. The maximum CRP rental rate for each offer is calculated in advance of enrollment. Producers may offer land at that rate or offer a lower rental rate to increase the likelihood that their offer will be accepted.

- Maintenance Incentive Payments – CRP annual rental payments may include an additional amount up to $4 per acre per year as an incentive to perform certain maintenance obligations.

- Cost-share Assistance – FSA provides cost-share assistance to participants who establish approved cover on eligible cropland. The cost-share assistance can be an amount not more than 50 percent of the participants' costs in establishing approved practices.

- Other Incentives – FSA may offer additional financial incentives of up to 20 percent of the annual payment for certain continuous sign-up practices.

Conservation practices eligible for CRP funding which are recommended BMPs for this watershed TMDL include but are not limited to filter strips, grass waterways, riparian buffers, wetland restoration, and tree plantings.

Clean Water Act Section 319 Grants

Section 319 was added to the CWA to establish a national program to address nonpoint sources of water pollution. Through this program, each state is allocated Section 319 funds on an annual basis according to a national allocation formula based on the total annual appropriation for the section 319 grant program. The total award consists of two categories of funding: incremental funds and base funds. A state is eligible to receive EPA 319(b) grants upon USEPA's approval of the state's Nonpoint Source Assessment Report and Nonpoint Source Management Program. States may reallocate funds through subawards (e.g., contracts, subgrants) to both public and private entities, including local governments, tribal authorities, cities, counties, regional development centers, local school systems, colleges and universities, local nonprofit organizations, state agencies, federal agencies, watershed groups, for-profit groups, and individuals.

USEPA designates incremental funds for the restoration of impaired water through the development and implementation of watershed-based plans and TMDLs for impaired waters. Base funds, funds other than incremental funds, are used to provide staffing and support to manage and implement the state Nonpoint Source Management Program. Section 319 funding can be used to implement activities which improve water quality, such as filter strips, streambank stabilization, etc.

Illinois EPA receives federal funds through Section 319(h) of the CWA to help implement Illinois' Nonpoint Source (NPS) Pollution Management Program. The purpose of the program is to work cooperatively with local units of government and other organizations toward the mutual goal of protecting the quality of water in Illinois by controlling NPS pollution. The program emphasizes funding for implementing cost-effective corrective and preventative BMPs on a watershed scale; funding is also available for BMPs on a non-watershed scale and the development of information/education NPS pollution control programs.

The Maximum Federal funding available is 60 percent, with the remaining 40 percent coming from local match. The program period is two years unless otherwise approved. This is a reimbursement program.

Section 319(h) funds are awarded for the purpose of implementing approved NPS management projects. The funding will be directed toward activities that result in the implementation of appropriate BMPs for the control of NPS pollution or to enhance the public's awareness of NPS pollution. Applications are accepted June 1 through August 1. Proposed 319 projects in TMDL watersheds receive high prioritization as long as they contain the required elements.

Environmental Quality Incentive Program (EQIP)

http://www.il.nrcs.usda.gov/programs/eqip/index.html
EQIP is a voluntary conservation program that provides financial and technical assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, the NRCS develops contracts with agricultural producers to implement conservation practices to address environmental natural resource problems. Payments are made to producers once conservation practices are completed according to NRCS requirements.

Persons engaged in livestock or agricultural production and owners of non-industrial private forestland are eligible for the program. Eligible land includes cropland, rangeland, pastureland, private non-industrial forestland, and other farm or ranch lands. Persons interested in entering into a cost-share agreement with the USDA for EQIP assistance may file an application at any time.

NRCS works with the participant to develop the EQIP plan of operations. This plan becomes the basis of the EQIP contract between NRCS and the participant. NRCS provides conservation practice payments to landowners under these contracts that can be up to 10 years in duration.

The EQIP objective to optimize environmental benefits is achieved through a process that begins with National priorities that address: impaired water quality, conservation of ground and surface water resources improvement of air quality reduction of soil erosion and sedimentation, and improvement or creation of wildlife habitat for at-risk species. National priorities include: reductions of nonpoint source pollution, such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds consistent with TMDLs where available as well as the reduction of groundwater contamination and reduction of point sources such as contamination from confined animal feeding operations; conservation of ground and surface water resources; reduction of emissions, such as particulate matter, nitrogen oxides (NOx), volatile organic compounds, and ozone precursors and depleters that contribute to air quality impairment violations of National Ambient Air Quality Standards reduction in soil erosion and sedimentation from unacceptable levels on agricultural land; and promotion of at-risk species habitat conservation.

EQIP provides payments up to 75 percent of the incurred costs and income foregone of certain conservation practices and activities. The overall payment limitation is $300,000 per person or legal entity over a 6-year period. The Secretary of Agriculture may raise the limitation to $450,000 for projects of special environmental significance. Payment limitations for organic production may not exceed an aggregate $20,000 per year or $80,000 during any 6-year period for installing conservation practices.

Conservation practices eligible for EQIP funding which are recommended BMPs for this watershed TMDL include field borders, filter strips, cover crops, grade stabilization structures, grass waterways, riparian buffers, streambank shoreline protection, terraces, and wetland restoration.

The selection of eligible conservation practices and the development of a ranking process to evaluate applications are the final steps in the optimization process. Applications will be ranked based on a number of factors, including the environmental benefits and cost effectiveness of the proposal. More information regarding State and local EQIP implementation can be found at www.nrcs.usda.gov/programs/eqip.

Wildlife Habitat Incentives Program (WHIP)

http://www.il.nrcs.usda.gov/programs/whip/index.html
WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private lands and nonindustrial private forest land. It provides both technical assistance and cost share payments to help:

- Promote the restoration of declining or important native fish and wildlife species.
- Protect, restore, develop, or enhance fish and wildlife habitat to benefit at-risk species.

- Reduce the impacts of invasive species in fish and wildlife habitat.
- Protect, restore, develop, or enhance declining or impaired aquatic wildlife species habitat.

Participants who own or control land agree to prepare and implement a wildlife habitat development plan. The NRCS provides technical and financial assistance for the establishment of wildlife habitat development practices. In addition, if the landowner agrees, cooperating State wildlife agencies and nonprofit or private organizations may provide expertise or additional funding to help complete a project.

Participants work with the NRCS to prepare a wildlife habitat development plan in consultation with the local conservation district. The plan describes the participant's goals for improving wildlife habitat, includes a list of practices and a schedule for installing them, and details the steps necessary to maintain the habitat for the life of the agreement. This plan may or may not be part of a larger conservation plan that addresses other resource needs such as water quality and soil erosion.

The NRCS and the participant enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts from 5 to 10 years from the date the agreement is signed for general applications and up to 15 years for essential habitat applications. Cost-share payments may be used to establish new practices or replace practices that fail for reasons beyond the participant's control.

WHIP has a continuous sign-up process. Applicants can sign up anytime of the year at their local NRCS field office. Conservation practices eligible for WHIP funding which are recommended BMPs for this watershed TMDL include but are not limited to filter strips, field borders, riparian buffers, streambank and shoreline protection, and wetland restoration.

Local Program Information

Local contact information for McDonough County is listed in the Table 12 below. The USDA Service Center is located at 1619 West Jackson Street in Macomb.

Table 12. McDonough County USDA Service Center Contact Information

Contact	Address	Phone
Local SWCD Office		
Cindy Moon	Cindy.moon@il.usda.gov	309-833-1711
Local FSA Office		
Joe Erlandson or Katie Haarmann	Joe.erlandson@il.usda.gov Katie.haarmann@il.usda.gov	309-833-1711 x 2 309-734-9308
Local NRCS Office		
Greg Jackson	Greg.jackson@il.usda.gov	309-833-1711 x 3

7.3 Monitoring Plan

The purpose of the monitoring plan for Spring Lake is to assess the overall implementation of management actions outlined in this section. This can be accomplished by conducting the following monitoring programs:

- Track implementation of management measures in the watershed
- Estimate effectiveness of management measures
- Continued monitoring of Spring Lake
- Storm-based monitoring of high flow events
- Tributary monitoring

Tracking the implementation of management measures can be used to address the following goals:

- Determine the extent to which management measures and practices have been implemented compared to action needed to meet TMDL endpoints
- Establish a baseline from which decisions can be made regarding the need for additional incentives for implementation efforts
- Measure the extent of voluntary implementation efforts
- Support work-load and costing analysis for assistance or regulatory programs
- Determine the extent to which management measures are properly maintained and operated

Estimating the effectiveness of the BMPs implemented in the watershed could be completed by monitoring before and after the BMP is incorporated into the watershed. Additional monitoring could be conducted on specific structural systems such as a constructed wetland. Inflow and outflow measurements could be conducted to determine site-specific removal efficiency.

Illinois EPA monitors lakes every three years and conducts Intensive Basin Surveys every five years. Continuation of this state monitoring program will assess lake water quality as improvements in the watersheds are completed. Any available future sampling data can be used to assess whether water quality standards in Spring Lake are being attained.

Section 8. Acronyms and Abbreviations

BMP Best Management Practices
CCC Commodity Credit Corporation
CRP Conservation Reserve Program
CWA Clean Water Act
CWS Community Water Supply
DMR Discharge Monitoring Report
EPA Environmental Protection Agency
EQIP Environmental Quality Incentive Program
FSA Farm Service Agency
GIS Geographic Information Systems
IPCB Illinois Pollution Control Board
ISGS Illinois State Geological Survey
LC Loading Capacity
MCL Maximum Contaminant Level
MGD Million Gallons per Day
MOS Margin of Safety
MRDL Maximum Residual Disinfectant Level
NHD National Hydrography Dataset
NPDES National Pollution Discharge Elimination System
NPS Nonpoint Source
NRCS Natural Resources Conservation Service
PCB Polychlorinated Biphenyls
SWCD Soil and Water Conservation District
TMDL Total Maximum Daily Load
USDA United States Department of Agriculture
USEPA United States Environmental Protection Agency
WASCOB Water and Sediment Control Basins
WHIP Wildlife Habitat Incentives Program
WLA Wasteload Allocation

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Appendix A. Watershed Photographs

Figure 1. Farm fields in Spring Creek watershed

Figure 2. Spring Lake tributary east at 1650 North Road (facing south)

Figure 3. Spring Lake tributary east at 1650 North (facing south)

Figure 4. Spring Lake tributary east at 1650 North (facing north)

Figure 5. Farm field in Spring Creek watershed

Figure 6. Farm field in Spring Lake watershed

Figure 7. Spring Creek at 1500 North, below dam (facing north)

Figure 8. Spring Creek at 1500 North, Below Dam (Facing South)

Figure 9. Nature area near entrance of Spring Lake Park

Figure 10. Spring Lake near RIA-1.

Figure 11. Spring Lake near marina

Figure 12. Spring Lake dock area

Figure 13. Spring Lake dam

Figure 14. Macomb water plant filtration system

Figure 15. Macomb water plant hollow fibers inside PALL filter modules

Figure 16. Macomb water plant (older filter system)

Figure 17. Groundwater reverse osmosis system

Figure 18. Old wood water pipe from Macomb

Appendix B. Responsiveness Summary

Appendix B: Responsiveness Summary

This responsiveness summary responds to substantive questions and comments on the Spring Lake Atrazine Total Maximum Daily Load (TMDL) Report received during the public comment period through September 16, 2013(determined by postmark). The summary includes questions and comments from the August 15, 2013 public meeting as discussed below.

What is a TMDL?

A Total Maximum Daily Load (TMDL) is the sum of the allowable amount of a pollutant that a water body can receive from all contributing sources and still meet water quality standards or designated uses. Each contributing source of the pollutant will be assigned an amount of pollutant which it cannot exceed if the TMDL is to be met. This amount is called an "allocation." A TMDL is developed for each waterbody segment that is impaired by pollutants that have numeric water quality standards.

This TMDL is for atrazine in Spring Lake. The report details the watershed characteristics, impairments, pollutant sources, load allocations, and reductions for the impaired lake in the watershed. The Illinois EPA implements the TMDL program in accordance with Section 303(d) of the Federal Clean Water Act and regulations there under.

Background

Spring Lake is located in the LaMoine River Watershed in McDonough County. The watershed covers nearly 13,700 acres. The major tributary to the lake is Spring Creek. The lake is impaired for public water supply designated use due to atrazine. The Clean Water Act and USEPA regulations require that states develop TMDLs for waters that do not meet water quality standards and have been placed on the Section 303(d) List. TMDL load allocations and reductions for atrazine in Spring Lake are presented in the report. A previous TMDL was completed and approved on 9/25/07 for the LaMoine Watershed and includes Spring Lake (http://www.epa.state.il.us/water/tmdl/report/lamoine-east-fork/lamoine-east-final-tmdl.pdf). The approved TMDL parameters for Spring Lake include total nitrogen, total phosphorus and total suspended solids.

Public Meeting

A public meeting was held at the Macomb City Hall Community Room at 6 p.m. on August 15, 2013. The purpose of the meeting was to provide the public with an opportunity to comment on the Spring Lake Atrazine TMDL and to provide additional data that may be included in the TMDL development process. The Illinois EPA announced the public notice by placing a display ad in the local newspaper in the watershed; The McDonough County Voice. The public notice gave the date, time, location, and purpose of the meeting. It also provided references to obtain additional information about this specific site, the TMDL Program, and other related issues. The public notice was also mailed to citizens and organizations in the watershed by first class mail.   The draft TMDL Report was available for review at the Macomb Public Library and on the Agency's web page at http://www.epa.state.il.us/public-notices/general-notices.html. Approximately 18 people attended the meeting.

Questions/Comments

1. Is the atrazine maximum contaminant level (MCL) a federal standard?

   Response: The Federal MCL for atrazine is 0.003 mg/L or 3 ug/L. The Illinois Pollution Control Board (IPCB) has adapted the Federal MCL as the state standard.   The Illinois EPA uses this as the standard for listing waters impaired for public water supply designated use. This determination is the level of atrazine in drinking water at which no adverse health effects are likely to occur.

2. The MCL used in the draft TMDL uses outdated and inaccurate science. The US EPA established a single day atrazine criteria of 298 ppb which includes a 300 fold margin of safety from the No Observed Effects Level (NOEL). The Illinois EPA used a single day atrazine criteria of 3 ppb for modeling atrazine reductions (i.e. no single sample should exceed 3 ppb). This is 100 times more restrictive. The US EPA established a 90-day average atrazine + degredates criteria of 37.5 ppb which includes a 300 fold margin of safety from the NOEL. The Illinois EPA uses a quarterly average (~ 90 days) of 3 ppb. This is approximately 10 times more restrictive. The US EPA established a lifetime average atrazine MCL of 3 ppb based upon an average of a running 4-quarter average, which includes a 1000 fold margin of safety from the NOEL and other conservative factors as discussed below. The MCL published in 1991 (USEPA, 1991) does not include the research and assessments conducted since that time. The MCL was based on a reference dose of 0.0048 mg/kg/day (rounded to 0.005 mg/kg/day) which was set from a mode of action that has since been proven to be not relevant to humans. In 2006, USEPA/OW published an updated reference dose of 0.018 mg/kg/day, rounded to 0.02 mg/kg/day (USEPA, 2006a), a value 4 fold greater than the value used to set the 1991 MCL. USEPA/OW has yet to revise the MCL, stating in the federal register in 2010 that it would consider revision after USEPA completed its re-evaluation of the risk assessment begun by the Office of Pesticide Programs in 2009 (USEPA, 2010).

   A few other aspects related to the extreme conservatism of the current 3 ppb lifetime MCL are; In calculating the 3 ppb MCL, EPA/OW included the assumption that 80% of the exposure would be from food items. However, atrazine residues do not occur in food items. EPA/OPP stated in 2006 that "Monitoring data from USDA's Pesticide Data Program and Food Safety Inspection Service, and registrant supplied laboratory and field data confirm that exposures to triazine residues in or on foods are negligible." (USEPA 2006b). EPA/OW has in essence included a 5 fold safety margin by assigning 80% exposure as coming from the diet when in reality residues from food items are negligible. The current 3 ppb MCL included a 1000 fold safety factor, which included a standard 100x safety factor generally applied to all pesticides, plus an extra 10x safety factor. In discussing the extra 10X safety factor, the FIFRA Scientific Advisory Panel of 2011 stated, "An extensive hazard database, spanning all life stages from conception to adulthood for atrazine, indicates no unique susceptibility in the developing organism. Additionally, the proposed point of departure, based upon attenuation of the LH surge, appears to be protective against adverse reproductive/developmental outcomes such as delays in onset of puberty, disruption of ovarian cyclicity and inhibition of suckling-induced prolactin release." (USEPA, 2011) The SAP further stated that the FQPA safety factor that addresses hazard potential should be removed (i.e. reduced to 1X), and also gave the option that "…that the FQPA Safety Factor component addressing the hazard potential could be reduced not just to 1X, but further by at least five-fold (i.e., to 0.2X or less)." At the same FIFRA Scientific Advisory Panel meeting, EPA/OPP proposed that the 1.8 mg/kg/day No Observable Effect Level (NOEL) should be revised to 2.56 mg/kg/day (a 40% higher value). Additionally, the SAP stated that adverse impacts are not expected even at higher levels, stating that "the spontaneous LH surge is highly resistant to atrazine given that 10 mg/kg for 4 days was without effect. Furthermore, it is reasonable to conclude that a 4-day exposure to 100 mg/kg is unlikely to have adverse effects on ovarian cyclicity or puberty" (USEPA, 2011). In summary, the IEPA criterion not only carries an unusually large implicit margin of safety, the MCL used in the draft TMDL uses outdated and inaccurate science. Atrazine has been widely studied and there are many studies out there. We respectfully request Illinois EPA to immediately update CWA atrazine assessment and TMDL criteria to reflect 2013 atrazine science for the protection of human health in drinking water as adopted by the US EPA.

Response: Illinois EPA currently uses the MCL of 3 ug/L. There have been no change to the IPCB rules and regulations and in the Federal MCL as of today. Please visit our website (http://www.epa.state.il.us/water/tmdl/atrazine-simazine.html) that includes links to information on atrazine in drinking water (USEPA), atrazine reregistration (USEPA), atrazine information from the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and Scientific Advisory Panel (SAP), atrazine toxicity from the Agency for Toxic Substances and Disease Registry (ATSDR) and atrazine studies by the USGS.

3. Does the agency have a plan for doing outreach or education? How are you going to convince farmers to do more conservation efforts?

   Response: As part of the implementation plan that is included in the TMDL report, the Agency discusses implementation actions- best management practices (BMPs) that are needed in the watershed to reduce the amount of atrazine in the lake. At the public meeting, IEPA provided information about these recommended practices along with the funding opportunities that are available through the 319 Financial Assistance Grant Program. Nonpoint source pollution is not regulated and the pollution control measures recommended in this report are voluntary.

4. We are concerned that the BMPs currently in place in the Spring Lake watershed are not being considered by Illinois EPA in its determination regarding whether a TMDL is necessary, nor are they considered in the draft TMDL implementation plan. Specifically, in 2010, the McDonough County Soil and Water Conservation District and the City of Macomb initiated work on a Section 319 project in response to a total phosphorus TMDL. To address water quality issues related to sediment and nutrient and reduce in-

lake pollution loading, a coordinated effort was initiated in 2010. As a result of the work pursuant to the Section 319 grant, between 2010 and 2012, 12 landowners within close proximity to Spring Lake participated in a cost-share program to install: 60 water and sediment control basins, 1 grade stabilization structure, 2850 feet of terrace systems and 5.1 acres of waterways. The implementation of those BMPs was estimated to have resulted in the following pollutant load reductions in Spring Lake: 911 tons sediment per year, 1354 lbs phosphorus per year and 522 lbs nitrogen per year. It is very likely that such actions taken as part of the total phosphorus TMDL implementation also resulted in load reductions of atrazine. In addition, other BMPs besides those listed above are likely in place in the watershed at this time. As such, BMPs currently in practice in the Spring Lake watershed should be considered as Illinois EPA determines whether a TMDL is necessary in this watershed.

Response: The Agency did include available information from the LaMoine River and Spring Lake Watershed Plan in the Draft TMDL Report. More information on the 319 project completed by the McDonough SWCD is included in the updated report. We hope through practices already put in place and future implementation actions, the next assessment will show reduced pollutants in the watershed. The Agency will track when this waterbody is not impaired and comes off the 305(b) assessment list and 303(d) impaired list.

5. The proposed TMDL is based on data that is not current and does not accurately reflect the current water quality of Spring Lake. Specifically, the data relied upon by Illinois EPA is from June 2003 through October 2009. Thus, the most current data being used as a basis for the draft TMDL is approximately four years old.

   Response: The latest assessment for Spring Lake was done for the 2014 Draft Integrated Report. Spring Lake was also listed for atrazine in the Final 2012 Integrated Report. This 2014 Integrated Report assessment was used for the Spring Lake TMDL and includes data through 2011. Once a monitoring station is sampled, the lab has to analyze the data and provide this to the assessment unit. The data has to be thoroughly reviewed using our quality assurance procedures. Monitoring is done every three years for a majority of lakes in the state. The TMDL report includes data from 2003, 2006 and 2009. The lake was sampled in 2012 but the data was not available for use. The new data would not have changed the fact that Spring Lake was listed for atrazine impairment. The 2009 data had a sampling result of 14 ug/L atrazine which is over fourfold the MCL of 3 ug/L. Data from 2009 to 2011 was used for assessment of the public water supply designated use.

6. The data set relied upon by Illinois EPA is limited in scope. There are a total of only 18 samples from one single location. No information is provided in the draft TMDL report regarding the location of that sampling point, referred to as RDR-1. There also is no data from the first quarter of any year.

   Response: IEPA samples this lake every three years. The sampling station used for the public water supply assessment is at the public water supply intake in the lake. Sampling is done by boat and in wintertime, it is not practical to sample during winter time. Monitoring is done April through October/November for most lakes in Illinois. A map is included in the final TMDL that has the locations of the monitoring stations.

7. Atleast one of the data points Illinois EPA relies upon for the draft TMDL is questionable in its accuracy. Specifically, the result for the sample taken on June 9, 2009 was 14 ug/L. The next highest result in the entire data set was 4.6 ug/L. If a result as high as 14 ug/L was observed, one would expect high results to linger into the next sampling round. The next sampling date in this case was July 22, 2009, approximately one and a half months after the 14 ug/L result was seen, but the result on July 22, 2009 was 0.72 ug/L. We request that Illinois EPA revisit and reassess the June 9, 2009 result. This is unusual, as reservoirs do not typically fluctuate that much because of the longer residence time of water in a reservoir. In addition, The Macomb CWS reported an atrazine finished water concentration on June 8, 2009 of 3.0 ppb (e.g., raw = finished in the absence of carbon treatment). Verification of this could be made with the analytical laboratory or by checking the residence time of water in Spring Lake. This single data point can have a major impact on the need and loading reductions required in this TMDL.

   Response: Atrazine samples in spring and early summer usually have higher rates due to runoff as a result of spring rain events and spring application of atrazine.

8. Illinois EPA should focus its resources at this time on collecting additional data and information to more thoroughly characterize the current water quality of Spring Lake. The TMDL process allows for this additional review in what is referred to as "Stage 2." Specifically, Illinois EPA should review the sample results relied upon for the draft TMDL and collect additional samples to build a more robust, updated and accurate data set before moving forward with developing a TMDL for the Spring Lake watershed.

   Response: After reviewing the pesticide data from the ten lakes listed as high priority for TMDL development due to atrazine and/or simazine (refer to http://www.epa.state.il.us/water/tmdl/303-appendix/2014/appendix-a3.pdf, the Agency did not find the need for additional data.

9. An implicit margin of safety is defined as "incorporated into the analysis through conservative assumptions" (pg. 16 of the draft Spring Lake Atrazine TMDL). The implicit margin of safety incorporated into the draft Spring Lake atrazine TMDL ranges as high 166% and is overly conservative and unreasonable. We request the IEPA define and reduce the cumulative implicit (166%) + explicit (0%) margins of safety to be equal to or similar to the implicit (0%) + explicit (10%) margins of safety applied to the Spring Lake Total Phosphorous TMDL adopted in 2007. The current atrazine MCL set by EPA Office of Water (USEPA/OW) and adopted by Illinois EPA is 3 ppb. For SDWA MCL compliance, the USEPA and IEPA Drinking Water unit utilize results that are rounded to one significant figure (the same number of significant digits as the MCL) as directed by USEPA guidance (USEPA WSG 21, 1981; Attachment 1). In the case of atrazine, compliance concentrations of 3.01 to 3.49 should be rounded to 3.0 ppb. By not incorporating the rounding guidance, a 16% implicit margin of safety (MOS) is

incorporated into the TMDL allocation equation (0.49/3 = 0.16 * 100 = 16 percent). The IEPA uses atrazine water quality assessment criteria under the Clean Water Act (CWA) which are more restrictive than SDWA MCL compliance water quality standards which adds to the implicit margin of safety by up to 39%. A drinking water frequency-of-exceedance threshold of 10% is used rather than a running 4-quarter average (R4-QA) of quarterly averages. (e.g. if more than 10% of samples, from the past three monitoring years, exceed a single sample concentration of 3 ppb, the waterbody is listed as impaired which provides the basis for developing a TMDL.) Using Spring Lake monitoring data (Table 6 of the TMDL), the atrazine annual quarterly average in Spring Lake (raw water) for 2003 was 2.78 ppb or 7% less than 3 ppb. In 2006 the annual quarterly average was 1.84 ppb or 39% less, and in 2009 the average was 2.65 ppb or 12% less. A range of 7 to 39% implicit MOS was incorporated into the Spring Lake atrazine listing (and required TMDL) by using the frequency-of-exceedance criteria.

Response: IEPA used the critical period data for the implicit margin of safety. This time period is when rainfall/runoff is highest usually during spring periods after herbicide applications take place. At this time, we expect high amounts of herbicides in runoff because not all applied is adsorbed by the plant. Averaging the exceedences is accounting for that critical period. Implementation actions devoted to this critical period will reduce impairment of atrazine in the waters.

10. The TMDL states "that compliance with an MCL for treated water is based on a running 4- quarter average, calculated quarterly, of samples collected at least once per quarter. However, for some untreated-water intake locations, sampling occur less frequently than once per quarter; therefore, statistics comparable to quarterly averages or running 4-quarter averages cannot be determined. For substances (atrazine) known to vary regularly in concentration in surface water during a typical year, average concentrations within the relevant sub-annual (e.g., quarterly) periods are used". The IEPA was aware of this atrazine seasonality; however the monitoring program does not represent the entire year. The IEPA instituted a guidance criterion which calls for the use of single sample results because a full year of monitoring data is not available. This methodology introduces bias sample frequency of the monitoring program and then multiplies it by the use of single sample results. The IEPA surface water monitoring program frequency decreases (or ceases) in the quarter's atrazine concentrations are expected to be below or approaching the limits of analytical detection. It is twice as frequent in the quarters atrazine is expected to occur. To calculate an implicit MOS range based on this practice, a first quarter result equal to the fourth quarter result was used. (i.e. for 2009 the fourth quarter result was 0.28 ppb, this same value was used for first quarter 2010 and a R4-QA was calculated). The 2009 running 3-quarter average was compared to the calculated 2009 R4-QA, the difference was calculated and a percent margin of safety determined. In 2009 the difference was 0.59 ppb or 20% margin of safety (2.65 ppb –2.06 ppb = 0.59 ppb; (0.59/3)*100 = 20%). In 2006 the difference was 0.34 ppb or 11%, and in 2003 0.15 ppb or 5%. The Safe Drinking Water Act compliance-running 4 quarters of sampling- you should sample all 4 quarters.

Response: As stated in the response to comment 6, IEPA does not sample lakes during the winter period due to no boat access from ice on the lake. This accounts for the raw water sampling used for assessments. IEPA also uses the Drinking Water Program assessment. This program uses finished water data provided by the water plant. Water treatment plants are required to send in at least one data analysis from all quarters of the year.

11. The atrazine load in the TMDL was calculated using the average of "exceeded values" (5.3 ppb). Atrazine concentrations from samples with results greater than 3 ppb were added together and averaged. This average concentration was then multiplied by 1) the volume of water in Spring Lake, 2) a mg to lb. conversion factor, and 3) a liter to gallons conversion factor. This yielded a load. Using the average of "all second quarter values" yields an average concentration of 4.29 ppb. This difference (5.3 – 4.29) is 1.01 ppb and a yields a current load of 39 lbs. (rather than 48 lbs.). Using available data rather than "picking and choosing" select data represents a 19% implicit MOS in calculating atrazine load for the Spring Lake TMDL. (5.3 – 4.29 = 1.01; 1.01/5.3 = 0.19; 0.19 * 100 = 19%)

    Response: As stated in the response to comment 9, the TMDL accounts for this critical period when it is expected to have high atrazine in runoff. Current regulations specify that TMDLs need to take into account critical conditions for stream flow, loading, and water quality parameters (see 40 CFR 130.7(c)(1)).

12. In Section 4.1 of the TMDL it is stated that "assessment of public and food processing water supply use is based on conditions in both untreated and treated water". The TMDL includes Clean Water Act (CWA) raw water monitoring data results, but does not include a presentation, discussion, or reference of water sources, treatment technologies, or compliance monitoring results at the Macomb Community Water Supply (CWS). A discussion the CWS and monitoring results are pertinent to the TMDL. The inclusion of the compliance monitoring data from Macomb CWS will also show that there have been no violations for atrazine in finished water and quarterly samples have not exceeded 0.75 ppb much less the MCL of 3.0 ppb. The ability of the Macomb CWS to change water sources during storm event periods is a best management practice (BMP) used by the CWS to reduce exposure to a long list of substances, including atrazine. This should be discussed in the BMP section of the TMDL.

    Response: Information has been added to the TMDL report for finished water data (refer to Section 5.1). Finished water quality data submitted four times a year from the Macomb Community Water Supply is meeting the MCL. Illinois EPA uses both raw and finished water quality data for the assessment of public water supply designated use. Please refer to Section 4.1 in the TMDL report for more information. More information on the Macomb Water Treatment Plant is included in the final TMDL report (refer to Section 5.4).

13. Section 5.1 Water Quality Data of the Spring Lake TMDL discusses the water quality monitoring data used to list Spring Lake as 303(d) impaired and the basis for developing a TMDL load. It states that six out of 18 samples exceeded the MCL in the years 2003,

2006 and 2009. It is not possible to exceed a R4-QA with individual sample results. This is an incorrect statement and reference to the MCL. This occurs frequently throughout the TMDL and should be corrected.

Response: This has been corrected.

14. Two sets of samples were collected on the same day (June, 2003 and July, 2003). Samples collected on the same day at the same location should be averaged for a single daily result, rather than double counting. (i.e. (3.3 ppb + 3.6 ppb)/2 = 3.45 ppb and (2.7 ppb + 3.2 ppb)/2 = 2.95 ppb). The total sample count should equal 16. Using rounding techniques specified by USEPA for SDWA MCL compliance, only 2 of the sixteen samples would exceed 3.49 ppb, once in 2006 and another in 2009. This leaves a frequency of occurrence of 12.5 percent ((2/16)*100)) rather than 33 percent specified in the report. This rounding methodology (as used by the IEPA Drinking Water Division) should be incorporated into the TMDL.

    Response: Only data from the last assessment (2009) was used in the calculations so no averaging is needed.

15. Do we test for Atrazine in lakes for aquatic life use? Why is this lake not impaired for aquatic life designated use?

    Response: Aquatic life designated use in lakes is determined by looking at phosphorus, chlorophyll a, Secchi disk transparency, macrophyte coverage and nonvolatile suspended solids. Refer to page 30-35 in the Integrated Water Quality Report for more information-http://www.epa.state.il.us/water/tmdl/303-appendix/2014/iwq-report-surface-water.pdf. There are specific guidelines to meet the aquatic life use and if they are not met, causes are identified (atrazine is included). It was determined that Spring Lake is meeting the aquatic life use and no causes needed to be identified.