

Working with Stakeholders to Protect Your Source Water

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Resources

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CONSTRUCTION

- Lake Springfield was constructed in 1933 as a drinking water source for Springfield
- It took 18 months for the basin to fill completely with water
- \$2.5 Million Dollar Bond for the construction of the lake
- Lake Springfield is considered a man made Lake



**Lake Springfield
was formed by
the impoundment of
Sugar Creek, and is
joined by Lick Creek**



Sugar Creek



Lick Creek

Today, Lake Springfield is primarily used as a cooling water source for the power plant, and is the largest municipally owned Lake in Illinois



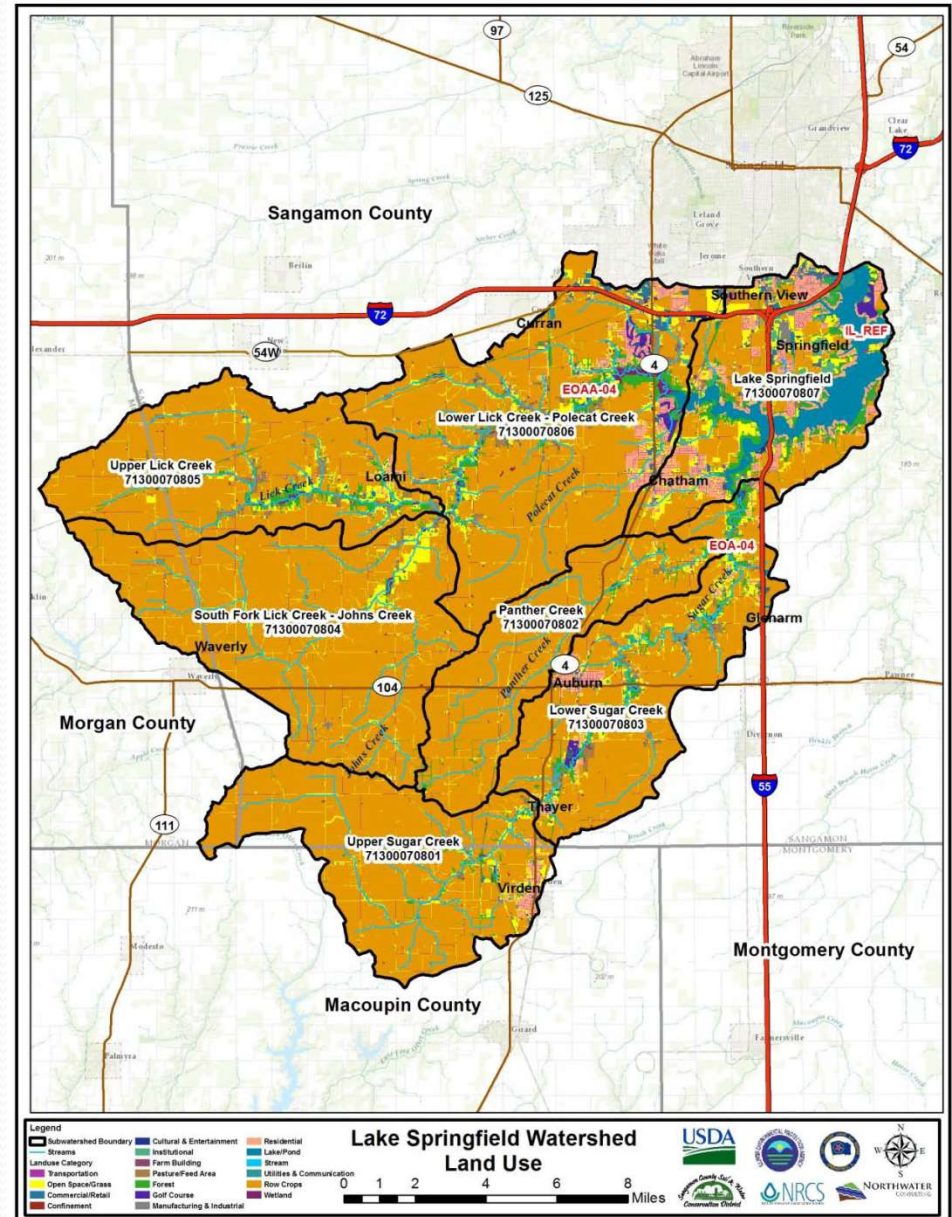


LAKE SPRINGFIELD WATERSHED

- **170,000 acres- (265 square miles)**
- **Mostly southwest of Springfield**
- **Bordered by I-72 to west and I-55 to south**
- **Predominately agricultural**
- **Main tributaries**
 - **Lick Creek (west)**
 - **Sugar Creek (south)**

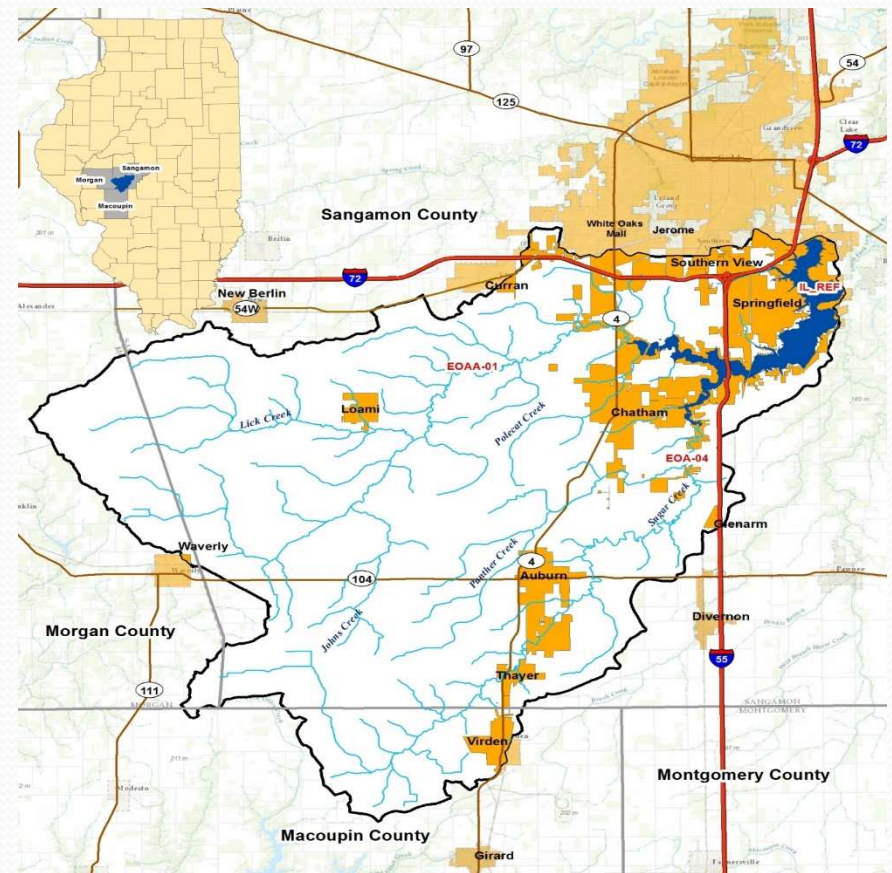
LAKE SPRINGFIELD WATERSHED LAND USE

74% cropland
 5% Forest
 4% Grassland
 Highest % Row crops =
 South Fork Lick & Panther Creek



LAKE SPRINGFIELD WATERSHED MORPHOLOGY

- The lake is located within the lower Sangamon River Watershed, draining an area of 265 square miles in portions of Sangamon, Macoupin and Morgan counties
- You can see from this map that when it rains in Springfield, the water doesn't end up in Lake Springfield
- The watershed is heavily influenced by soils, human activity, and land use





LAKE SPRINGFIELD MORPHOLOGY

- **2 Dams (Spaulding Dam and the Saddle Dam)**
- **4,300 acres and holds approximately 17 billion gallons per day.**
- **12 miles long and on average ½ mile wide.**
- **57 miles of shoreline.**
- **Water Plant produces on average 22 million gallons per day.**
- **Each foot of Lake holds 1,000,000,000 gallons.**

LAKE SPRINGFIELD MORPHOLOGY

CONT.

- Lake Springfield, like most lakes, undergoes stratification during the warmer months. Stratification in the Lake is more prominent around the deepest areas (near the intake)
- In the cooler months, the lake experiences turnover. During turnover, nutrients and organic matter from the bottom of the lake mixes into the water column

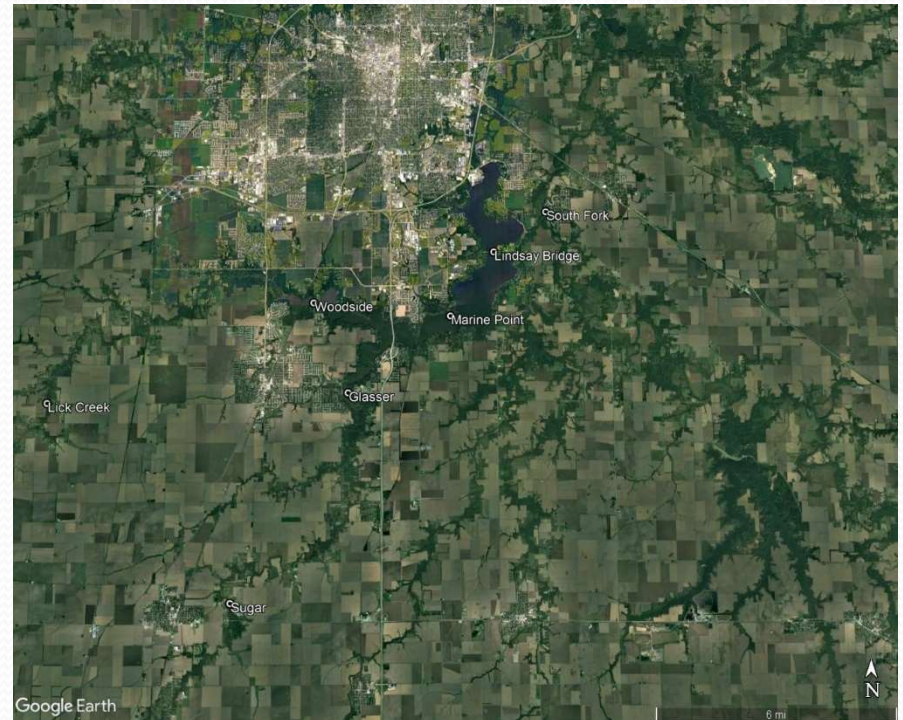


Lake Springfield Operations

- The Lakes water level is kept around full pool (560.00 ft). During the summer, the lake level increases to 560.50 ft. This is done through a combination of raising and lowering of the gates at Spaulding Dam, and pumping water from the Saddle Dam
- Lake level measurements are tracked weekly, as well as the amount of rain from precipitation events via our rain gauge
- All readings are available on the City Water, Light & Power website

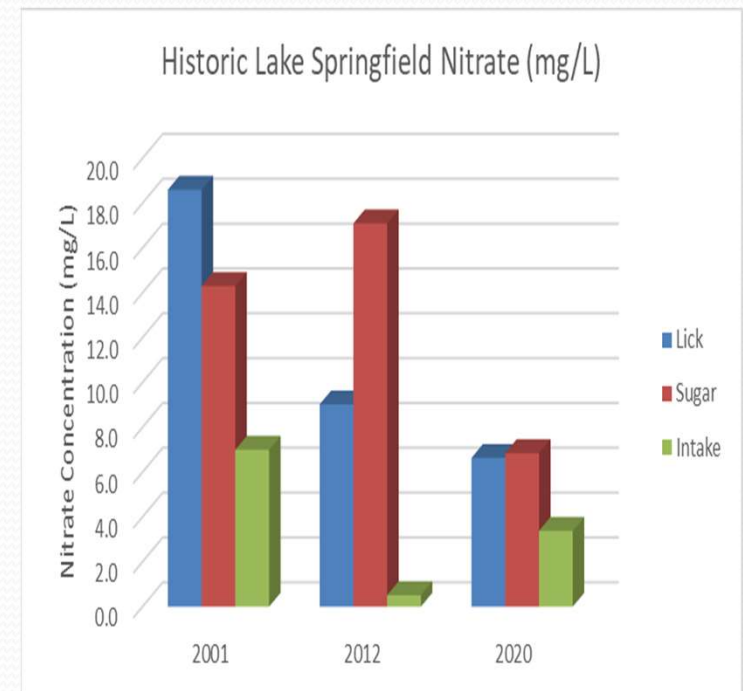
Weekly Monitoring

- We monitor locations, both lake and watershed, for Nitrate and Phosphorus. These locations combined help provide a current nutrient profile for the lake
- These locations include: South Fork, Lindsay Bridge, Marine Point, Woodside, Glasser Bridge, Sugar Creek, and Lick Creek



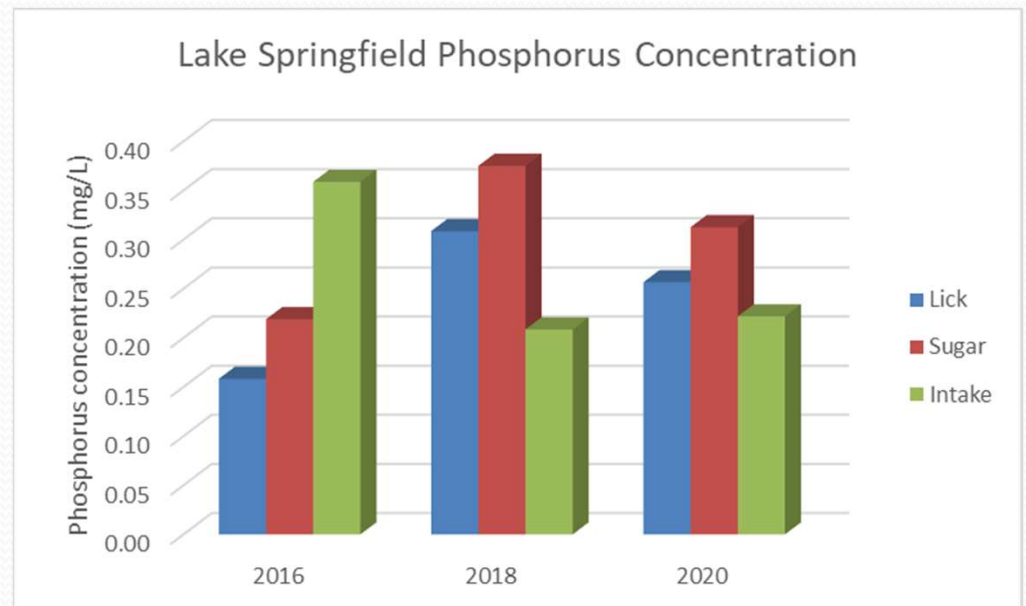
Nitrate

- Lake Levels for Nitrate have historically been an issue
- Counts above the drinking water standard of 10 (mg/L) have been recorded in the tributaries, but the average concentration has decreased over the decades
- Finished water values are well below the EPA standard
- These reports are available for stakeholders via CWLPs website



Phosphorus

- Legacy Phosphorus in Lake Springfield is another challenge for water treatment
- Phosphorus from sediment and human application has saturated Lake Springfield, and contributed to its eutrophic conditions
- EPA guidelines suggest 0.05 (mg/L) for finished water



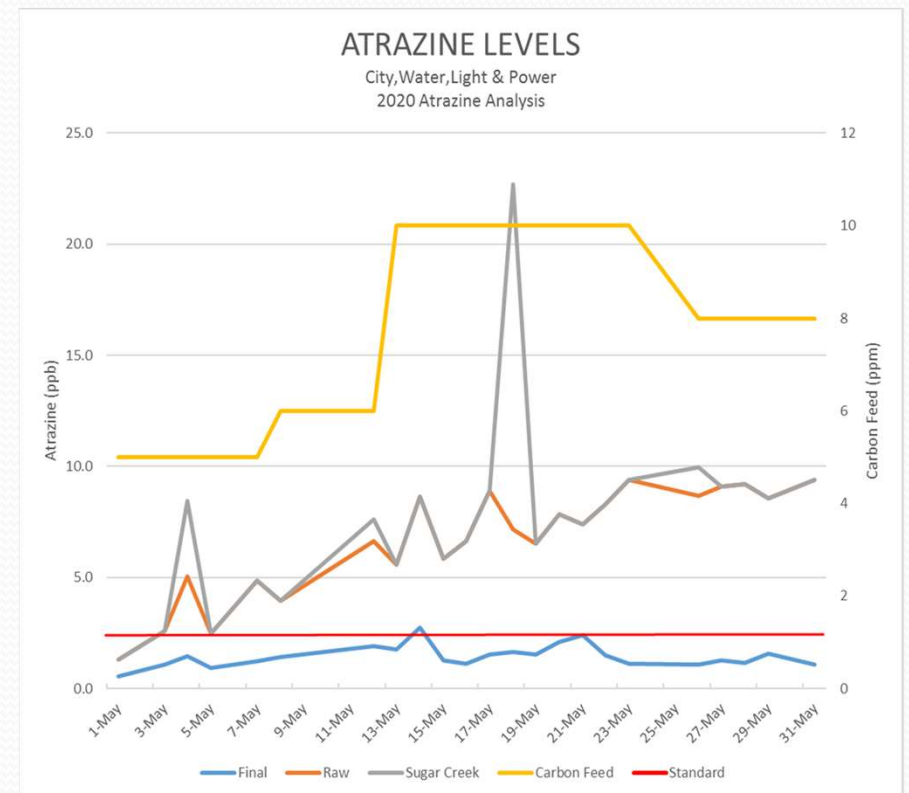
Sediment

- Sedimentation is another unique issue at Lake Springfield. Nutrients are carried in sediment into the lake and released into the water column, contributing to eutrophic conditions
- Sedimentation has also reduced the carrying capacity of the lake. Dredging has been used in the past to help reverse this
- Working with stakeholders to adopt no till/cover crop practices have reduced sedimentation to the lake



Atrazine

- The agricultural herbicide, Atrazine, specifically poses a challenge in the treatment process of Lake Springfield water
- In 1994, CWLP had a near violation for atrazine (3 ppb)
- Since then, efforts have been made to decrease land application of atrazine
- This issue led to the formation of the LSWRPC



Atrazine Cont.

Working with stakeholders to implement two-pass atrazine application, alternative chemicals, no till, and other BMPs has helped achieve compliance and reduced treatment costs

Syngenta

AAtrex® 4L

Herbicide

For season-long weed control in corn, sorghum, and certain other crops

GROUP 5 HERBICIDE

RESTRICTED USE PESTICIDE

(GROUND AND SURFACE WATER CONCERNS)

FOR RETAIL SALE TO AND USE ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION, AND ONLY FOR THOSE USES COVERED BY THE CERTIFIED APPLICATOR'S CERTIFICATION.

THIS PRODUCT IS A RESTRICTED-USE HERBICIDE DUE TO GROUND AND SURFACE WATER CONCERNS. USERS MUST READ AND FOLLOW ALL PRECAUTIONARY STATEMENTS AND INSTRUCTIONS FOR USE IN ORDER TO MINIMIZE POTENTIAL FOR ATRAZINE TO REACH GROUND AND SURFACE WATER.

Active Ingredients:

Atrazine: 2-chloro-4-ethylamino-6-isopropylamino-s-triazine 42.6%

Related Compounds 0.9%

Other Ingredients: 56.5%

Total: 100.0%

AAtrex 4L contains 4 lbs. active ingredients per gallon.

Shake well before using.

KEEP OUT OF REACH OF CHILDREN.

CAUTION





Algae

- Eutrophic conditions can lead to issues at Lake Springfield with Algae
- Algal byproducts, such as MIB and Geosmin, have led to taste and odor issues in finished water
- Lake Springfield has not had an HAB, however anything is possible when hypertrophic conditions persist
- Most issues occur during Lake Turnover
- Special monitoring during the warmer months help our staff prepare for any suspected issues

Algal Blooms

Blue-Green Algal blooms are dangerous, and have not been an issue at Lake Springfield

Green Algae is usually harmless, and is the most common visible Lake algae

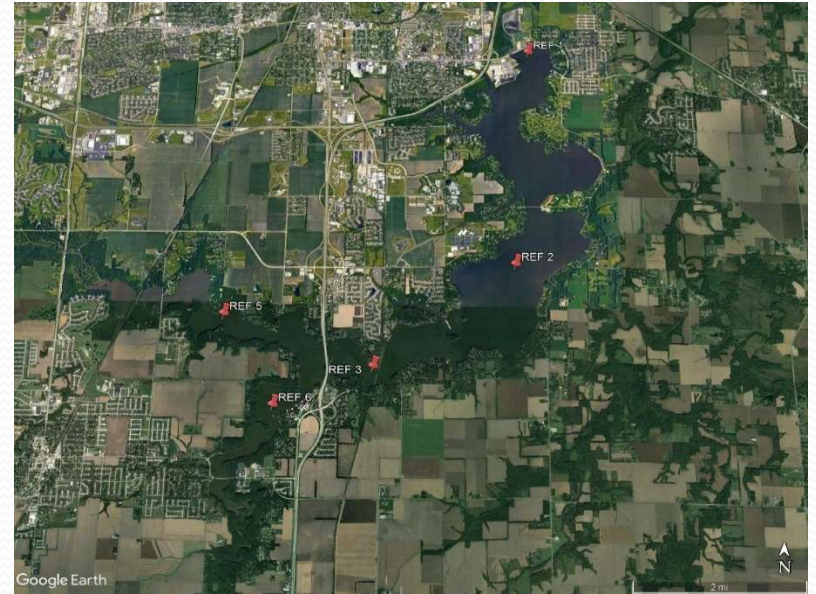


Rio St Lucie River, Jeff Tucker 6-24-16



Summer Monitoring

- We monitor 5 locations in lake during the summer. These locations are monitored biweekly, from May till October
- Parameters recorded at these locations include: pH, Dissolved Oxygen (mg/L), Temperature, Secchi depth/color, Conductivity, P & T Alkalinity, E.coli, and Total Suspended Solids

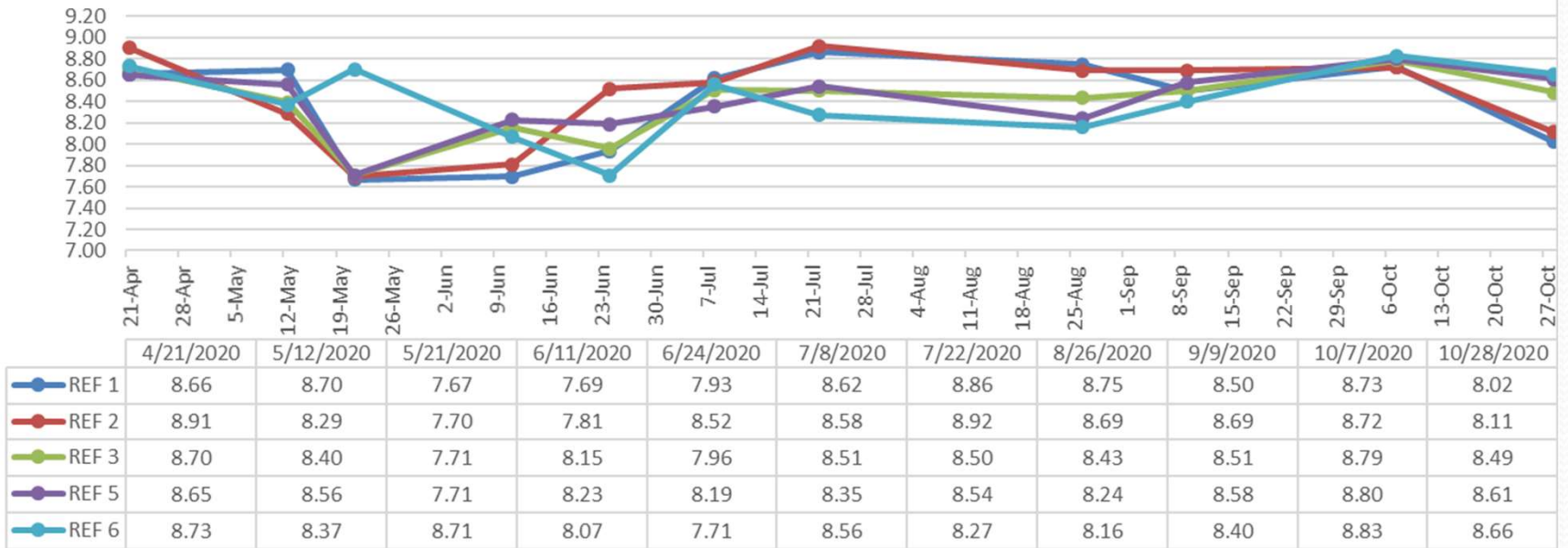




pH in Lake Springfield

- pH is one of the most commonly measured water quality parameters
- Not only does it share information about the acidity of the water column, but it can also warn our staff of potential issues in the Lake
- Normal pH range for lakes are between 6.5-8.5
- Lake Springfield pH is slightly higher than that range from 7.7-9.0. This is common with turbid surface water and poses no health risk, but does cause a “akali” bitter taste

Lake Springfield Water Quality-2020 pH



	REF 1	REF 2	REF 3	REF 5	REF 6
Average	8.38	8.45	8.38	8.40	8.41
Maximum	8.86	8.92	8.79	8.80	8.83
Minimum	7.67	7.70	7.71	7.71	7.71
Std. Dev	0.45	0.42	0.32	0.30	0.34

Dissolved Oxygen (mg/L) & Temperature (°C)

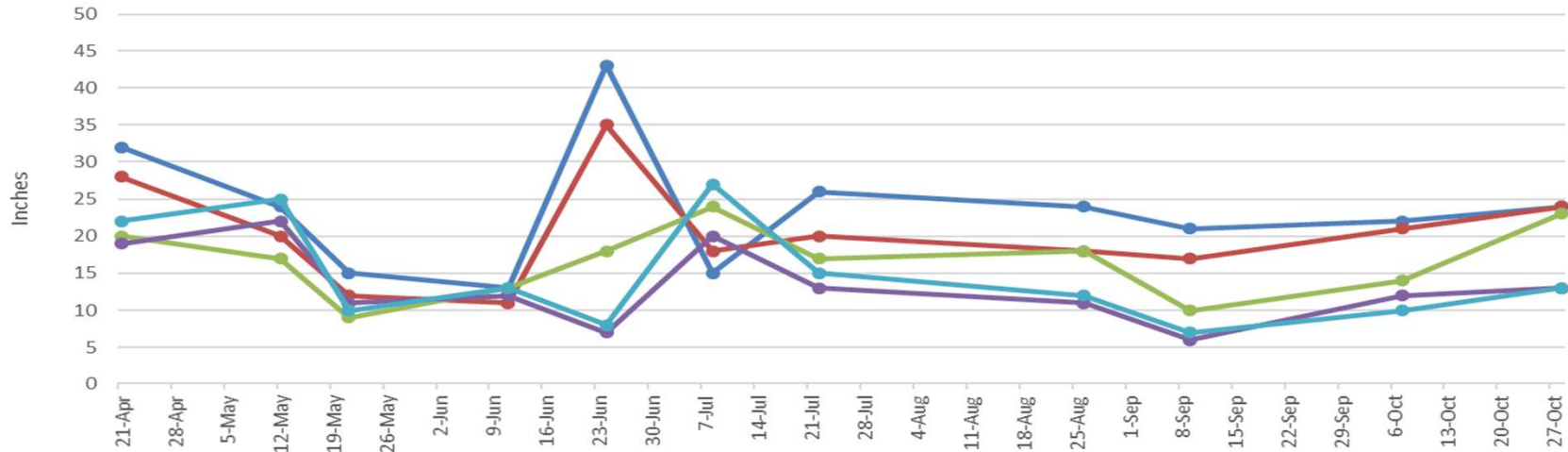
- Dissolved oxygen is a great indicator of productivity in the water column. It is measured as the amount of oxygen available in the water column for usage by aquatic animals and plankton
- Dissolved oxygen & Temperature decrease the deeper the water, however lake turnover can cause both to become uniform throughout the water column temporarily
- These parameters combined tell us whether the lake is stratified or if its mixing, and can help warn of potential hypereutrophic conditions

Secchi Depth/Color

- The secchi depth and color chart are tools that we use to measure the clarity of the water
- Different sites have different levels of clarity
- This is a tool that we use to monitor for potential algal blooms (paired with D.O., pH, and Temp)
- Share this information with IEPA and NALMS



Lake Springfield Water Quality Data -2020
Secchi Depth (Inches)



	4/21/2020	5/12/2020	5/21/2020	6/11/2020	6/24/2020	7/8/2020	7/22/2020	8/26/2020	9/9/2020	10/7/2020	10/28/2020
REF 1	32	24	15	13	43	15	26	24	21	22	24
REF 2	28	20	12	11	35	18	20	18	17	21	24
REF 3	20	17	9	13	18	24	17	18	10	14	23
REF 5	19	22	11	12	7	20	13	11	6	12	13
REF 6	22	25	10	13	8	27	15	12	7	10	13

	REF 1	REF 2	REF 3	REF 5	REF 6
Average	23.5	20.4	16.6	13.3	14.7
Maximum	26	35	24	22	27
Minimum	13	11	9	6	7
Std. Dev	8.50	6.83	4.82	5.10	6.87



E.coli

- We monitor and record E.coli counts for the filter plant and recreational use at Lake Springfield
- High counts of E.coli (above the bathing beach standard of 232 cfu/mL) pose a risk to human consumption and can indicate a contamination in the Lake
- This information we share with the stakeholders, especially for water related events (ie. Triathlon)
- Normal ranges for Lake Springfield are between 10-130 cfu/mL



Current Conditions

- Currently, education and outreach have led to numerous grants for Lake Springfield and its stakeholders
- Lake Springfield is on the EPA Section 303 (d) list for Impaired Waters, specifically for phosphorus and sediment
- Taste & Odor issues from lake turnover



Stakeholder Connection

- Although CWLP has adapted to adverse conditions relating to Lake Springfield, the most important treatment is prevention
- Stakeholders have the opportunity to have a voice and impact on the water quality of Lake Springfield, and have made tremendous strides throughout the decades
- Work with stakeholders to remove Lake Springfield from the EPA Section 303 (d) list for Impaired Waters, meet the TMDL for the Lake Springfield Watershed, and together help meet the Illinois Nutrient Loss Reduction Strategy of reducing nitrogen and phosphorus by 45% in Illinois waterways

History of Collaboration to recruit and work with Stakeholders





LAKE SPRINGFIELD WATERSHED – 39 YEARS

1982- CWLP BEGAN LAKE SPRINGFIELD MAINTENANCE AND RESTORATION PLAN

REMOVE SEDIMENT FROM THE LAKE

PROVIDE SHORELINE STABILIZATION

WATERSHED PROTECTION

1983 - CWLP COST SHARE PROGRAM WITH SCSWCD BEGAN

\$25,000/YEAR – ESTABLISH BMPs IN LSW TO:

REDUCE SOIL EROSION

IMPROVE WATER QUALITY

STABILIZE SHORELINE

1984 – 1st Sedimentation Survey

1987 - PHASE I DIAGNOSTIC/FEASIBILITY STUDY FOR LAKE SPRINGFIELD

RESTORATION PLAN

1987-1990 - DREDGING PROJECT – PHASE 1 – 3.2 MILLION CUBIC YARDS OF

SEDIMENT REMOVED FROM LAKE SPRINGFIELD



1990 - LAKE SPRINGFIELD WATERSHED RESOURCE PLANNING COMMITTEE (LSWRPC) WAS FORMED – 1ST RESOURCE PLAN WRITTEN


1991- LAKE LAND USE PLAN DEVELOPED, revised 1994, 2005, 2012, 2014

1994 - NEAR VIOLATION OF DRINKING WATER STANDARD (3 PPB) FOR ATRAZINE

1995 - ADDENDUM TO 1990 WATERSHED PLAN TO ADDRESS PESTICIDE ISSUES

1995 - EPA 319 GRANT- URBAN CONSTRUCTION EROSION CONTROL BMPS

1997- 5 YEAR STUDY – “ASSESSMENT OF BEST MANAGEMENT PRACTICES (BMPs) EFFECTIVENESS ON WATER QUALITY AND AGRONOMIC PRODUCTION IN THE LAKE SPRINGFIELD WATERSHED”



1997-2002 - “Assessment of BMP effectiveness on Water Quality and Agronomic Production in the LSW” began

2003 – EPA 319 GRANT (40% MATCH FROM CWLP)

600 ACRES OF GRASS FILTER STRIPS ESTABLISHED – 15 YEAR CRP

2004 - SEDIMENTATION SURVEY - 7% DECLINE IN EROSION RATE OVER 20 YEARS

2008 -USDA GRANT “NORTHERN BOBWHITE QUAIL CONSERVATION INITIATIVE”
HABITAT FOR WILDLIFE (SAFE) - 2,000 ACRES- 20 CONTRACTS IN LSW

2012 - LSWRPC MEET TO REVISE 1990 PLAN

2013 - IEPA PRIORITY LAKE AND WATERSHED IMPROVEMENT PLAN

GRANT - STABILIZED 2,756 FEET OF HIGHLY ERODIBLE SHORELINE



2013 - SPECIAL 3-YR. NITROGEN MANAGEMENT PROGRAM/STUDY BEGAN-
GOAL: REDUCE NITRATE N TO 5 PPM AT LAKE'S INTAKE AT ALL TIMES


2013 - EPA 319 GRANT TO IMPLEMENT BMPs IN WATERSHED and WRITE NEW
WATERSHED-BASED PLAN – CWLP PROVIDES 40% MATCH

2014 - STAGE 1 TMDL STUDY COMPLETED FOR LAKE SPRINGFIELD AND SUGAR
CREEK WATERSHED

2015 – ON-GOING WORK WITH LAKE HOMEOWNERS TO EDUCATE ON URBAN
BMPs FOR LAWN CARE MAINTENANCE, FERTILIZER AND PESTICIDE
USE. USGS INSTALLS 2 GAUGES AT LICK & SUGAR CREEK

2015 – IL NUTRIENT LOSS REDUCTION STRATEGY RELEASED BY EPA
PHASE 1 MILESTONES - BY 2025 - REDUCE NITRATE NITROGEN BY 15%
- REDUCE PHOSPHORUS BY 25%

2016 – FINAL RESULTS OF THE 3-YR. NITROGEN MANAGEMENT STUDY
FINAL WATERSHED-BASED PLAN

- 
- 2016-2017 – SCSWCD cover crop program in LSW. Thirty-five LSW producers planted 1,400 acres of cover crops in the fall of 2016.
 - 2017– Final Total Maximum Daily Load (TMDL) Study for 5 impaired water body segments of the LSW, including Lake Springfield, 3 segments of Sugar Creek and the Hoover Branch segment north of Spaulding Dam.
 - 2017-Final Lake Springfield Watershed-based Management Plan, a Strategy to Enhance and Protect the Water Quality and Natural Resources of Lake Springfield and Its Watershed.
 - 2017-2019 – IEPA 319 Grant for agricultural and urban BMPs throughout the LSW, as a continuation and expansion of efforts to significantly reduce nutrient loadings in this watershed’s streams from surface water runoff and to ultimately improve the quality of the water in the lake. Also this grant includes funding for cover crops, nutrient management plans and education activities.

Current Funding Opportunities

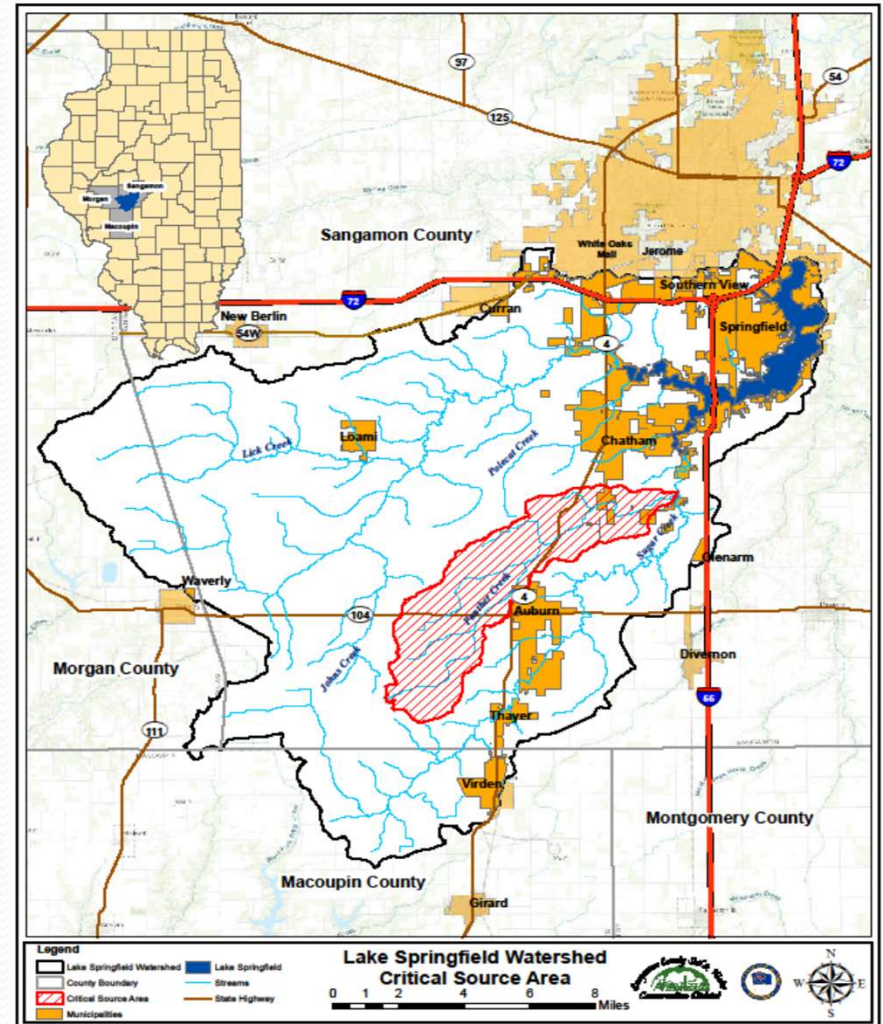
Funding Source - Grant	2019 Funding (millions)	Description
EPA - 319	165.4	The purpose of Illinois EPA's 319 program is to work cooperatively with units of local government and other organizations toward the mutual goal of protecting the water quality in Illinois through the control of NPS pollution. The program includes providing funding to these groups to implement projects that utilize cost-effective best management practices (BMPs) on a watershed scale. Projects may include structural BMPs such as detention basins and filter strips, non-structural BMPs such as construction erosion control ordinances and setback zones to protect community water supply wells. Technical assistance and information/education programs are also eligible.
USDA/NRCS - RCPP (Regional Conservation Partnership Program)	300	The Regional Conservation Partnership Program (RCPP) promotes coordination of NRCS conservation activities with partners that offer value-added contributions to expand our collective ability to address on-farm, watershed, and regional natural resource concerns. Through RCPP, NRCS seeks to co-invest with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide measurable improvements and outcomes tied to the resource concerns they seek to address.
USDA/NRCS - NWQI (National Water Quality Index)	23.7 (2018)	a partnership among NRCS, state water quality agencies and the U.S. Environmental Protection Agency to identify and address impaired water bodies through voluntary conservation. NRCS provides targeted funding for financial and technical assistance in small watersheds most in need and where farmers can use conservation practices to make a difference. Conservation systems include practices that promote soil health, reduce erosion and lessen nutrient runoff, such as filter strips, cover crops, reduced tillage and manure management. These practices not only benefit natural resources but enhance agricultural productivity and profitability by improving soil health and optimizing the use of agricultural inputs.

• Current Partners

- City of Springfield / CWLP (MW)
- Sangamon County Soil and Water Conservation District (SWCD) (SG)
- Northwater Consulting (FP)
- ManPlan Inc (FP)
- Illinois Department of Natural Resources – fish and lake morphology (SG)
- Illinois Lake Management Association (NP)
- Illinois Farm Bureau (SG)
- Illinois Fertilizer & Chemical Assoc. (AA)
- Springfield Plastics (FP)
- USGS
- Illinois Corn Growers Assoc. (ICGA)

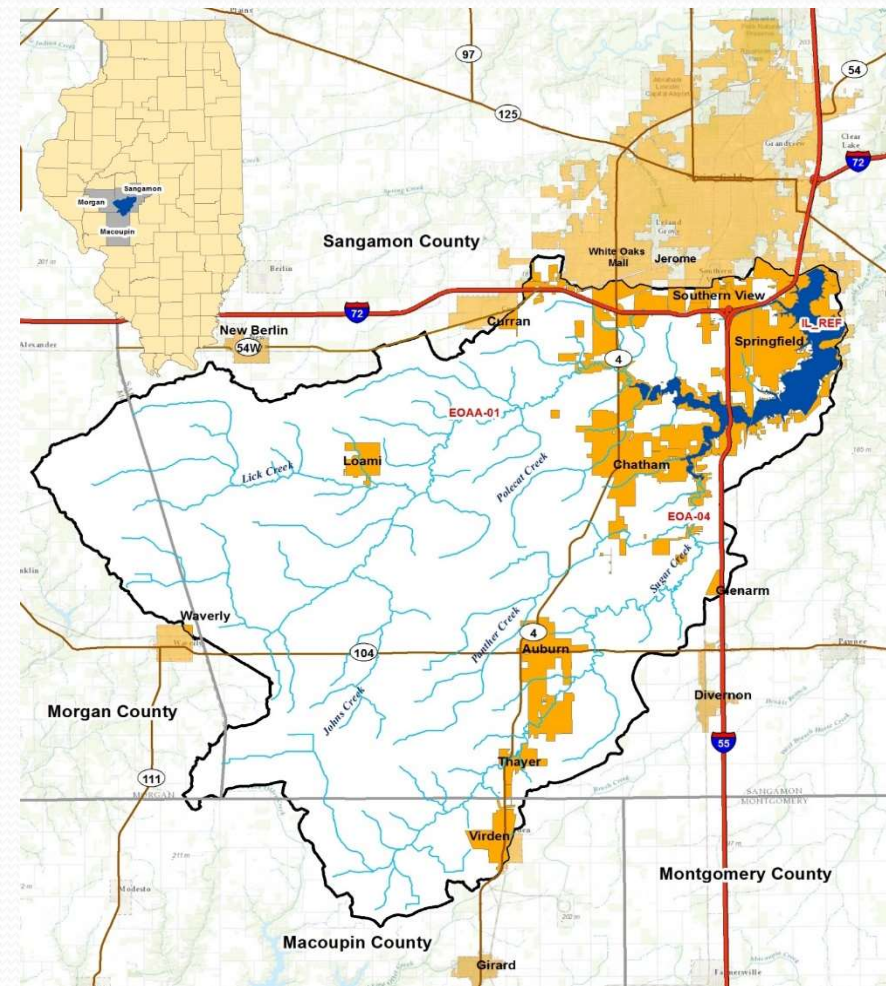
NWQI

- CWLP has received funding through an NWQI Grant **2020**
- The Grant is administered by NRCS
- \$136,300 per year through **2023**
- Focus is the Panther creek sub-watershed (Critical Source Area)
- Targeting in field soil health practices
 - NM, FB, NT/TMP, CC



RCP

- The funding is administered by CWLP-partner-led
- 5 year program
- \$1.3 from NRCS; over \$2 mil from CWLP/Partners; seed money from CWLP (1:1)
- Entire watershed
- Targeting in field soil health practices, also including structural



IEPA 319

- CWLP provided seed money \$280,000 (60:40)
- The Grant is administered by SWCD
- \$420,000 from EPA for 2 years
- \$700k total, counting towards RCPP
- Tillage and gully surveys, online interface; many structural practices

BMP Type	Number of Sites	Total Units Installed
Conservation Tillage (acre) <input type="text"/>	10	2,000
Cover and/or Green Manure Crop (acre) <input type="text"/>	20	2,000
Grassed Waterway (acre) <input type="text"/>	5	5
Grade Stabilization Structure (number) <input type="text"/>	1	1
Nutrient Management Plans (acre) <input type="text"/>	20	2,000
Shoreline Stabilization (feet) <input type="text"/>	2	2,600
Streambank Stabilization (feet) <input type="text"/>	1	1,000
Stream Channel Stabilization (e.g. riffles) (feet) <input type="text"/>	1	3
Woodland Improvement (acre) <input type="text"/>	1	78
Other BMPs <input type="text"/> NMP Implementation, Urban BMPs, Saturated Buffer, <input type="text"/>		<input type="text"/> Add a r



Challenges in Water Treatment

- ❖ Removal of herbicides
 - ❖ Lead removal
 - ❖ Suspended Particles
 - ❖ Nutrients
-
- ❖ How to reach and fund stakeholders?



OBSTACLES

- Planning- what do you need?
- MOTHER NATURE
- LANDOWNERS
- FUNDING
- PARTNERSHIPS



C-BMP

Illinois Council on Best Management Practices



City Water, Light & Power

Springfield, Illinois



Strong, Active Partners Yield Results



**Lincoln Land
Community College**



Ag Retailers

Producers



Landowners



Incentives



Government



Private Land- Land Use Plans

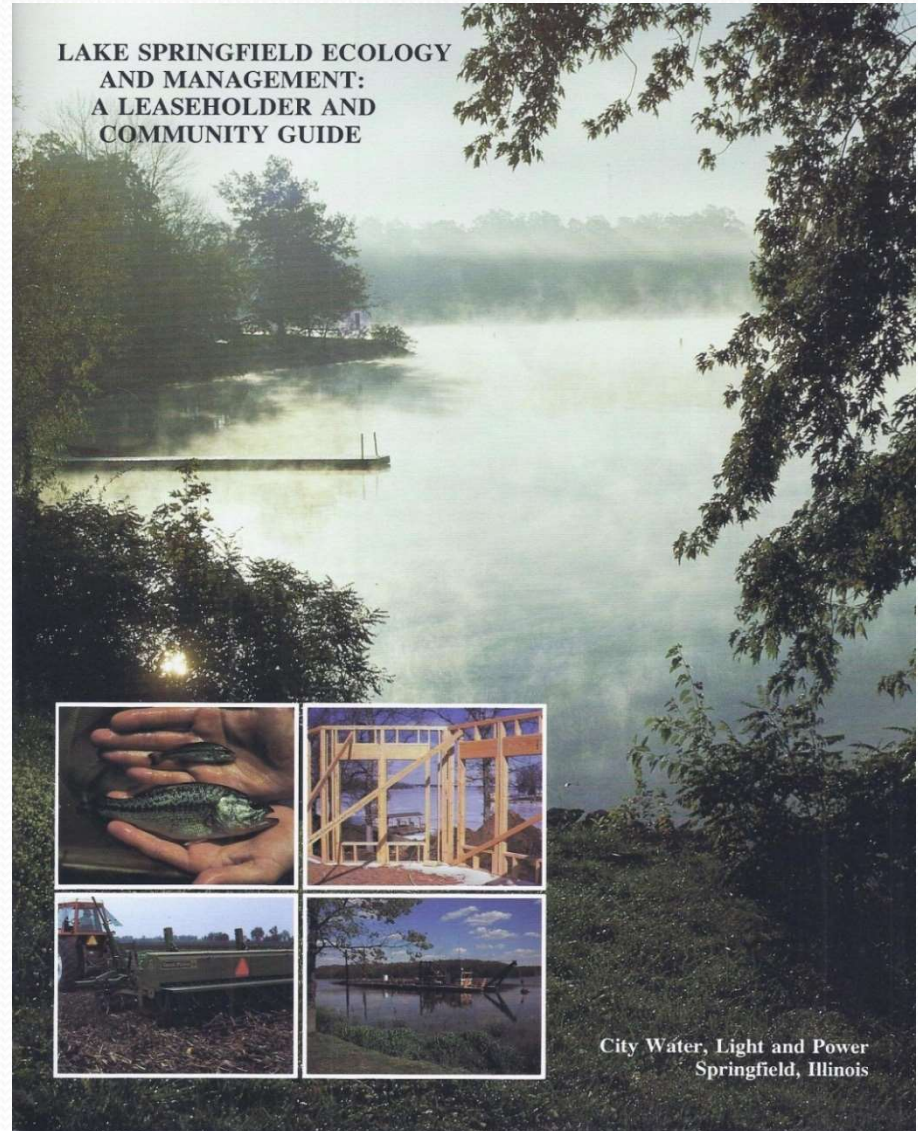
LAND USE PLAN FOR LAKE SPRINGFIELD AND ITS MARGINAL PROPERTIES

February 1991
Revised December 2005, September 2012 and May 2014

City Water, Light and Power

Springfield, Illinois

LAKE SPRINGFIELD ECOLOGY AND MANAGEMENT: A LEASEHOLDER AND COMMUNITY GUIDE



City Water, Light and Power
Springfield, Illinois



The plan sets forth five primary policies regarding:

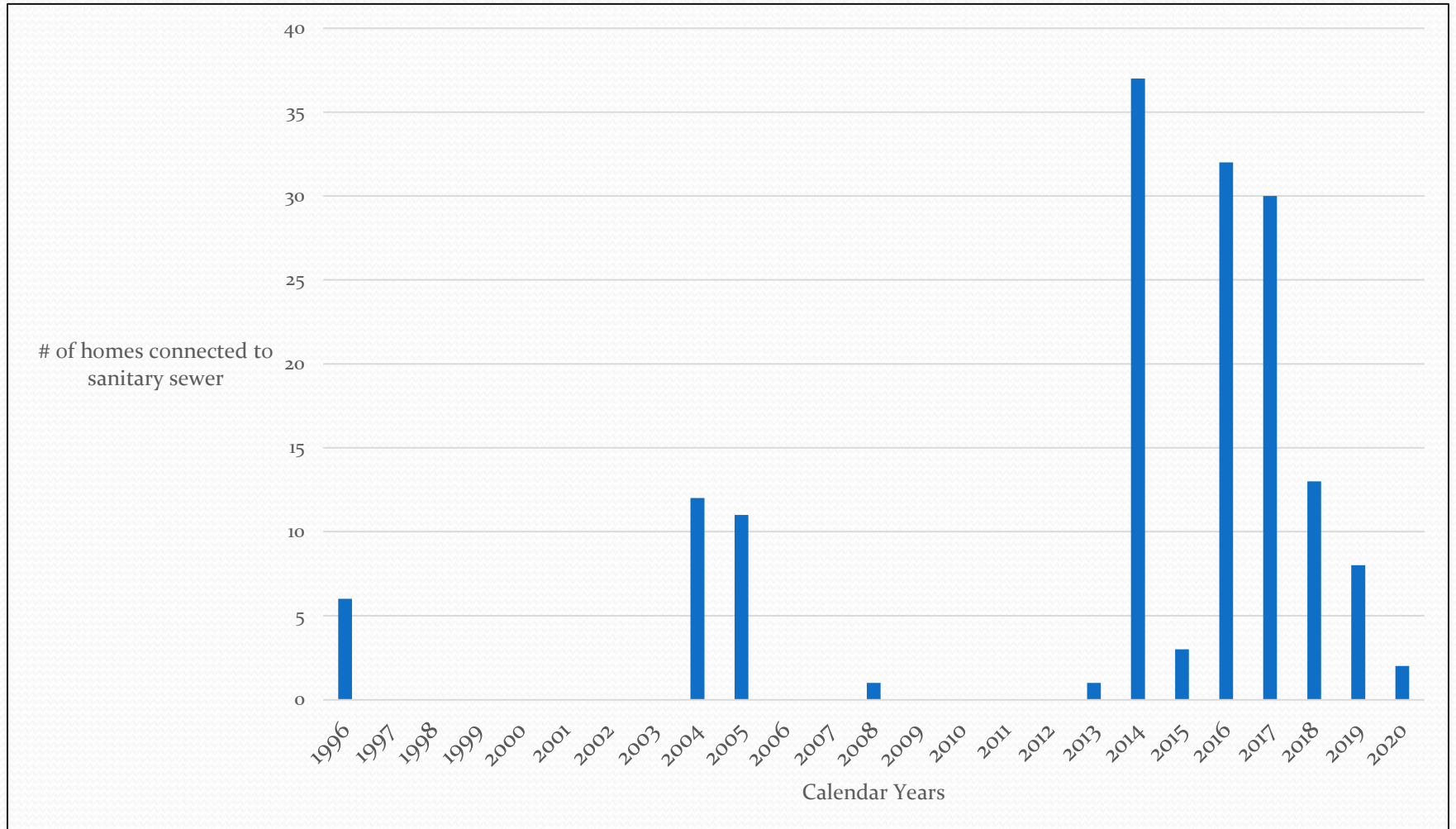
- **the establishment of five land use categories and limits on activities allowed in each.**
- **the requirement that the public be notified of and allowed input into plans that would substantially change the principal use of any of the five categories.**
- **the regulation of leases and sales of marginal lands.**
- **the regulation of existing leaseholds and conversion of existing properties to new uses.**
- **a commitment to preserve, protect and develop wildlife preserves, green spaces and lake parks according to their unique characteristics.**

Another Goal for CWLP is to eliminate all septic systems from the Lake Springfield Marginal Lands.





Number of Homes on Sewer



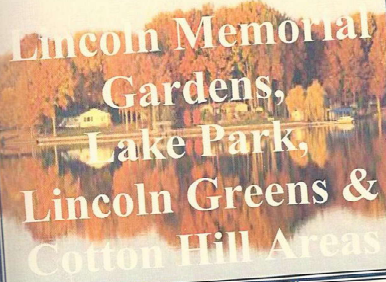
Sanitary Sewer Study

South & East Side of Lake Springfield

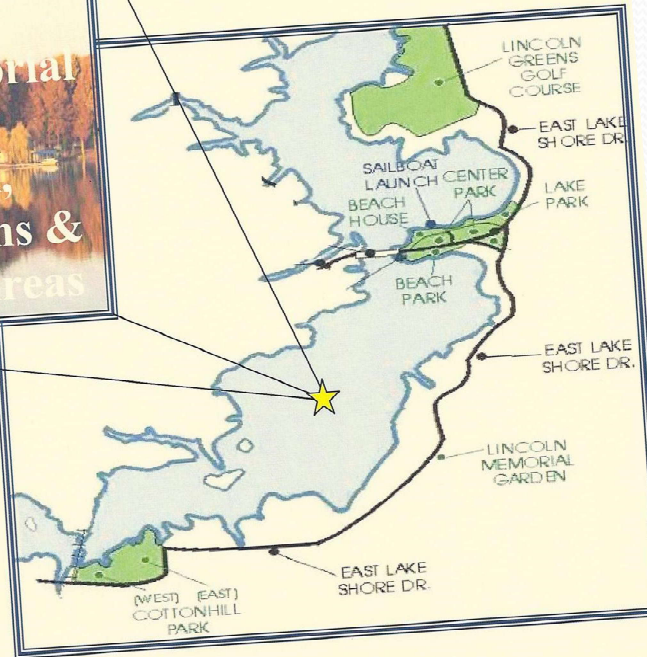
Springfield, Illinois

February 2013

Serving:



Lincoln Memorial
Gardens,
Lake Park,
Lincoln Greens &
Cotton Hill Areas



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3223 S. Meadowbrook Road
Springfield, Illinois 62711
217.698.8900

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