2018 Annual Report
Part B
Illinois Volunteer Lake Monitoring Program

By
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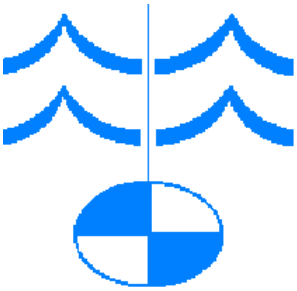

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Acknowledgements

First and foremost, thanks to this year's 255 volunteer lake monitors who made this program and report a possibility. Their dedication to Illinois lakes is greatly appreciated and acknowledged.

Lake Name County Name	Volunteer Names
Altamont New Effingham Co.	Jarrett Goers Lloyd Wendling Ryan Spade
Apple Canyon Jo Daviess Co.	Gary Hannon Kim Rees Bill Ware Fern Tribbey Steve Tribbey Aren Helgerson Kerstin Stople
Arcadia Williamson Co.	Keith Gardner Bill Nielsen
Barrington Lake Co.	Valomry Dyokas Tom McGonigle Ann Kirkley Kathy Aron Dan Brockman Louis Yer Len Zolna Pat Flynn Ionn Anderson L. Lee Norm Erih
Bass Lee Co.	Jerry Corcoran
Beaver Grundy Co.	Barb Arnold Jim Arnold
Big Bear Lake Co.	Gabriel Rodriguez
Bird's Pond Sangamon Co.	Harry Hendrickson Phil Voth
Black Oak Lee Co.	Jerry Corcoran
Bloomington Mclean Co.	Tony Alwood Jill A Mayes
Bluff Lake Co.	Alana Bartolai Joyce Gaffney
Bruce DuPage Co.	Dave Phillips
Butler Lake Co.	Dan Colwell Mary Colwell
Camelot Peoria Co.	Joe Rush Christopher Mackesy Vincent Johnson
Campton Kane Co.	Dave Hanson
Campus Jackson Co.	Marjorie Brooks Louis Helsing
Candlewick Boone Co.	Chuck Hart
Carbondale Jackson Co.	Kim Cole Bill Daily Rob Ittner Will Lusk Eric Stead Jesse Warden Jimmy Hendrix Lee Pilkington Matt Weaver Skylar Hanson
Carroll Carroll Co.	Joe Rush
Catatoga Macoupin Co.	Marie Dawson Walter L Dawson
Catherine Lake Co.	John Massman Berit Massman Bob Mazzeffi Erica Adrian John Vrchota

Cedar Jackson Co.	Eric Stead Lee Pilkington Jesse Warden Matthew Weaver Skylar Hanson
Channel Lake Co.	John Massman Bob Mazzeffi Adrian Robinson Adrian Mazzeffi John Vrchota
Charles DuPage Co.	Darlene Garay Ken Brennan
Charlotte Kane Co.	Mike Howell Reider Hahn
Chautauqua Jackson Co.	Michael T Madigan Nancy L Spear
Chicago Botanic Garden Cook Co.	Bob Kirschner
Countryside Lake Co.	Eric Butler Ethan Butler Evan Butler
Crooked Lake Co.	Blair Dawson
Cross Lake Co.	Gregory Goldbogen Pam Goldbogen
Crystal Champaign Co.	Kara Dudek Andy Rousseau Alex Ivanova Zoe Wu
Crystal McHenry Co.	Jeremy Husnik Kelly Burdick Bob Bruzzino
Dawson Mclean Co.	Allan (Jim) Zoerb Clark Ranney Wayne Lockwood
Deboer Woods Will Co.	David Casillas Dennis Dempsey
Deep Lake Co.	Ron Riesbeck
Defiance McHenry Co.	Mary Colwell Rachel Berry Erin Slifer Greta Taylor
Des Plaines Lake Co.	Paul Klonowski
Devils Kitchen Williamson Co.	Don Johnson
Diamond Lake Co.	Greg Denny
Druce Lake Co.	Matt DeLacluyse Mary DeLacluyse Cara DeLacluyse
Duck Lake Co.	Charles Nilson
Dunlap Madison Co.	Carolyn Green Doug Carney
East Loon Lake Co.	Dave Tatak Karen Tatak Tom Keefe
Echo Lake Co.	Anne McMorris Jeff McMorris
Evergreen Mclean Co.	Tony Alwood Jill A Mayes
Forest Lake Co.	Larry Steker Joe Wachter
Fourth Lake Co.	Joyce Gaffney Gerard Urbanozo
Frontier Sangamon Co.	Loey Fretz Lossaine Mozley Steven Mozley
Fyre Mercer Co.	Ted Kloppenborg
Gages Lake Co.	Matt Brueck Paul Brueck Zack Brueck
Galena Jo Daviess Co.	Steve Birkbeck Madelynn Wilharm
Gamlin St. Clair Co.	Scott Framsted

Golfview DuPage Co.	Donald Schultz Linda Salerno Martha Schultz Peter Salerno
Goose McHenry Co.	Ross K Nelson Tamara Mueller
Grass Lake Co.	Alana Bartolai Joyce Gaffney
Grays Lake Co.	Bill Soucie Timothy Bliese
Griswold McHenry Co.	Melanie Kandler Adam Garcia
Hastings Lake Co.	Donald Wilson
Homer Champaign Co.	Adam Kurczewski Dalton Kerans Emily Steffes Emily Williams Peter Goodspeed
Honey Lake Co.	Thomas Robbins Wes Garbutt Wyatt Byrd
Huntley Lake Co.	Don Wilson Jacob Nast
Island Lake Co.	Paul Meindl
Jaycee Jefferson Co.	Todd Piper
Killarney McHenry Co.	Neil O'Brien Dennis Oleksy
Kinkaid Jackson Co.	Scott Wilmouth J.T. Jenkins
LaFox Pond Kane Co.	J. Brian Towey
Lake of Egypt Williamson Co.	JoAnn Malacarne Leroy Pfaltzgraff Lori Pfaltzgraff Sandra Anspaugh Tom Anspaugh
Lake of the Woods Champaign Co.	Adam Kurczewski Dalton Kerans Emily Steffes Emily Williams Peter Goodspeed
Lancelot Peoria Co.	Joe Rush Jeff Hammond Christopher Mackesy Vincent Johnson
Leopold Lake Co.	Joe Marencik
Linden Lake Co.	John Filippo Nancy Filippo
Little Bear Lake Co.	Gabriel Rodriguez
Little Silver Lake Co.	James Sheehan
Loch Lomond Lake Co.	John Hines Paul Hemmenling Tony Baade Terri Anderson
Long Lake Co.	Robert Ringa III Joe Popeck
Longmeadow Cook Co.	Barb Schuetz
Louise Lake Co.	Anne Kokke April Adler Beth Adler Geoff Ommen Henri Kokke
Mattoon Shelby Co.	David Basham Heather McFarland Kory Culp
Miller Jefferson Co.	Joan Beckman Eddie Greer Thomas Zielonko Jim Rozycki Jeff Osborn
Miltmore Lake Co.	Don Jackson

Minear Lake Co.	Barb Barry Tom Barry Ned Herchenbach David Johnson
Murphysboro Jackson Co.	Scott Wilmouth J.T. Jenkins
Napa Suwe Lake Co.	Joe Sallak Joyce Sallak
New Thompson Jackson Co.	David Crawshaw Sandy Crawshaw
NICC Pond Lake Co.	Leonard Dane
Nippersink Lake Co.	Alana Bartolai Joyce Gaffney
Otter Macoupin Co.	Stan Crawford Otis Foster Joe Hogan Jeff Stanley Tanner Barnes
Paradise Coles Co.	David Basham Heather McFarland
Paris Twin East Edgar Co.	Greg Whiteman Andy Goodwin
Paris Twin West Edgar Co.	Andy Goodwin Greg Whiteman
Petersburg Menard Co.	Tom Lawton Barry Bass
Petite Lake Co.	Alana Bartolai Joyce Gaffney
Pine Lee Co.	Jerry Corcoran
Richardson Wildlife Lee Co.	J. Brian Towey
River Bend Vermilion Co.	Philip Solter Leellen Solter
Round Lake Co.	Ann Hansen Dan Madden Sarah Johnson
Ruth Du Page Co.	Stephen Melvin Julie Melvin
Sand Lake Co.	Michael Plishka
Sangchris Christian Co.	Jacob Sherell Beth Whetsell Greggory Miller Greg Ratliff Jessica Riney Renee Israels
Sara Effingham Co.	Janet Kennedy Bob Kennedy
Silver McHenry Co.	Bruce Wallace Todd Wallace
Spring Lake Co.	Alana Bartolai Joyce Gaffney
Spring McDonough Co.	Brian McIlhenny
Spring Arbor Jackson Co.	John Roseberry
Spring Ledge Lake Co.	Mike Heinrich Tom Heinrich Judy Heinrich
Springfield Sangamon Co.	Dan Brill Quentin Jordan
St. Mary's Lake Co.	Alana Bartolai Joyce Gaffney
Sterling Lake Co.	Paul Klonowski Alana Bartolai
Sunset Champaign Co.	Adam Kurczewski Dalton Kerans Emily Steffes Emily Williams Peter Goodspeed
Sunset Lee Co.	Jerry Corcoran
Sunset Macoupin Co.	Charlie Edwards

Swan Cook Co.	John Kanzia Jack McCracken Jennifer Aguilar Joe Clayton Lyanna Dimas Paige Hines Patti Umbricht
Third Lake Co.	Patty Morthorst Tom Morthorst Cara DeLacluyse
Three Oaks North McHenry Co.	Paul McPherson
Three Oaks South McHenry Co.	Paul McPherson
Thunderbird Putnam Co.	Mark Serio
Timber Lake Co.	Aaron Schroeder Daniel Hanson
Tower Lake Co.	Tom Kubala Zach Rowley Jen Grey Mitch Coulter Quinn Rowley Steve Burgoon
Twin Oaks Champaign Co.	Jim Roberts
Valley Lake Co.	Marian Kowalski Sherry Johnson
Virginia Cook Co.	Paul Herzog Janet Herzog
Weslake St. Clair Co.	Charles Meirink
West Loon Lake Co.	Dave Tatak Tom Keefe
Westlake Winnebago Co.	Joe Rush
Wonder McHenry Co.	Ken Shaleen Tony Musel Dennis Gallo
Woodhaven Lee Co.	Jerry Corcoran
Woods Creek McHenry Co.	Adam Brink Zach Hansen Kyle Trusty JR Davis
Wooster Lake Co.	Christopher Larsen
Zurich Lake Co.	Paul Dawidczyk

This report represents the coordinated efforts of many individuals. The Illinois Environmental Protection Agency's Lakes Program, under the direction of Gregg Good, was responsible for the original design of the Volunteer Lake Monitoring Program (VLMP) and its continued implementation. Two Area-wide Planning Commissions: Chicago Metropolitan Agency for Planning (CMAP) and Greater Egypt Regional Planning and Development Commission (GERPDC), along with Lake County Health Department (LCHD), were responsible for program administration in their regions of the state under the statewide coordination of Greg Ratliff (IEPA).

Additional Program coordination was provided by Teri Holland and Tara Norris (IEPA); Holly Hudson (CMAP); Tyler Carpenter (GERPDC); and Alana Bartolai (LCHD). Training of volunteers was performed by Teri Holland, Greg Ratliff, Holly Hudson, Tyler Carpenter, and Alana Bartolai. Data handling was performed by Teri Holland, Greg Ratliff, Tara Norris, Greggory Miller, Roy Smogor (IEPA), Holly Hudson, Tyler Carpenter and Alana Bartolai. This report was written by Greg Ratliff and reviewed by Teri Holland, Roy Smogor, Gregg Good, Mike Bundren, Tara Norris, and Alana Bartolai. Maps were created by Greggory Miller.

Acronyms and Abbreviations

AIS	Aquatic Invasive Species
CHL-*a*	Chlorophyll-*a*
CMAP	Chicago Metropolitan Agency for Planning
DO	Dissolved Oxygen
GERPDC	Greater Egypt Regional Planning and Development Commission
GPS	Global Positioning System
IEPA	Illinois Environmental Protection Agency
LCHD	Lake County Health Department
mg/L	Milligrams per Liter
mL	Milliliter
NPS	Non-point Source
NVSS	Non-volatile Suspended Solids
RFLA	Request for Lab Analysis
SD	Secchi Depth
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TN:TP	Total Nitrogen to Total Phosphorus ratio
TP	Total Phosphorus
TSI	Trophic State Index
TSI^{CHL}	TSI for Chlorophyll-*a*
TSI^{SD}	TSI for Secchi Depth
TSI^{TN}	TSI for Total Nitrogen
TSI^{TP}	TSI for Total Phosphorus
TSS	Total Suspended Solids
ug/L	Microgram per Liter
VLMP	Volunteer Lake Monitoring Program
VSS	Volatile Suspended Solids

VLMP Annual Report Part A and Part B

The VLMP Annual Report is comprised of two parts and the appendices. The Annual Report Part A is the companion document for this report and is composed of the Volunteer Lake Monitoring Program's Background, Methods and Procedures, and Data Evaluation sections. Part A seldom changes. Part B is updated yearly and follows below.

The Annual Report in its entirely can be referenced online at https://www2.illinois.gov/epa/topics/water-quality/monitoring/vlmp/Pages/data.aspx.

The components of Part A and Part B are listed below.

Part A

Acknowledgements
Acronyms and Abbreviations
Program Objectives
Background
Methods & Procedures
Data Evaluation
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Part B

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Acronyms and Abbreviations
Annual Report Part A and Part B
Results and Discussion
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Results and Discussion

Basic Monitoring Program Results

Lakes

One hundred twenty-nine lakes were monitored at least once in 2018. These lakes are distributed across the state with a large cluster occurring in Lake County. The lakes enrolled in the program represent several different lake types: backwater, glacial, impoundments (dammed and dug), quarries (coal, sand, gravel and borrow pits) and ponds. Figures 1 and 2 show the distribution and lake types of the 2018 VLMP lakes.

Volunteers

Two hundred fifty-five volunteers participated in lake monitoring during the 2018 season. These monitors donated over 2,823.55 volunteer-hours of their time for 987 monitoring events. Volunteers are primarily lakeshore residents, lake owner/managers, sportspersons, environmental group members, public water supply personnel, or interested citizens.

Data Returns

This year 51 lakes were monitored ten or more times throughout the season (Table 1). Of the remaining lakes in the Program, 26 lakes had seven to nine data returns, 28 had four to six data returns, and 24 had three or less data returns.

Table 1: VLMP lakes monitored 10 or more times.

Waterbody/County	Waterbody/County	Waterbody/County
Apple Canyon/Jo Daviess	Echo/Lake	Murphysboro/Jackson
Arcadia/Williamson	Evergreen/McLean	Napa Suwe/Lake
Barrington/Lake	Forest/Lake	Pine/Lee
Bass/Lee	Galena/Jo Daviess	Richardson Wildlife/Lee
Black Oak/Lee	Hastings/Lake	River Bend/Vermilion
Bloomington/McLean	Huntley/Lake	Round/Lake
Carbondale/Jackson	Island/Lake	Sangchris/Christian
Catatoga/Macoupin	Killarney/McHenry	Silver/McHenry
Catherine/Lake	Kinkaid/Jackson	Spring/McDonough
Charles/Du Page	La Fox Pond/Kane	Spring Arbor/Jackson
Chautauqua/Jackson	Lake of Egypt/Williamson	Springfield/Sangamon
Countryside/Lake	Leopold/Lake	Sunset/Lee
Crystal/Champaign	Linden/Lake	Swan/Cook
Dawson/McHenry	Little Silver/Lake	Third/Lake
Deboer Woods/Will	Loch Lomond/Lake	Valley/Lake
Deep/Lake	Long/Lake	Virginia/Cook
Devils Kitchen/Williamson	Miller/Jefferson	Woodhaven/Lee

Figure 1: 2018 VLMP Lakes

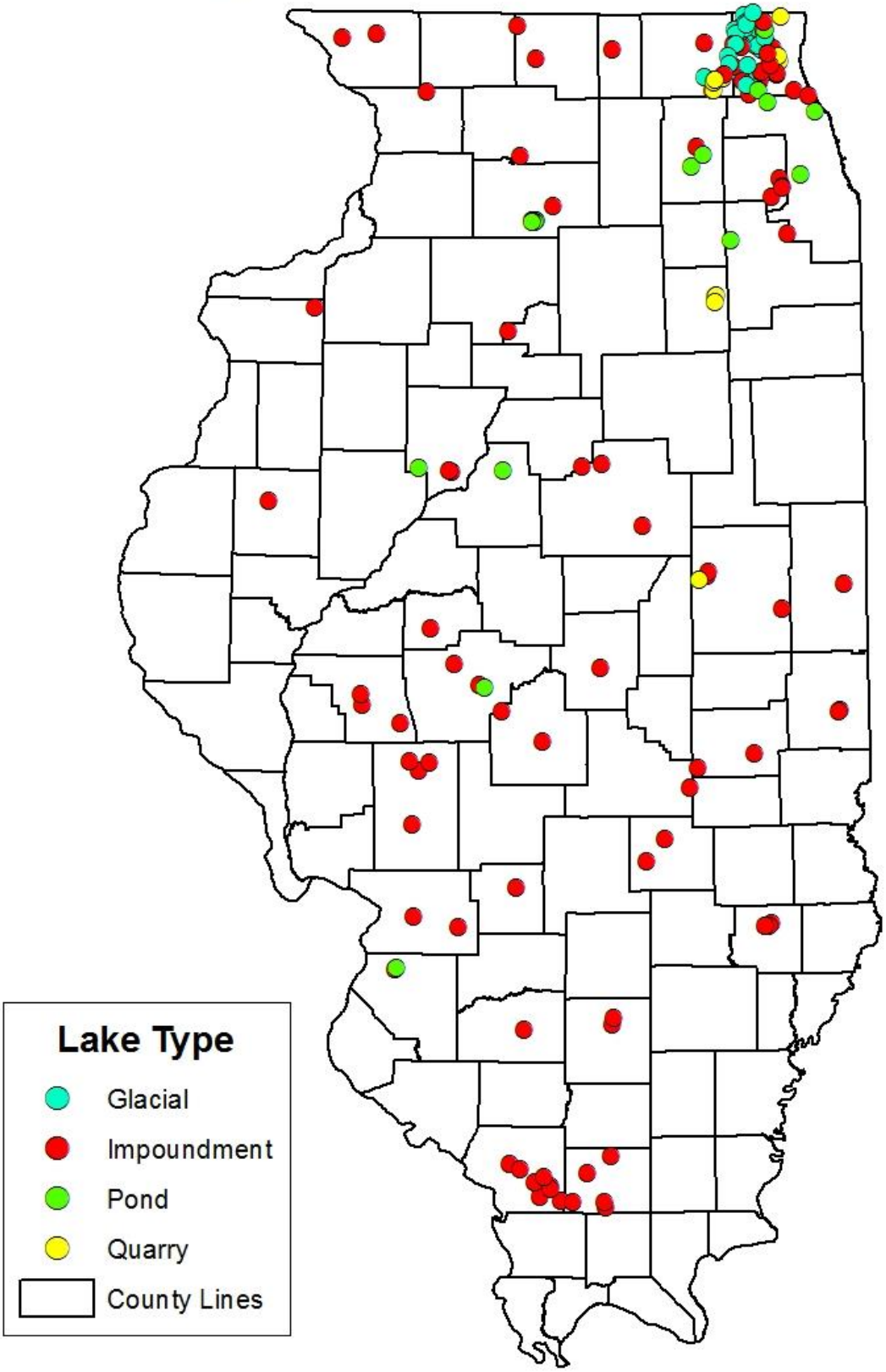
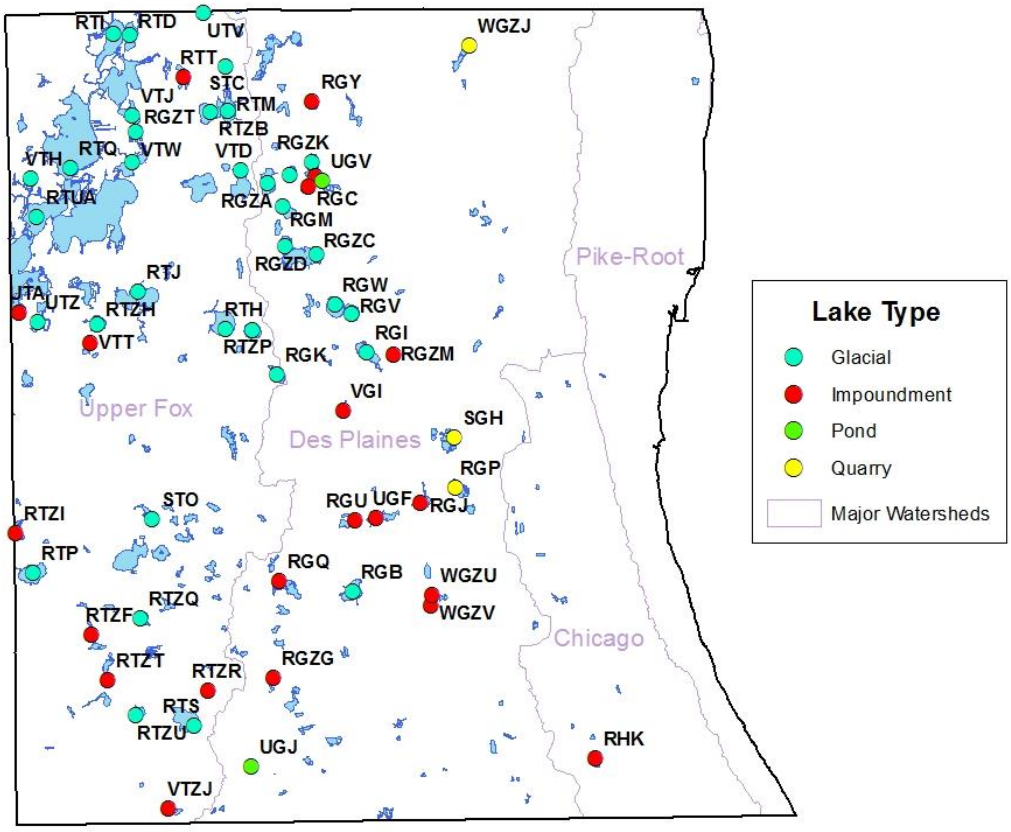


Figure 2: 2018 Lake County VLMP Lakes



Transparency Ranking

One hundred nineteen lakes are ranked highest to lowest based on median summer Secchi depth transparency, in inches (Table 3). The list is ranked in ascending order, from the least productive (highest clarity) to the most productive (lowest clarity) lakes. Four lakes in the table were not ranked because Secchi transparency data were not yet provided by the volunteer or the Secchi depths were either visible on the bottom of the lake or hidden by plants, thus negating the usability of the transparency data. Because total phosphorus data were also collected for the lakes with missing Secchi transparency data, we were still able to determine the trophic status. Once missing Secchi transparency data are obtained, Table 3 will be updated.

Transparency Variability

Average transparency data for all the years data are available online at http://dataservices.epa.illinois.gov/waBowSurfaceWater/Default.aspx. When average annual Secchi transparency data are displayed on a graph, it can help visualize a "trend" for that lake. A trend is a way to describe the pattern of data over time. Increasing, declining, stable, and fluctuating are all terms used to describe the Secchi transparency trend for a lake. If your lake demonstrates a declining trend in Secchi depth transparency, you may want to start looking into the reasons for the declining

trend. Trends based on lake average Secchi disk transparency should be interpreted with caution. A lake's average transparency for a year can be affected by numerous factors, such as:

1. Variations in meteorological conditions and precipitation patterns;
2. Water depths;
3. Variations in the timing and frequency of monitoring;
4. Variations in monitoring techniques and perceptions by different volunteers;
5. Exact location of sampling sites;
6. Growth of aquatic plants that can inhibit the depth to which the Secchi disk can physically be lowered;
7. Variations in lake management (e.g., aquatic plant treatments, drawdowns etc.);
8. Spills, construction, or other temporary human impacts; and
9. Human error in not adhering to monitoring guidelines.

A technical analysis of lake trends should always consider these types of potential sampling errors and variability. Factors such as the minimum and maximum transparencies for each year, seasonal patterns in transparency, effects of a storm event or management practice on transparency, and many other factors also should be examined when interpreting Secchi transparency trends. Hence, it is apparent that the most reliable data trends are those derived from consistent and frequent monitoring throughout the season and over a period of years.

Percent Macrophyte Coverage

Volunteers made an estimate of the percent coverage of macrophytes (aquatic plants) visible on the lake surface. The amount of macrophyte growth in a lake has a large impact on both the life cycles of aquatic animals and public use. In many of Illinois lakes, macrophyte growth is limited by the turbidity of the water. Lakes with little or no macrophytes may require aquatic plant species restoration projects to support local fish populations. Other lakes may need to introduce best management practices (BMPs) that reduce plant growth and restore boating and swimming opportunities to the public.

Appendix B: 2018 VLMP Lake Data includes the percent macrophyte coverage data as well as all other monitoring data associated with collection of transparency data. These data are also accessible online as soon as they are entered by the volunteer or coordinator.

Expanded Monitoring Program Results

Water Quality Monitoring

Volunteers at 73 lakes collected water quality samples. Four lakes were sampled under the Tier 3 program where water samples were collected for analysis at multiple lake stations (including a sample near the lake bottom). Sixty-nine lakes were sampled under the Tier 2 program where water samples were collected at a single lake site, usually the deepest site (surface sample only). The water quality and chlorophyll data are provided in Appendix A: 2018 VLMP Lab Data.

Total Phosphorus (TP): The median values ranged from 0.009 mg/L to 0.987 mg/L. The single highest value overall was found at Long Lake in Lake County, 2.41 mg/L total phosphorus. Forty-two lakes had median values of TP over the 0.05 mg/L water quality standard (WQS). Nine of thirty-one lakes with median TP under 0.05 mg/L WQS had one or more sampling events with levels over the WQS. There were 22 lakes where **all** TP values were below the WQS (Table 2). TSI^{TP} values were also calculated (Table 3).

Table 2: 2018 lakes with all total phosphorus results below the Illinois water quality standard (0.05 mg/L)

Lake/County	Lake/County	Lake/County	Lake/County
Barrington/Lake	Devils Kitchen/Williamson	Lake of Egypt/Williamson	Sunset/Champaign
Carroll/Carroll	Diamond/Lake	Leopold/lake	Thunderbird/Putnam
Catherine/Lake	Druce/Lake	Miltmore/Lake	Virginia/Cook
Charlotte/Kane	Fyre/Mercer	Petersburg/Menard	Wooster/Lake
Crystal/McHenry	Killarney/McHenry	Silver/McHenry	
Deep/Lake	Kinkaid/Jackson	Spring Arbor/Jackson	

Chlorophyll-a: Chlorophyll-a values provide an estimate for the amount of algae present in a lake. Samples for chlorophyll-a were collected at seventeen lakes (four Tier 3, ten Tier 2, and 3 Tier 1). LCHD collected the chlorophyll samples for the Tier 1 lakes and 2 of the Tier 2 lakes. Median chlorophyll-a concentrations ranged from 40.2 μg/L at Gages in Lake County to 72.7 μg/L at Bruce in DuPage County. Lake TSI^{CHL} values were also calculated (Table 3).

Non-volatile Suspended Solids (NVSS): NVSS is an indicator for sediment turbidity present in a lake. NVSS median values were calculated by subtracting the volatile suspended solids (VSS) from the total suspended solids (TSS). (TSS – VSS = NVSS). Fifty-nine of the seventy-three lakes sampled showed no significant amounts of NVSS (less than 3 mg/L); thirteen were 12 mg/L or less; and the last one was under 20 mg/L.

Nitrogen: Nitrogen is an essential nutrient for plants and animals. Lakes were analyzed for three sources of nitrogen: ammonia, nitrites + nitrates (inorganic nitrogen), and Total Kjeldahl Nitrogen (TKN, organic nitrogen + ammonia). Total nitrogen is the sum of TKN and inorganic nitrogen.

Total Nitrogen to Total Phosphorus (TN/TP) ratio is a tool that is commonly used to indicate which of the two nutrients (nitrogen or phosphorus) are limiting algal growth. A TN:TP ratio <10:1 indicates that nitrogen is the limiting nutrient and a ratio >20:1 indicates that phosphorus is the limiting nutrient. When the TN:TP ratios were calculated for the 2018 lakes, 10 lakes were determined to be nitrogen limited, 35 are considered transitional (both may be limiting growth), and 28 are phosphorus limited. While many people assume that phosphorus is always the limiting nutrient responsible for algal growth, results here suggest the need to consider both nutrients when creating a management plan. Additionally, plotting the change of ratios over the course of the growing season for a particular lake may be useful for spotting seasonal trends, but is not within the scope of this report.

Chloride: None of the 39 lakes sampled for chloride had any values over the Agency's water quality standard (WQS) for surface water (500 mg/L). The median chloride values ranged from 6.0 mg/L at River

Bend in Vermilion County to 392 mg/L at Bruce in DuPage County. Chloride sampling was generally limited to the general Chicago metropolitan area, with a few exceptions.

Alkalinity: For 2018, all but one lake analyzed for alkalinity appears to be well buffered (not sensitive to acid rain). Well buffered lakes have alkalinity concentrations greater than 25 mg/L. Median Alkalinity values across the state ranged from 23 mg/L at Devils Kitchen in Williamson County to 257 mg/L at Longmeadow in Cook County. Devils Kitchen values fall within the category of low sensitivity to acid rain.

Using the USGS Hardness Scale; water from 18 lakes can be considered "Very Hard," water from 35 lakes are considered "Hard," water from 16 lakes are considered "Moderately Hard," and water from 4 lakes are considered "Soft." All six lakes with soft water were found in Southern Illinois: Devils Kitchen and Lake of Egypt in Williamson County; Cedar, Spring Arbor, and Kinkaid in Jackson County; and Miller in Jefferson County. When using water from reservoirs with very hard or hard water, softeners may be required. Having a good soft water source is an economic boon for any municipality.

Table 3: Lake Ranking by Transparency (with Trophic State Indices)

Tier	Lake Code	Waterbody	County	Rank	Median SD (in)	TSI^{TP}	TSI^{CHL}	TSI^{SD}	Trophic State
2	VTD	Deep	Lake	1	279	41.1		31.8	Mesotrophic
1	WTJ	Three Oaks North	McHenry	2	211			35.8	Oligotrophic
1	WTG	Three Oaks South	McHenry	3	198			36.7	Oligotrophic
2	SGB	Virginia	Cook	4	184	35.5		37.8	Oligotrophic
1	RDW	Beaver	Grundy	5	180			38.1	Oligotrophic
1	WGZJ	Sterling	Lake	6	177			38.4	Oligotrophic
2	RTW	Silver	McHenry	7	156	39.4		40.2	Oligotrophic
2	VTZH	Crystal	McHenry	8	137	40.0		42.0	Mesotrophic
1	RGI	Gages	Lake	9	134		40.2	42.4	Mesotrophic
1	RTZB	West Loon	Lake	9	134			42.4	Mesotrophic
2	REZN	Sunset	Champaign	11	126	43.2		43.3	Mesotrophic
2	RGV	Druce	Lake	12	124	42.2	43.1	43.5	Mesotrophic
1	RGM	Sand	Lake	13	119		43.5	44.1	Mesotrophic
2	VTZ	Charlotte	Kane	14	113	54.7		44.8	Eutrophic
1	UTV	Cross	Lake	15	108			45.5	Mesotrophic
1	RTS	Zurich	Lake	16	104			46.0	Mesotrophic
1	RTB	Defiance	McHenry	17	102			46.3	Mesotrophic
2	RNJ	Devils Kitchen	Williamson	18	96	38.7		47.2	Oligotrophic
1	STC	Little Silver	Lake	19	93			47.6	Mesotrophic
2	RTZV	Killarney	McHenry	20	90	46.5		48.1	Mesotrophic
1	RTI	Channel	Lake	21	87			48.6	Mesotrophic
2	VGI	Leopold	Lake	22	84	57.0		49.1	Eutrophic

Table 3: Lake Ranking by Transparency (with Trophic State Indices)									
Tier	Lake Code	Waterbody	County	Rank	Median SD (in)	TSI^{TP}	TSI^{CHL}	TSI^{SD}	Trophic State
2	RGW	Third	Lake	23	82	49.0	43.1	49.4	Mesotrophic
1	RNU	Jaycee	Jefferson	24	81			49.6	Mesotrophic
2	RTD	Catherine	Lake	25	76	57.3		50.5	Eutrophic
1	RTZQ	Timber	Lake	26	75			50.7	Eutrophic
1	RGP	Minear	Lake	27	74			50.9	Eutrophic
2	RMQ	Carroll	Carroll	28	73	54.1		51.1	Eutrophic
2	RGZD	Miltmore	Lake	29	69	46.6	46.0	52.0	Mesotrophic
2	RTZU	Honey	Lake	30	66	58.4		52.6	Eutrophic
2	RLH	Fyre	Mercer	31	64	43.2		53.0	Mesotrophic
2	VDE	Catatoga	Macoupin	32	63	57.3		53.2	Eutrophic
2	REL	Petersburg	Menard	32	63	45.0		53.2	Mesotrophic
1	RGY	Huntley	Lake	34	62			53.5	Eutrophic
2	RTZT	Barrington	Lake	35	60	42.3		53.9	Mesotrophic
3	RNC	Kinkaid	Jackson	36	58	49.4	55.2	54.5	Eutrophic
1	RNE	Cedar	Jackson	37	56			54.9	Eutrophic
2	RAL	Lake of Egypt	Williamson	38	54	48.0		55.4	Mesotrophic
1	UGF	St. Mary's	Lake		54			55.4	Out of Season
1	WTO	NICC Pond	Lake	39	53			55.7	Eutrophic
2	SDQ	Thunderbird	Putnam	40	52	53.2		56.0	Eutrophic
2	RPJ	Bass	Lee	41	50	71.4		56.6	Hypereutrophic
1	WGZV	Little Bear	Lake	42	48			57.1	Eutrophic
2	WBE	River Bend	Vermilion	42	48	75.1		57.1	Hypereutrophic
2	RTZF	Tower	Lake	42	48	59.4		57.1	Eutrophic
1	RGC	Linden	Lake	42	48			57.3	Eutrophic
2	RGZB	Hastings	Lake	46	46	61.4		57.8	Eutrophic
1	UDH	Sunset	Macoupin	46	46			57.8	Eutrophic
1	RTH	Round	Lake	46	46			57.9	Eutrophic
1	RGK	Grays	Lake	49	45		47.0	58.1	Mesotrophic
2	RPM	Woodhaven	Lee	49	45	64.9		58.1	Eutrophic
2	RMJ	Apple Canyon	Jo Daviess	49	45	64.1		58.2	Eutrophic
1	RGZC	Fourth	Lake		45			58.2	Out of Season
2	RNZG	Spring Arbor	Jackson	49	45	48.0		58.2	Mesotrophic
3	RTJ	Long	Lake	53	43	62.7	51.6	58.7	Eutrophic
1	RPZB	Pine	Lee	53	43			58.9	Eutrophic
2	REE	Dawson	McLean	55	41	57.7		59.6	Eutrophic
2	RTZR	Echo	Lake	56	40	60.8		59.8	Eutrophic
2	RPV	Candlewick	Boone	57	39	63.8		60.1	Eutrophic
	RTY	Griswold	McHenry		38			60.5	Out of Season

Table 3: Lake Ranking by Transparency (with Trophic State Indices)									
Tier	Lake Code	Waterbody	County	Rank	Median SD (in)	TSI^{TP}	TSI^{CHL}	TSI^{SD}	Trophic State
1	STM	La Fox Pond	Kane	58	38			60.5	Eutrophic
2	RPZK	Westlake	Winnebago	59	38	82.7		60.7	Hypereutrophic
2	SDP	Lancelot	Peoria	60	37	73.3		60.9	Hypereutrophic
1	RPL	Sunset	Lee	60	37			60.9	Eutrophic
1	RTM	East Loon	Lake	60	37			61.1	Eutrophic
2	RAZP	Arcadia	Williamson	63	36	64.2		61.3	Eutrophic
2	RMM	Galena	Jo Daviess	63	36	67.0	64.7	61.3	Eutrophic
2	RGJ	Butler	Lake	63	36	66.8		61.5	Eutrophic
2	RGZG	Forest	Lake	66	35	65.5		61.7	Eutrophic
1	VTJ	Bluff	Lake	67	35			61.9	Eutrophic
2	UDB	Camelot	Peoria	68	34	76.4		62.1	Hypereutrophic
1	RTZS	Goose	McHenry	68	34			62.1	Eutrophic
2	VGZF	Deboer Woods	Will	70	33	73.2	54.9	62.5	Eutrophic
1	RGZA	Crooked	Lake	71	32			63.0	Eutrophic
1	RJZK	Gamlin	St Clair	71	32			63.0	Eutrophic
2	RTZZ	Woods Creek	McHenry	71	32	62.2		63.0	Eutrophic
1	RPK	Black Oak	Lee	71	32			63.2	Eutrophic
2	RBO	Homer	Champaign	71	32	60.6		63.2	Eutrophic
3	RCE	Sara	Effingham	71	32	58.7	65.3	63.2	Eutrophic
2	RNZO	New Thompson	Jackson	77	31	58.6		63.4	Eutrophic
1	RJJ	Weslake	St Clair	77	31			63.4	Eutrophic
1	RGQ	Countryside	Lake	77	31			63.7	Eutrophic
1	WGZU	Big Bear	Lake	80	30			63.9	Eutrophic
2	RGR	Charles	Du Page	80	30	68.2	63.8	63.9	Eutrophic
2	RDF	Otter	Macoupin	80	30	56.2		63.9	Eutrophic
2	RBU	Crystal	Champaign	80	30	64.9		64.2	Eutrophic
2	RNZH	Campus	Jackson	84	29	63.9		64.4	Eutrophic
2	UGV	Spring Ledge	Lake	84	29	65.2		64.4	Eutrophic
2	RHZK	Longmeadow	Cook	86	28	65.2		64.9	Eutrophic
1	SDA	Evergreen	McLean	87	26			66.0	Eutrophic
1	RPZI	Richardson Wildlife	Lee	87	26			66.0	Eutrophic
1	RJD	Dunlap	Madison	89	25			66.5	Eutrophic
1	RDO	Bloomington	McLean	90	24			67.1	Eutrophic
1	RTZI	Island	Lake	90	24			67.1	Eutrophic
2	RNZI	Miller	Jefferson	90	24	62.8		67.1	Eutrophic
1	RND	Murphysboro	Jackson	90	24			67.1	Eutrophic
2	WGZY	Swan	Cook	90	24	103.6	68.8	67.1	Eutrophic

Table 3: Lake Ranking by Transparency (with Trophic State Indices)									
Tier	**Lake Code**	**Waterbody**	**County**	**Rank**	**Median SD (in)**	**TSI^{TP}**	**TSI^{CHL}**	**TSI^{SD}**	**Trophic State**
2	REG	Lake of the Woods	Champaign	95	23	64.1		67.7	Eutrophic
2	SEB	Bird's Pond	Sangamon	95	23	71.7		68.1	Hypereutrophic
1	SNA	Chautauqua	Jackson	95	23			68.1	Eutrophic
1	RTZG	Duck	Lake	98	22			68.4	Eutrophic
1	VTW	Petite	Lake	99	21			69.1	Eutrophic
3	REB	Sangchris	Christian	99	21	63.5	67.0	69.1	Eutrophic
2	RGZM	Valley	Lake	99	21	68.9		69.4	Eutrophic
1	RBX	Paris Twin West	Edgar	102	20			69.8	Eutrophic
2	RGB	Diamond	Lake	102	20	56.5		70.1	Eutrophic
1	RTQ	Grass	Lake	102	20			70.1	Hypereutrophic
1	RTUA	Nippersink	Lake	102	20			70.1	Hypereutrophic
2	RCF	Mattoon	Shelby	106	19	73.7		70.5	Hypereutrophic
1	RBL	Paris Twin East	Edgar	106	19			70.9	Hypereutrophic
2	RCJ	Altamont New	Effingham	108	18	75.0		71.3	Hypereutrophic
1	STJ	Campton	Kane		18			71.3	Out of Season
1	REZO	Frontier	Sangamon	108	18			71.7	Hypereutrophic
2	RTZC	Wonder	McHenry	110	17	73.5		72.5	Hypereutrophic
1	RGZT	Spring	Lake	111	16			73.0	Hypereutrophic
2	REF	Springfield	Sangamon	111	16	88.8		73.4	Hypereutrophic
1	STO	Napa Suwe	Lake	113	15			73.9	Hypereutrophic
2	REZL	Twin Oaks	Champaign	114	14	79.5		74.9	Hypereutrophic
2	RDR	Spring	McDonough	114	14	84.5		75.4	Hypereutrophic
1	VGZD	Des Plaines	Lake	116	13			76.5	Hypereutrophic
2	RNI	Carbondale	Jackson	117	12	72.7		77.1	Hypereutrophic
2	RGU	Loch Lomond	Lake	117	12	65.1		77.1	Eutrophic
2	RCG	Paradise	Coles	117	12	85.8		77.1	Hypereutrophic
2	VGZE	Ruth	Du Page	117	12	74.4	67.5	77.1	Hypereutrophic
2	VTZJ	Louise	Lake	121	6	85.1		87.1	Hypereutrophic
2	RGA	Bruce	Du Page			64.6	72.7	VoB	Eutrophic
2	RHJA	Chicago Botanic Gardens	Cook			53.4	46.1	NS	Eutrophic
2	RGZW	Golfview	Du Page			65.5		NS	Eutrophic
2	RTZH	Wooster	Lake			55.8		NS	Eutrophic
NS - Secchi data was not submitted by volunteer by mail or online portal.									
VoB - the Secchi depth readings were either visible on the bottom or hidden by plants.									

Trophic Status

The trophic status was determined for 125 lakes by calculating a TSI for Secchi transparency depth (TSI^{SD}), Total phosphorus (TSI^{TP}), and chlorophyll-a (TSI^{CHL}) where data were available (Table 3). When the TSI values did not agree, the trophic status of a lake was determined by looking at the TSIs in priority order: TSI^{TP}, TSI^{CHL} and TSI^{SD}. For 2018, twenty-three lakes were determined to be hypereutrophic, seventy-three were eutrophic, twenty-two were mesotrophic, and seven were oligotrophic.

Dissolved Oxygen and Temperature Measurements

Dissolved oxygen (DO) and temperature (temp) were measured at twenty-nine lakes. Measurements were taken at the same lake sites monitored for Secchi transparency. All four Tier 3 lakes and forty-three Tier 2 lakes provided data sheets which have been compiled into Appendix C: 2018 VLMP Dissolved Oxygen Profiles. Table 4 shows an example of a typical DO/Temp profile sheet collected by the VLMP volunteers.

Table 4: DO/Temperature Data, RNE-1, 7/25/2018, 13:36 hrs.

Depth (feet)	DO (mg/l)	Temperature (°C)
0	9.0	29.9
1	9.1	29.8
3	9.1	29.6
5	9.1	28.9
7	8.9	28.6
9	8.4	28.4
11	6.8	28.0
13	3.3	26.9
15	0.6	24.8
17	0.2	21.2
19	0.1	18.6
21	0.1	16.5
23	0.1	15.2
25	0.1	14.3
27	0.1	13.4
29	0.1	13.0
31	0.1	12.6
33	0.0	12.3
35	0.0	12.1
37	0.0	12.0
39	0.0	11.9

The DO/Temp data can easily be visualized by creating a depth profile graph (Figure 3). A depth profile graph depicts the changes in DO and temperature through lake depth. These graphs are used to determine if the lake is thermally stratified and the location of a thermocline if the lake is stratified. Anaerobic conditions can also be observed on these plots. When anaerobic conditions are persistent, water chemistry samples might show an increase in phosphorus and ammonia concentrations near the lake bottom.

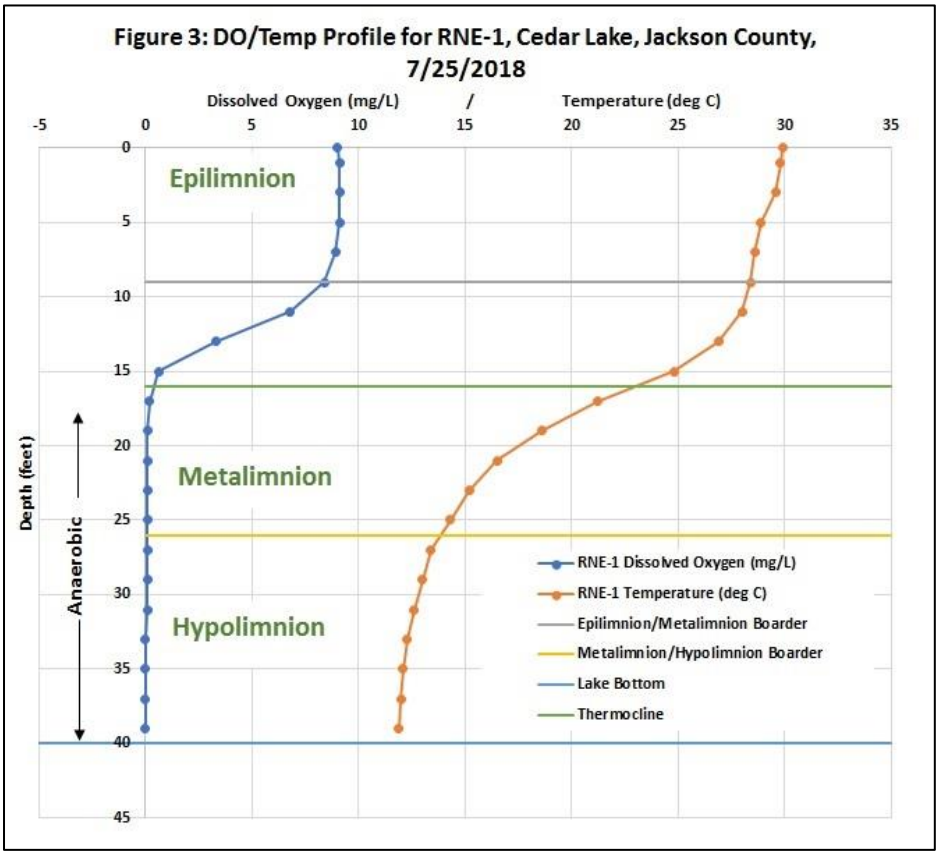


Figure 3: DO/Temp Profile for RNE-1, Cedar Lake, Jackson County, 7/25/2018

Best management practices can be implemented to address this issue. For example, an aerator can be used to break up thermal stratification and oxygenate hypolimnetic waters to alleviate effects of anaerobic conditions.

Summary

The two hundred fifty-eight volunteers collectively pooled 2,686 hours of effort to visit one hundred twenty-nine lakes for a total of nine hundred sixty-three monitoring trips. 2018 volunteers were lakeshore residents, lake owner or managers, sportspersons, environmental group members, public water supply personnel, and interested citizens. Though a large cluster of lakes in the program are in Lake County (50 lakes), the rest of the lakes are scattered throughout the state. Lakes represented this year in the Program include glacial lakes, impoundment lakes (dammed and dug), quarry lakes (coal, sand, gravel and borrow pits) and ponds. No backwater lakes participated in the program this year.

Data from the VLMP continues to show heavy loading of nutrients into Illinois lakes. Median total phosphorus values for the seventy-three lakes sampled ranged from 0.009 mg/L to 0.987 mg/L. Forty-two of these lakes had median TP values over the Illinois water quality standards (WQS) in freshwater lakes greater than 20 acres in size (0.05 mg/L). Of the thirty-one lakes with median TP values under the WQS, nine had at least one exceedance of the standard. Thirty percent of the lakes studied did not exceed the Illinois WQS for total phosphorus in fresh water lakes.

The other nutrient of concern in Illinois lakes is total nitrogen (nitrate + nitrite values plus TKN). Unlike total phosphorus, there is no Illinois WQS for total nitrogen. Total nitrogen values had a median range of 0.330 mg/L to 3.79 mg/L this sampling season. The highest total nitrogen value reached 7.65 mg/L.

Setting Goals with Volunteer Data

There are many options for improving the water quality of a lake – from picking up litter to implementing best management practices (BMPs) in the watershed. BMPs have been developed for construction, cropland, and forestry, as well as other similar land-use activities. Managers of lakes and streams can focus their BMPs to control water runoff, erosion, nutrient loading and contaminant loading. There is a long list of BMPs with a set of priorities assigned at low, medium, or high for agriculture, construction, urban runoff, hydrologic modification, resource extraction, groundwater, and wetlands.

The volunteer data helps to identify and justify the use of BMPs. Are the water quality issues in your lake caused by nutrient loading, high suspended solids, aquatic plant growth, or a combination of the three? Are the plant issues caused by invasive species? If so, maybe there is grant money through a local, state or federal program to eradicate that invasive species. In all cases of grant applications, data to confirm your need is valuable.

Illinois EPA publishes a series of fact sheets called “Lake Notes” that provide information on a wide range of lake and watershed related topics. Aquatic Exotics, Aquatic Plant Management Options, Common Lake Water Quality Parameters, Lake Dredging, Shoreline Buffer Strips, and Where to Go for Lake Information are just a few of the subjects covered by the fact sheets. These fact sheets can be found at the following address:

https://www2.illinois.gov/epa/topics/water-quality/surface-water/Pages/lake-notes.aspx

Grants Available to Control Nonpoint Source Pollution in Illinois

319 Grants are available to local units of government and other organizations to protect water quality in Illinois. Projects must address water quality issues relating directly to nonpoint source pollution. Funds can be used for the implementation of watershed management plans, including the development of information and/or education programs, and for the installation of best management practices.

IEPA receives these funds through Section 319(h) of the Clean Water Act and administers the program within Illinois. The maximum federal funding available is 60 percent. The program period is two years unless otherwise approved. This is a reimbursement program.

Illinois Environmental Protection Agency
Bureau of Water
Watershed Management Section
Nonpoint Source Unit
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Applications are accepted June 1st through August 1st. If August 1st is a Saturday or Sunday, the deadline becomes the Friday prior to August 1st before 5 p.m. Electronic submittals are not accepted. Please mail applications to the address provided to the right.

Contact Number: (217)782-3362

Links for 319 Grants

- Section 319 Application
- Section 319 Application Instructions

Glossary of Terms

A full glossary of terms can be found in part A of the report at https://www2.illinois.gov/epa/Documents/iepa/water-quality/monitoring/vlmp/2015-annual-report-part-a.pdf