



Michigan's Citizen Volunteer Partnership for Lakes

2016 Annual Summary

Managed By:
Michigan Department of Environmental Quality
Michigan Lake & Stream Associations, Inc.
Michigan State University Department of Fisheries and Wildlife
Great Lakes Commission
Huron River Watershed Council



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I. Introduction

The Michigan Department of Environmental Quality (DEQ), Michigan Lake & Stream Associations (MLSA), the Great Lakes Commission, the Huron River Watershed Council, and Michigan State University have partnered to implement the Cooperative Lakes Monitoring Program (CLMP).

The goals of the CLMP are to:

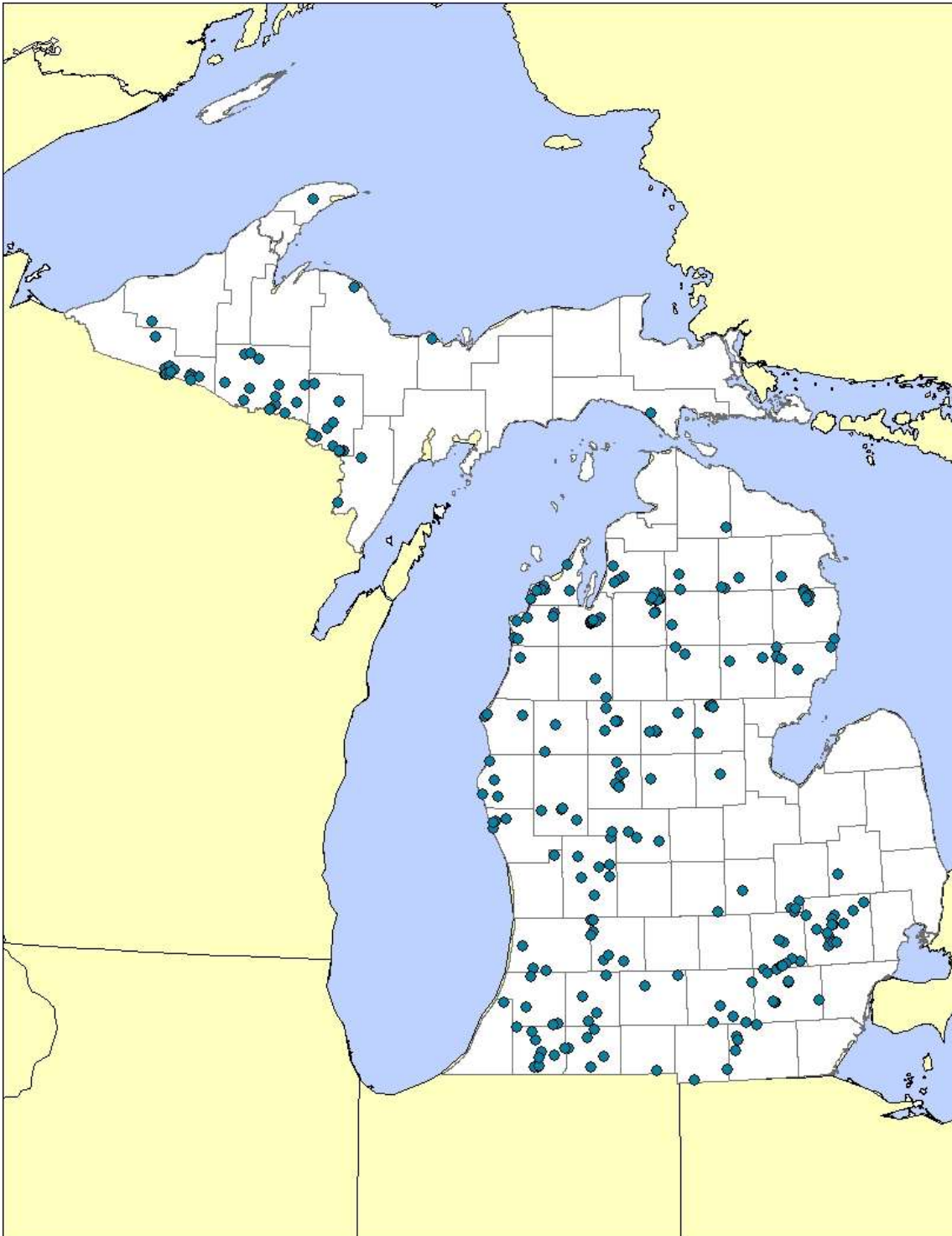
- Provide baseline information and document trends in water quality for individual lakes.
- Educate lake residents, users, and interested citizens in the collection of water quality data, lake ecology, and lake management practices.
- Build a constituency of citizens to practice sound lake management at the local level and to build public support for lake quality protection.
- Provide a cost-effective process for the DEQ to increase baseline data for lakes state-wide.

This report summarizes the 2016 CLMP field season.

To learn more about the CLMP program, there are many other resources available:

1. The Michigan Clean Water Corps website includes a variety of resources including the online database which contains all CLMP data. www.micorps.net
2. The CLMP Manual contains an overview of the program and all of the volunteer monitoring procedures: <https://micorps.net/wp-content/uploads/CLMP-Manual.pdf>
3. Starting in 2014, each lake enrolling in the program received an individual report summarizing their data. <https://micorps.net/individual-lake-reports/>
4. The CLMP Quality Assurance Project Plan (QAPP) is a detailed report on how the CLMP collects and maintains high quality scientific data: <https://micorps.net/wp-content/uploads/QAPP-CLMP.pdf>

II. Map of 2016 CLMP Participating Lakes



III. Summary Statistics of Monitored Parameters

A. Secchi Disk Transparency

CLMP volunteers measure water transparency using a Secchi disk from late spring to the end of the summer. Ideally, 18 weekly measurements are made from mid-May through mid-September. Minimum participation requires submitting 1 measurement; full participation is submitting at least 8 measurements.

2016 Secchi Disk Transparency	
No. of sites enrolled	237
No. of sites meeting minimum participation	206 (87%)
No. of sites meeting full participation	181 (76%)
Total no. of measurements reported	2630
Lake with lowest average transparency	4.0' (Duncan Lake, Barry County)
Lake with high average transparency	36.1' (Torch Lake, Antrim County)
Mean (average) measurement of all lakes	13.2'

B. Total Phosphorus

CLMP volunteers collect water samples for total phosphorus during spring overturn, when the lake is generally well mixed from top to bottom, and during late summer, when the lake is at maximum temperature stratification from the surface to the bottom.

2016 Total Phosphorus Monitoring	
<u>Spring Overturn Sampling</u>	
No. of sites enrolled	189
No. of sites submitting valid samples	165 (87%)
Minimum reported value	< 3 µg/L (multiple lakes)
Maximum reported value	70 µg/L (Woods Lake, Kalamazoo)
Mean (average) value	9.3 µg/L
<u>Summer Stratification Sampling</u>	
No. of sites enrolled	221
No. of sites submitting valid samples	203 (92%)
Minimum reported value	< 3 µg/L (multiple lakes)
Maximum reported value	94 µg/L (Sanford Lake, Midland Co)
Mean (average) value	13.9 µg/L

C. Chlorophyll-a

Volunteers collect water samples for chlorophyll-a, an estimator of the amount of algae in the water column, once per month from May through September. Minimum participation requires at least one valid sample be submitted; at least four valid samples must be submitted to be considered full participation in this parameter.

2016 Chlorophyll-a Monitoring	
No. of sites enrolled	150
No. of sites meeting minimum participation	144 (96%)
No. of sites meeting full participation	126 (85%)
Total no. of valid samples	654
Minimum median Lake measurement	< 1 µg/L (multiple lakes)
Maximum median Lake measurement	10 µg/L (Brooks Leelanau Co.)
Median Lake measurement	1.9 µg/L

D. Dissolved Oxygen and Temperature

CLMP volunteers measure dissolved oxygen and temperature profiles for their lakes, measured from the surface to within 3 feet of the bottom, at the deepest point in the lake. These profile measurements are made with an electronic meter, ideally every two weeks from mid-May through mid-September.

2016 Dissolved Oxygen and Temperature Monitoring	
No. of sites enrolled	63
No. of sites submitting at least one profile	56 (89%)
Total no. of profiles submitted	409

E. Exotic Aquatic Plant Watch

Volunteers in this monitoring program survey their lakes for invasive aquatic plants of special concern for Michigan lakes: curly-leaf pondweed, Eurasian watermilfoil, Hydrilla, and starry stonewort.

2016 Exotic Aquatic Plant Watch	
No. of sites enrolled	29
No. of sites submitting report	20 (69%)

F. Aquatic Plant Identification and Mapping

This program is the most labor-intensive volunteer activity within the CLMP. Typically, a team of volunteers from each enrolled lake is involved, with assistants from a MiCorps biologist. The end result is a plant distribution map and abundance report for all plants growing in the lake, including both native and, if found, invasive species.

2016 Aquatic Plant Mapping	
No. of sites enrolled	7
No. of sites submitting report	6 (86%)

G. Score the Shore

This was the first official year of this program (2015 was the pilot year). Volunteers motor around the lake, reviewing 1000 foot sections of shoreline in regards to littoral habitat, riparian habitat, and erosion control.

2016 Score the Shore	
No. of sites enrolled	35
No. of sites submitting report	25 (71%)

IV. DEQ Side-by-side Data Verification

DEQ staff monitor several lakes a year alongside the CLMP volunteer for phosphorus and chlorophyll. In the early years of the program, the DEQ used its standard operating procedures to collect the data, which differ slightly from the volunteers' monitoring procedures. The goal of the side-by-side visits was to ensure that the volunteer procedures produced accurate data. The correlation between DEQ samples and volunteers' samples has proven to be very high through many years of these side-by-side tests. CLMP and DEQ staff have concluded that the original goal of the side-by-sides has been met.

Starting in 2011, DEQ began to use the volunteer procedures to run the side-by-side data verifications. The new goal of the side-by-side visits are to build relationships with the volunteers and ensure that they correctly follow the volunteer procedures as a check on the training protocols.

A. 2016 Total Phosphorus Side-by-side samples

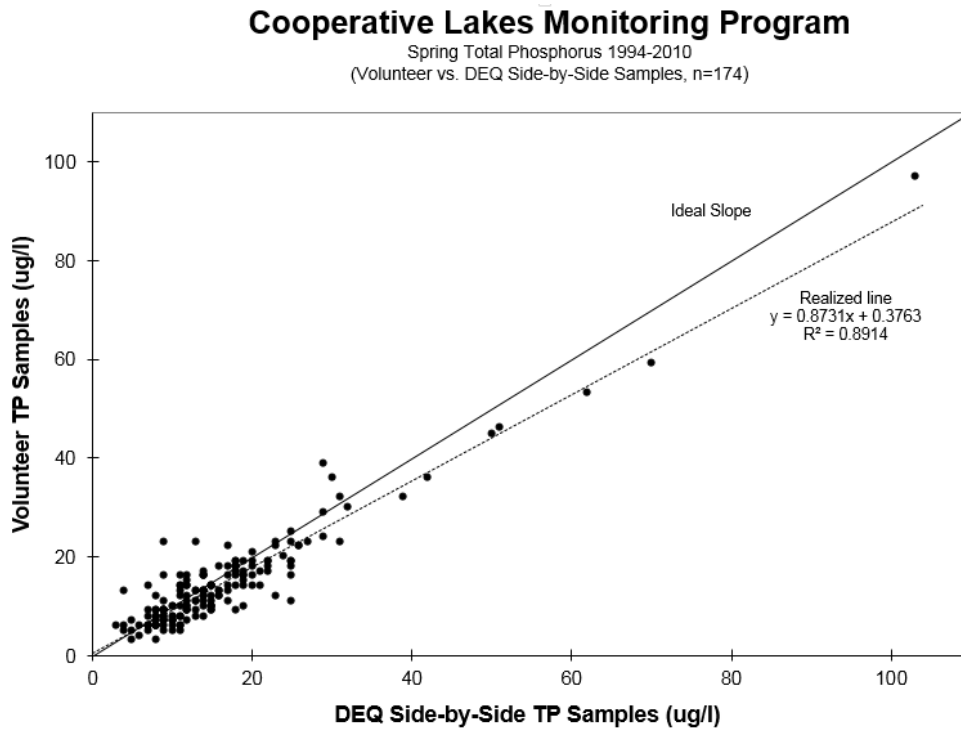
Date	Lake	Lake ID	County	Phosphorus ($\mu\text{g/L}$)			
				Vol	Rep	DEQ	Rep
9/9/16	Chain	350146	Iosco	11		8	
9/15/16	Chippewa	540050	Mecosta	17		15	
9/16/16	Isabella	370135	Isabella	16		13	
9/23/16	Ford	810573	Washtenaw	85		47	

B. 2016 Chlorophyll Side-by-side samples

Date	Lake	Lake ID	County	Chlorophyll ($\mu\text{g/L}$)			
				Vol	Rep	DEQ	Rep
5/12/16	Lower Herring	100085	Benzie	<1.0		<1.0	
5/18/16	Crystal	820591	Washtenaw	<1.0		<1.0	
6/14/16	Manitou	780233	Shiawassee	9.3		4.0	4.3
6/16/16	Portage	750245	St. Joseph	1.6		23	
8/11/16	Lotus	630414	Oakland	<1.0		1.4	
8/11/16	Maceday	630415	Oakland	<1.0		1.4	
9/9/16	Chain	350146	Iosco	2.4		2.5	
9/15/16	Chippewa	540050	Mecosta	5.1		8.1	

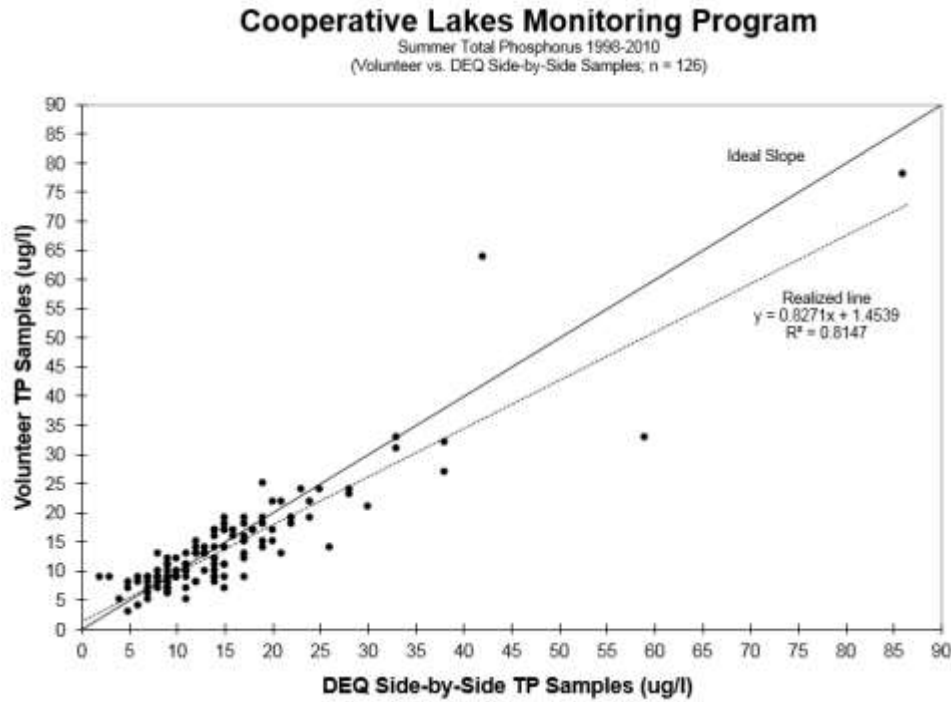
C. Total Spring Phosphorus side by side data

1994-2010

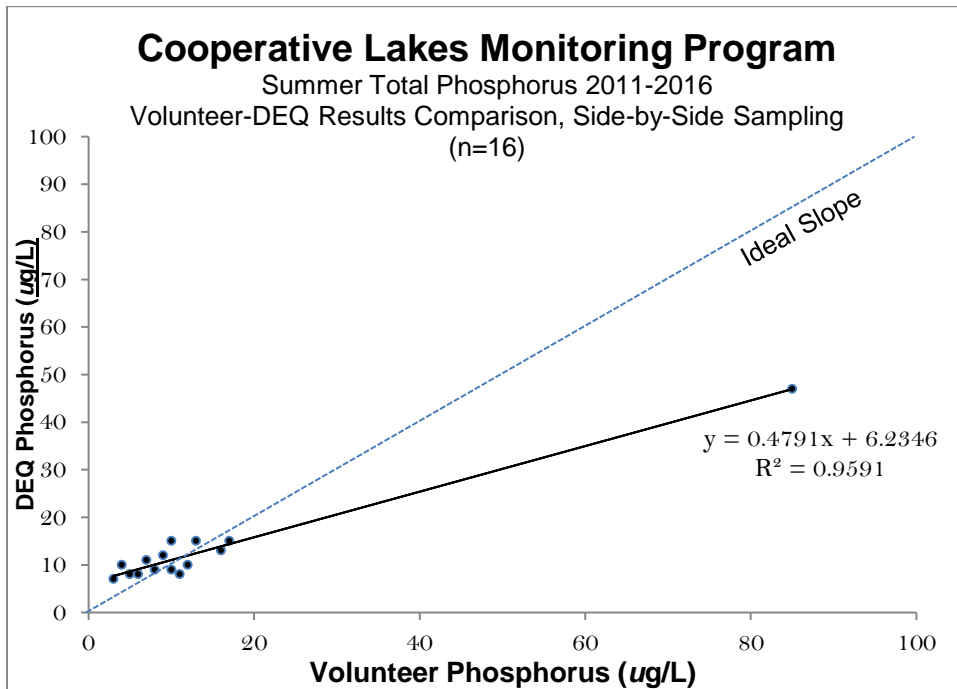


2011-2016: Graph not produced. (Because spring phosphorus is taken quickly after ice out, it is not possible to plan ahead for spring P side-by-sides and these samples are no longer taken).

D. Total Summer Phosphorus side-by-side data

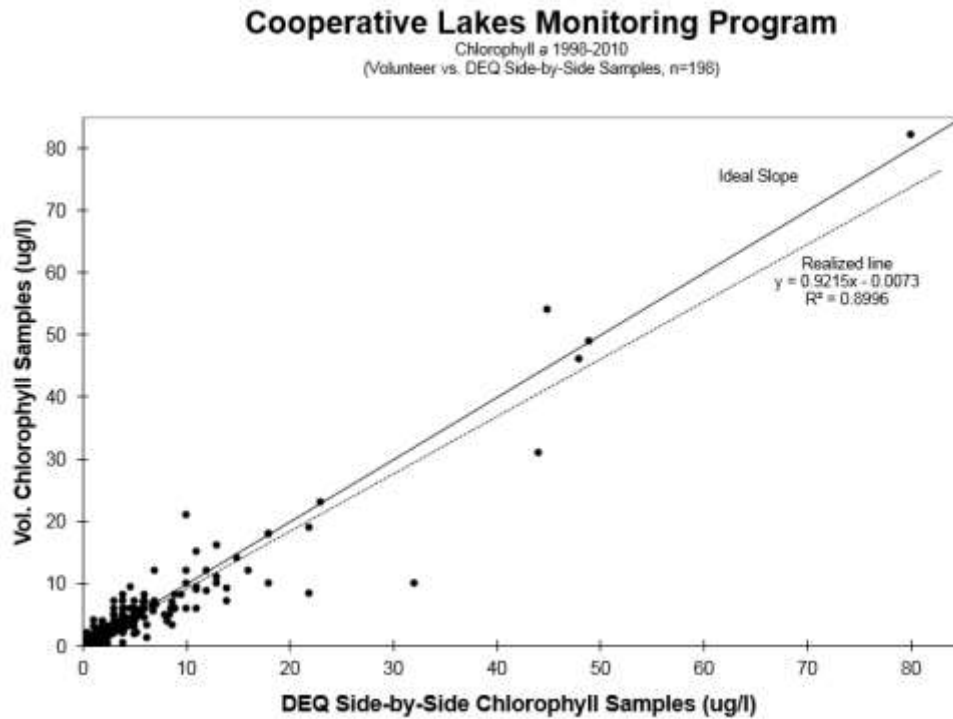


2011-2016

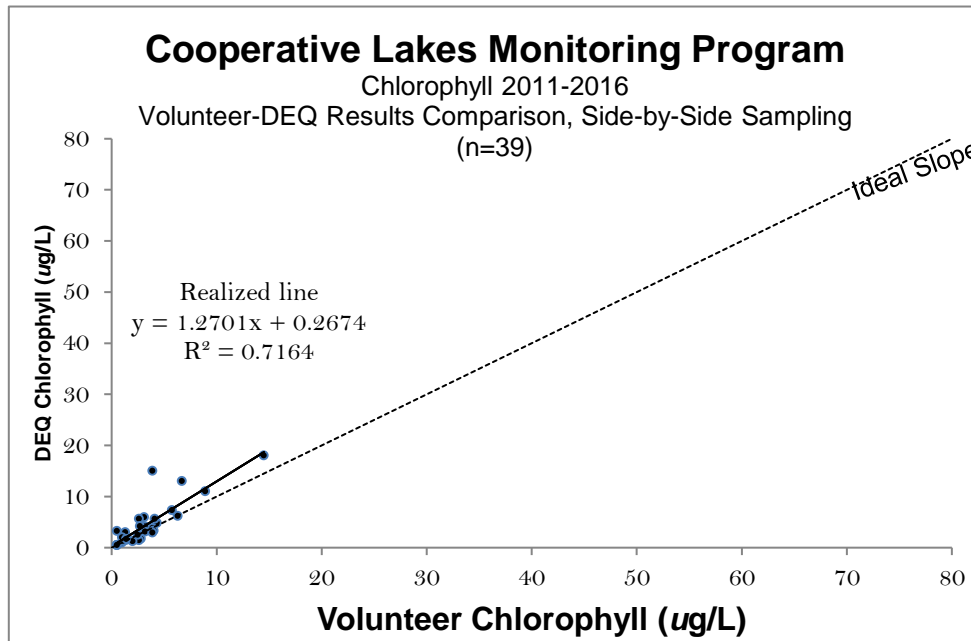


E. Chlorophyll, side-by-side data

1994-2010



2011-2016



V. Thank you, CLMP Volunteers!

In 2016, 418 volunteers participated in Michigan's Cooperative Lakes Monitoring Program.

Adam Freid	Carl Seaver	Dave Pruess
Al Schwennessen	Carolyn Grace	Dave Ridders
Al Vichunas	Carolyn LeJuste	Dave Whitehead
Alice Reed	Carolyn Zader	David Allen
Allen Dyer	Cary Hamann	David Ball
Andy DuPont	Char McDonnell	David Hayhow
Angie Stine	Charlene Peterson	David Kindt
Ann Hruska	Charles Miller	David Maxson
Anne Conklin	Charles Richards	David VanPortFleet
Arda Bucher	Charlie Jones	Dennis Arms
Arnold Domanus Jr.	Charlie Spoering	Dennis Curtice
Art Hoadley	Charlie Taylor	Dennis LaFave
Arthur Bombrys	Cherly Dyer	Dennis Paulin
Arthur Hoadley	Cheryl Pytlarz	Dennis Zimmerman
Ashley Harris	Cheryl Zuelke	Diane Blanchard
Barb Smith	Chris Floyd	Diane Tryon
Barbara Cunningham	Christie Budnick	Dick Morey
Barbara Lund	Christine Loc	Dick Peterson
Barbara VanDenEeden	Chuck Goll	Don Hunkins
Bart Harris	Chuck Harris	Don Klobucar
Becky Norris	Chuck Pilar	Donald Ferguson
Bernard Woltjer	Chuck Pugh	Donald Parkey
Bethany Sheffer	Chuck Wolverton	Donald Petree
Bill Bainton	Connie Jayne	Doris Loomans
Bill Henning	Connie Selles	Dorothy Jamison
Bill Miner	Craig Kivi	Dottie Myers-Hill
Bill Smith	Dale French	Doug Hanna
Bill Tidey	Dale Hartman	Doug Hansen
Bob Barr	Dale Peterson	Doug Jager
Bob Forche	Dale Sharpee	Douglas Cooper
Bob Haase	Dan Bailey	Douglas Gembis
Bob Hutchings	Dan Smith	Douglas Scott Miller
Bob Leon Lederman	Daniel Hayes	Duane Drake
Bob Sacksteder	Daniel Stock	Ed Franks
Bonnie Hay	Darlene Morey	Ed Hass
Bonnie Isaacs	Darly Lang	Ed Novak
Bonnie Kanitz	Darrill Peltier	Ed Waits
Brian Nurmi	Darrin Wassom	Elaine Pentilla
Brigid Forlenza	Daryl Allison-Busch	Eldonna May
Bruce King	Dave Beeke	Ellen Whitehead
Bruce Lichliter	Dave Havercamp	Emery Blanksma
Bryan Roels	Dave Hays	Emil Kezerle
C. Richard Sierakowski	Dave Hedges	Emmett Holmes
Calvin Killen	Dave Lee	Eric Shafer
Carim Calkins	Dave Long	Ernest Litch

Frank Hulme
Frank Siewiorek
Frank Wolf
Fred Daris
Fred Dean
Fred Farkas
Fred Jensen
Frederick Jensen
Gary Cross
Gary Gries
Gary Johnson
George Hanley
George King
George Purlee
Georgia Richardson
Gerald Cox
Gerald Gerou
Gerry Kraft
Gertrude Temple
Glenn Hayden
Gordon Buchanan
Gordon Fox
Greg Garrett
Greg Nichols
Greg Wenzel
Gregg Kabacinski
Gretchen Klobucar
Harris John Iler
Harry Dawson
Hope Bradley
Howard Wandell
Irene Badini
Irene Petree
Jac Groppuso
Jack Burke
Jack Delee
Jack Walls
Jacob Calkins
Jacqueline Dauw
James Feudi
James Findley
James Gonzalez
James Novitski
Jan Omo
Jan Reid
Jane Patterson
Janet Durbin
Jean Roth

Jean Stuart
Jeff Adams
Jeff Banaszynski
Jeff Jayne
Jeff Sanborn
Jennifer Parker
Jerry Hughes
Jim Cherfoli
Jim Collins
Jim Hamp
Jim Kelts
Jim McDowell
Jim McGurrin
Jim Meyer
Jim Mortimer
Jim Ross
Jim Roth
Jo Foley
Joan Uhley
Joanne Iler
Joe Czuk
Joe Evans
Joe Plunkey
Joe Porter
Joe Primozich
Joe Reynolds
Joel Blum
Joel Johnson
John (Red) Warner
John Collins
John DiGiovanni
John Hartsig
John Hause
John Hoek
John Kreag
John Lindahl
John Lund
John Mater
John Peterson
John Reed
John Sheppard
John Sick
John Stivers
John Waclawski
John Wilks
John Zuelke
Jon Waitz
Jon Wilford

Joshua Epperly
Judith Briggs
Judith Pugh
Judy Kukla
Judy Porman
Judy Shatney
Julie Lovelace
Julie Stivers
Karen Curtis
Karen Holmes
Karl Jacob
Katherine Haynor
Kathleen Anne Petersen
Kathleen Peterson
Kathryn Haughton
Kathy Gallagher
Kay Johnson
Kay Weber
Keith Carman
Keith Dennis
Kelly Dowd
Ken Gill
Kenneth Nelson
Kimberly Andrews
Kurt Richardson
Kyle Brown
Laurence Gavin
Lee Embrey Sr.
Linda Daniels
Linda Davis
Linda Hass
Lindsay Peterson
Lisa Sostecke
Lon Nordeen
Lonnie Loveland
Lori Huddleston
Lori Mroczek
Lorraine Willison
Lynda Little
Lynn Beres
Lynn Hoepfinger
Mari Dallapiazza
Marilyn Merit
Maris Ziemelis
Marjorie Findley
Mark Bradburn
Mark Ellingson
Mark Little

Mark Mitchell
Mark Smith
Martin Straka
Marty Foster
Marv Kingsley
Mary Shaw
Mary Sue Pollitt
Matthew Long
Maurine McCloud
Michael Borys
Michael Cunningham
Michael Dombrowski
Michael Mutschler
Michael Needham
Michael Scherba
Michael Selmo
Mike Alexa
Mike Boss
Mike Cherkoian
Mike Devarenne
Mike Gallagher
Mike Gildea
Mike Jones
Mike Litch
Mike Russell
Mike Sheehy
Mitchell LeClaire
Nancy Beckwith
Nanette Hibler
Neil Barr
Netty Kiekoover
Nicolette Jenaras
Nola Parkey
Pat Peterson
Pat Wolters
Patricia Nelson
Patsy Mortimer
Paul Curell
Paul Dalpra
Paul Fallon
Paul Gluski
Paul Smith
Peggy Merrill
Phil Sworden
Ralph Vogel
Ray Malcoun
Reno Nave

Rhonda Wassom
Ric Rentfro
Rich Meeuwenberg
Richard Brown
Richard Frendt
Richard Walklet
Richard Weber
Rick Bakka
Rick Kinan
Rick Meeks
Rick Rumstead
Rita Heady
Rob Namowicz
Robb Zoellmer
Robert Alvey
Robert Barr
Robert Blauwkamp
Robert Clark
Robert Embrey
Robert Johnson
Robert Schirado
Robert Turnquist
Robert VanDenBrouck
Robert Willing
Roger Gaede
Roger Giallorati
Roger Hopkins
Roger Storm
Ron Henning
Ron Rausch
Ron Reid
Ronald Basso
Ronald Compton
Ronald Heady
Ronald Kreiger
Ronnie Hughes
Roy Pentilla
Ryan Kanitz
Sandra Michalik
Sara Basso
Sarah Litch
Scott Austin
Scott Scarpelli
Shane Van Wasshnova
Sheri Kurtyak
Stacy Daniels
Stan Grove

Stan Roland
Stephen Franklin
Steve Lindsay
Steve Ockaskis
Steve Roth
Steven Kosto
Sue Boss
Susan Donovan
Susan Houseman
Susan LaRose-Grover
Susan Wedzel
Susan White
Sven Anderson
Ted Gatto
Terry Dugan
Terry Mohler
Thomas Clement
Thomas Madden
Thomas Tisue
Tim Murphy
Tim Stegeman
Tom Donaldson
Tom Donovan
Tom Engle
Tom Kowolski
Tom Leister
Tom Ollila
Tom Page
Tom Rush
Tom Thering
Traceford A. LaRose
Ursula Charaf
Ursula Froehlich
Virginia Himich
Wayne Kiefer
Wayne Swallow
Wayne Wunderlich
Wellington Jones
Wendy Shrake
Wes Durbin
Wesley Nolde
William Fronk
William Gay
William Meserve
William Stewart

VI. Thank you, DEQ and DNR Employees!

These individuals help with the logistics of collecting samples, mailing them to Lansing, and distributing and collecting Dissolved Oxygen meters.

Beth Anderson
James Caron
Kristina Coffey
Debra Frazier
Greg Goudy
Martin Hedges
Sonya Hudson
Nicole McIntyre
Deana Mercs
Deana North
Lucy Robinson
Jean Roth
Crystal Smith

VIII. CLMP Contacts

Questions about enrollment or monitoring equipment:

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Questions about aquatic plants or sample turn-in for any parameter:

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Questions about Dissolved Oxygen/Temperature meters or side-by-side sampling:

Marcy Knoll Wilmes
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Questions about data entry or getting a login/password for the MiCorps Data Exchange:

Laura Kaminski
Great Lakes Commission
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Questions about anything else:

Dr. Paul Steen
Huron River Watershed Council
734-769-5123 x601, psteen@hrwc.org