

WINONA LAKE

Your Lake, Your Story

LILLY CENTER FOR
**LAKES &
STREAMS™**



GRACE
COLLEGE



Winona Lake

LAKE SIZE: 562 acres

WATERSHED SIZE: 18,730 acres

MAX DEPTH: 79 feet

AVERAGE DEPTH: 30 feet

INLETS: Cherry Creek, Keefer-Evans Ditch, Peterson Ditch

OUTLETS: Eagle Creek

ACCESS: Public at Hillside Dr.

RECREATION: Boat, Fish, Ski, Swim at Public Beach on Park Ave.

LAKE BOTTOM: Sand, Gravel, Muck, Marl

BEST FISHING: Bluegill, Redear, Catfish, Crappie, Largemouth Bass, Walleye

WINONA LAKE :

Past, Present & Future

Since glaciers first formed this lake, the health of Winona Lake has been of importance to the surrounding residents, businesses, families, and even the economy. Understanding the past of Winona Lake helps in guiding present and future research. Trends on local lakes assist in providing context for years past as well as years to come. Each lake is different with a story and rhythm of its own. Families on Winona Lake, whether you have visited the lake for one summer or for one century, have shaped this lake just as it has shaped you and you have the power to leave a legacy for a healthy Winona Lake for future generations.

Our Study:

The Lilly Center for Lakes & Streams has been closely studying local lakes since 2007. However, lakes in Kosciusko County have a wonderful heritage of scientific research going back to 1875. Understanding the health of local lakes in the context of their history can assist in guiding future research and actions. As we investigated the past and the present of local lakes, we researched and collected data on water clarity, nutrients, dissolved oxygen and other parameters. This is a summary of our results and research specific to your home: Winona Lake. Past data was collected only from university and government sources during the months of July and August. Both past and present research uses data collected in open water above the deepest point in the lake. This research and its publication was funded by the K21 Health Foundation, Kosciusko County Convention Recreation and Visitors Commission, Grace College and private donors.

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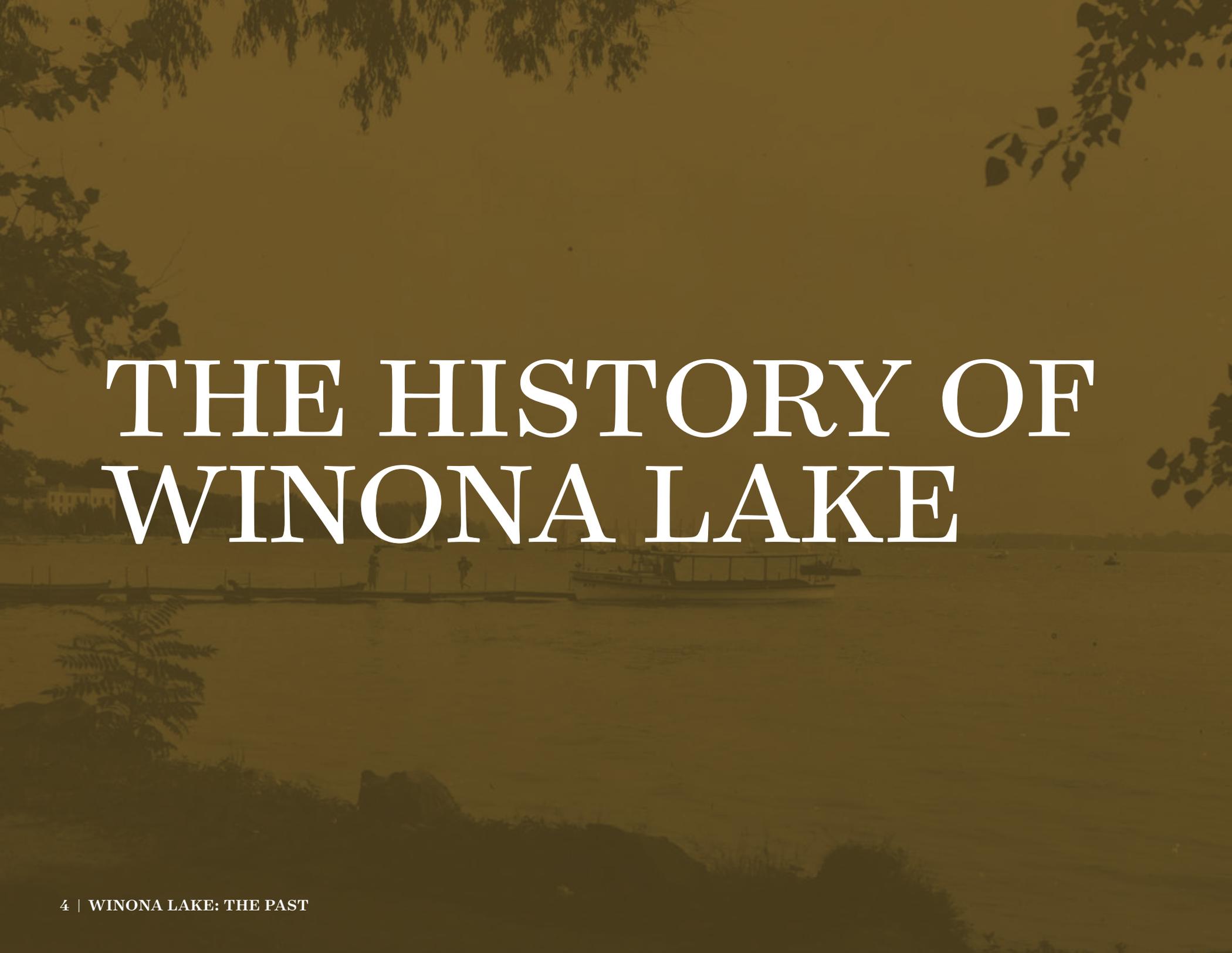
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THE HISTORY OF WINONA LAKE

How the Lake Was Formed

Winona Lake is a glacial lake. It was formed by the movement of glaciers which retreated from the land and left behind large deposits of ice and glacial material. These deposits left depressions into the land and as they melted, created large pools of water, or glacial lakes. This and other natural Kosciusko County lakes are glacial lakes. The nearby Great Lakes are the largest glacial lakes in the world.



THE TURN OF THE CENTURY

Until the start of the 1900s, Indiana lakes had not yet been widely viewed as subjects for research.

Rather, local lakes were places of recreation and fellowship. Winona Lake, formerly Eagle Lake, is located just over one mile from the city of Warsaw, Indiana. Winona Lake and the surrounding area were historical hubs for religious activity. In 1881, the Beyer brothers purchased land to build spring houses due to the natural sources of water in the Winona Lake area. Additionally, the beauty of the surrounding landscape attracted visitors, leading to the opening of Garfield Park and construction of the Eagle Lake Hotel, known today as the Winona Hotel. In 1902, the canal on Winona Lake was built and construction on cottages and homes began, leading to an influx in seasonal visitors from dozens to several thousand each year.

Life on Winona Lake was different from decade to decade as the community experienced alternating financial devastation (early 1900s, 1970s and 1980s) and financial revival (1950s and 60s). By 1994, however, Winona Restoration Company through the partnership of Dr. Dane Miller and Brent Wilcoxson, restored businesses, grounds, and commercial and residential areas in Winona Lake. To learn more about the history of Winona Lake, visit villageatwinona.com.



RESEARCH ON WINONA LAKE

Through the Decades

1875: Indiana Geological Survey examines and collects data on lakes in Kosciusko County, including Eagle Lake (Winona Lake).

1912: Indiana University gathers temperature profiles, dissolved oxygen profiles, and algae abundance data.

1946-1948: Indiana Department of Conservation studies the lake for general hydrology, background history, ice thickness data, and temperature profiles.

1900s

1910s

1920s

1930s

1940s

1950s

1896-1902: The Indiana University Biological Station collects temperature profiles and algae species data. Student room and board costs are \$1.25-\$3.00 per week.

1973: EPA conducts lakes survey to collect temperature and dissolved oxygen profiles.

2007-PRESENT: Grace College's Lilly Center for Lakes & Streams collects data on Secchi depth, temperature profiles, dissolved oxygen profiles, nutrients, algae toxins and algae counts on Winona Lake.

1960s

1970s

1980s

1990s

2000s

2010s

1992-PRESENT: Volunteers collect Secchi depth and nutrient data on Winona Lake as part of Indiana University volunteer program.

1991, 1994, 1998, 2004, 2006: Indiana University Clean Lakes Program collects data on Secchi depth, nutrients, and algae counts.

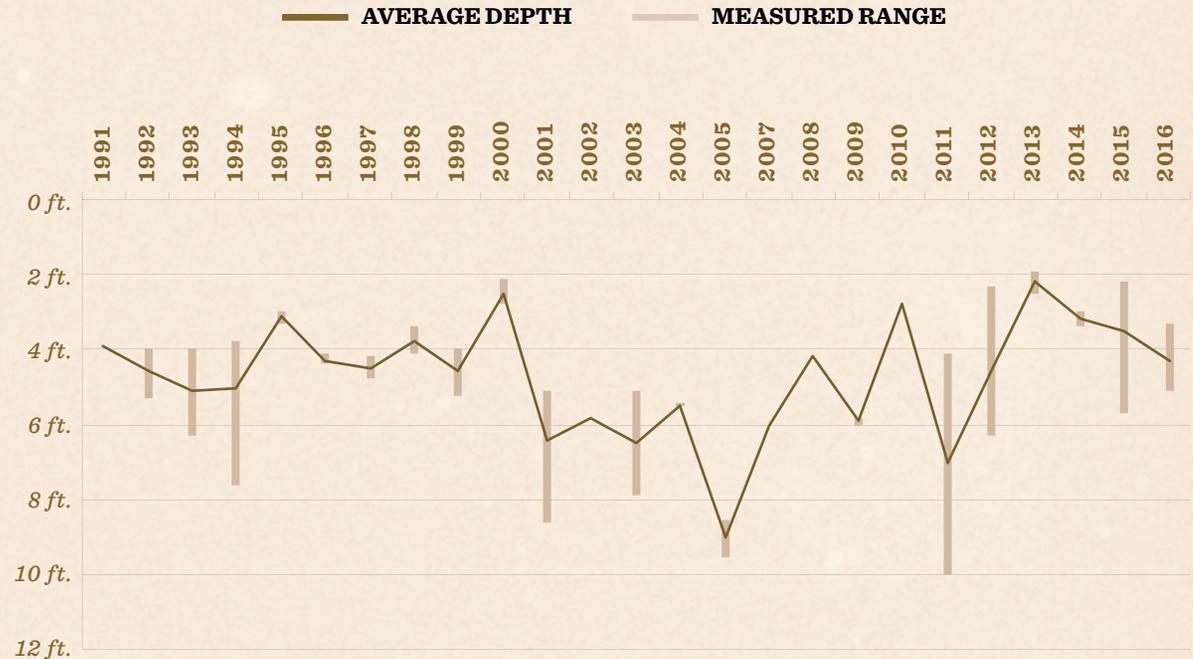
Water Clarity

The first Secchi disk was created in 1865 by Father Pietro Angelo Secchi, who was the pope's scientific adviser. Secchi had been asked to create a new and reliable transparency instrument to measure water clarity, so he created an all-white disk which could be lowered into water to measure clarity depth. On April 20, 1865, the first Secchi disk was lowered by Secchi from the papal stream yacht into the Mediterranean Sea.¹ To read more about the Secchi disk and the importance of measuring water clarity, see page 18.



Water Clarity Pioneer
Father Pietro Angelo Secchi

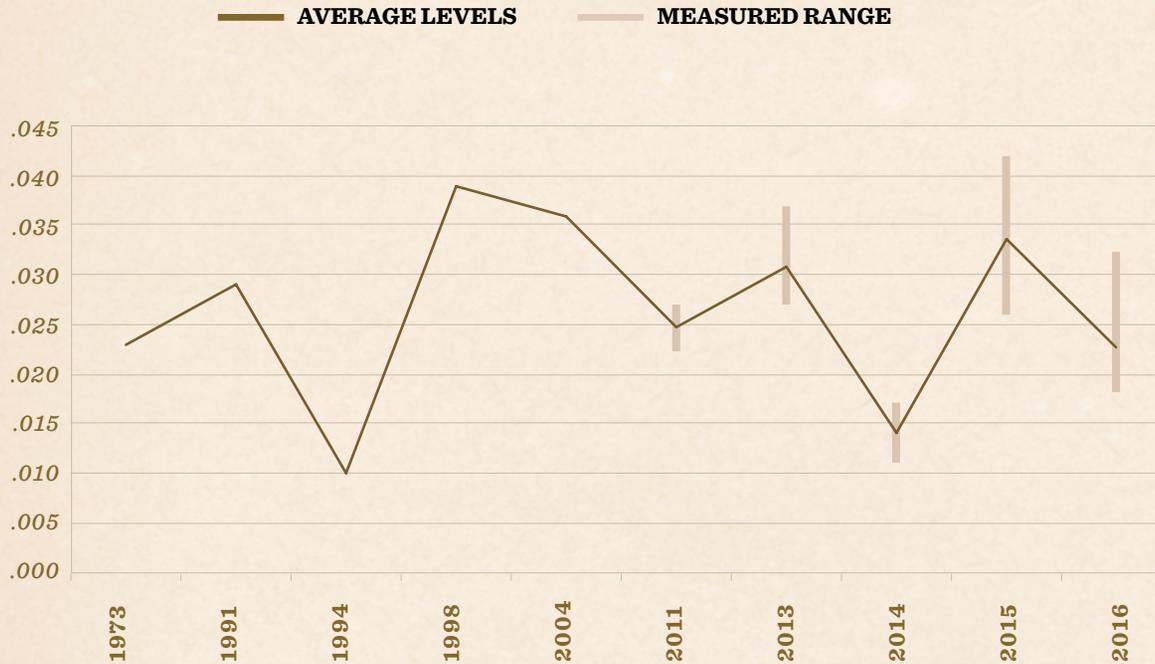
HISTORY OF WATER CLARITY IN WINONA LAKE



DATA SUMMARY:

Water clarity for July and August in Winona Lake increased significantly from 1991 to 2009 and then decreased significantly in the most recent years. Water clarity decreases could be due to more algae growth as a result of increased nutrient (phosphorus and nitrogen) levels. Increases in water clarity are likely due to less algae which could be the result of less nutrients or high populations of invasive zebra mussels which eat some types of algae.

HISTORY OF PHOSPHORUS LEVELS IN WINONA LAKE



DATA SUMMARY:

Winona Lake total phosphorus levels in July and August do not show any obvious trends over the past 40 years. Over this time period, surface water phosphorus levels range from 0.01 to 0.04 mg/L; these levels are all above the Environmental Protection Agency recommended guidelines.

Phosphorus Levels

The Experimental Lakes Area (ELA) in Ontario, Canada is a laboratory of 58 small lakes and their watersheds unaffected by the influence of humans which has been set aside for scientific research.²

One of the issues the ELA has had a profound impact on is the understanding of eutrophication, or the process leading to nutrient-abundant lakes. In 1974, Dr. David William Schindler found that eutrophication occurs in large part due to land runoff and much of the algae growth which occurs in lakes is primarily as a result of phosphorus rather than nitrogen or carbon.²

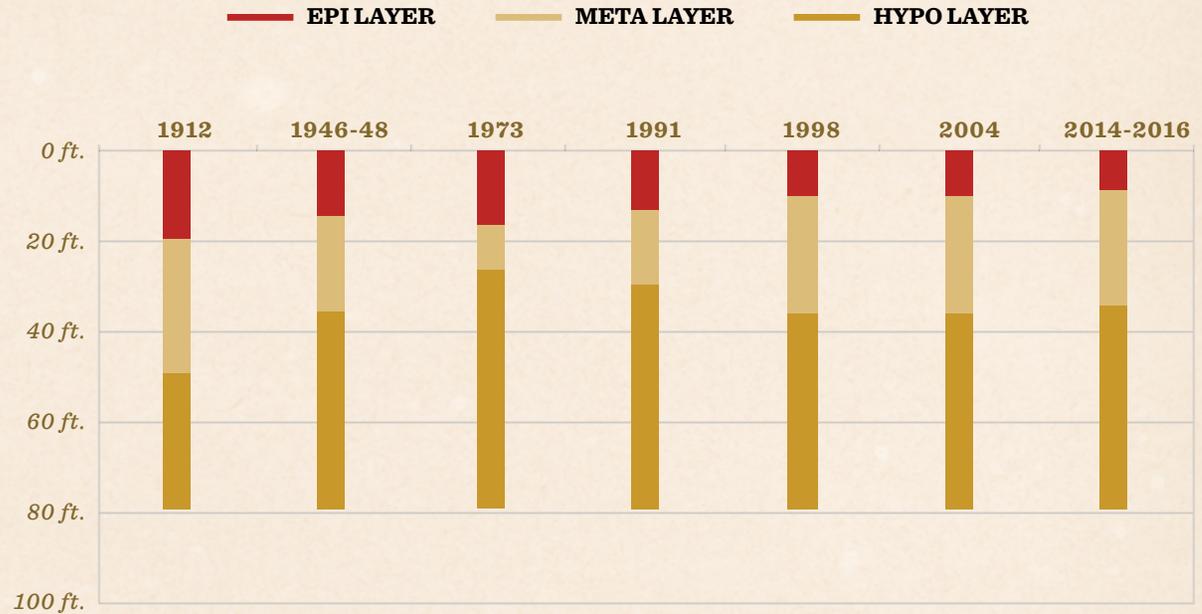
Water Temp.

EPI LIMNION LEVEL: The surface layer of a lake. This layer is the warmest and mixes from recreational activity and wind blowing across the lake surface.

METALIMNION LEVEL: The layer of water between the epilimnion and the hypolimnion. Water temperature changes quickly from warm to cold within this zone.

HYPOLIMNION LEVEL: The bottom layer of water in a lake which is colder than the top layers. This layer is isolated from the rest of the lake all summer and most of the fall, so it stays cold. Oxygen from the other two layers cannot come down into this layer.

HISTORY OF WATER TEMPERATURE IN WINONA LAKE

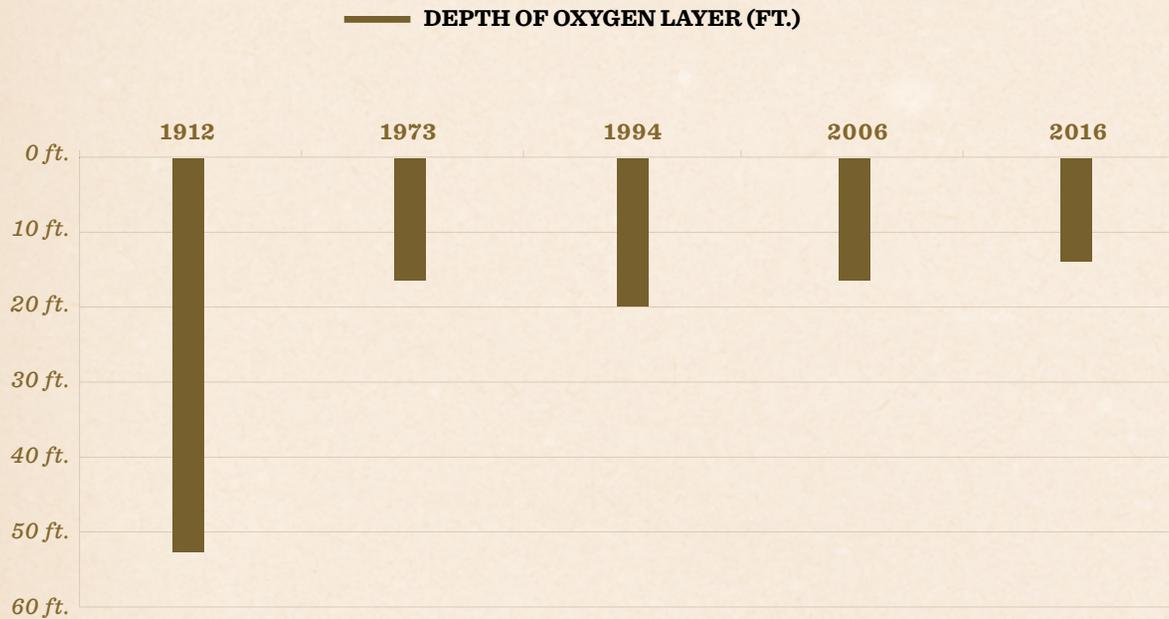


DATA SUMMARY:

Winona Lake water temperature layers seem to have changed over the past 100 years. Over this time period, the warm surface water layer may have become thinner in Winona Lake while the bottom cold water layer may have become thicker. You may have noticed this colder water layer at some time yourself if you have ever dived down deep into the lake.

HISTORY OF DISSOLVED OXYGEN LEVELS

IN WINONA LAKE



DATA SUMMARY:

The oxygen layer depth in Winona Lake has been decreasing over the last 100 years during July and August. This increasingly limits the space that fish can live and forces fish to a warmer surface water layer. Some fish cannot survive in warmer water such that certain fish might now be unable to survive in Winona Lake though they may have historically.

Dissolved Oxygen

Dissolved oxygen is the major factor that determines where organisms can survive in an aquatic system. During the summer, many lakes become layered based on temperature — and the bottom layer is often depleted of oxygen. This is because of chemical reactions that occur when dead plants decay on the bottom. Since the layers do not mix in the summer, the lake is not able to replenish its oxygen through mixing of lake waters. Oxygen depletion also occurs in the winter when surface ice keeps oxygen from entering the water from the air above.

Before dissolved oxygen sensors were developed, scientists used the Winkler method to measure dissolved oxygen in lakes and streams. The Winkler method is a technique which uses “titration,” or the addition of chemical reagents, to determine dissolved oxygen presence. In this method, water is added to a sample bottle and a series of reagents are added. These reagents make an acidic compound, to which the titrating compound is added to neutralize the mixture. The mixture eventually changes colors indicating the dissolved oxygen concentration.³

A Legacy on the Lake

Chris's family has been living on Winona Lake for nearly 50 years, so he has seen awareness of the lake's health grow over time. "During the mid to late '70s, the lake was filthy... people thought that's just how it was," Chris explained. But since that time, Chris said the attitudes of lake residents and those in the area have changed. "I have a long history with the lake and want to see it constantly improving," he mentioned.

His parents bought a lot on the north side of Winona Lake in 1970 and a few years later built a new home. After graduating from I.U. in 1984, he later married his wife, Beth (Huffer); they bought the lake house from his mother in the late '90s. Beth's grandparents too had lake properties and Beth also enjoyed her summers on the lake in the '70s and '80s.

Chris said he believes Winona Lake is a great asset to the community, both financially and aesthetically: "It's a good investment to live on the lake because God's not making any more lakes!" he said. Furthermore, property values hinge on the lake maintaining its health and any deterioration that impacts the lake can negatively affect the local economy, as was the case at Grand Lake St. Mary's in East Ohio.

Because Chris believes so strongly in making Winona Lake a better place to live, he has served on the board of the Winona Lake Preservation Association (WLPA) for 20 years, serving as president for the last 13 years. He explained, "I love the lake and I love volunteering my time serving to enhance our quality of life on the lake." WLPA addresses issues and topics on Winona Lake including promoting aquatic conservation, lake education, water quality, weed control, the

Peterson Ditch Restoration, The Fairgrounds shore restoration and currently the association is assessing a feasibility study they sponsored on restoration of the Wyland Ditch in collaboration with the Clean Waters Partnership.

It's a good investment to live on the lake because God's not making any more lakes!

Some of Chris's favorite memories on Winona Lake include learning how to waterski and barefoot in junior high school, tubing on old tractor tubes, tying up with several boats on the lake and just hanging out, and (in recent years) enjoying evening cocktail cruises with lake friends. He loves living on Winona Lake for many reasons from the peaceful winters watching Bald Eagles chase waterfowl, to the busyness of summer activities. But mostly, Chris loves that the lake is a place for community, and "There's always action with people enjoying the lake and, from our North Point home, you always feel a part of it!" either through chatting with friends cruising by or giving a friendly wave.

As for the future? "I hope it [Winona Lake] is much the same with ever-improving water quality. I want to see a new generation carry the torch of not only enjoying the lake, but taking care of it."



COLE, CAYLA, CHRIS, BETH,
& CHRISTIAN CUMMINS.



WINONA LAKE TODAY

The Lilly Center for Lakes & Streams at Grace College samples streams which flow into Winona Lake biweekly year round, even in the most brutal of weather conditions. Additionally, the Lilly Center samples the lake weekly during the summer to gain a better understanding of the lake's condition during the months it is most active.

The data collected and presented in the following section is a summary of our results specific to your home: Winona Lake.

An Economic Force

Kosciusko County lakes and streams not only contribute to the natural beauty and historical richness of our community, but also largely contribute to our county's current economy.

In fact, the Lilly Center for Lakes & Streams estimates that Kosciusko County lakes contribute approximately \$313 million to the county's economy annually. Understanding the impact of our lakes on the economy is an important part of Winona Lake's story now and into the future. Essentially, the health of Winona Lake can directly affect the health and success of the economy.



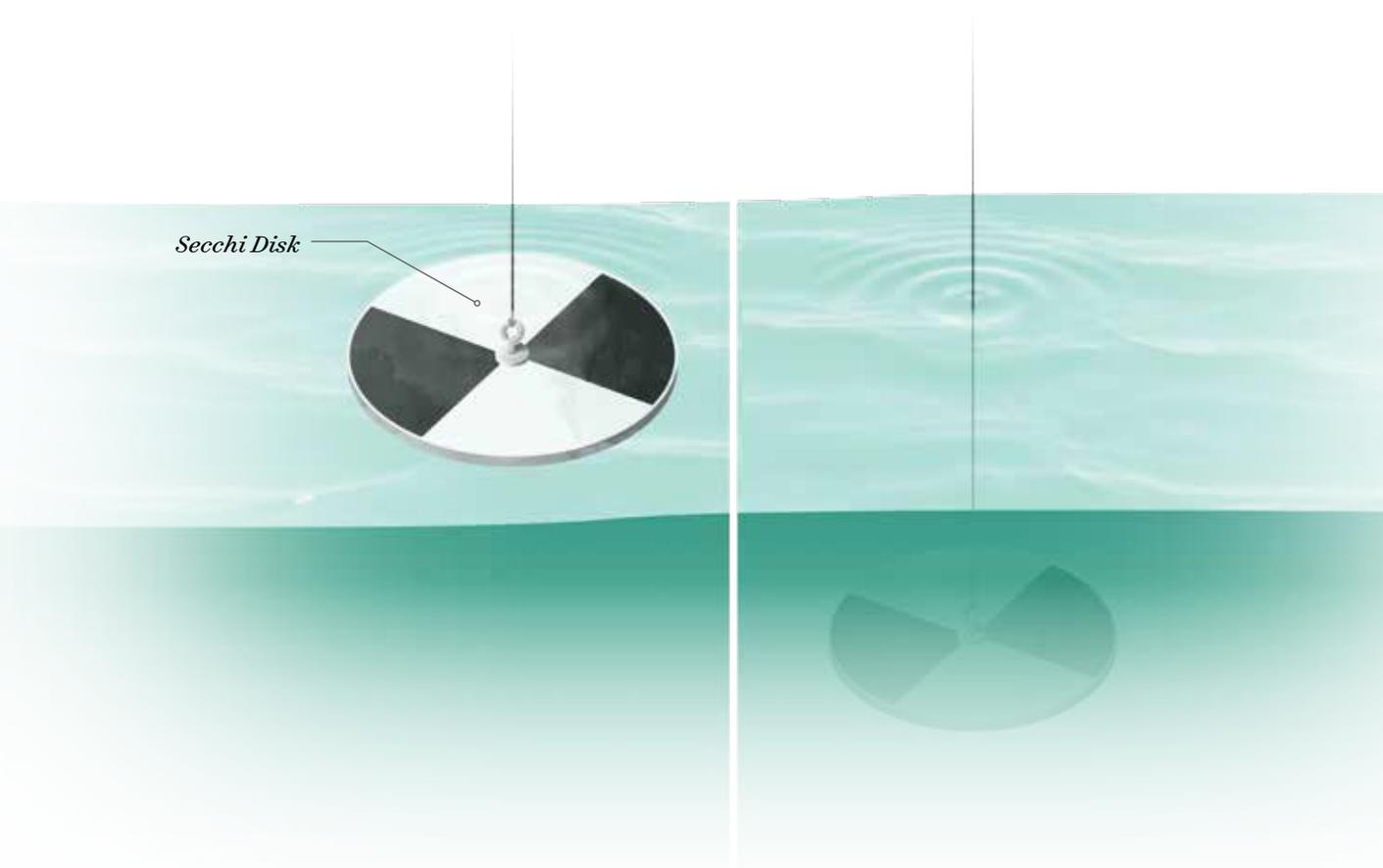
Water Clarity

A MEASURE OF HOW FAR DOWN LIGHT PENETRATES THROUGH WATER

Today, we still measure water clarity using a Secchi disk, but why is consistent measurement of water clarity important? Measuring water clarity is the first step in assessing the health of a lake. A clear lake is generally a healthy lake, but murky water is a sign that something may be wrong — such as too much sediment, pollution or an overgrowth of algae. Once the clarity of water is assessed, it is important to conduct more tests to find out what is affecting the lake's water.

HOW IS WATER CLARITY MEASURED?

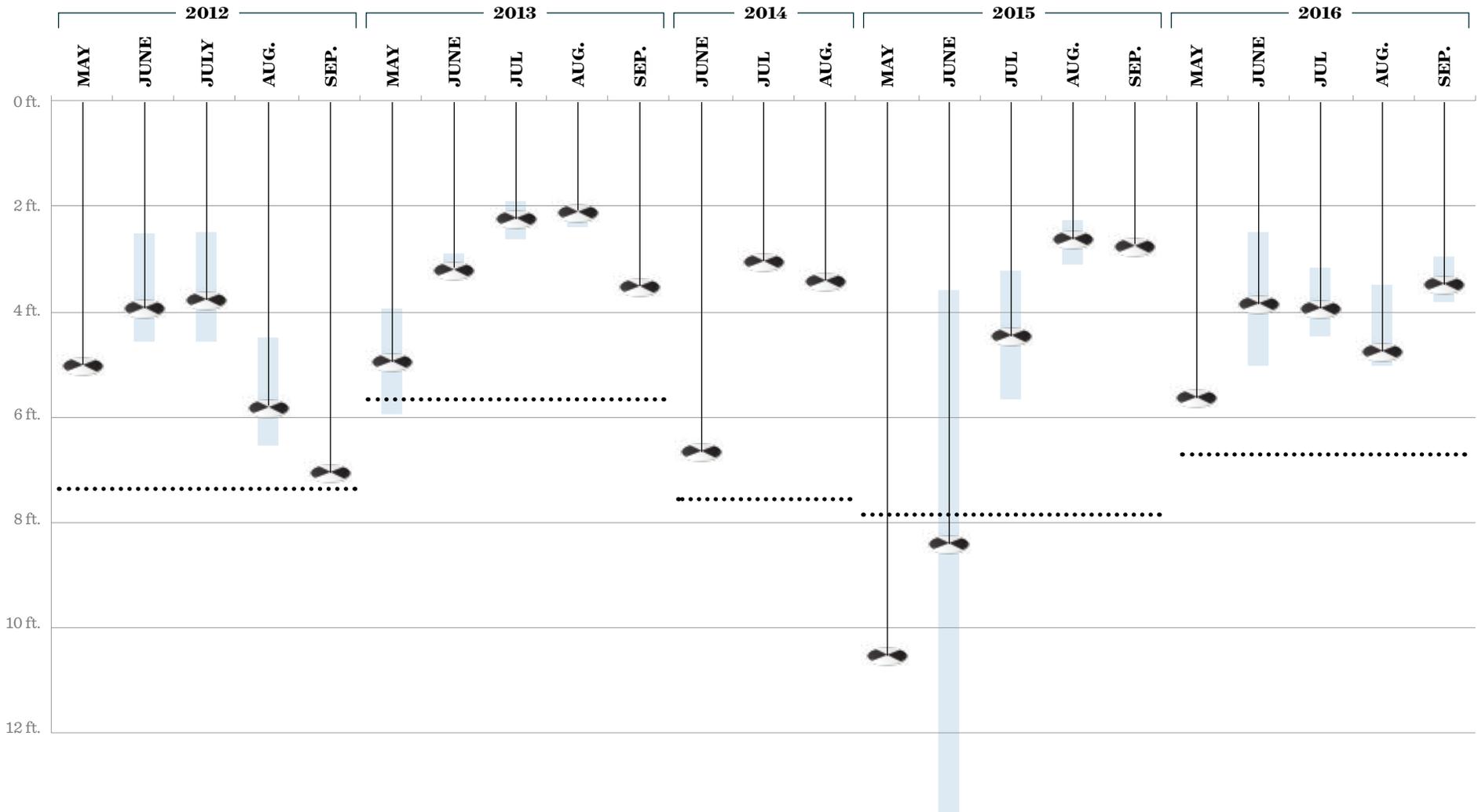
Water clarity is measured with a tool called a Secchi disk. A Secchi disk is a frisbee-sized metal disk that is painted with a black and white pattern. The disk is attached to a string and lowered into the lake water until the black and white pattern is no longer visually distinct. The depth of the disk is recorded as a measure of the water's clarity.



Current Water Clarity IN WINONA LAKE

DATA SUMMARY: Winona Lake's water clarity was typically lowest during June or July each year before improving toward the end of summer. This decreased clarity is likely due to generally higher nutrient (nitrogen and phosphorus) levels during these months compared to other months. Winona Lake's water clarity was consistently lower than other all-sports lakes in the county.

 WINONA LAKE AVERAGE
  WINONA LAKE MEASURED RANGE
 ALL-SPORTS LAKES IN COUNTY (YEARLY AVERAGE)



Nutrients

SOLUBLE MINERALS THAT PLANTS NEED TO GROW

TOO MUCH OF A GOOD THING: Nutrients are good for lawns and gardens. But when they enter the lake in the form of fertilizers, human and animal waste, or yard waste, they make aquatic plants and algae grow too much. Two of the most important nutrients to study are phosphorus and nitrogen. They are responsible for a majority of weed and algae growth in the lake.

NUTRIENTS, PLANTS AND ALGAE

The figure below shows how nutrients affect a lake's plant life

Few Nutrients

Optimum Nutrient Levels

Nutrient Overload

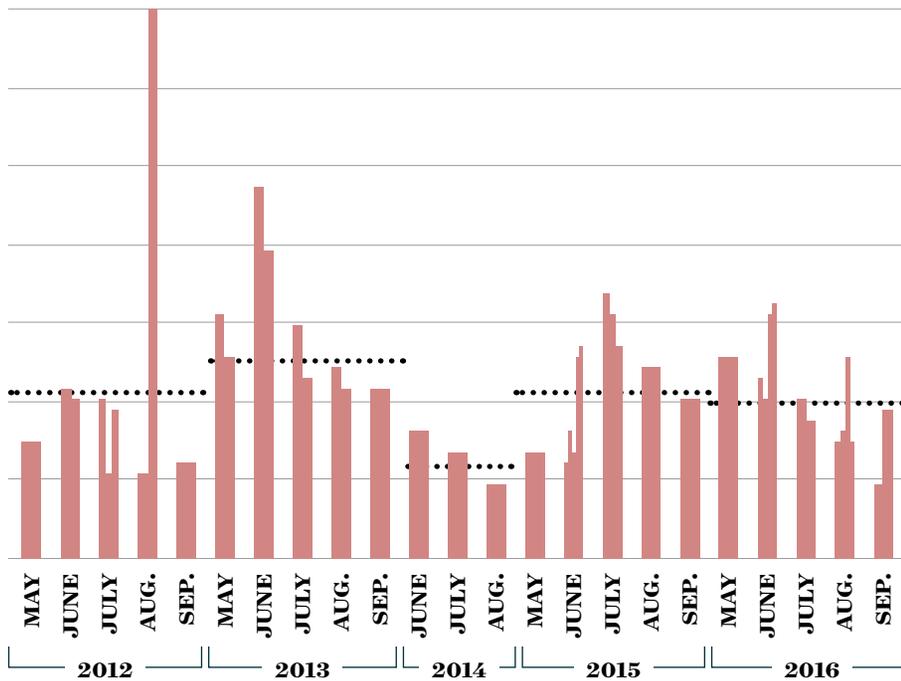


Current Nutrient Levels

IN WINONA LAKE

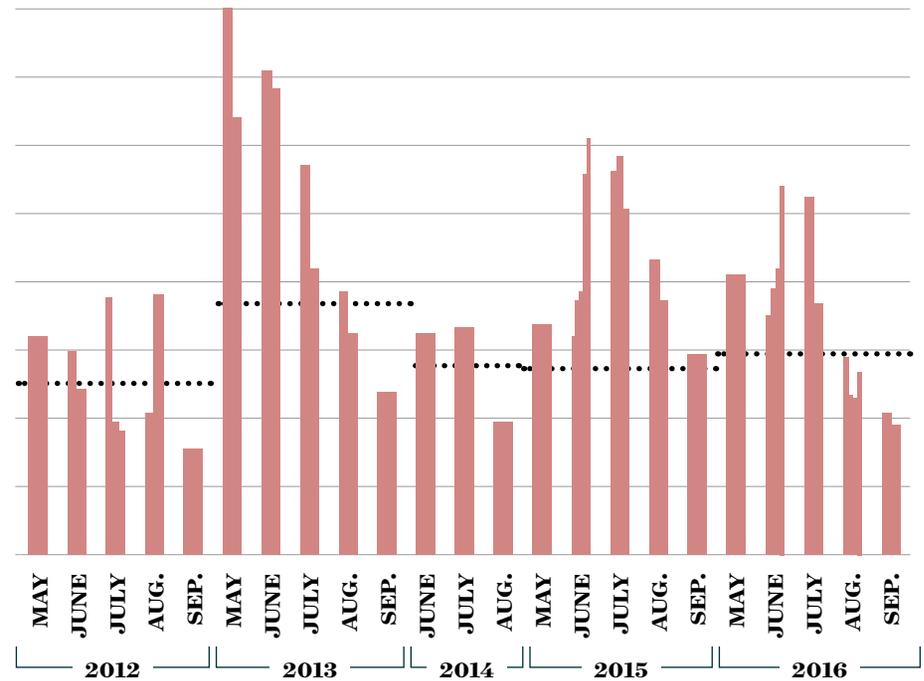
DATA SUMMARY: Both phosphorus and nitrogen levels in Winona Lake were always above the Environmental Protection Agency recommended guidelines. Overall, the months of June and July had the highest phosphorus and nitrogen levels. Winona Lake's phosphorus and nitrogen levels were similar to other all-sports lakes in the county.

|| WINONA LAKE ALL-SPORTS LAKES IN COUNTY (YEARLY AVERAGE)



PHOSPHORUS LEVELS IN WINONA LAKE

■ Good Levels ■ Bad Levels



NITROGEN LEVELS IN WINONA LAKE

■ Good Levels ■ Bad Levels

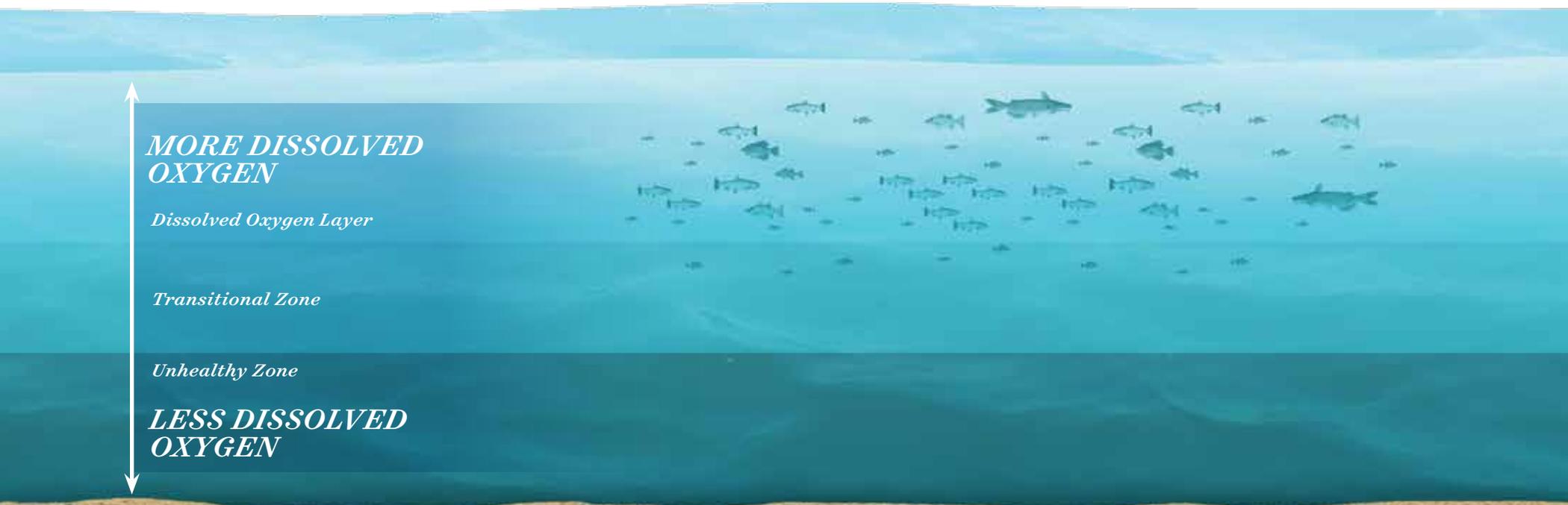
Dissolved Oxygen

GASEOUS OXYGEN IN WATER AND AVAILABLE TO AQUATIC ORGANISMS FOR RESPIRATION

THE EFFECTS OF DISSOLVED OXYGEN: Dissolved oxygen is the major factor that determines where organisms can survive in an aquatic system. During the summer, many lakes become layered based on temperature — and the bottom layer is often depleted of oxygen. This is because of chemical reactions that occur when dead plants decay on the bottom. Since this layer does not mix with the other layers, it is not able to replenish its oxygen through mixing of lake waters. Oxygen depletion also occurs in the winter when surface ice keeps oxygen from entering the water from the air above.

DISSOLVED OXYGEN LAYER

The figure below shows how far down fish and other aquatic species have enough oxygen to survive

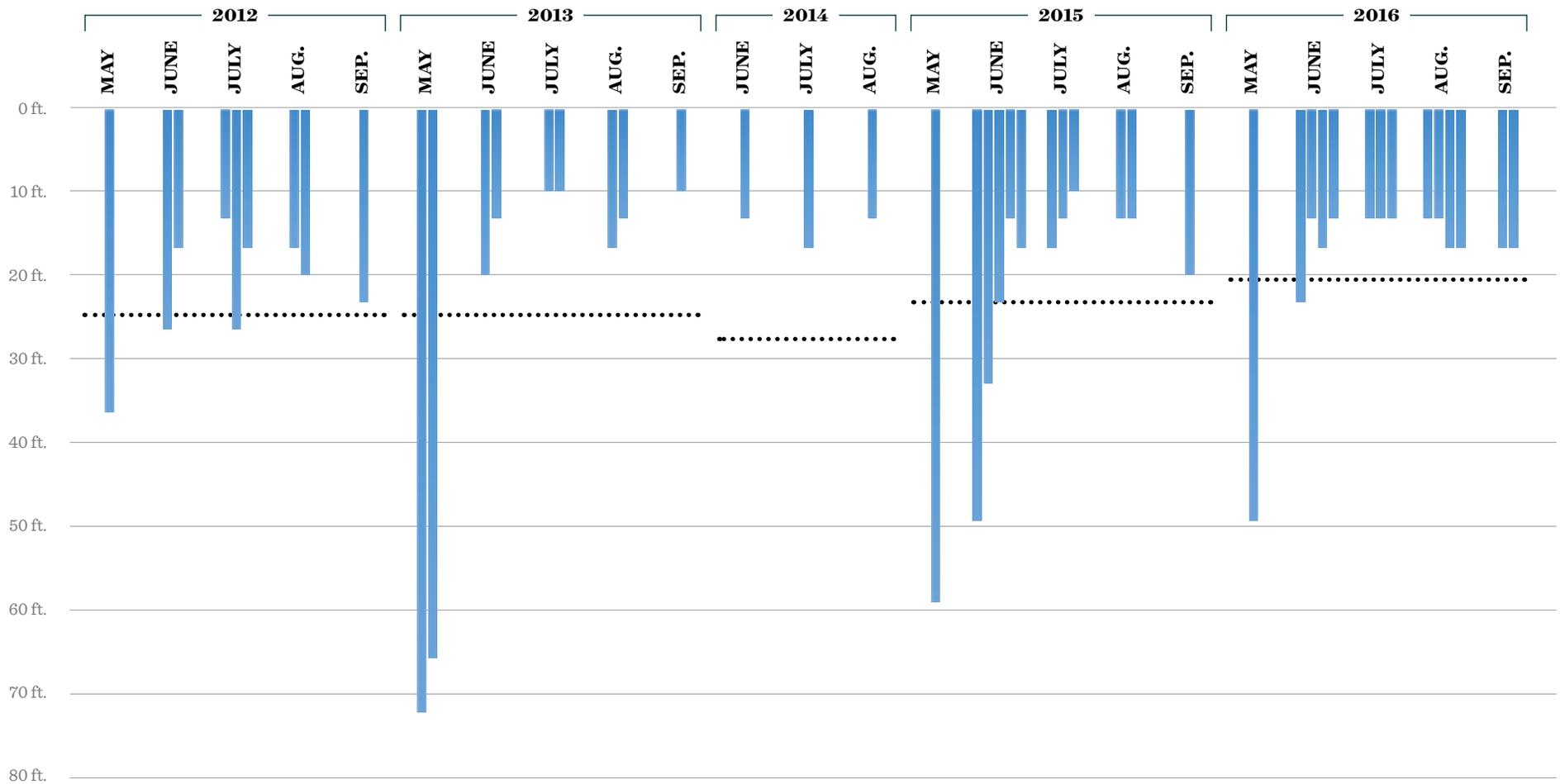


Current Dissolved Oxygen Levels

IN WINONA LAKE

DATA SUMMARY: The oxygen layer was often thinnest in the middle of the summer, squeezing fish into a smaller space and forcing them into warmer water. The oxygen layer varied among all-sports lakes in the county (partially depending on the lake depth), but Winona Lake's oxygen layer was usually thinner.

|| WINONA LAKE ALL-SPORTS LAKES IN COUNTY (YEARLY AVERAGE)



Blue-Green Algae

ALSO CYANOBACTERIA; A SPECIFIC GROUP OF MICROSCOPIC ORGANISMS THAT TYPICALLY LIVE IN WATER AND USE LIGHT FOR PHOTOSYNTHESIS

WHY ANALYZE ALGAE? You have probably seen green or brown “scum” on the surface of the lake before. That is most likely algae. Algae can also be mixed down into the water, changing the color of the lake. Our research focused specifically on blue-green algae because it is the type of freshwater algae capable of producing health-threatening toxins.

WHAT IS BLUE-GREEN ALGAE? A type of algae distinguishable from other algae by its paint-like or “pea soup” appearance. This algae is actually a kind of bacteria that is often blue-green in color but can also be blue, green, reddish-purple or brown.

HEALTH RISKS BASED ON BLUE-GREEN ALGAE LEVELS

For recreational waters as outlined by the World Health Organization

	LOW RISK LEVELS	MODERATE RISK LEVELS	HIGH RISK LEVELS
Possible Health Problems	Short-term adverse health outcomes, e.g. skin irritations, gastrointestinal illness	Potential for long-term illness with some cyanobacterial species Short-term adverse health outcomes, e.g. skin irritations, gastrointestinal illness	Potential for acute poisoning Potential for long-term illness with some cyanobacterial species Short-term adverse health outcomes, e.g. skin irritations, gastrointestinal illness
Typical Actions	Post on-site risk advisory signs Inform relevant authorities	Watch for scums or conditions conducive to scums Discourage swimming and further investigate hazard Post on-site risk advisory signs Inform relevant authorities	Immediate action to control contact with scums; possible prohibition of swimming and other water contact activities Public health follow-up investigation Inform public and relevant authorities

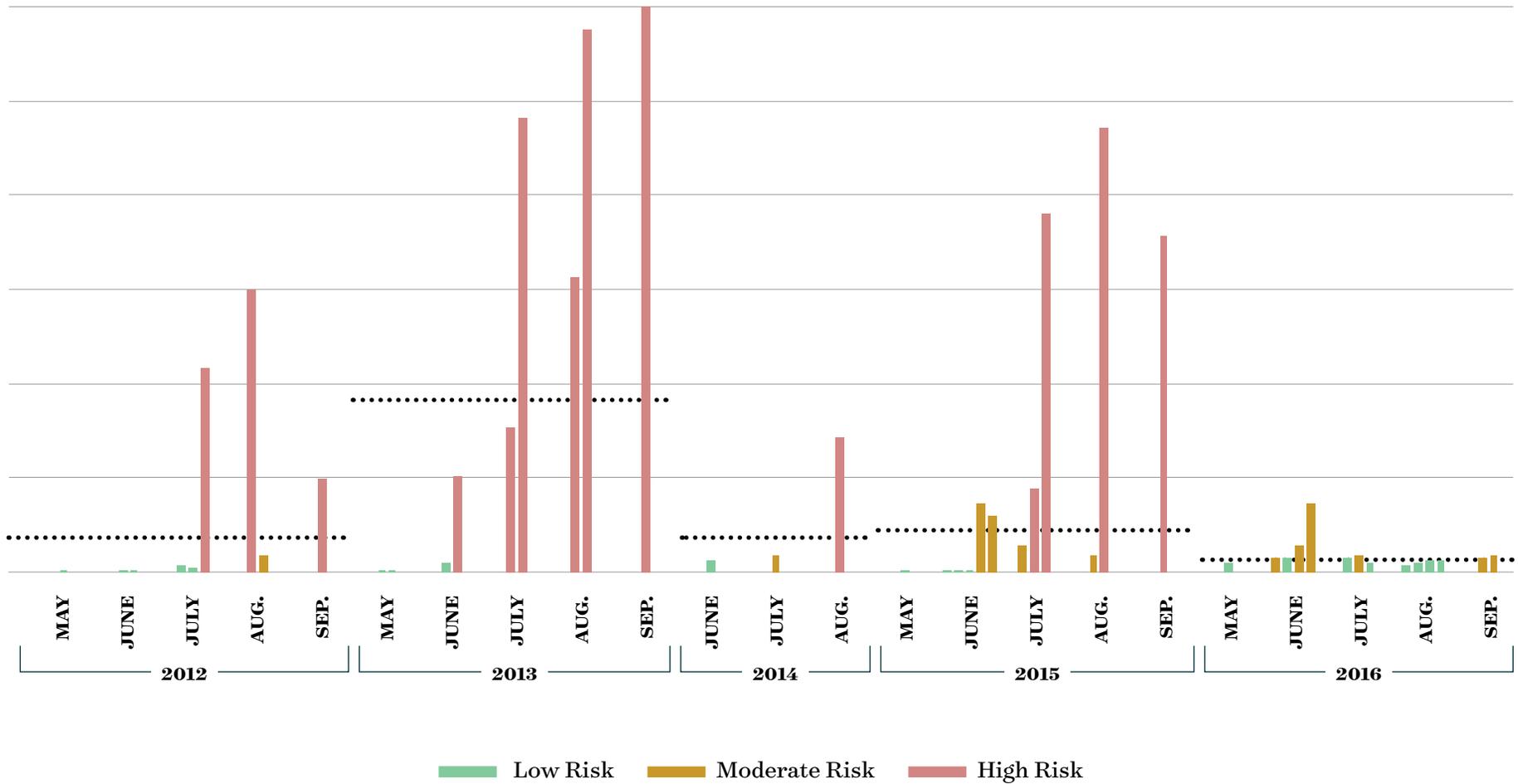
Blue-Green Algae Layer



Current Algae Levels IN WINONA LAKE

DATA SUMMARY: Blue-green algae populations in Winona Lake were often above human health guidelines even though the microcystin toxin levels sometimes remained low at those same times (see toxins on next page). Algae levels were in the “high risk” zone fourteen times and in the “moderate risk” zone twelve times in the last five years. Algae levels were substantially lower in 2014 and 2016 showing the variability in blue-green algae populations. Winona Lake’s algae levels were often higher than other all-sports lakes studied in the county.

|| WINONA LAKE ALL-SPORTS LAKES IN COUNTY (YEARLY AVERAGE)



Microcystin Toxin

A COMMON TOXIN PRODUCED BY BLUE-GREEN ALGAE THAT PRIMARILY TARGETS THE LIVER BUT IS ALSO A SKIN, EYE AND THROAT IRRITANT

BLUE-GREEN ALGAE AND TOXIN LEVELS: In addition to measuring the amount of blue-green algae in the lake, we also measured toxins produced by the algae. Both measurements are important because it is not yet understood what causes blue-green algae to release toxins – although our research planned for this summer on Winona Lake will likely give us more clues. A lake may

have a lot of blue-green algae but not much toxin. The ratio of blue-green algae to toxin is not consistent, so it is important to investigate both.

WHAT IS MICROCYSTIN? Microcystin is the most commonly studied toxin produced by blue-green algae. At high levels, microcystin can cause a variety of health problems (see chart below).

HEALTH RISKS BASED ON MICROCYSTIN LEVELS

For recreational waters as outlined by the World Health Organization

	LOW RISK LEVELS	MODERATE RISK LEVELS	HIGH RISK LEVELS
Possible Health Problems	Short-term adverse health outcomes, e.g. skin irritations, gastrointestinal illness	Potential for long-term illness Short-term adverse health outcomes, e.g. skin irritations, gastrointestinal illness	Potential for acute poisoning Potential for long-term illness Short-term adverse health outcomes, e.g. skin irritation, gastrointestinal illness
Typical Actions	Post on-site risk advisory signs Inform relevant authorities	Watch for scums or conditions conducive to scums Discourage swimming and further investigate hazard Post on-site risk advisory signs Inform relevant authorities	Immediate action to control contact with scums; possible prohibition of swimming and other water contact activities Public health follow-up investigation Inform public and relevant authorities

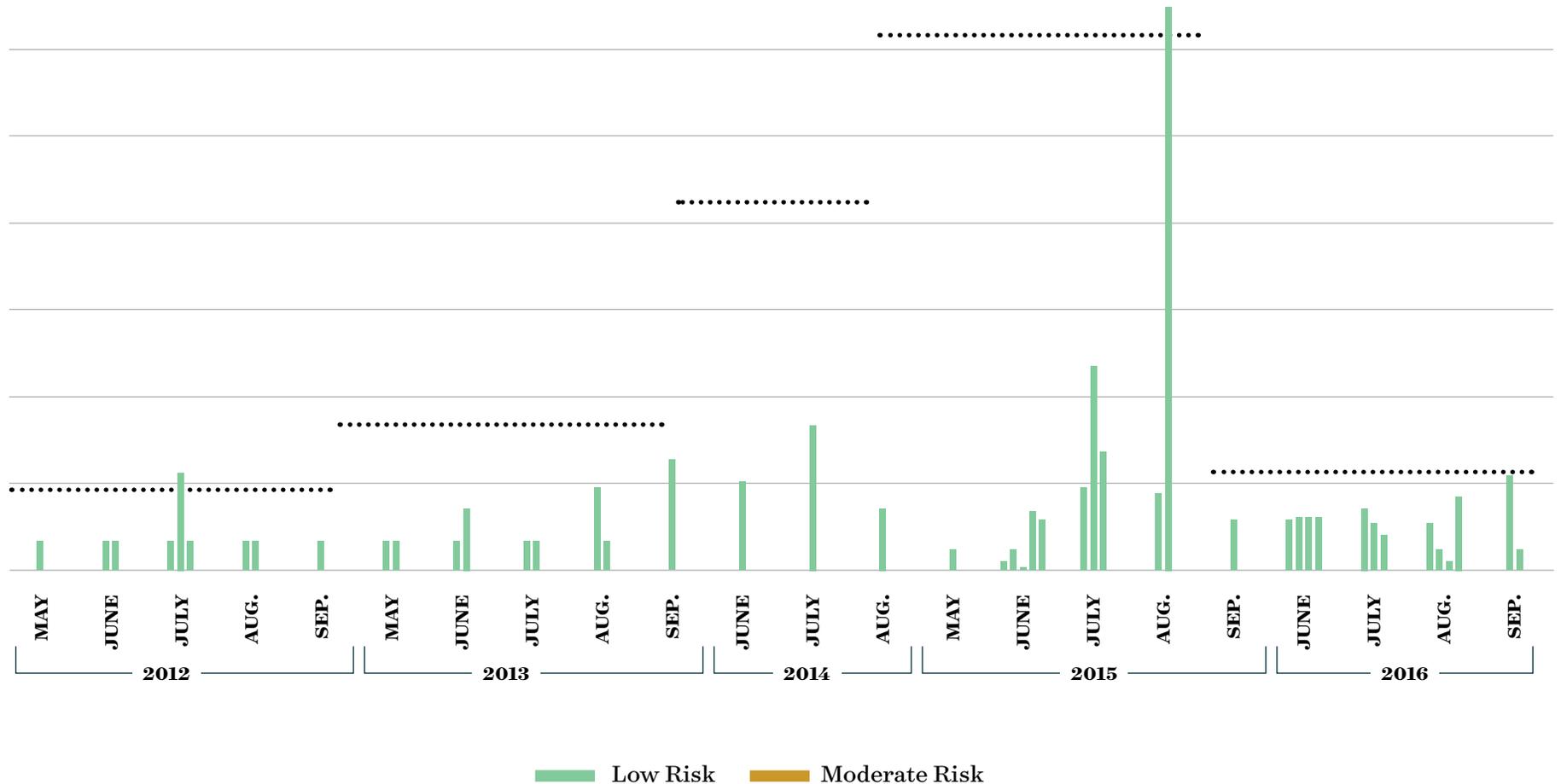
Sometimes blue-green algae can produce toxins



Current Toxin Levels IN WINONA LAKE

DATA SUMMARY: Winona Lake’s microcystin levels were consistently in the “low risk” zone. Winona Lake’s microcystin levels were lower than other all-sports lakes in the county. Even though Winona Lake’s microcystin toxin levels were consistently below guidelines for human health, there is strong potential for future risk as seen by the variability of the data. The lake’s blue-green algae numbers suggest that under the right conditions, such as high nutrient levels and warm temperatures, blue-green algae could produce microcystin toxin levels above human health guidelines in Winona Lake.

|| WINONA LAKE ALL-SPORTS LAKES IN COUNTY (YEARLY AVERAGE)



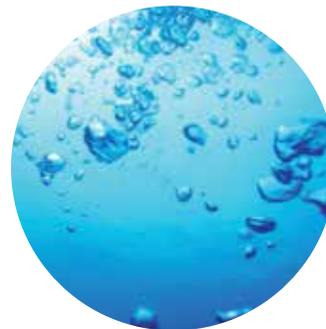
Why the Data Matters

Winona Lake has a story which includes a strong research heritage stretching back over 140 years. Though this previous research was limited and sporadic, pairing it with recent research from the Lilly Center allows us to explore some possible trends in our lakes. For Winona Lake, these trends show us some progress and reason for hope for the future, but they also show challenges that require more focused and strategic action:



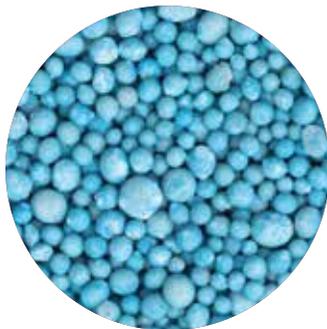
WATER CLARITY

Past trends over the last 25-30 years show previous improvement in water clarity with declines most recently. Water clarity declines could be due to more algae growth overall, while increases in water clarity are likely due to less algae, potentially from high populations of invasive zebra mussels that eat some types of algae.



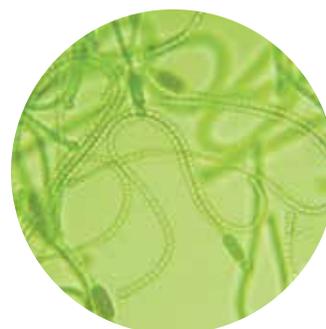
OXYGEN LEVELS

Past trends over the last 100 years show oxygen levels have declined over time. This increasingly limits the space in which fish can live and can lead to more available nutrients which encourage more algae and weed growth. Currently, fish can survive in only about the top 18% of Winona Lake's total depth during the summer.



PHOSPHORUS LEVELS

Past trends over the last 40 years show no obvious trends in phosphorus levels. Past and current phosphorus and nitrogen levels are all above recommended guidelines, encouraging excess weed and algae growth in Winona Lake.



BLUE-GREEN ALGAE

Blue-green algae populations in Winona Lake are often above human health guidelines even though algae toxin levels have remained consistently low. Winona Lake's algae toxin levels were generally lower than other popular lakes in the county. High blue-green algae populations suggest there is still strong potential for future risk.

Some of these measures show signs of hope, while others encourage us to work even harder toward a cleaner Winona Lake. The Lilly Center's current research now makes county lakes, once studied sporadically and inconsistently, the most thoroughly studied in the state allowing future strategic actions based on science.

Making Winona Lake the Best it Can Be

Erin said she has a “vested interest in Winona Lake so I want it to be as perfect as possible.” She has grown up on water her entire life as Lake Tippecanoe was her childhood home and she had her first home as an adult on the lake. Throughout her childhood, many of Erin’s friends lived on Winona Lake, so she began making memories on Winona Lake as well. She explained, “You could say I’ve been on Winona for more than 30 years. I plan to live out my life here as well.”

Erin shared that the lake is important for a variety of reasons, “I simply delight and take comfort in the sights and sounds of it, but practically speaking it gives a lot back to our community. First of all, its backdrop is wonderful for commerce. These businesses and restaurants can flourish simply because of its aesthetics. That’s a wonderful thing.” The local economy benefits from tourism and property ownership as a result of Winona Lake, Erin explained. She added, “The entertainment factor on a lake is truly endless. I’ve seen a fox traverse the ice, deer swim to its shore, people cross country ski, ATV, snowmobile or simply walk across it. Summertime is the best.”

In addition to economic benefits, Erin mentioned that the health of

Winona Lake should be a high priority to the community, “Our wildlife, economy, and human lifestyle depend upon the lake being clean and healthy... What would we do without it? What would I do without it?” Erin said she does not like the possibility of Winona Lake becoming “useless for the future.”

*The entertainment factor on a lake
is truly endless.*

Erin hopes to pass her homes and properties to her children and future generations. She is working to protect the lake by being considerate of potential pollutants through actions like avoiding fertilizer use, and supporting the Lilly Center for Lakes & Streams, and local lake associations. She continued, “I feel so blessed and appreciate every day I live on this lake.”



THE FUTURE OF WINONA LAKE

At the Lilly Center for Lakes & Streams, we are increasing our momentum with cutting edge research and groundbreaking education. We are also increasing collaboration with local groups to make sure these trends reflect the positive work of so many organizations, community groups, and individuals who have been the bright spots in the lake's story.

THE LILLY CENTER FOR LAKES & STREAMS IS DEDICATED TO MAKING WINONA LAKE CLEAN, HEALTHY, SAFE AND BEAUTIFUL

WE HAVE THE EXPERTISE AND TOOLS TO CONDUCT GUIDING RESEARCH.

Led by a professor of freshwater science, outfitted with the necessary equipment, and growing to meet continuing community need the Lilly Center can perform high-quality research at a local level, focusing on the lakes and streams of Kosciusko County.

WE HAVE THE CAPACITY AND COMPETENCY TO PROVIDE RESOURCES.

Our website is a clearinghouse of data, tools and other resources pertaining to Kosciusko County lakes and streams. Our offices house educational and scientific resources we make available to local communities and our facilities are continuing to expand. And now, the Lilly Center's presence in the community is supported into the future by our growing endowment fund.

WE HAVE THE BACKGROUND AND TALENT TO ENGAGE AND EDUCATE RESIDENTS.

Our staff is experienced at national and local levels with operating K-12 and community outreach programs. Our Grace College student interns and volunteers give us the personnel we need to effectively and efficiently conduct our education programs.

WE HAVE THE INFRASTRUCTURE AND POSITIONING TO LEAD COLLABORATIVE EFFORTS AMONG LOCAL ORGANIZATIONS.

Our expanding Grace College facilities accommodate meetings, workshops and other gatherings. With countywide perspective we help create working partnerships and facilitate exchanges of knowledge and expertise.

WE WANT OUR LAKES AND STREAMS TO BE SOMETHING WE CAN ALL BE PROUD OF, TO BE CLEAN, HEALTHY, SAFE AND BEAUTIFUL.

By supporting the Lilly Center for Lakes & Streams you're ensuring that every effort is being made to make the lakes and streams of Kosciusko County cleaner now and into the future through ongoing research, education, and collaboration.

Preparing for the Future

In 2015, the Lilly Center for Lakes & Streams established an endowment fund for the purpose of establishing the Lilly Center as a permanent entity in the county for groundbreaking research, community and K-12 education, and effective collaboration. Funds contributed to the endowment sustain our efforts for the health of our economy, for the health of our communities, and for the health of your children and grandchildren.

The response and support for this endowment project has been astounding. We have received gifts and pledges from individuals, businesses and organizations which have helped us raise over \$5M to be set aside in an endowment fund to provide ongoing support for the Lilly Center into the future.

Furthermore, this spring, Grace College's Lilly Center for Lakes & Streams announced its change in name. The new name acknowledges the substantial leadership gifts for the Lilly Center's endowment that were secured from Lilly Endowment, Inc. as well as from the Lilly Family through the Ruth Lilly Philanthropic Foundation.

The Lilly Center for Lakes & Streams is honored to be affiliated with the Lilly Family and their legacy of research involvement on local lakes. The Lilly Family's influence in a legacy of research excellence with Kosciusko County lakes is unmatched in our region. The Lilly Center for Lakes & Streams is committed to excellence in all our efforts to ensure that our local lakes continue to be among the most thoroughly studied in the state for generations to come.

LILLY CENTER FOR
**LAKES &
STREAMS**™



GRACE
COLLEGE

COLLABORATING TO MAKE KOSCIUSKO COUNTY LAKES CLEANER

Winona Lake is best served as the following organizations continue to grow in partnership and make an important impact in their unique areas of expertise:



WINONA LAKE PRESERVATION ASSOCIATION promotes aquatic conservation, lake education, safety and recreational use of Winona Lake for our community. The association addresses issues and topics on the lake including weed control, water quality, raising and lowering the lake, and specific lake projects that monitor and ensure Winona Lake's water quality improvement. For more information, visit winonalakepreservation.net.



THE WATERSHED FOUNDATION (TWF) was founded in 1997 to protect and improve water quality in our local lakes and streams. TWF takes action by stopping pollution at its source. The Foundation achieves success by installing water quality improvement projects on the land, empowering landowners to make clear choices for clean water, and leading partnerships throughout the upper Tippecanoe River watershed. For more information, visit WatershedFoundation.org.



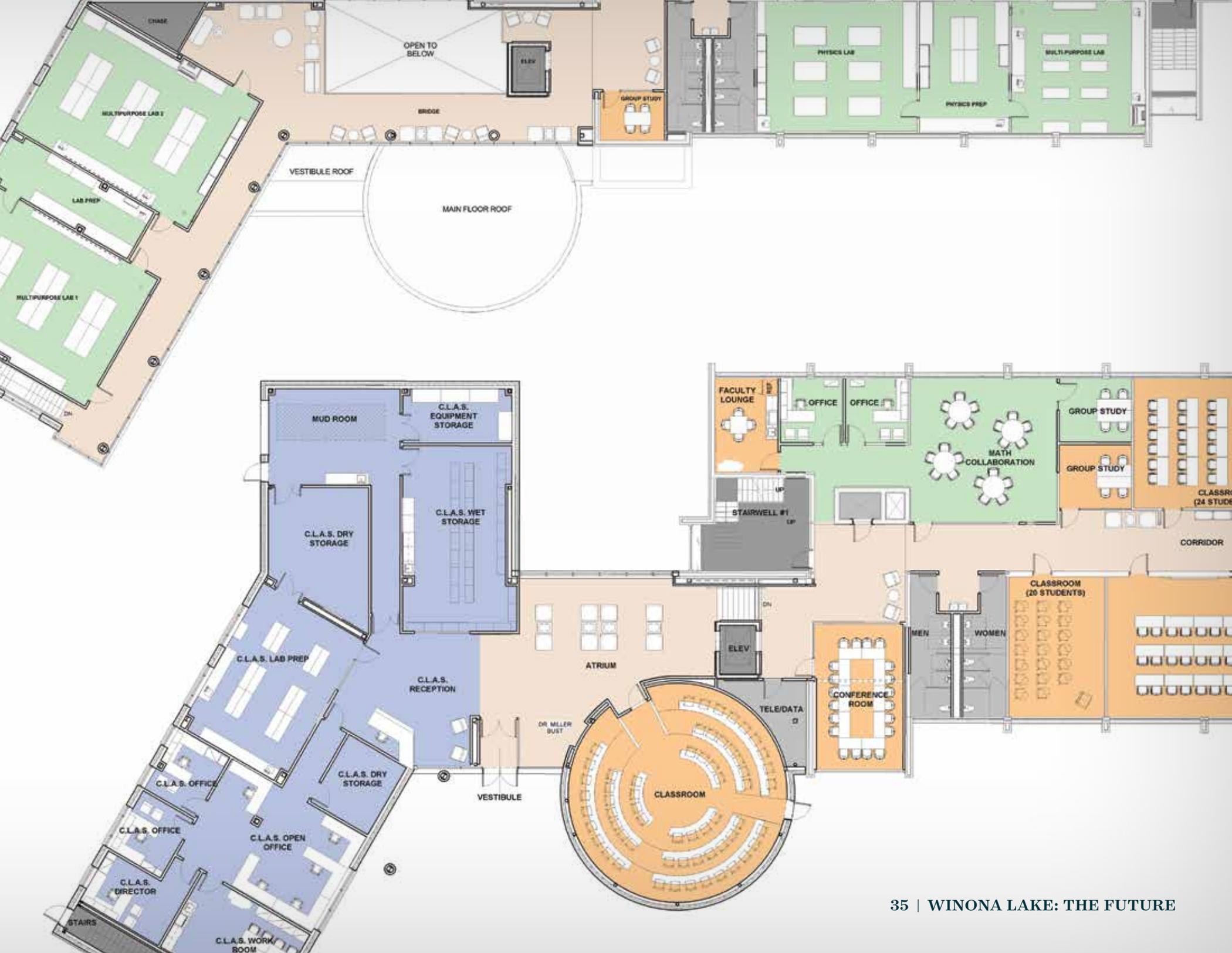
LILLY CENTER FOR LAKES & STREAMS AT GRACE COLLEGE Established in 2007, the the Lilly Center for Lakes & Streams is dedicated to conducting research, providing lake and stream education, and collaborating with other groups to make Winona Lake and other county lakes clean, healthy, safe and beautiful. For more information, visit lakes.grace.edu.

New Facilities

The Lilly Center for Lakes & Streams has experienced great growth in programming, research, staff, and community involvement over the last decade. New facilities will feature state-of-the-art laboratory space, community and educational resources, increased storage space which will allow for program expansions, and collaborative office space.

The Lilly Center for Lakes & Streams is looking forward to the construction of new facilities. Grace College is beginning construction on a new science facility: the Dr. Dane A. Miller Science Complex this summer. With major funding by Dr. Dane and Mary Louise Miller, Zimmer Biomet, K21 Health Foundation, and friends of Grace College, the new facility will include specifically designed and dedicated space for the Lilly Center. This space will help the Lilly Center increase its impact in the community.



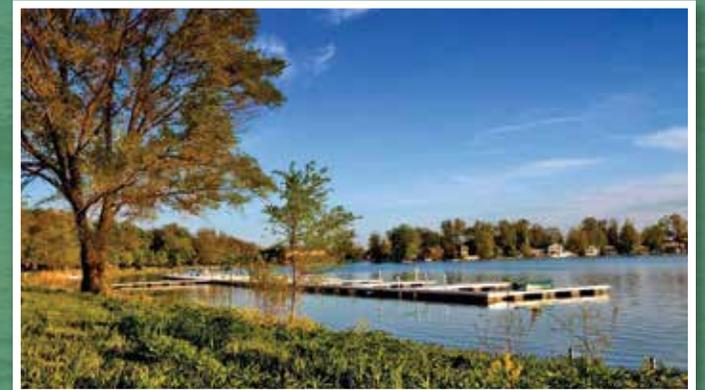


WINONA LAKE HAS A GREAT STORY. NOW IT IS YOUR TURN TO HELP WRITE THE NEXT CHAPTER.

Winona Lake and other Kosciusko County lakes have shaped not only our local landscape, but each of our lives. Our endowment fund is one way to ensure that these resources are always studied, monitored, and never forgotten. But, making and keeping them clean is up to you.

Making our lakes and streams cleaner is more important than ever. The health of our lakes is directly linked to the health of the local economy, the health of your children and grandchildren, and the health of our greater community.

Endowment funds ensure the Lilly Center's presence, but ensuring continual program growth in areas of groundbreaking research, K-12 and community education, and collaboration with partner groups can only be accomplished through your ongoing support.



What you can do to help:



REDUCE FERTILIZER USAGE ON YOUR LAWN AND GARDEN

(especially close to the lake) to save yourself some money and keep extra nutrients out of Winona Lake. If you want to know exactly how much nutrients your lawn or garden needs, the Lilly Center for Lakes & Streams can help you with soil testing resources.



EXPAND COLLABORATIVE RELATIONSHIPS AND PROJECTS WITH NON-LAKE RESIDENTS.

Water flows downhill, so neighborhoods, industries, farmers and businesses in areas surrounding Winona Lake all influence the lake. Your support and participation has allowed the Lilly Center for Lakes & Streams to pursue these efforts, and we look forward to working with you to expand them.



ADD BEAUTIFUL VEGETATION ALONG YOUR SHORELINE

to filter out nutrients as water carries them toward the lake. Native plants (those plants that occur naturally in our region) are best because they cut down on your maintenance costs and provide the best filtration. The Lilly Center for Lakes & Streams has information to help you get started.



PROVIDE FINANCIAL SUPPORT

toward research to solve the identified challenges facing Winona Lake. The Lilly Center samples inflowing and outflowing streams and can use this data to start quantifying nutrient sources. This will help us navigate future efforts toward efficiently reducing these nutrient sources. Your financial support helps us pursue strategic actions based on science.



AVOID YARD WASTE ENTERING THE LAKE.

Leaves, grass clippings or other yard waste have nutrients which increase algae growth, reduce water clarity and lead to less oxygen for fish. Use this yard waste as compost in your garden to further reduce your fertilizer use or have it removed from your property. If you would like to start composting and need some direction, the Lilly Center for Lakes & Streams can help.



ENGAGE OUR LAKE NEIGHBORS AND OUR NON-LAKE COMMUNITY MEMBERS

in educational programs that inform them about how to best take care of Winona Lake. You might consider helping as a volunteer for the Northern Indiana Lakes Festival or financially supporting one of our K-12 programs.

Protecting Winona Lake for Future Generations

Winona Lake is important to George and Mary Clemens for many reasons. The two explained that the principal reason the lake is important to them, aside from the other business properties they own, is that their largest personal financial investment is in the lakefront property they own as well as their properties across the street from the lake. The intrinsic value of Winona Lake, as well as the pleasure that George and Mary, their children and grandchildren receive from local lakes is “...something on which no monetary value can be placed,” explained Mary. She continued, “Because of what the lake has to offer in entertainment options, and the beauty of the setting alone, they bring our children and grandchildren here as often as schedules permit. Regardless of whether or not we can be on or in the lake, we never cease to appreciate the year-round beauty of it. One of our favorite seasons is when all of the piers and boats are taken out and the simplistic beauty of the lake, alone, is seen anew... It is a treasure that most communities do not have and we are doubly fortunate that both the city of Warsaw and the town of Winona Lake border the lake itself.”

Mary’s parents moved from Plymouth to Warsaw in the early ‘70s and purchased a home on North Bay Drive; they lived there until they retired to southern Texas in the ‘90s. George’s parents purchased a home on Country Club Lane in the mid ‘70s and lived there until they passed away. In 1978 George and Mary purchased a home on Country Club Drive with an easement to the lake, and then in 1999 they purchased the lakefront home of Betty Zimmer Morgan, along with a guest house and lots across the street. These properties, themselves, have a great deal of history.

George and Mary believe that taking care of Winona Lake is important: “Treating the lake with the respect it deserves is what will make it sustainable for generations to come, while protecting the property values and financial investments that have been made by so many individuals.” They hope that their children and grandchildren will enjoy their properties on Winona Lake long into the future, with all of the love and appreciation George and Mary have for the lake.

The Clemens’ are working to make Winona Lake better as contributors to WLPA, supporters of the Lilly Center for Lakes & Streams, as well as The Watershed Foundation.

They also donate time to city government and local area economic boards to help foster a healthy financial basis for protecting Winona Lake. “All of these organizations work hand-in-hand to maintain and improve the quality of Winona Lake” Mary explained.

Treating the lake with the respect it deserves is what will make it sustainable for generations to come.

The Clemens’ shared that the various seasons on Winona Lake are special to them as throughout the year they enjoy seeing it completely frozen with the ice fishermen on it, hosting family (especially the grandchildren), and celebrating the 4th of July annually. They particularly enjoy the 4th of July activities in their neighborhood which include various parties, a 4th of July Parade (which is always on the 4th of July, regardless of the day on which it falls), a wiffle ball tournament held on their land across the street, and the “...magnificent fireworks that are shot off from two strategically placed barges on the lake itself.”

George and Mary “...hope that 10 or 20 years from now the improvements around the lake will be even more evident than what we have seen over the past 40 years... From what we can see, the children of Winona “Lakers” will fill the shoes of those who have gone before them and continue the trend of cleaning up, improving the various homes and properties on the lake and just being good stewards, in general, of the creation with which we have all been blessed. We hope that whomever owns our Winona Lake properties in the future will love and appreciate the lake as much, if not more, than we do and hopefully will also be involved in promoting and protecting it by putting their good intentions into actions!”



It's time to make a difference.

If you would like to support the Lilly Center for Lakes & Streams in our efforts to make your lake clean, healthy, safe and beautiful through groundbreaking research, K-12 and community education, and collaboration, you may enclose your donation in the envelope included. All gifts are tax-deductible and 100% of funds go directly to the Lilly Center to support our work.

Interested in making a difference in your lake for future generations? Call us at 574-372-5100 x6445 to talk to us about planned and estate giving options.

DONATE ONLINE

Would you like for your gift to start making a difference in your lake's health right away? Just visit our website and click "Donate Now".

lakes.grace.edu



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Historic images courtesy of Indiana Historical Society



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