

LAKE WAWASEE

Your Lake, Your Story

LILLY CENTER FOR
**LAKES &
STREAMS™**



GRACE
COLLEGE



Lake Wawasee

LAKE SIZE: 3,006 acres

WATERSHED SIZE: 24,448 acres

MAX DEPTH: 81 feet

AVERAGE DEPTH: 22 feet

INLETS: Dillon Creek, Turkey Creek,
Lake Papakeeche Outlet, Launer
Creek

OUTLETS: Syracuse Lake

ACCESS: Public; Hatchery Rd.
and CR 1000N

RECREATION: Boat, Ski, Fish, Swim

LAKE BOTTOM: Gravel, Muck, Sand

BEST FISHING: Bluegill, Crappie,
Largemouth Bass, Northern Pike,
Pumpkinseed, Redear, Rock Bass,
Yellow Perch

L A K E W A W A S E E :

Past, Present & Future

Since glaciers first formed this lake, the health of Lake Wawasee has been of importance to the surrounding residents, businesses, families, and even the economy. Understanding the past of Lake Wawasee 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 Lake Wawasee, whether they have visited the lake for one summer or for one century, have shaped this lake just as it has shaped them. And now you have the power to leave a legacy for a healthy Lake Wawasee 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: Lake Wawasee. 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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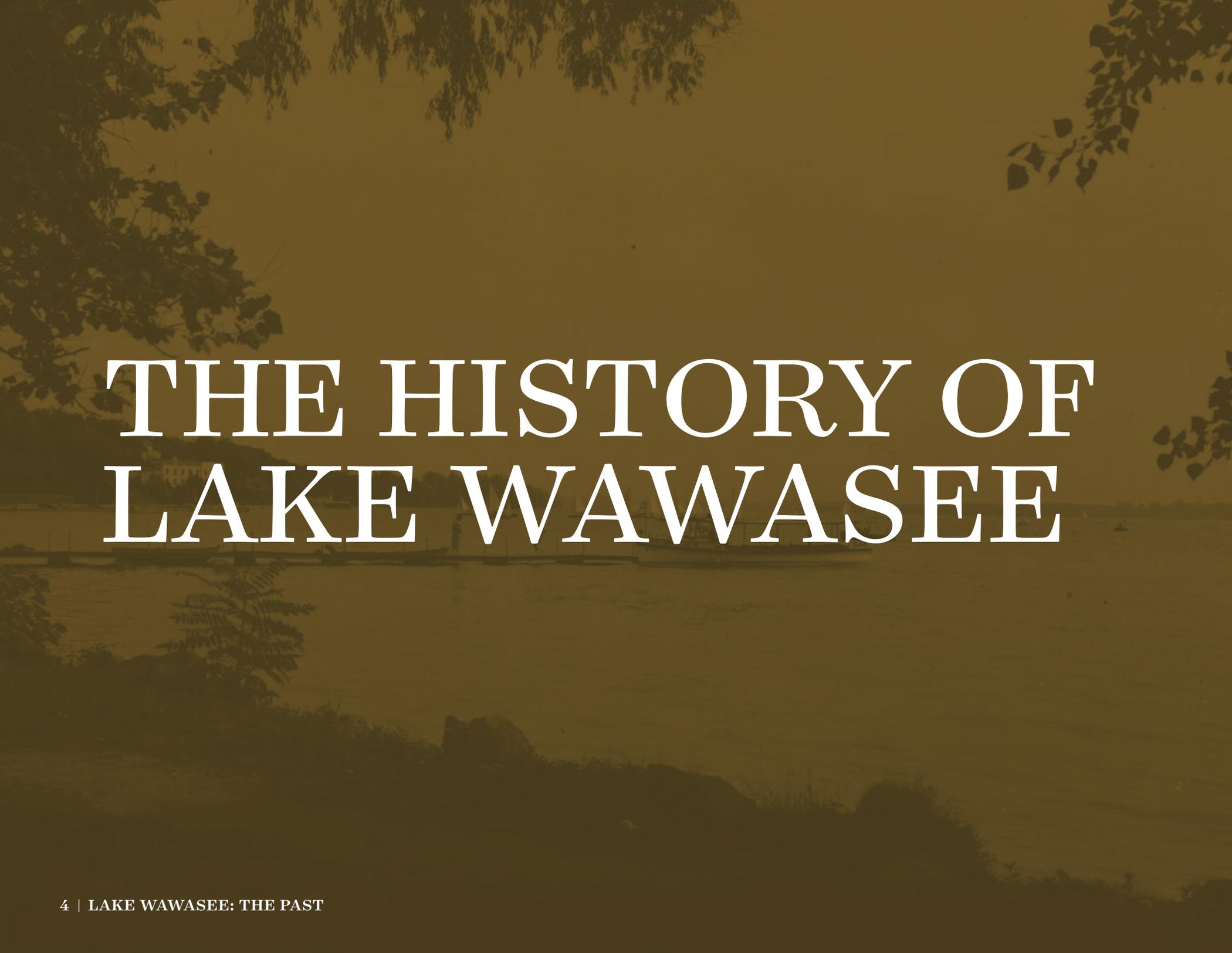
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THE HISTORY OF LAKE WAWASEE

How the Lake Was Formed

Lake Wawasee 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 in the land and as they melted they 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. Throughout the 1900s, businesses were established on Lake Wawasee to make the lake a vacationer's paradise. Wawasee Boat Company was established in 1929, and the Wawasee Yacht Club was established shortly thereafter in 1935. Griffith's Wawasee Marina was founded in 1946 and, nearly 30 years later, Main Channel Marina was established in 1976. In addition to marinas and boat companies, Lake Wawasee continues to be home to popular restaurants and resorts, including Oakwood Resort (est. 1893) and The Frog Tavern (est. 1932).



RESEARCH ON LAKE WAWASEE

Through the Decades

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

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

1951: Butler University studies algae species.

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.

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

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 Lake Wawasee.

1960s

1970s

1980s

1990s

2000s

2010s

1971: Earlham College studies algae species.

1989–PRESENT: Volunteers collect Secchi depth and nutrient data on Lake Wawasee as part of Indiana University volunteer program.

● **1994, 2000, 2003, 2006, 2010, 2015:** Indiana University Clean Lakes Program collects data on Secchi depth, nutrients, and algae counts.

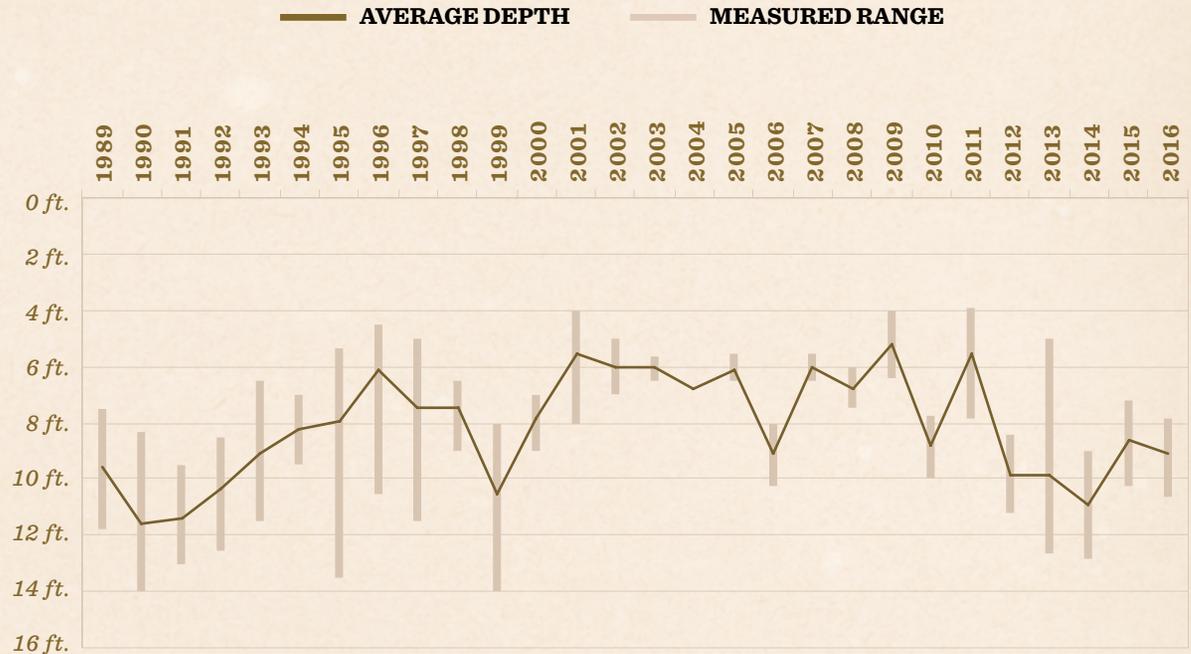
Water Clarity

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

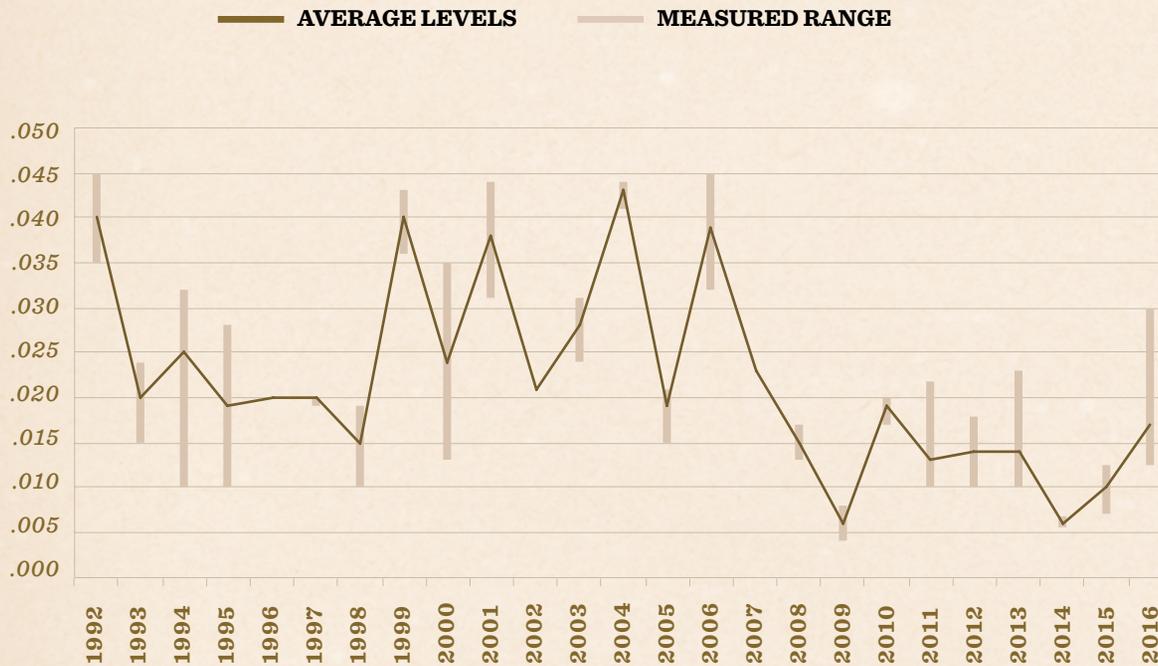
HISTORY OF WATER CLARITY IN LAKE WAWASEE



DATA SUMMARY:

Water clarity for July and August in Lake Wawasee decreased significantly from 1989 to 1996 and then increased significantly from 2007 to 2016. 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 LAKE WAWASEE



DATA SUMMARY:

Lake Wawasee total phosphorus levels (mg/L) in July and August were significantly lower over the last 10 years compared to levels from 1992 to 2006. This likely explains increasing water clarity over the last 10 years as less nutrients lead to less algae, making the water clearer.

Phosphorus Levels

The Experimental Lakes Area (ELA) in Ontario, Canada is a laboratory of 58 small lakes and their watersheds. They are unaffected by the influence of humans because they have 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 over-productive 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

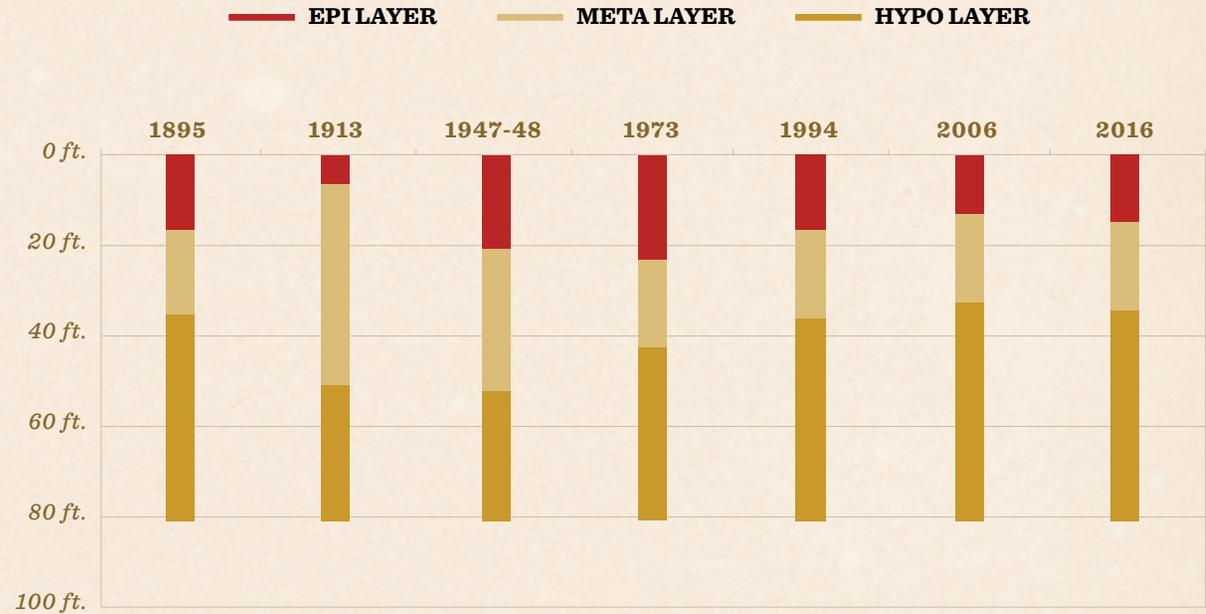
Water Temp.

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 LAKE WAWASEE

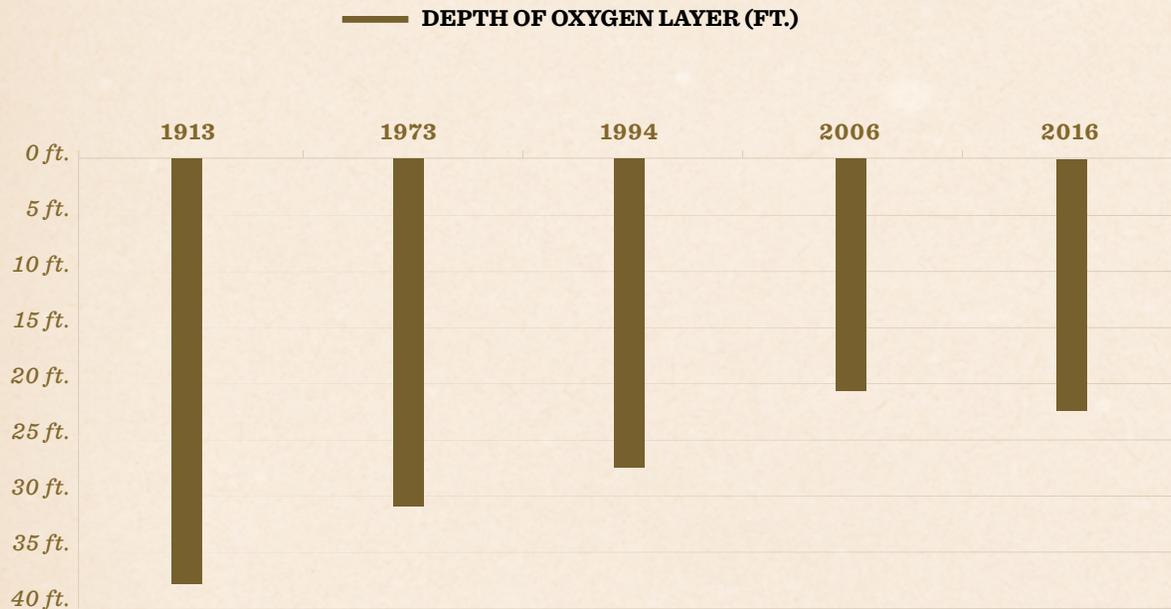


DATA SUMMARY:

Lake Wawasee water temperature layers do not show any obvious trends over the past 120 years. Over this time period, surface water (epilimnion) temperatures range from 72° to 86° F for July and August while water at the bottom of the lake ranges from 52° to 59° F. 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 LAKE WAWASEE



DATA SUMMARY:

The oxygen layer depth in Lake Wawasee has been decreasing over the last 100 years during July and August. This increasingly limits the space in which fish can live and forces fish to a warmer surface water layer. Some fish cannot survive in warmer water which is why they are no longer able to survive in Lake Wawasee as recorded 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

Jeff Herdrich's family legacy on Lake Wawasee stretches back six generations and continues on the lake.

Jeff explained that his ancestors were lakers, beginning in 1910, but they enjoyed visiting the lake so much, they decided to make the permanent move to Lake Wawasee. Since then, the Herdrichs have enjoyed making the lake their home through sailing, boating, and fishing.

His history on Lake Wawasee means that Jeff has seen the lake change over time. "I used to drink the lake water!" Jeff laughed, "...I've seen a difference in water quality." He recalls time of development on the lake, continued growth of algae due to an overabundance of nutrients, and invasions of species including zebra mussels. "I feel Lake Wawasee is pretty clean, but it could be cleaner. People won't come here if it isn't clean," Jeff said.

Jeff is helping make Lake Wawasee cleaner by serving as the property manager for the Wawasee Area Conservancy Foundation and supporting the work of the Lilly Center for Lakes & Streams.

Jeff explained that, over time, more knowledge has developed concerning what is harmful for lakes, and now that damage has been done to local lakes, "we just have to catch up now."

Water quality in general is becoming more and more important. It's a global commodity.

Jeff's children and grandchildren also understand the importance of keeping local waterways clean. Ben, Jeff's son, explained, "Water quality in general is becoming more and more important. It's a global commodity... It affects the economy and properties have an investment on the lake." Ben's career is now in watersports and he said, "It's definitely shaped me... If Wawasee didn't exist, I doubt I'd have these experiences."



LAKE WAWASEE TODAY

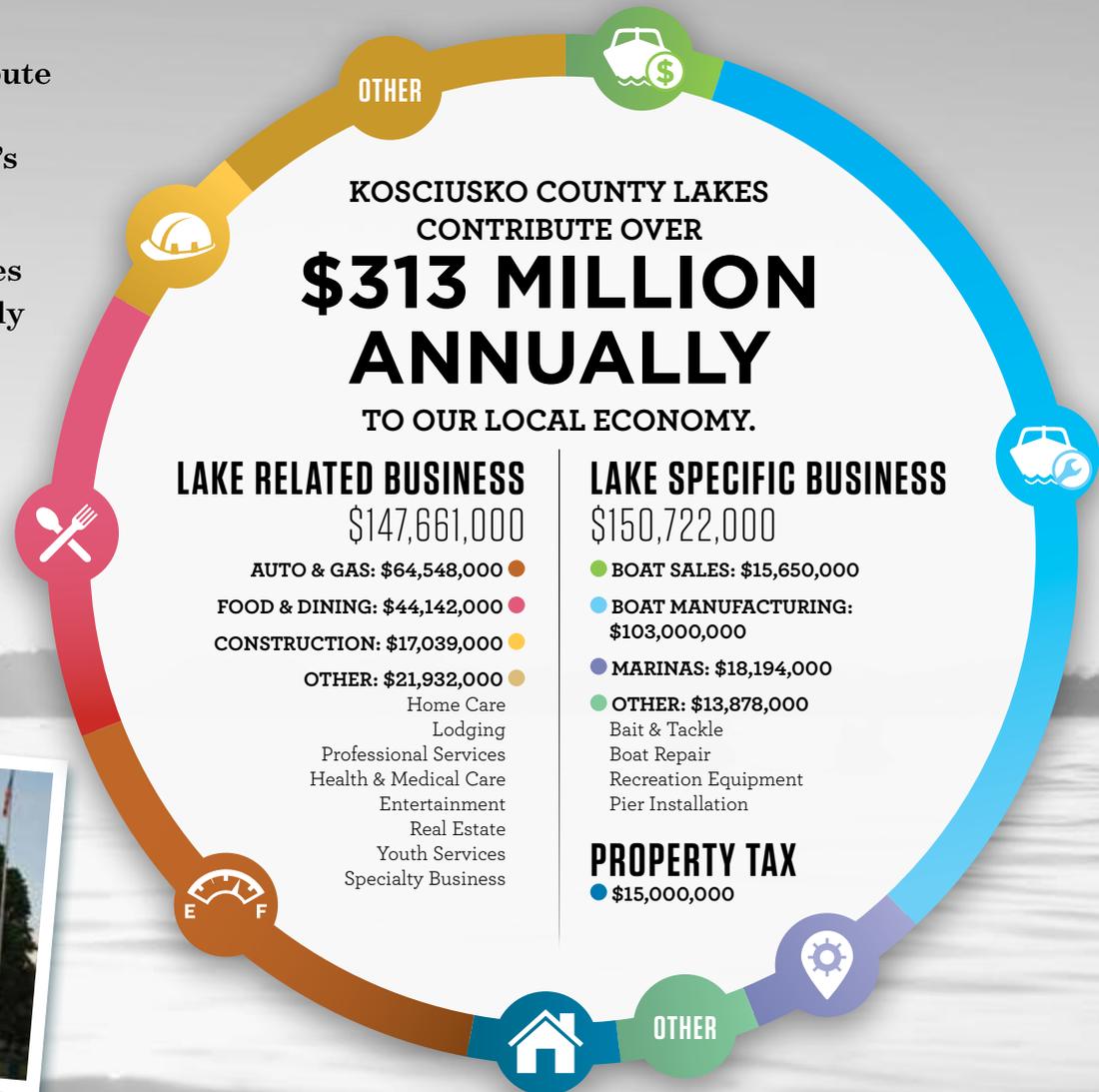
The Lilly Center for Lakes & Streams at Grace College samples streams which flow into Lake Wawasee biweekly year round, even in the most brutal of weather conditions. Additionally, the Lilly Center samples the lake weekly during the summer to gain a better understanding of the lake's condition during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

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 Lake Wawasee's story now and into the future. Essentially, the health of Lake Wawasee can directly affect the health and success of the economy.



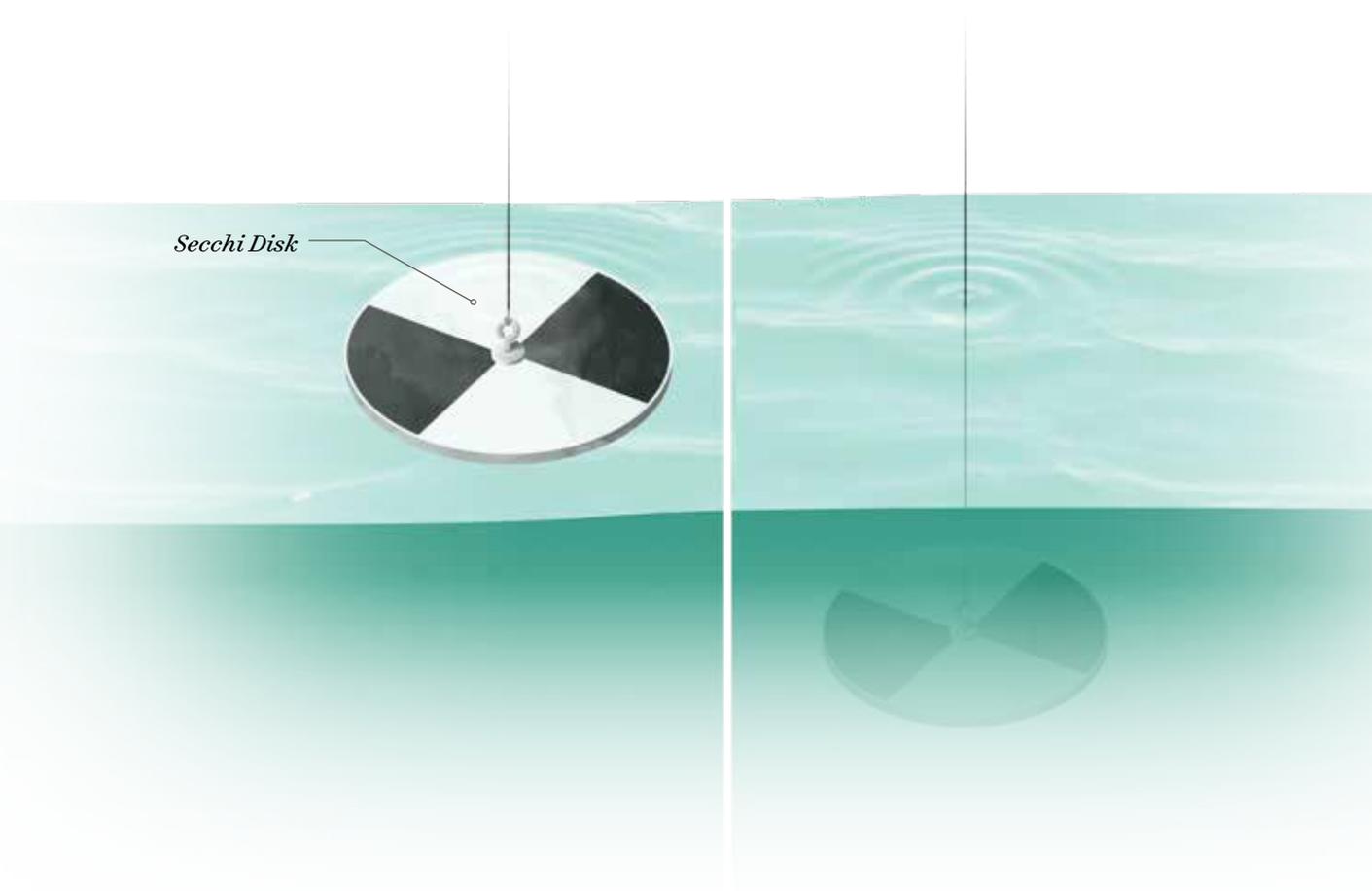
Water Clarity

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?

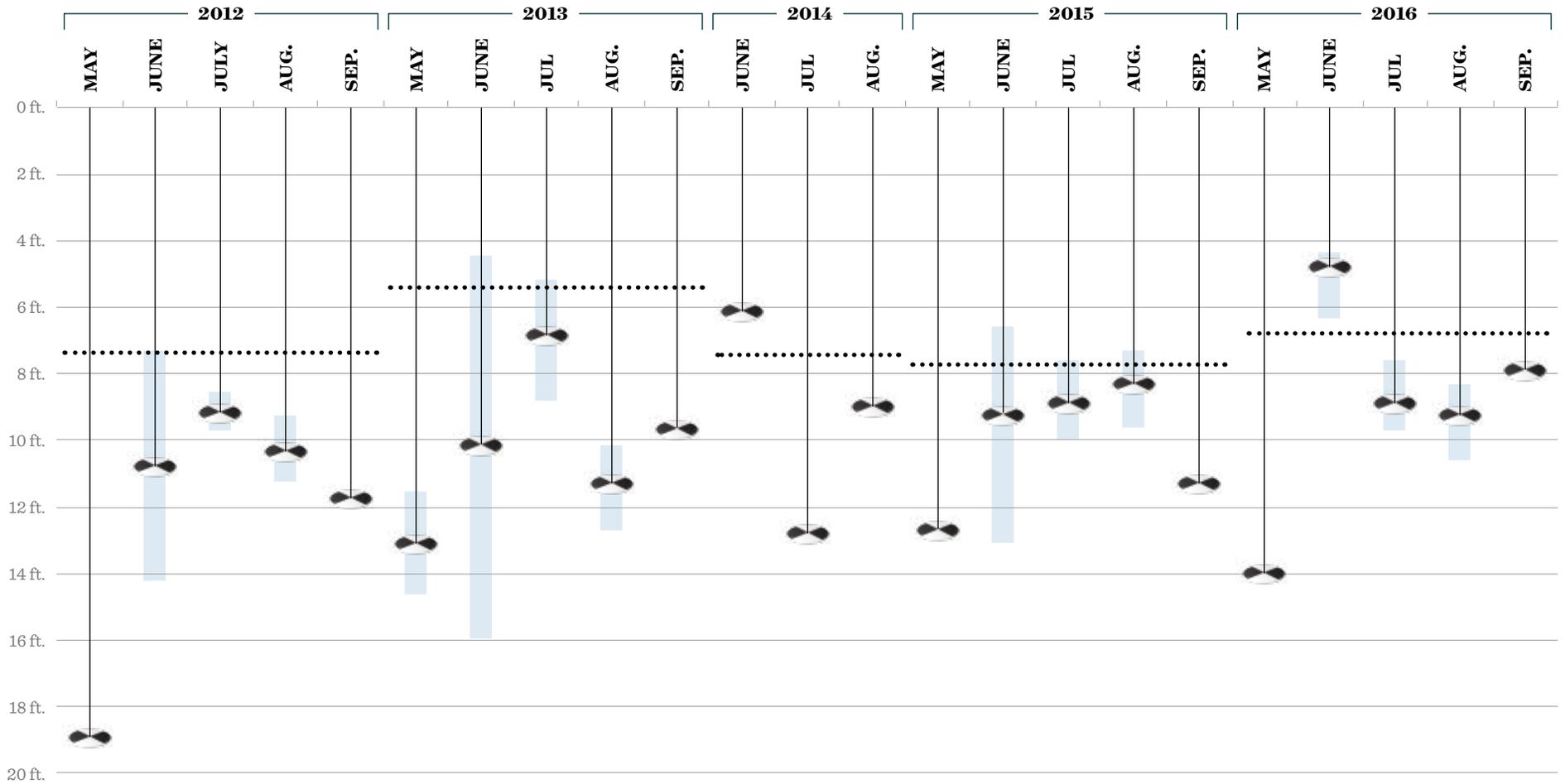
Water clarity is measured with a tool called a Secchi disk. A Secchi disk is a frisbee-sized metal disk that is painted with a black and white pattern. The disk is attached to a string and lowered into the lake water until the black and white pattern is no longer visually distinct. The depth of the disk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



Current Water Clarity IN LAKE WAWASEE

DATA SUMMARY: Lake Wawasee's lowest water clarity measurement was always in June during each of these five summers. This decreased clarity is likely due to generally higher nutrient (nitrogen and phosphorus) levels in June compared to other months. Lake Wawasee's water clarity was higher than other all-sports lakes in the county.

 LAKE WAWASEE AVERAGE
  LAKE WAWASEE 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

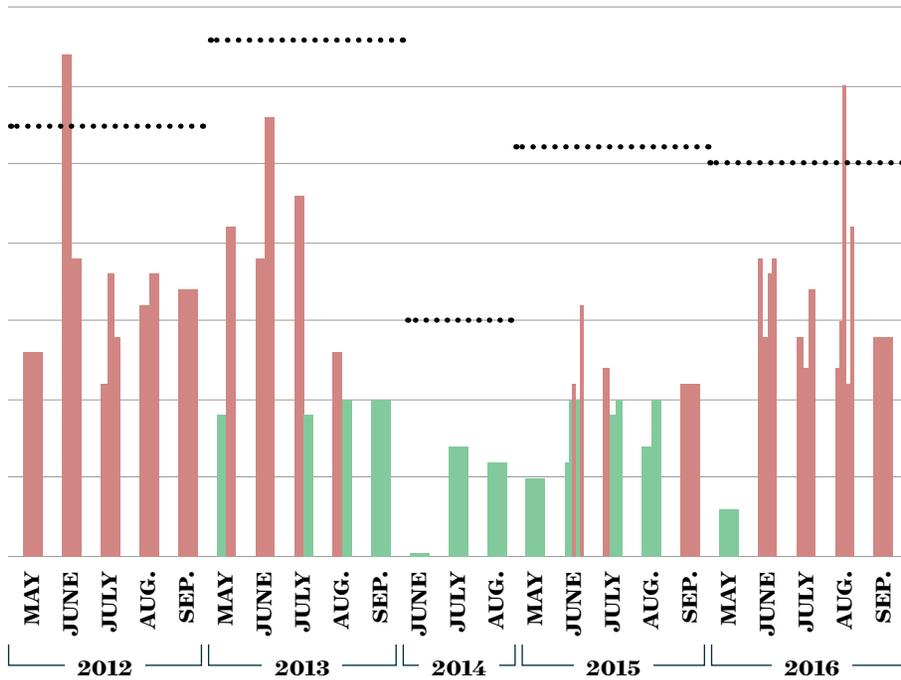


Current Nutrient Levels

IN LAKE WAWASEE

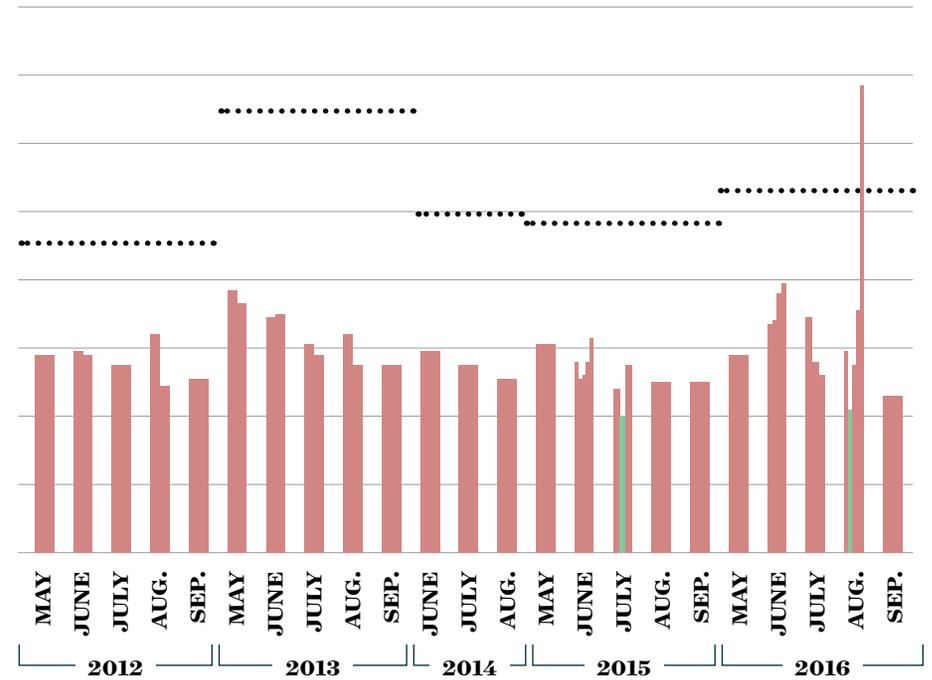
DATA SUMMARY: Both phosphorus and nitrogen levels in Lake Wawasee were consistently well above the Environmental Protection Agency recommended guidelines. 2016 showed higher TP and TN levels compared to 2014 and 2015. Lake Wawasee's phosphorus and nitrogen levels were lower than other all-sports lakes in the county.

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



PHOSPHORUS LEVELS IN LAKE WAWASEE

■ Good Levels ■ Bad Levels



NITROGEN LEVELS IN LAKE WAWASEE

■ Good Levels ■ Bad Levels

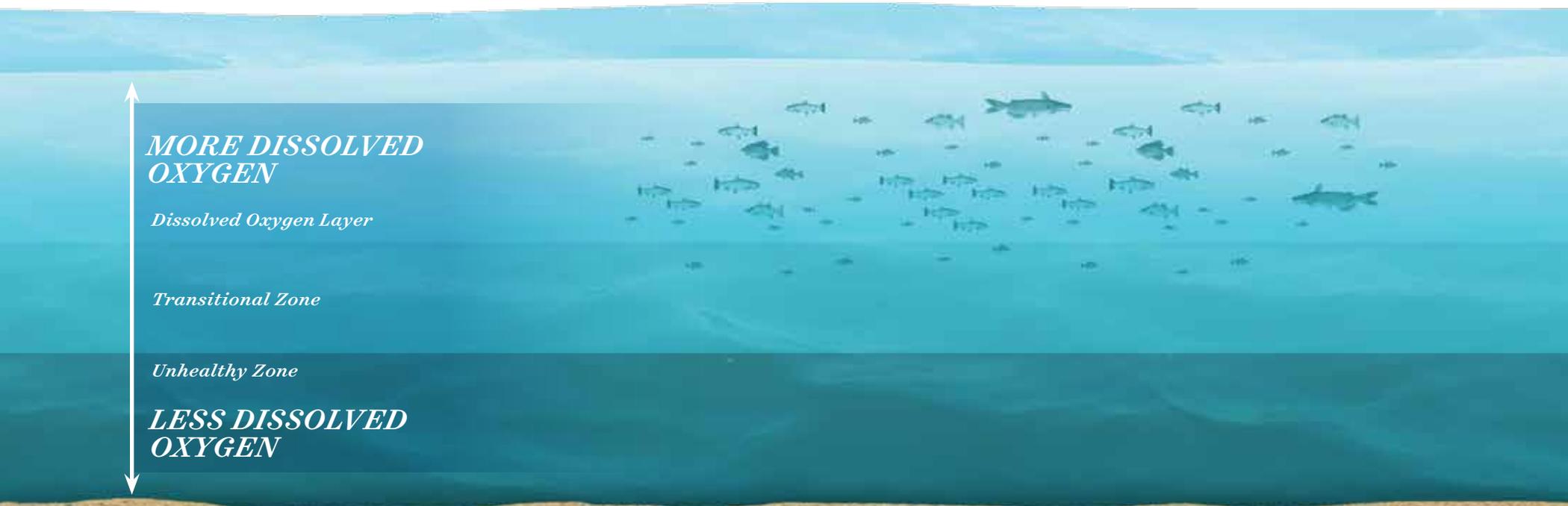
Dissolved Oxygen

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

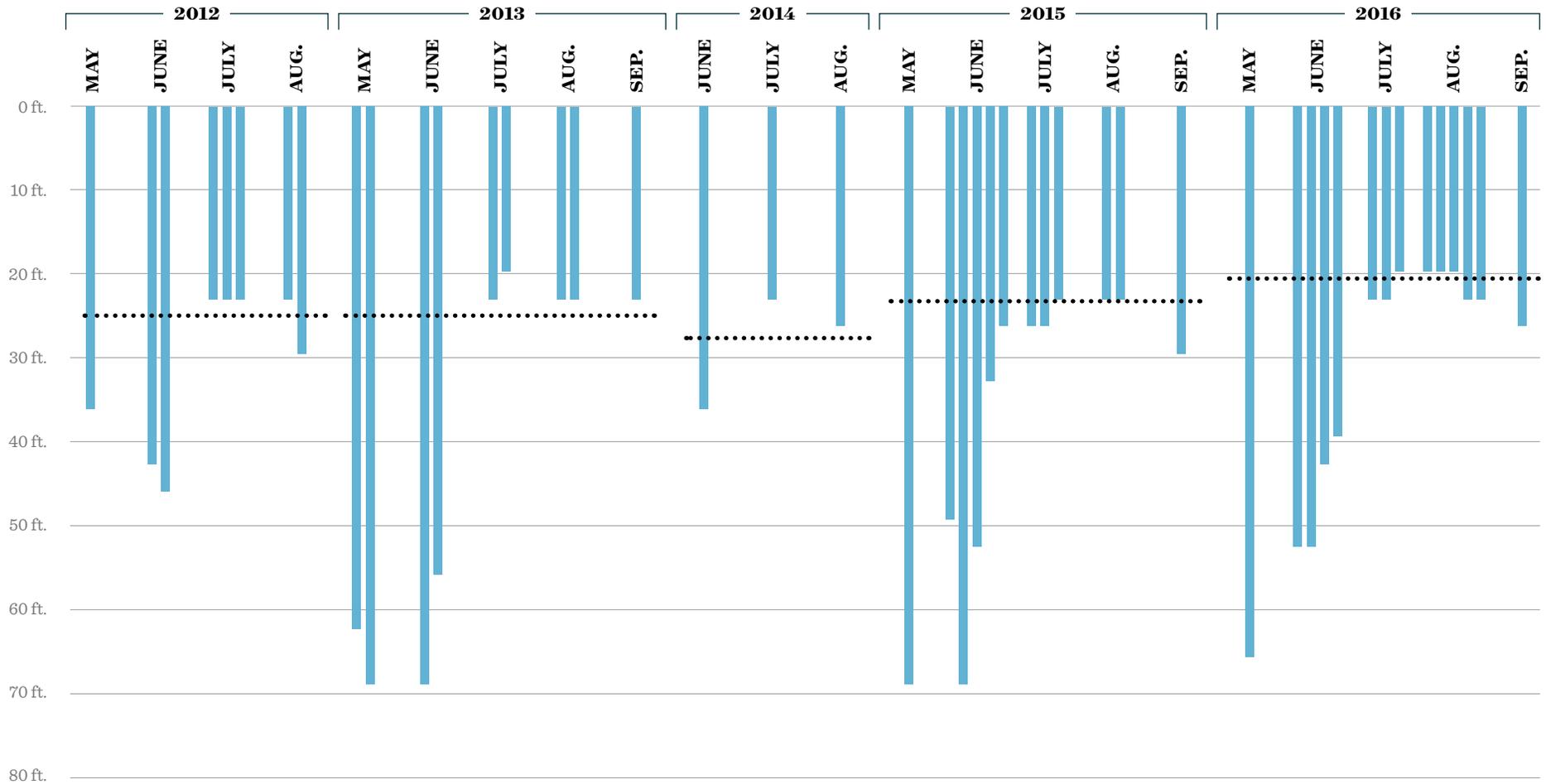


Current Dissolved Oxygen Levels

IN LAKE WAWASEE

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 Lake Wawasee's oxygen layer was often thicker.

|| LAKE WAWASEE 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

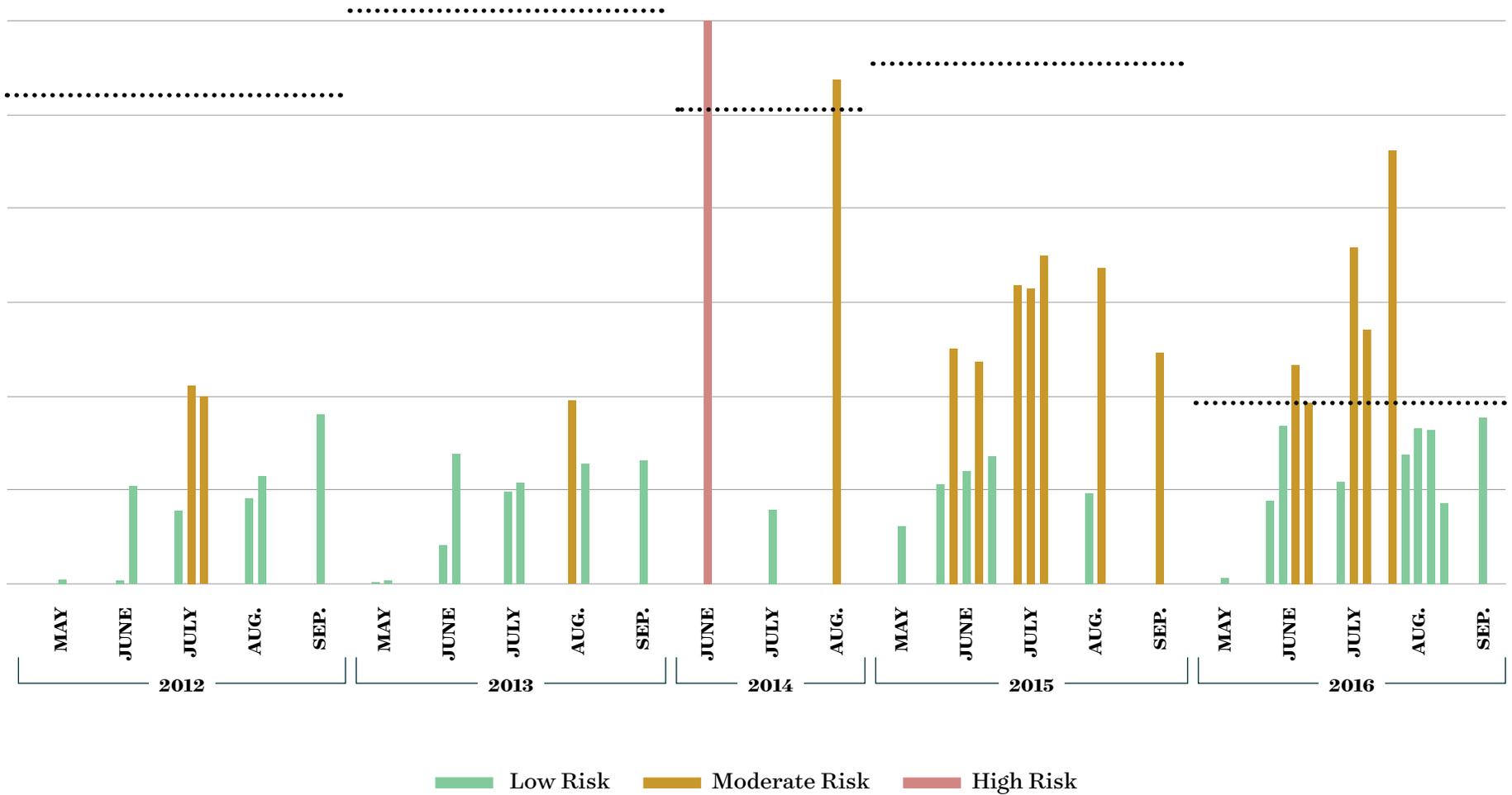
Blue-Green Algae Layer



Current Algae Levels IN LAKE WAWASEE

DATA SUMMARY: Blue-green algae populations in Lake Wawasee 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 only once and in the “moderate risk” zone sixteen times in the last five years. Lake Wawasee’s algae levels were seldom higher than other all-sports lakes studied in the county.

|| LAKE WAWASEE 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 Lake Wawasee 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

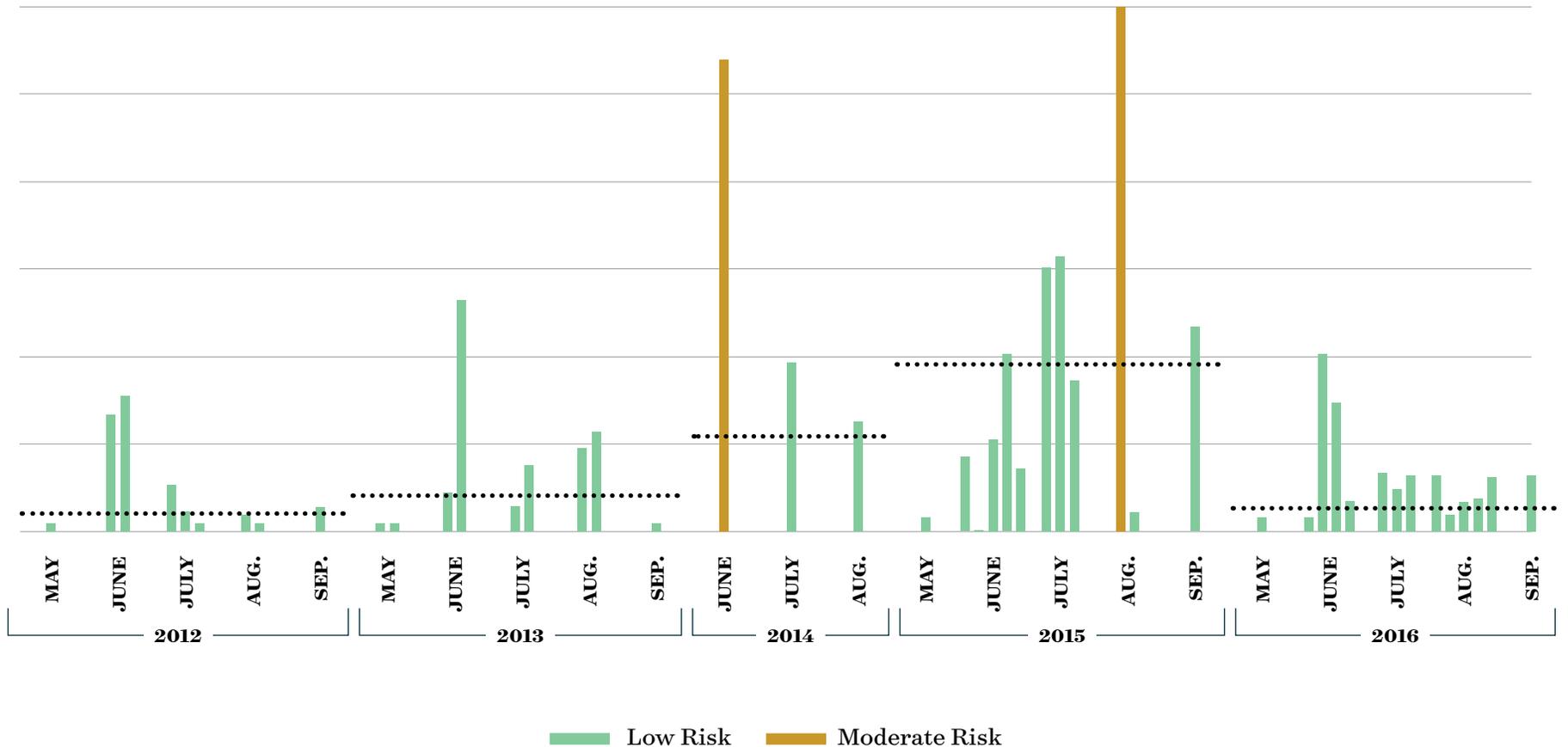


Current Toxin Levels

IN LAKE WAWASEE

DATA SUMMARY: While Lake Wawasee microcystin toxin levels were highly variable over the last five years, levels were typically in the “low risk” zone. Lake Wawasee’s microcystin levels were generally higher than other all-sports lakes in the county. Even though Lake Wawasee’s microcystin toxin levels were usually below guidelines for human health, there is strong potential for future risk. 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 Lake Wawasee.

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



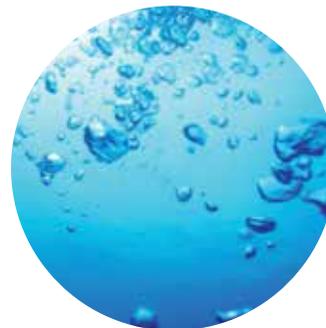
Why the Data Matters

Lake Wawasee 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 Lake Wawasee, 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.



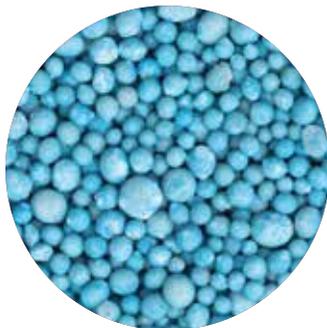
WATER CLARITY

Trends over the last 25-30 years show previous declines in water clarity with improvement 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.



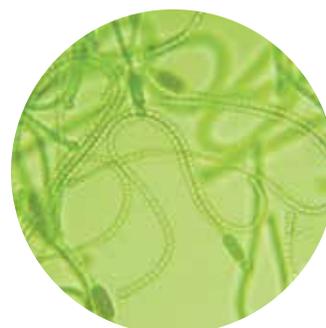
OXYGEN LEVELS

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 sustain algae and weed growth. Currently, fish can survive in only about the top 25% of Lake Wawasee's total depth.



PHOSPHORUS LEVELS

Trends over the last 25-30 years show lower phosphorus levels most recently. This might explain increasing water clarity over the last 10 years as less nutrients lead to less algae, making the water clearer. Despite this apparent improvement, phosphorus and nitrogen levels continue to remain well above recommended guidelines.



BLUE-GREEN ALGAE

Blue-green algae populations in Lake Wawasee are often above human health guidelines even though algae toxin levels sometimes remain low at those times. Lake Wawasee's algae toxin levels were generally higher than other popular lakes in the county, meaning there is strong potential for future risk.

Some of these measures show signs of hope, while others encourage us to work even harder toward a cleaner Lake Wawasee. 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.

Creating a Lake Family

Jane Finch and her family have a rich history on Lake Wawasee. Jane's love for the lake came from her mother, who grew up renting cottages on the lake and then brought her nine children to Lake Wawasee each summer. Jane has been visiting the lake since she was a child and her husband, Harry, grew up on Webster Lake.

After years of visiting parents and in-laws, the Finch family bought their own property on Lake Wawasee. They have lived in their "dream cottage" for nearly 25 years and they hope to keep the now 100 year-old cottage in their family for the next 100 years. Jane explained, "...as a result of our childhoods, we have developed lake water in our veins!" And, after many years of helping friends to locate on the lake, Jane became a licensed broker and has worked with Prickett's Properties for many years "selling her love of the lake."

Jane realizes that her family's longevity on the lake means that "...it is critical that we and our families do everything to protect and preserve this lake for future generations." Jane is doing her part through serving on various boards for Wawasee Property Owners Association, Wawasee Area Conservancy Foundation, and the Orderly Development Committee of WPOA. Harry and Jane also support the Lilly Center for Lakes & Streams. She explained that, through the collaboration of these organizations, the community can best work toward a cleaner Lake Wawasee. "It is imperative that we keep our lakes clean and healthy for

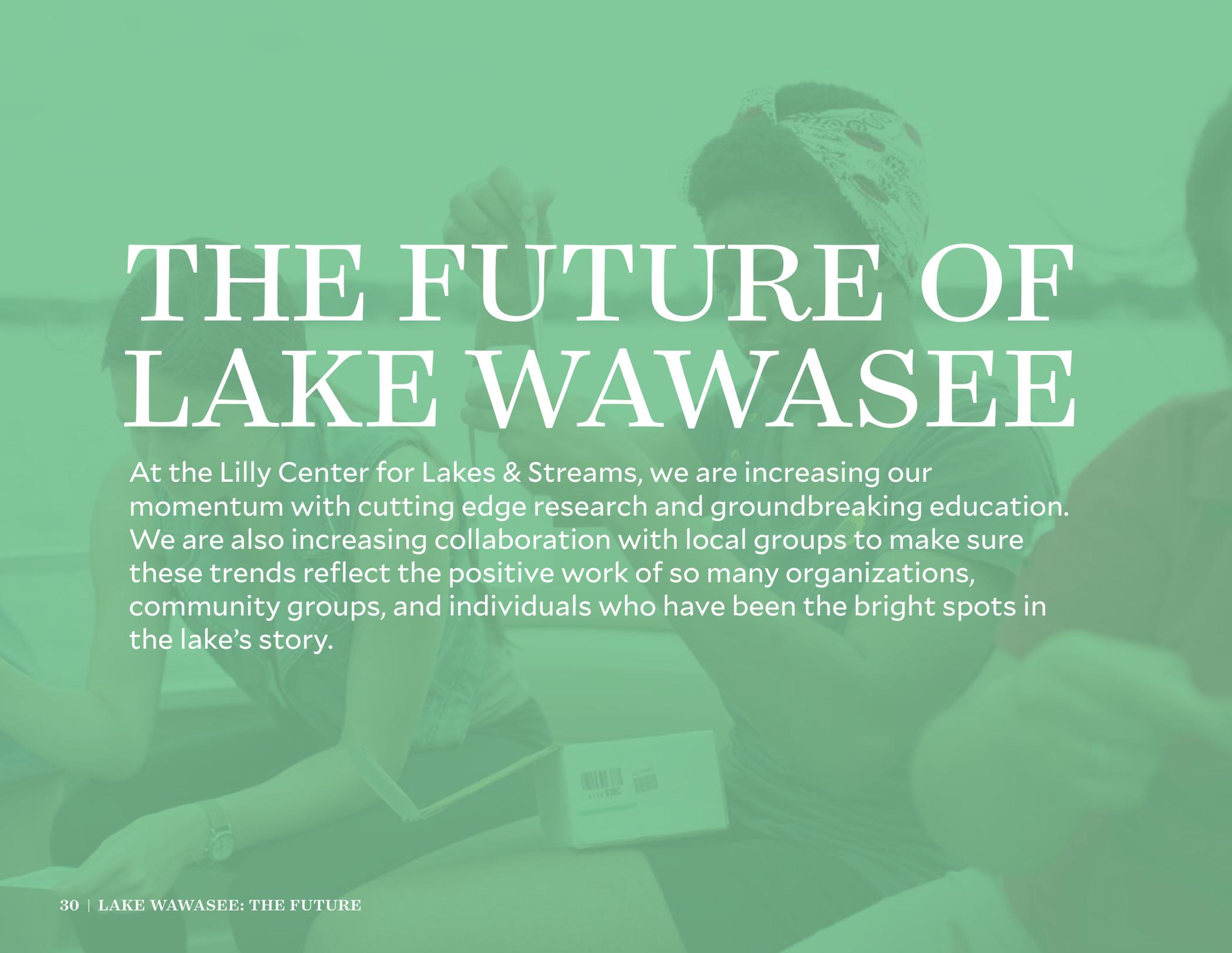
the continued enjoyment of families. Who wants to go visit a dirty lake? Who wants to eat fish from a polluted lake? All lakes begin to die the day they are born. It is up to each generation to help lakes to live on as long as possible," Jane explained.

It is imperative that we keep our lakes clean and healthy for the continued enjoyment of families.

One of Jane's favorite memories on Lake Wawasee is watching sunsets over the lake from her deck on Morrison Island with her mother. Jane's mother spent her 101 years on the lake and most enjoyed those sunsets!

Jane's family has developed a lake family, consisting of neighbors and friends around Lake Wawasee. She hopes this family of relatives and friends, and their kids and grandkids, continues as they support one another and the lake-- just as the generations before them. "If that happens," Jane said, "we will have orderly development, clean and safe waters, and enjoyable sunsets!"





THE FUTURE OF LAKE WAWASEE

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 LAKE WAWASEE 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 history on Lake Wawasee and their 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

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



WAWASEE PROPERTY OWNERS ASSOCIATION Formed in 1955, WPOA values safety on Lake Wawasee and works with government officials to provide education about lake and boating safety. This association also monitors water clarity and quality, supports WACF's wetlands acquisition program, and provides recreational activities on Lake Wawasee throughout the summer. For more information, visit wawaseepoa.org.



WAWASEE AREA CONSERVANCY FOUNDATION Established in 1991, WACF works "...to anticipate, seek out and resolve threats to the water quality in the Wawasee area watershed. The Foundation is dedicated to promoting education, encouraging best management practices to reduce erosion and acquiring wetlands and endangered shoreline areas." For more information, visit wacf.com.



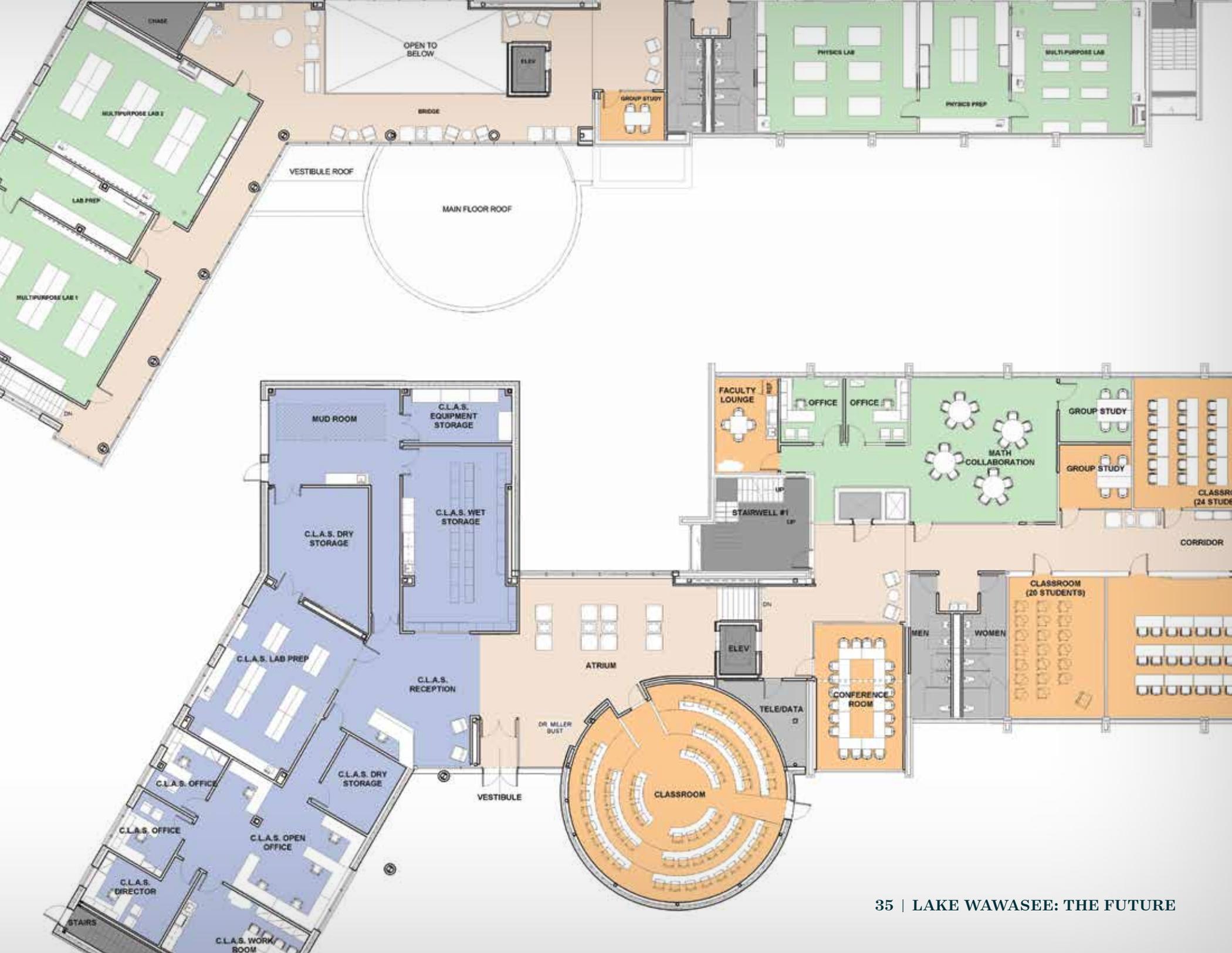
LILLY CENTER FOR LAKES & STREAMS AT GRACE COLLEGE Established in 2007, the Lilly Center for Lakes & Streams is dedicated to conducting research, providing lake and stream education, and collaborating with other groups to make Lake Wawasee and other county lakes clean, healthy, safe and beautiful. For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





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

Lake Wawasee 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 Lake Wawasee. 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 Lake Wawasee 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 Lake Wawasee. 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 Lake Wawasee. You might consider helping as a volunteer for the Northern Indiana Lakes Festival or financially supporting one of our K-12 programs.

Making Lake Wawasee the Best it Can Be



Jim and Kay Young are working with local organizations to make Lake Wawasee even better. Kay Young's father grew up on the lake during the summer months and she began coming to Lake Wawasee when she was around 10 or 11 years old. She finally settled on Lake Wawasee in 1969 and raised her two sons on the lake.

It gets in your blood, it's part of you, I can't imagine not being here and getting to give back to something so important in life.

Kay said her lifestyle on Lake Wawasee as a kid was one of unscheduled freedom which has influenced the way she lives as an adult. When she's at the lake, Kay feels as though she's on vacation—even when she is at home.

Kay said of Lake Wawasee, "It gets in your blood, it's part of you, and I can't imagine not being here and getting to give back to something so important in life." She also mentioned that Lake Wawasee and the community that comes with living on the lake helps build friendships.

While Lake Wawasee is a place of recreational opportunity, Kay mentioned that the lake is of particular importance to the health of the local economy. She mentioned that the lake would be, "Nothing if not clean..." and that she looks forward to continuing to work with local groups including the Lilly Center for Lakes & Streams, Wawasee Property Owners Association, and Wawasee Area Conservancy Foundation toward a better future for Lake Wawasee.

Decades into the future, Kay hopes that "...we still have clean waters, abundant wildlife, and the family times we enjoy now."



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 Syracuse-Wawasee Historical Museum



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