

# Geneva Waters

## Fall 2017 - Vol. 33, No. 4



“Paths of Light”

Photo By Fred Noer

### ***Geneva Lake Environmental Agency Quarterly Publication***

#### **Featured in this issue:**

*State of the Lake; Value of Water; Relationship Between Biomass,  
Piers, and Shading; Weevils Bio Control; Some Good News, But;  
Change In Arsenic Drinking Water Standards; Geneva Lake  
Conservancy Receives Rohner Family Donation; Consequences;  
Lake Notes*

# Geneva Lake Environmental Agency

## Our Mission:

**The Geneva Lake Environmental Agency is determined to maintain Geneva Lake's resources by protecting, preserving and enhancing a desirable lake and watershed quality.**

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Once again, as summer slips into fall, we are enjoying the fall colors and weather. It has been a warm fall, with 90-degree temperatures in mid-September. A freeze finally hit the garden during the closing days of October. Due to the dry late summer and early fall, colors are not as sharp as in some years. There are still enough yellow, oranges, and reds in the woods to remind us why we live in the Midwest.

September was an unusually warm month. Four days exceeded 90 degrees, and six days exceeded 80. These were the first 90-degree days since June 11 when a high of 90.5 was recorded. The warmest temperature recorded during September was 92.9 on September 23. We welcomed the first day of autumn on September 22 with a high of 92.6. The coldest temperature recorded for September was 46.4 during the night of September 6.

With the warm September weather came some very dry weather. Only four days had precipitation. September's total precipitation was 0.27 inch. The 25-year average for September is 3.51 inches. As of the end of September, due to the very wet spring and early summer, we were still 5.43 inches above the average running total for the year.

Early October recorded warm temperatures. The highest temperature recorded



in the first half of October was 80.2 on October 2. Seven days recorded highs of over 70 degrees within the first two weeks of the month. During the second half of October, temperatures moderated to more normal autumn temperatures with highs in the 50s and 60s. Temperature-recording equipment went down at the air-monitoring site on October 18. Based on the garden, there was not a strong frost until the last week of October.

October brought the fall rains that are needed for the trees to get through winter. Fourteen days had precipitation with a total of 4.56 inches, almost twice the 25-year average of 2.38 inches. As of the end of October we have had a total of 37.61 inches of precipitation compared to the 25-year average total annual precipitation of 34.56 inches.

November looks to be a bit on the warm side, but as of this writing it is early. November is often known for the first snow of the winter. A week of nighttime lows below freezing came in early November with flurries the fourth weekend of November.

## **STATE OF THE LAKE**

2017 was hard on Geneva Lake. The year started with no ice cover on the west end of the lake. Deep lakes in the northern hemisphere need the winter ice and snow cover to allow for a “resting” period when suspended material can settle. The limited light condition also reduces the amount of plant biomass in the



system. Without the snow and ice cover the lake is constantly mixing, reducing in-lake settling. Without a winter cover more evaporation occurs.

A warm and wet winter, spring, and early summer (11.3 inches above normal) made excellent conditions for runoff and plant production in the lake. Water clarity was reduced throughout the summer, and vascular plant (weeds) grew well. The rather cool yet dry second half of the summer helped keep the plant growth and water clarity relatively good. Sampling of the zooplankton community again showed a reduction in some important species.

Lake level was slightly above the norm as well as above the spillway, which allowed for discharge to the White River. From mid-September to mid-October lake level was below the spillway and a very limited amount of water was released from the lake.

Mid-September brought one of the biggest cyanobacteria blooms seen in recent times. A species of *Anabaena* produced a lakewide bloom that lasted 2-3 days. Warm air temperatures (90 degrees) and water temperatures (79 degrees), sunny and calm days, and the runoff of early summer rains produced perfect conditions for the bloom.

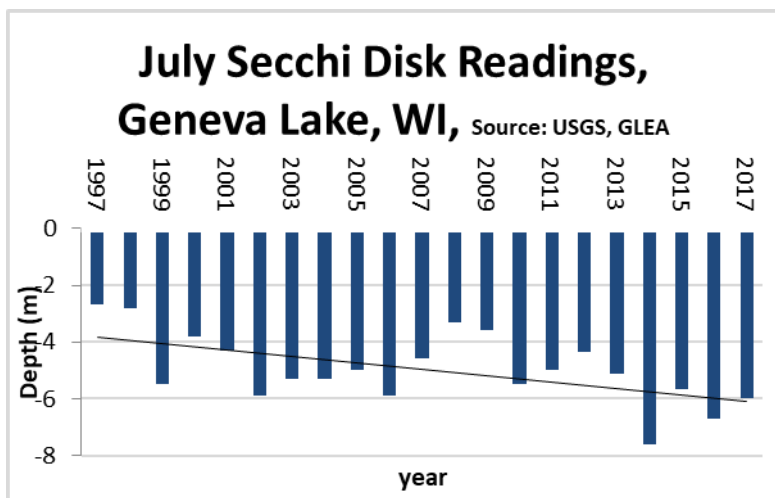


Figure 1

Trends in water clarity have shown an increase over the years, (Figure 1) in part due to the zebra mussels' prolific filtering of lake water. Lake chloride levels continue to increase, with spring-time values of 47.1 mg/l, 48.3 mg/l, and 49.4 mg/l over the last three years. E-coli bacteria counts at the beaches remained good for the summer. Of 197 samples collected over the summer, only 10 exceeded the advisory criterion (five percent) and two exceeded the closing criterion (one percent). The closing exceedance was under unique environmental conditions and occurred while the beach was not officially opened.

Spring and fall total phosphorus values continue to show an increase over the last five years. (Figure 2) Perhaps the most concerning state of the lake criterion is the amount of anoxic waters (without oxygen) measured in the lake, especially during late summer and early fall. Deep lakes in the northern hemisphere

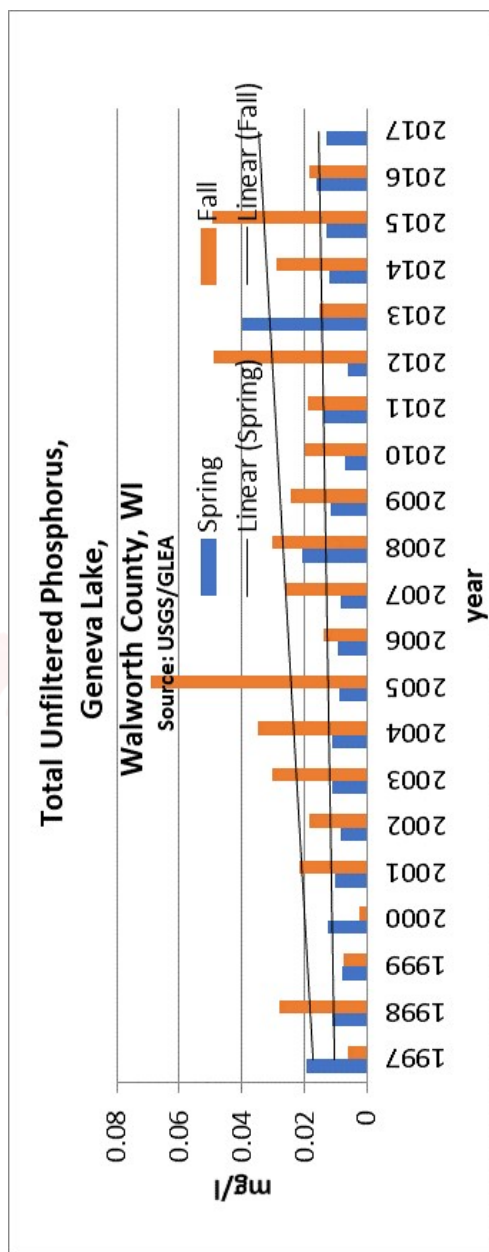


Figure 2

stratify during the summer, with warm water on the top and cold water on the bottom. This stratification is so strong that mixing between the top and the bottom water doesn't take place. As summer progresses, the amount of oxygen in the deep water is used up and not replaced. The deep, dark water goes anoxic, limiting oxygen-requiring organisms from inhabiting this area. For cold-water species of fish such as trout and cisco, this can result in very stressful and potentially deadly conditions.

This anoxic condition also is responsible for the release of phosphorus from lake-bottom sediments back into the water column. If this process begins early enough in the stratification process, the lake sediments can become a major source of phosphorus to the lake. This will continue until stratification breaks down and the lake mixes bring oxygen to the deep waters. However, at this destratification, the released phosphorus then becomes available throughout the water column and can trigger significant algae blooms.

In general, Geneva Lake is showing signs of stress. Things happened this year that have seldom been documented in past years. Several of these may have been the results of very unique situations, but some of them are the results of changes in and to the lake. It is still a high-quality lake, one of the best in southeastern Wisconsin, but it is being stressed.

## VALUE OF WATER

Water is the backbone of our economic, environmental, aesthetic, and social health. It is what makes this third rock from the sun habitable for human life. We search the universe looking for it with the hope that with its presence we will find interplanetary life. Yet do we fully value it, or do we take it for granted?

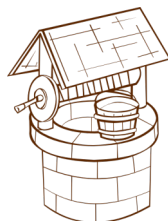


There are market and non-market values to water. Market value is what is paid for water based upon our demand and its supply. Non-market values are experiences and uses that become difficult to put a dollar value on such as the aesthetics of a colorful sunset over the blue waters of a lake or the joy of kayaking on a white-water stream.

The value of water to an individual is the price one is willing to pay for the use of water. The dollar value of water is driven by the supply and demand for water. Econ 101 teaches us that if supply is low and demand is high the dollar value is high. If supply is high and demand is low, the dollar value is low. In most developed countries, water is perceived as high in supply with demand easily met, thus water does not have much of a dollar value. As is the case with many natural resources, much of water's value is not directly observed in the marketplace.

Water is cheap. In the Midwest the average household of five uses around 12,000 gal/month and pays less than \$30/month for its water. Generally, we don't pay for the water, we pay for it to be pumped, delivered, and treated. What we pay to swim and boat in water are generally what it cost to deliver the water use and not for the water. As noted politician and conservationist Richard D. Lamm pointed out in 1986, "It is ironic that we treat our most valuable resource as if it were worthless. We are quick to understand the value of gold or oil or beef. Yet we take for granted the water to mine and mill the gold or to feed and process the beef."

Drought and increased demand are throwing out the old assumptions of water. All humans need water. Human growth is exponential, yet water is finite. R.G. Wetzel in his third edition of *Limnology, Lake and River Ecosystems* warns us of water's future with demotechnic growth. Demotechnic growth considers the increase in demand for water not only from the increased in population, but as civilization becomes more technological the amount of water use per person will increase. Let us be proactive and not fall into the pit that Ben Franklin spoke of when he said, "We only know the worth of the water when the well is dry."



## THE RELATIONSHIP BETWEEN BIOMASS, PIERS AND SHADING IN THE LITTORAL ZONE

From “Effects of Pier Shading on Littoral Zone Habitat and Communities in Lakes Ripley and Rock, Jefferson County, WI.” Paul J. Garrison, David W. Marshal, Laura Stremick-Thompson, Patricia L. Cicero, and Paul D. Dearlove.

A recent study of the impacts of pier shading on two calcareous lakes in southeast Wisconsin found a significant impact on biodiversity and degradation of littoral zone (near shore) habitat. The study conducted on Lake Ripley and Rock Lake in Jefferson County found that significant shading under piers resulted in a reduction of aquatic plant abundance, causing a shift in community composition to one dominated by shade-tolerant species. Median biomass under piers was 95 percent less than in the control site. (Figure 3) Small insects (macroinvertebrates) showed a 62 percent decrease from the control site. Fish catch rates also showed a significant decrease of 71 percent.

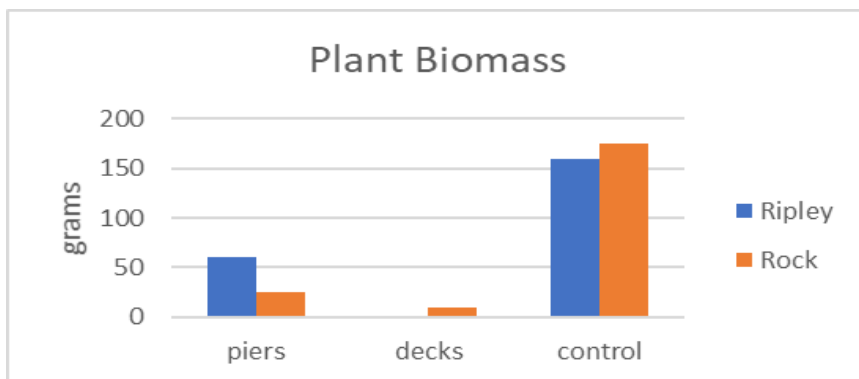
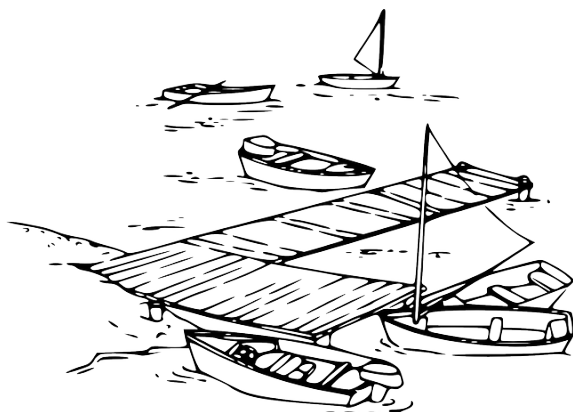


Figure 3

Piers with cribs may offer habitat for adult fish. However, driven by a tenfold reduction in light availability under piers, the study found the change in the cover and food resulted in a decrease in the number of juvenile Centrarchid (crappies, bluegills, pumpkin-seeds).

Size of and height of piers, amount of deck area, and the orientation of the piers all impacted the degree of littoral zone change. In this study the littoral zones of both lakes were significantly smaller than Geneva Lake's littoral zones, so the shading had a larger overall impact on the lake. However, the number and size of piers on Geneva Lake are much greater.

With food chain changes in Geneva Lake such as the significant reduction in some zooplankton species and the number of large piers on Geneva Lake, could these changes in littoral biomass be taking place in Geneva Lake? The GLEA hopes to conduct research on this matter during the summer of 2018.

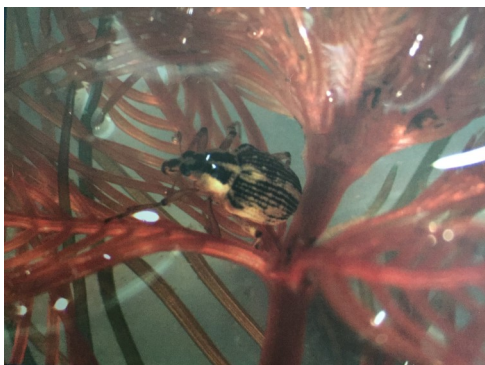




## THREE CHEERS FOR THE WEEVIL'S BIOCONTROL

Source: "Abundance of milfoil weevil in Wisconsin Lakes: Potential effects from herbicide control of Eurasian watermilfoil." Havel, John E., Knight, Susan E., and Jiazga, James R., *Lake and Reservoir Management*, 2017, Vol. 3, 270-279.

When a system becomes infested by a non-native species, often the first question ecologists ask is "What kept this invasive in control in its native habitat?" Eurasian water milfoil (EWM) is one such plant species that has invaded many Wisconsin lakes. There are several native



An adult milfoil weevil feeding on a stem of Eurasian watermilfoil. Copied from cover of *Lake and Reservoir Management*, Vol. 33, Issue 3, September 2017. Photo by Christopher Winter.

milfoil species that are naturally occurring in Wisconsin lakes, but, as is the case with most invasives, EWM in lakes has become a serious problem, crowding out native species and spreading almost unchecked. EWM has been reported in 635 Wisconsin lakes, with nuisance levels reported in 15 percent of the 413 lakes studied.

The native milfoil weevil has received attention as a potential bio-control agent for EWM. A recent study that assessed the density

of milfoil weevils in 36 lakes in northern Wisconsin found an inverse relationship between the milfoil weevils and the amount of chemical treatment in lakes. The study found that “the patterns of low weevil density in treated lakes may be explained either by slow recolonization of weevils after destruction of host EWM or by historically low weevil densities.” For biological agents to have long-term control, they need to have an established presence.

## **SOME GOOD NEWS, BUT . . .**

Sen. Cory Booker (D-N.J.) has introduced a bill to require agencies to consider the cumulative impacts of pollution of air and water when the EPA is reviewing permit for facilities under the Clean Water Act and Clean Air Act. “Collectively, the bill would be a significant step forward on environmental justice,” wrote David Konisky, a political scientist at Indiana University. But Konisky set the bill’s odds of passing at zero.

## **CHANGE IN ARSENIC DRINKING WATER STANDARDS SHOW POSITIVE RESULTS**



In 2006 when the U.S. Environmental Protection Agency reduced the maximum allowed arsenic levels in public water systems from 50 micrograms to 10 micrograms per liter, there was a lot of concern over the potential impact on the ability of water supplies being able to meet that tougher standard.

According to a National Health and Nutrition Examination Survey conducted between 2003 and 2014, and reported in *The Lancet*, ([http://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(17\)30195-0/fulltext](http://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(17)30195-0/fulltext)) a survey of 14,127 individuals resulted in a 17-percent reduction of arsenic levels among those using public water systems, along with hundreds of fewer lung, bladder, and skin cancer cases.

Deep wells in the Geneva Lake area are impacted by arsenic from a natural process that takes place in the deep limestone/dolomitic aquifer. Some of our private well testing found levels exceeding the drinking water standard for arsenic. Private wells are not required to be tested, but we strongly encourage private well owners with wells deeper than 175 feet to test for arsenic.

## **GENEVA LAKE CONSERVANCY RECEIVES A ROHNER FAMILY DONATION.**

The Jack Rohner family recently made a generous donation to the Geneva Lake Conservancy that allowed the conservancy to purchase 5.1 acres near Kishwauketoe Nature Conservancy along Southwick Creek in Williams Bay. The land will be used to develop a children's fishing park in honor of Mr. Rohner's late wife Helen.

The park will be a children's-based park to help youth better understand the life cycle of trout and their need for a clean environment. The park also will include a native plant nature trail. It is hoped a small barn on the property will be restored for children's activities.

"This park will not only provide new activities for children, it will also help draw families and other visitor to Williams Bay to learn about the health of our fisheries and the importance of protecting aquatic habitat," said Karen Yancey, conservancy executive director.

There is an effort to improve the channel and water quality of the creek. The effort is coming together and involves the Village of Williams Bay, Kishwaukee Nature Conservancy, the State of Wisconsin Department of Natural Resources, and hopefully Trout Unlimited.



## CONSEQUENCES

In a recent article in *Science News* (<https://www.sciencenews.org/article/pollution-killed-9-million-people-2015>), the Lancet Commission on Pollution and Health reported that governments and their efforts towards global development have disregarded the impacts of development on the quality of the planet. In an October 19, 2017, report (<http://www.thelancet.com/commissions/pollution-and-health>), the commission found that “pollution is the largest environmental cause of disease and death in the world today.” The commission estimates that in 2015 pollution was responsible for “9 million premature deaths.” Further, the commission went on to state that “exposure to dirty water, air, and soil puts a more than \$4.6 trillion drain on the global economy.”



## *Lake Tides*

– The average household water use per person in the United States in 2015 was 84 gallons, a decrease of seven percent from 2010. That figure represents households that get water from a utility. For households that supply their own water, usually via a well, the average daily use per person was 77 gallons, a five percent decrease. (<https://pubs.er.usgs.gov/publication/ofr20171131>)



– The 2017 GLEA and Linn Sanitary District well-testing program of 13 wells located around Geneva Lake found no wells with E-coli bacteria present and no wells exceeded the drinking water standard for nitrate.

– The lengths of U.S. winters are shortening, according to data gathered from 700 weather stations across the country, with records dating back to 1895. In many areas, the first frost of winter arrives a month later than it did 100 years ago. <https://www.theguardian.com/us-news/2017/oct/28/us-winter-has-shrunk-by-more-than-one-month-in-100-years>.

– An ecology dive was held October 22 in Williams Bay. This is the fifth year that Loves Park SCUBA has held the dive. Unfortunately, the weather didn't cooperate, so water clarity was poor.



– The City of Lake Geneva Plan Commission voted to not recommend changing its comprehensive plan map to allow for commercial use of lakefront property.

– It looks as if the Village of Fontana government will be considering a memorial park bench proposal for Micki O'Connell, past trustee and GLEA board member.



– The Town of Linn is moving forward on its updated comprehensive master plan. The next meeting is scheduled for November 28 at 6 p.m.

– Stanford researchers found a link between drought-related media coverage and increased household water savings. Using California’s drought as a case study, the researchers found that for every 100-article increase over a two-month period, an 11 to 18 percent decrease in water demand followed.

– Researchers at Rice University have discovered a microbe that helps degrade dioxane, a groundwater contaminant and suspected carcinogen found at thousands of polluted locations.

-These words were sung over 30 years ago by a folk music icon. Do things ever change? “Last night I dreamed I saw the planet flicker. Great forests fell like buffalo. Everything got sicker. And to the bitter end, big business bickered. And they called for the three great stimulants of the exhausted ones, artifice, brutality, and innocence . . . .” Joni Mitchell, Crazy Crow Music.





## GLEA's Geneva Waters Newsletter 'Green Option'

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# Save Geneva Lake

Phosphorus is the most problematic pollutant in the lake. Most lawns in our area don't need phosphorus. When lawn fertilizers run off into the Geneva Basin, they feed the **unsightly, smelly and potentially toxic** algal bloom and promote the growth of weeds in the lake.

**USE OF PHOSPHORUS FERTILIZERS IN  
THE GENEVA LAKE SHORELINE AREAS  
IS REGULATED.**



# Geneva Lake Environmental Agency

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