

Geneva Waters

Summer 2018 - Vol. 34, No. 3



“Enjoying the View” Library Park, Lake Geneva By Fred Noer

Geneva Lake Environmental Agency Quarterly Publication

Featured in this issue: *Summer– Hot & Damp, Geneva Lake Levels, New Aquatic Invasive, Near -Shore Fish Survey, Phosphorus Initiative, Cyanobacteria, Fish Stocking; Geneva Lake, Heat & the Great Lakes Warming, District Judge Reinstates Clean Water Rule, NU Professors; students working to create historical climate map of Midwest, and Lake Tides.*

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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SUMMER – HOT AND DAMP



Now that summer is over and we are entering autumn, it can be said with some certainty it sure felt wet and hot during the 2018 summer. From June 1 to August 31 there was a total of six days with a maximum temperature of 90 degrees or higher and a total of 17.99 inches of precipitation. The 33-year average for the three summer months as recorded at the Geneva Lake Atmospheric Monitoring Site is 7.12 inches. As of the end of August precipitation at the Geneva Lake Atmospheric monitoring station is 12.58 inches above the 33-year average for the same time.

June had a total of nine days of over 80 degrees and two days of over 90. The highest hourly temperatures were 91.0 on June 29 and 91.2 on June 30. They were also the hottest days of the summer as recorded at the monitoring site. The lowest nighttime hourly temperature recorded for June was 45.6 on June 6.

June had a total of 9.87 inches of precipitation that fell over thirteen days. That is the wettest June since recording began at the



Geneva Lake site in 1984. On June 18 2.90 inches fell and was followed by four days of precipitation, making for a five-day total of 4.5 inches. Another heavy rain day was June 26 when 2.51 inches of rain fell in one day. Two other heavy rain days contributed to flooding and wet conditions, June 26th when 2.51 inches fell and June 15th when 1.20 inches fell. The 33-year average precipitation for June is 4.40 inches.

July had 17 days of over 80 degrees, with two days above 90 -- 90.3 on July 4 and 90.5 on July 13. The lowest hourly temperature recorded in July was 53.6 during the night of July 7. July was a dry month, with only 1.46 inches of precipitation. The 33-year average precipitation for July is 3.48 inches. In the four days of July 19-22, rain occurred each day, for a total of 0.93 inch.

August had 16 days of hourly temperatures over 80 and two days of hourly temperatures over 90 – August 4 and 26, 90.2 and 90.0, respectively. A nighttime hourly low of 55.5 was recorded on August 26. A monthly total of 6.66 inches of rain fell on 14 days. The 33-year average precipitation for August is 3.67 inches.



Three days had precipitation over an inch, with August 15 receiving 1.04 inches, August 20 receiving 1.62 inches, and August 28 receiving 1.25 inches.

It was no doubt a wet summer. As of the end of August we have already received 2.24 more inches of rain than the 33-year average for total annual precipitation. Perhaps what made it most uncomfortable was the humidity or the high dew point. Although no record of dew points is available, it was not uncommon to see dew points in the 70s during the summer. For comparison, the Minnesota State Climate Office issued a statement declaring the 88-degree dew point temperature measured at Moorhead (on the Red River across from Fargo, North Dakota) between 7 p.m. and 9 p.m. on July 19, 2011, is the record high for dew points observed in the United States. (Source: Weather Underground)

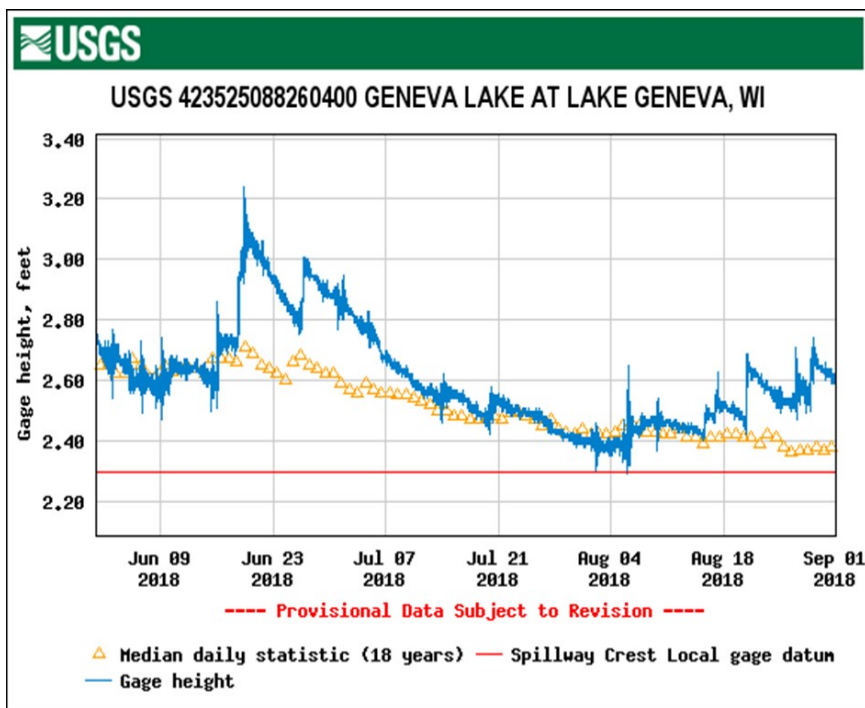
GENEVA LAKE LEVEL

With all the rain this summer, Geneva Lake level has been high. It never dropped below the spillway other than during a few short periods because of it rocking in its basin. The highest recorded



lake level was at 10:44 a.m. on June 19 when the lake was recorded at 865.10 feet above NAVD88. That is greater than 11 inches over the spillway. On June 18-22 we received 4.5 inches of rain. Not only was that a lot of rain to fall directly on the lake, but after the 2.90 inches on June 18 the following rains had little infiltration as the ground was saturated, causing a high runoff rate.

In managing the lake level, the limiting factor for water released from the main outlet is the culvert under Center St. When the water leaving the lake via the spillway and the main gates reaches



the top of the culvert, the only other option is to release water from the millrace. Combined, this can account for a lot of water moving downstream. Burlington, downstream on the White River, has had serious flooding issues in recent years. A delicate balance must be found to release enough water from the lake to prevent flooding and damage to Geneva Lake's shoreline while not flooding downstream communities. The Geneva Lake Level Corporation is charged with finding that balance and has done a good job of it over the years.

NEW AQUATIC INVASIVE – STARRY STONE-WORT

With the popularity of Geneva Lake among boaters, it is no surprise that Geneva Lake is considered on the front line of the ongoing battle against aquatic invasives. Recently a new non-native aquatic plant has been discovered in Geneva Lake. Starry stonewort was been identified at a location on the southeast side of the lake. The extent of the invasive's distribution in Geneva Lake is unknown. To learn the plant's distribution in Geneva Lake, the Geneva Lake Environmental Agency is hoping to have a plant survey done at all boat-access sites before the end of the 2018



boating season. The GLEA is applying for a Wisconsin surface water rapid response grant to assist in having the survey conducted and to conduct some education and outreach on the invasive and its ecology.



ARKIVE www.arkive.org
Photo by Paul Skawinski

Starry stonewort is an algae that looks like a large vascular plant. This makes its eradication very difficult. There are no known effective eradication measures for starry stonewort.

Chemical treatment has been attempted but has not been able to effectively reduce the reproductive bulbils that bed into the sediment. Mechanical treatments such as hand removal and diver-assisted suction harvesting have seen short-term success followed by regrowth of the population.

Starry stonewort remains a prohibited species in a limited number of Wisconsin's lakes, and the opportunity to prevent its spread still exists. As a reminder, boaters can prevent the spread of inva-



sive species through these Stop Aquatic Hitchhiker steps:

- Inspect your boat, trailer, and equipment, including anchors.
- Remove any attached aquatic plants or animals (before launching, after loading, and before transporting on a public highway).
- Drain all water from boats, motors and all equipment.
- Never move live fish away from a body of water.

NEAR-SHORE FISH SURVEY

During early August a near-shore fish survey was conducted at 18 shoreline sites around Geneva Lake using a small-mesh sein and electro shocker. Similar surveys were conducted in 1978 and 2004. The survey was conducted by four fisheries biologists previously employed by the State of Wisconsin Department of Natural Resources. They were involved in the earlier surveys. Two present WDNR fisheries biologists also assisted. A complete report is available at the GLEA.



The following paragraphs are from the August 29, 2018, final report “2018 Shoreline Fish Survey of Geneva Lake” by John Lyons, Dave Marshall, Tim Larson, and Will Wawrzyn.



“Lake shorelines provide essential habitat for many species of fish, and they are critical to the functioning and sustainability of the lake fish community. Many game fishes such as walleye, yellow perch, smallmouth bass, largemouth bass, and bluegill spawn along the shoreline, and their juveniles occupy the shoreline for much of their first year of life.”



“A total of 941 fish representing 15 species and one hybrid, including nine gamefish species and three species sensitive to environmental degradation, were collected. Numbers of individuals and species were lower than in previous shoreline fish surveys in 1978 and 2004. Lower total abundance in 2018 may have been caused by seasonal differences in fish distribution and annual fluctuations in fish reproductive success, but the decline in number of species reflects a reduction in the diversity and health of the shoreline fish fauna. However, the shoreline fish fauna of Geneva Lake is still of reasonably good quality compared to other lakes in southern Wisconsin and remains worthy of protection and rehabilitation efforts.”



“Currently, suitable habitat for two of three sensitive species, rock bass and smallmouth bass, remains widespread in Geneva Lake. For the third sensitive species, least darter, habitat is much more limited.”

“Generally, throughout the lake habitat rehabilitation to promote sensitive species could include:

- Selective removal of shoreline armoring and establishment of buffer areas of natural riparian vegetation to diversify habitat and filter runoff.
- Addition of large woody debris to increase fish spawning habitat and hiding cover and invertebrate production.
- Protection and restoration of near-shore native aquatic vegetation for fish and invertebrate habitat.
- Control of invasive species.

PHOSPHORUS INITIATIVE

Working together, the Geneva Lake Conservancy, the Geneva Lake Association, and the Geneva Lake Environmental Agency have undertaken the Phosphorus Initiative, an effort to reduce



phosphorus loading to Geneva Lake. A recent letter sent to lake residents lists different ways in which property owners can assist in protecting the lake by following simple yet proven practices on their property. As a lake property owner, you can help to lower phosphorus levels in Geneva Lake by:

- Preventing leaves, lawn clippings, and other lawn waste, which are high in phosphorus, from entering the lake and asking your lawn service and neighbors to do so as well.
- Limiting the use of fertilizers and lawn chemicals, which may contain phosphorus, nitrogen, and other chemicals that encourage algae growth. Refrain from watering your lawn after applying fertilizer.
- Having your soil tested before applying fertilizers or contracting to have fertilizers applied to your lawn. This will prevent the application of unnecessary fertilizers that will run off into the lake.
- Stopping soil erosion by planting native plants along the lake-front and streams leading to the lake, which will filter phosphorus and other pollutants before they reach the water.
- Monitoring construction sites to prevent soil and other runoff into the lake by installing silt fences and channeling runoff



into areas with vegetation, not into the lake.

- Taking measures not to disturb the lake bottom, as sediment contains years of phosphorus buildup.
- Avoiding washing cars, boat, or pets near the lake and bathing or shampooing in the lake.
- Disconnect water from impervious areas from surface waters by running it into an infiltration area such as a rain garden or infiltration trench.

Another component of the initiative is an effort to work with farmers to reduce runoff from their fields by establishing and maintaining buffer strips along streams and roadside ditches to filter the runoff water. One of the major watershed sources of phosphorus is to be studied with the hope that recommendations for phosphorus loading reduction can be implemented.

We are all stakeholders within the Geneva Lake watershed. Everyone of us can do our bit to help keep Geneva Lake the unique water resource that we have all come to love.



CYANOBACTERIA - AGAIN?!

In early August small cyanobacteria blooms were recorded at selected sites on Geneva Lake. The blooms appeared to be most prominent in a few small areas that were on the downwind side of the lake. The blooms were short-lived, lasting less than a day. They again raise concern over changes in Geneva Lake's quality. Cyanobacteria blooms have been noticed the last three years, with



Cyanobacteria floating on the surface waters of Geneva Lake.

last year being the largest and most enduring. This year's blooms were the earliest in the year of the three. No beaches had to be closed, as they were not observed in the any swimming areas.

FISH STOCKING, GENEVA LAKE



Not everyone knows this, but the State of Wisconsin Department of Natural Resources has annually stocked fish in Geneva Lake for many years. As of 2017, over the last 10 years 1,334,181 fish, most large fingerlings, have been stocked. Four major types of



fish have been the core of the stocking program, walleye, lake trout, brown trout, and muskellunge. By far, the most abundant has been the Rock-Fox strain of walleye, with 767,154 stocked over five years. The Seneca Lake strain of lake trout is the second most abundantly stocked fish, with 298,037 stocked in nine of the 10 years. The St. Croix strain of brown trout has been stocked every year in 2008-17 for a total of 253,266. The most recent addition of stocked fish is the Upper Wisconsin River muskellunge. The Muskie has been stocked for five years since 2010, with a total of 15,724 stocked. With all these fish being stocked, one must wonder why it's so difficult to catch them?



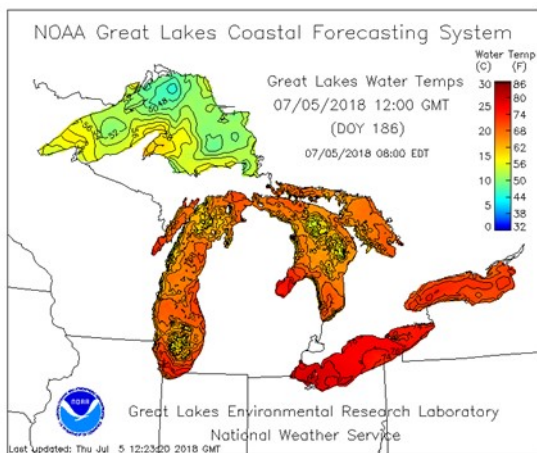
HEAT AND THE GREAT LAKES WARMING

The National Oceanic and Atmospheric Administration (NOAA) has been recording the temperature of the earth for many years. In a press release on September 6 NOAA stated the summer of 2018 was tied with 1934 as the fourth-hottest summer on record for the contiguous United States after three months of blistering temperatures. August, meanwhile, finished as the 17th warmest August. The Southwest and Northeast broiled under record heat.



Not surprisingly, NOAA also stated that as of July the Great Lakes are showing a significant increase in water temperatures. Lake Superior is the only Great Lake not significantly warmer than long-term averages. Lake Erie and Lake Ontario are much warmer than long-term averages.

Lake Michigan's entire lake average surface temperature is 67.8 degrees. The long-term average is 61.9 degrees, making Lake Michigan 5.9 degrees warmer than the long-term average. Recalling that water requires one calorie of energy to raise one gram (10 grams = 1/3 ounce) of water one degree Celsius (10⁰ Celsius = 50⁰ Fahrenheit), that's a lot of energy added to the lake. It has been asked if Geneva Lake is showing any warming trends? A review of the many years of lake data may be a good winter project.



DISTRICT JUDGE REINSTATES CLEAN WATER RULE

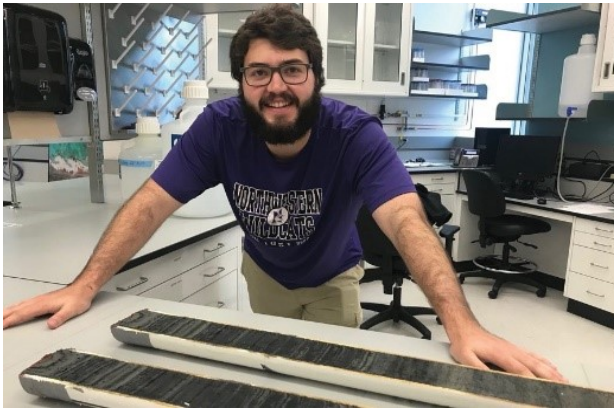
There is hope. In an August article from the Federal Water Tap of the Circle of Blue, a U.S. district court judge in South Carolina ruled that the EPA's suspension of a rule that determines which waterways are protected by the Clean Water Act did so without following proper procedures. He agreed with several conservation groups that the EPA did not take public comments, nor did it consider the consequences of suspending the Clean Water Rule (WOTUS). This means the rule will go into effect in 26 states, where the U.S. Army Corps of Engineers will regulate activities that impact wetlands and streams. WOTUS has been the target of the Trump administration in its deregulatory mission. Unfortunately, this may not be the end, as the Trump administration is still trying to repeal and rewrite WOTUS in a less inclusive manner.



NU PROFESSORS, STUDENTS WORKING TO CREATE HISTORICAL CLIMATE MAP OF MIDWEST

(The following article was taken from the Daily Northwestern and reported by [Rachel Kupfer](https://dailynorthwestern.com/2018/05/31/campus/nu-professors-students-working-to-create-historical-climate-map-of-midwest/), May 31, 2018, <https://dailynorthwestern.com/2018/05/31/campus/nu-professors-students-working-to-create-historical-climate-map-of-midwest/>)

Picture the dirt at the bottom of a lake: It may seem slimy, squishy, and unappealing. But for Earth and Planetary Sciences professor Yarrow Axford's research team, that sediment is key to understanding the Midwest's past climate, or "paleoclimate."



Weinberg junior Peter Puleo. In Earth and Planetary Sciences Prof. Yarrow Axford's lab, at Northwestern University, Puleo has worked with lake sediment cores, which are tubes of mud with visible bands of different colors and minerals. He is shown here with a sediment core from Geneva Lake. Source: Peter Puleo



Peter Puleo, a Weinberg junior, has been working with Axford to study layers of lake sediment — collected in tubes of mud called “cores” — to reconstruct the history of southeastern Wisconsin’s climate.

The sediment data can then be compared to existing climate data from past studies by other researchers of pollen. This will solidify findings about how the Midwest’s climate has changed over time, Puleo said. “There was a recent study put out that said the southern Great Lakes region had a strange temperature discrepancy from the rest of the Midwest,” Puleo said. “We’re looking to see if we can find a temperature lag in the sediments we’re studying.”

Using chemical testing and radiocarbon dating, Puleo hopes to create a detailed timeline of the area’s climate history. Within the next year, he hopes to have a record and map of temperature or precipitation shifts for at least the past 10,000 years, he said.

The data will help predict how the planet will respond to manmade changes, research team members said. Axford, who has



done similar work with lakes in the Arctic, said it's important to understand those effects in the Midwest, especially. "As a nation, we need to know more about what happens in the agricultural heartland of our country when climate changed in the past," Axford said. "It will give us somewhat of a roadmap for what to expect in the future."

To collect cores, the team traveled to Geneva Lake in Wisconsin. Geneva Lake has close to 100 feet of thick and "beautifully layered" sediment at its bottom, Axford said. Over five days, the group spent hours on a boat using Axford's equipment to draw cores from the lake's floor, Puleo said. Those cores are cylinders of lake sediment 4 meters long and 7.62 centimeters in diameter, with visible bands of different colors and minerals. They were then split into three sections and cut down the middle.

Everett Lasher, a Ph.D. student from Axford's lab who attended the trip, has studied cores from Greenland, but never from the United States. The findings from Geneva Lake should provide a lot of background on the area, he said. "We're really excited to



see how old it is at the bottom, how deep into time we get.

There's some really interesting sedimentary features," Lasher said. "Maybe there's early human activity recorded in this lake. That would be pretty cool."

The group will have to wait for test results to know what chemicals and biological materials it has to work with and to study, along with what methods it can apply, Axford said. Puleo is in the process of analyzing the cores now. With the help of Earth and Planetary Sciences research associate Mitchell Barklage, he will decode and understand the chemical messages within the cores by using reflected sound waves to create images of sediment layers. Other department members, including Earth and Planetary Sciences professor Maggie Osburn, will look for indicators of past climate change using biological materials. "It's the early, fantasizing 'what might be possible' stage until we learn more about how old the mud actually is and how well various ingredients of the mud are actually preserved," Axford said. "This is just the very, very beginning."



LAKE TIDES

-- From 1980 to 2014, 41 percent of all the economic losses globally, and 27 percent of the fatalities, were from one source: flooding rivers. Source: Circle of Blue

-- A pilot whale died last summer in southern Thailand after eating more than [80 plastic bags](#) and other debris, Agence France-Presse reports. On a Spanish beach in April a [33-foot sperm whale](#) was found dead. Its digestive system had more than 60 pounds of garbage.

-- Circle of Blue's annual survey of water rates in 30 U.S. cities found the slowest rate of increase since the survey began in 2010.



-- There have been 95 disease outbreaks in the United States between 2000 and 2014 that were traced to swimming in rivers, lakes, and oceans. Nearly three in five outbreaks happened in the month of July. The outbreaks caused two deaths.



An algal bloom swirls in the western basin of Lake Erie, in September 2017. Several Cities get their drinking water from Lake Erie. Photo courtesy of USGS/NASA

Source: CDC

-- Drinking-water regulators will soon know a lot more about algal toxins in U.S. drinking water because water utilities are being required to test for 10 cyanotoxins.

https://www.circleofblue.org/2018/world/regulators-will-soon-know-a-lot-more-about-algal-toxins-in-u-s-drinking-water/?mc_cid=05fdf17fda&mc_eid=e2fc1

-- If you have ever been to the Boundary Waters Canoe Area Wilderness of Northern Minnesota you will know how tranquil and good for the spirit these waters are, especially those where motorboats are excluded. Well, the **U.S. Forest Service** has



recently reopened lands in northern Minnesota near a wilderness area for mining.

-- New water wars are taking place in the southwest. Not about drinking water as you might expect in this arid region, but by the oil and gas industries to use for fracking. New Mexico has limitation on the amount of water that can be used for this mining process, but Texas doesn't. Large groundwater withdrawals in Texas are draining aquifers in New Mexico.

-- Ohhh, what are we doing to our waters? Geneva Lake had an early cyanobacteria bloom, the water quality of Wisconsin lakes is at its worst, cyanobacteria blooms are becoming common, the red tide in Florida is the worst it has ever been, and even Lake Superior experienced a cyanobacteria bloom this summer. Let us not forget that without clean water we will not survive.



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