

Protecting Delafield's Greatest Natural Asset

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and the City of Delafield Lake Welfare Committee

Water has a special meaning to the area we live. In fact, it could be said that water is central to making the Lake Country area unique and highly desirable area to call home. This article will go through some of the issues facing our water resources and will provide some suggestions local business and home owners can do to protect the special nature of our Lake Country area.



Rain falls in Delafield. The rain water makes its way into the nearest stream, streams converge to rivers, and rivers eventually make their way to the ocean. So, why not help the rain water on its way? Install gutters and downspouts on our houses to direct rainwater away from our property, build driveways and roads to direct the water into the nearest storm sewer, bury concrete pipes to direct the water to bigger concrete pipes leading to the nearest river or lake, and then release the water to flow down to the Mississippi river and the Gulf of Mexico. What could be better than helping Mother Nature?

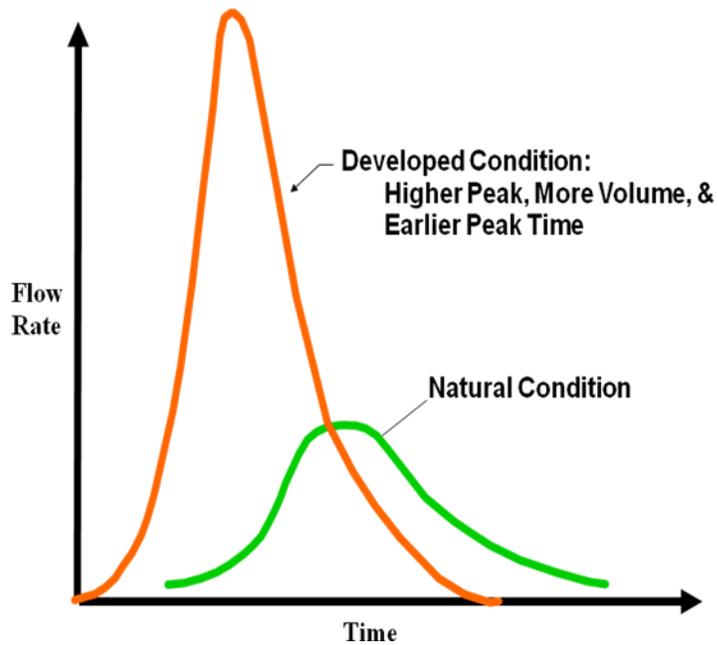


Figure 1: Flow Rate, Then and Now

Unfortunately, that's not what Mother Nature had in mind when she engineered earth's rivers and streams. Originally, rain water would disperse in the tree canopy, drip into the compost on the forest floor, soak into the soil, replenishes the ground water tables, and eventually emerge from springs to supply streams and rivers with a nearly constant flow of water. Figure 1: Flow Rate, Then and Now shows the flow of water entering rivers and streams during a rainstormⁱ. The rate as nature intended is shown in green, and the rate mankind has created is shown in orange. Unfortunately, thanks to our roofs, downspouts, lawns, driveways, streets, and storm sewers, the peak water volume entering our streams and rivers during a storm is many times higher than nature designed them to handle.



Figure 2: Erosion



Figure 3: Flooding



Figure 4: Sediments

The consequences of exceeding the natural flow rate include erosion, flooding, and sediment as shown in Figures Figure 3: Flooding, Figure 2: Erosion, and Figure 4: . The eroded soil from the waterways eventually settles into our lakes and along with the nutrients carried from our lawns, creates a perfect breeding ground to choke our lakes with algae, weeds, and mud. This in turn negatively impacts fishing, swimming and other recreational uses of the lake.

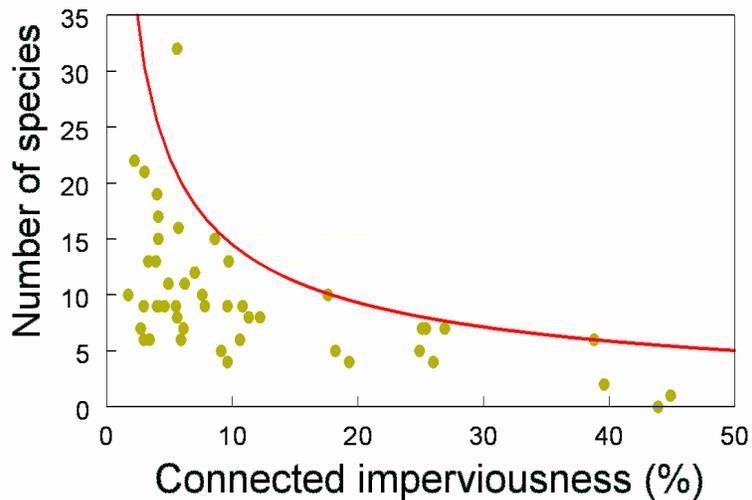


Figure 5: Fish species vs impervious waterways

Likewise, the increased peak flow and energy of increased runoff can have a significant impact on the wildlife habitat. Figure 5: Fish species vs impervious waterways shows research indicating how the

number of fish species (green dots) changes with the amount of impervious surfacesⁱⁱ. Here you can see that in areas with less than 10% impervious surface, fish species are abundant. However, as impervious surface area increase shown on the right side of the graph, fish species decline to just a few, typically rough fish like carp. In just the 14 years I have lived on the lake, I've noticed bass have totally abandoned some of the channels as spawning grounds (leaving the territory solely to the carp).

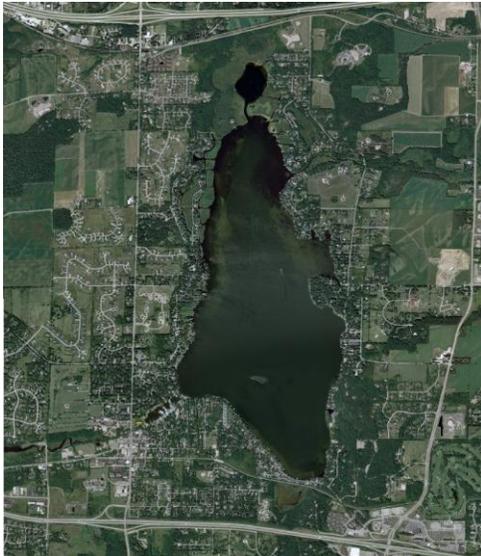


Figure 6: Aerial view of Lake Nagawicka and Delafield

Nagawicka Lake is our city's prime natural resource. The lake maintains Delafield as a highly desirable area to live and thus maintains healthy property values in the area. Lake Nagawicka and the Bleaker Street boat ramp are available to all residents of Delafield and Nashotah, and the lake brings many tourists to our city businesses. Furthermore, the tax revenue of water-front properties provides roughly \$1000 per year tax benefit to the other properties in Delafield. The more we can maintain and improve the desirability of the lake and its tax value, the more this savings will continue to grow and the more all Delafield property values will continue to grow. Nagawicka Lake is well worth the effort to maintain and improve its quality as well as the quality of its water shed.



Figure 7: Low Impact Neighborhoods

So, what can we do as individual citizens of Delafield? Plenty!

Those living in an area served by an effective storm water retention system are already providing a significant positive impact on the water quality in our area. Thank you! As the rest of us update our homes and yards, we can all promote the idea of Low Impact Design and Functional Landscaping as show in Figure 7: Low Impact Neighborhoods.

Interestingly, statistics show that the number of trees in the U.S. has actually been *increasing* in recent yearsⁱⁱⁱ. It turns out that developed land has more trees per acre than farm land, and the ever increasing productivity of our nation's farmers has allowed the ratio of farm land to grow smaller. As individuals, we can continue to support this trend by beautifying our properties with trees and native Wisconsin plants and shrubs.



Figure 8: Rain Gardens

While waiting for your trees to grow or your area to be served by a retention pond, planting a Rain Garden is an excellent way for individuals to improve their property and have an immediate positive impact on our water resource. Rain Gardens provide rain water a chance to soak in rather than rushing from your property into the nearest stream or lake. Figures Figure 8: Rain Gardens and Figure 9: Rain Garden Design show the look and design of a Rain Garden.

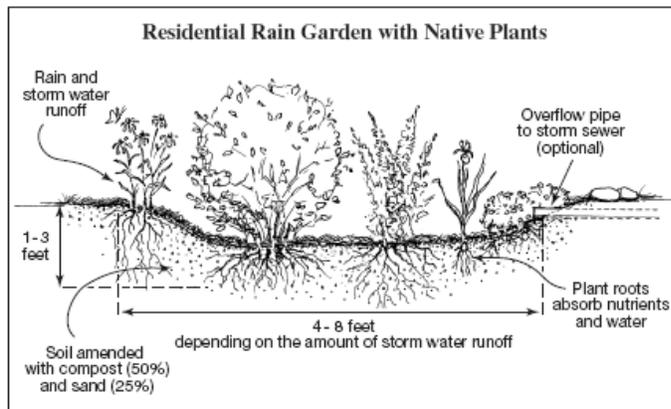


Figure 9: Rain Garden Design

Rain Gardens are simply a slightly depressed garden located where it can catch the water from your downspout, driveway or yard. Rain Gardens are typically dug 6 to 8 inches deep, planted with perennial native plants, and are typically one-third the size of the area draining to it. Additional detailed information is also available on these websites:

www.dnr.state.wi.us/runoff/rg/

clean-water.uwex.edu/pubs/pdf/home.gardens.pdf

<http://www.waukeshacounty.gov/page.aspx?SetupMetalId=15012&id=22924>

www.raingardennetwork.com



Figure 10: Rain Barrel

In addition to Rain Gardens, slow-draining rain barrels provide a way to collect and slow the storm water surge. Specially designed rain barrels that inhibit the growth of mosquitoes are available from Waukesha county at a nominal cost. Simply place one of these at each downspout to provide a storm water buffer and a great source of water for your plants and gardens.

For more information, check out this Waukesha county website:

www.waukeshacounty.gov/page.aspx?SetupMetaId=15012&id=22940



Figure 11: "Before" and "After" photographs of Oak Street shoreline naturalization

For those who do live on water frontage, an additional step you can take to protect our water resource is to building a natural buffer at the water’s edge. Shoreline naturalization brings many benefits including reducing the flow of water and nutrients into the lake, natural beatification of your property, and a natural barrier to reduce the geese and the mess they leave on your lawn. Figure Figure 11: "Before" and "After" photographs of Oak Street shoreline naturalization shows the before and after images of a shoreline naturalization project performed on the south shore a few years back^{iv}. Which view would you prefer to frame our lake?

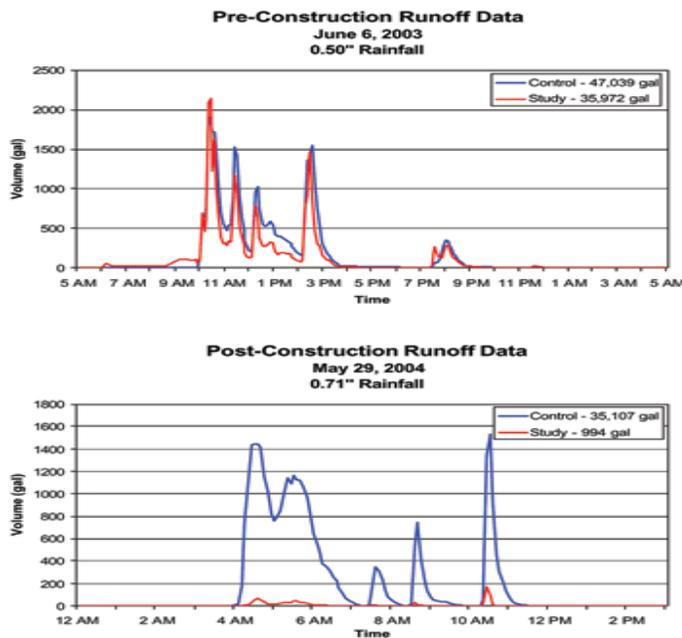


Figure 12: Runoff Study, before and after updating a neighborhood with low-impact techniques.

These measures can be highly effective. Figure 12: Runoff Study, before and after updating a neighborhood with low-impact techniques. shows the results before and these types of measures were made to a neighborhood to lower its impact to the environment^v. The top graph shows that the runoff (red line) was nearly the same as the rainfall (blue line) in the original high-impact neighborhood. The lower graph shows how the runoff (red line) has been reduced to nearly zero after these measures were implemented. The lower graph is much more like Mother Nature originally engineered our world to be.



As bad as it is, sediment is only half the problem. While the mud provides the perfect medium for weed growth, weeds need fertilizer for energy. The combination of sediments and nutrients promotes weed and algae growth, limiting light penetration and the growth of aquatic vegetation. This in turn can reduce oxygen levels in the water, affecting fish and other aquatic organisms.

Fortunately, the state of Wisconsin has followed the city of Delafield lead in placing reasonable restrictions on the use of phosphor in fertilizers to reduce the nutrients entering our rivers and lakes. Other measures you can take to reduce nutrients flowing into the lake include:

- Collect your dog waste and flush it down the toilet or compost your biodegradable cat litter,
- Make sure the ash from your bonfire doesn't wash into the lake,
- Continue to support the city's effort to cut and remove the weeds from the lake before they decay to create 2nd generation nutrients,
- Avoid boating through weedbeds to reduce the amount of uncollected weeds and spreading invasive weed species,
- Dispose of yard waste where it won't decompose and wash nutrients into waterways,
- Keep leaves from blowing into streets served by storm sewers or directly into lakes and waterways, and
- Wash your car on your lawn (instead of your driveway or street)

Check out this Waukesha County web page for even more ideas on how you can help.

www.waukeshacounty.gov/page.aspx?SetupMetaId=32188&id=32242

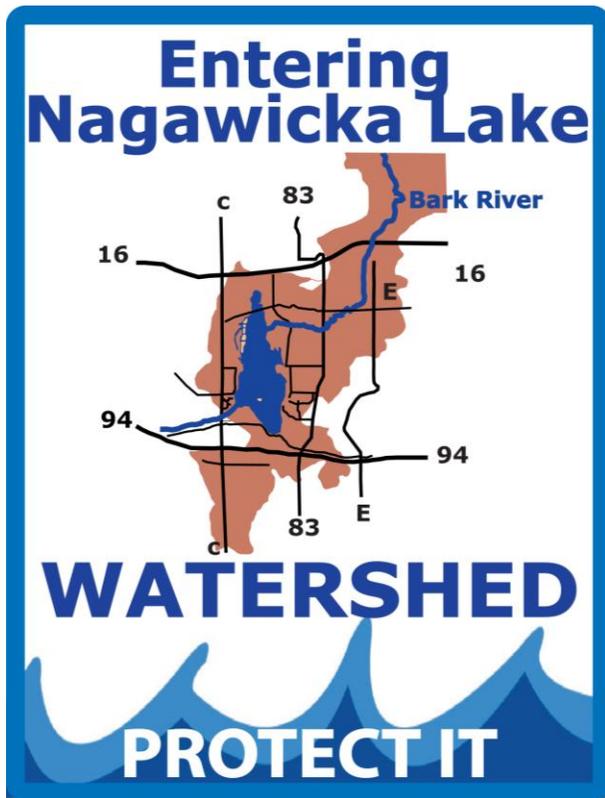


Figure 13: New watershed signs coming to Delafield

To help remind us that we all have an impact Delafield's water resources, the Lake Welfare Committee is developing signs to place at major entrances to the Nagawicka Lake Watershed (Figure 13: New watershed signs coming to Delafield). Remember the suggestions in this article when you see these signs, and spread the word on what we can all do to help protect and maintain our lake.

What happens on the Land



The health of our lake is vital importance to all Delafield residents. What we do today has a significant impact on what the lake will be tomorrow, and what we will pass on to our grandchildren and their grandchildren. With just a little effort, we can enhance the beauty of our properties, protect our drinking water supplies, and protect Delafield's most valuable natural asset.

ⁱ Schueler, 1992, in MPCA, 2000

ⁱⁱ LIZHU WANG, JOHN LYONS, PAUL KANEHL, ROGER BANNERMAN, 2006

ⁱⁱⁱ World deforestation rates and forest cover statistics, 2000-2005; Rhett A. Butler, mongabay.com; November 16, 2005

^{iv} Lisa Reas, LJ Reas Environmental Consulting

^v Burnsville Stormwater Retrofit Study, June 2006, Barr Engineering Company