



What on earth is going on with Maple Lake?

Lots, some good, some bad. But, there are no easy answers. First, let's start with what the 'lake' really is. Maple Lake is a body of water created by impounding the Paw Paw River. This is important to remember. It is not a spring fed lake like many around Paw Paw. Rather, it is a lake resulting from impounding the two branches of the Paw Paw River.

Okay, okay. So what's going on with the impounded river we call Maple Lake?

Unfortunately, years of sediment build-up has been transforming the lake. Impounded bodies of water naturally 'fill in', a process called 'eutrophication.' A lake that is 'eutrophic' is a lake good for growing weeds and algae but not necessarily appealing to the eye or good for other aquatic life. As it 'fills in' its value in a community and to property owners decreases. Even the type of fish in the lake has changed. Maple Lake was once a cold-water fishery with trout and walleye. As it has filled in it becomes shallower and warmer. The once cold water fishery becomes a warm water fishery supporting more pan fish.

Sadly, sediment and warmer water are excellent for growing weeds.

Why is that?

In a shallower lake sunlight needed to grow plants can reach the bottom of the lake. This allows photosynthesis to take place throughout the water column. Deeper lakes have less weeds because photosynthesis cannot reach to the bottom where plant roots are. Photosynthesis takes place everywhere now in Maple Lake.

A shallower lake is also a warmer lake. Warmer water also helps aquatic plants grow. Colder lakes have less weeds.

Around Paw Paw, there are a number of deeper, colder, spring fed lakes. They shouldn't be compared to an impounded body of water like Maple Lake.



Fly over the river after a rain and you can see where sediment enters the river. The post-rain coloration is remarkable. The picture at the right shows sediment washing in after a rain.



Where does the sediment come from?

The simple answer is most of sediments come from upstream. The west branch (also referred to as the south branch of the Paw Paw River) brings sediment from places as far south of Paw Paw as Eagle Lake, Decatur and Hamilton Township areas.

These sediments come from multiple sources including: farm land runoff, road runoff, stormwater runoff, stream bank erosion, careless construction projects along the water ways - all poor land management practices. In heavy rain events, even more sediment is washed into the Paw Paw River and carried along until it settles out.

More bad news! The sediments are rich in organic material and phosphorus—both good fertilizer for growing weeds!

Why does the sediment stop in Maple Lake?

Sediments that are carried in the water flow will settle out when the velocity of water slows down and allows the sediment particles to sink to the bottom. Heavy sediments such as sand settle first and lighter sediments settle out only when the velocity of the water slows way down.

Unfortunately, water velocity slows down when dams are built to control the flow of water. River water will also slow down when the width of the river increases and the water can 'spread out' over a greater space.

Both things happen when the south branch of the Paw Paw River gets to Paw Paw. Sediments settle out when they reach Briggs Pond and when they get in Maple Lake.

The Dams Don't Help?

Well, they helped create Maple Lake and Briggs Pond but they don't help because they catch sediments. The hydro-power plant and earthen dam was built in 1908. As we all know, dams slow the flow of water which allows sediments carried in the water to 'settle' out. In 1937 the dam washed out and it was rebuilt in 1938. The dam remains today even though it ceased producing electricity in 1969 due to certain state and federal rules and regulations which made it impractical to continue operations. But they still catch sediments!

Why can't someone just haul the sediments away?

We wish it was that simple. But, remember we said the sediments comes from a variety of sources including farm lands. And, remember we said the sediments have been building up for years and years. Well, in the past, farmers often used chemicals with arsenic on their crops such as grapes and tree fruits. The arsenic particles attached to soil particles and is carried with sediments.

Also, sediments from the soils along the south branch of the river are very fine - really small and light particles. When these travel through water they create an electric charge which attracts the arsenic naturally in the water to attach to the particles. So, now we get sediments with arsenic as well as with nutrients! When the sediment settles out, the arsenic contamination is too high to just dredge and put on open land. State regulations say it must be put in a landfill capable of holding toxic materials.

This is a very expensive proposition. Our last estimate, 3 years ago, to remove 5,000 cubic yards and truck it to a landfill was around \$140,000. Imagine the costs in today's dollars!

The Village has already spent about a million dollars over the last 15 years and can't afford doing so any more - especially since the sediments keep coming! The Village would soon be bankrupt.

Aren't there State or Federal Grants that could pay to remove the sediments or the weeds?

No. The State considers sediment removal and weed control as a local 'maintenance' issue. The same with controlling weeds. No State grants monies are available for these 'maintenance' issues.

When we met with our Congressman, Fred Upton, he indicated the federal government pays for sediment removal in harbors such as in St. Joseph/Benton Harbor where the Paw Paw River runs into the St. Joseph River. The federal government, with Congressman Upton's support, has spent millions dredging that harbor to keep the harbor open for shipping. But, again, no federal monies for inland waterway or inland lake sediment removal or weed control.



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Plenty. They raise monies through a special assessment to combat weed growth. Lake front property owners are assessed an annual amount to kill weeds. They spend over \$20,000 a year on chemical applications to kill weeds. However, State regulations determine the type, amount and location of chemical applications on Maple Lake. This means their efforts are limited.

Unfortunately, as the lake takes on more and more sediment, weed growth increases. That is because the sediment that keeps coming into the lake from upstream is high in organic material and phosphorus....and arsenic.

Treating the weeds with chemicals could be an on-going process!

Dealing with the sediments coming in requires a long term effort! That is why the County Drain Commissioner is involved. The south branch of the Paw Paw River is part of the Gates Drain. The County Drain Commissioner has responsibility and authority to pursue long term options.



My Gosh! It sounds so hopeless!

Please don't think that. Too much is at stake. Much of what Paw Paw is, is because of the lake. If the lake dies, a great portion of Paw Paw dies with it.

Think about it...

- What kind of a community would we have without our lake?
- How many businesses would close up when their customers stop coming?
- How many employees would also leave to find employment elsewhere?
- How would we replace the taxes lost that are paid by lake front property owners when their property value drop? They pay thousands and thousands in taxes that support our schools, ambulance, fire department, law enforcement agencies, our library, roads and local government. Who will make up this loss?

GREAT! So, what is being done?

Even though it may not look like it, lots! Please read on.

What's being done?

Drawing the Lake Down: As you notice, the lake has been lowered. We lowered it 4 feet and will keep it this way through the winter. Lake experts (limnologists) say exposing the weed roots and seeds to freezing temperatures will kill them. This will reduce weed growth next season even if nothing is done with the sediments. The lake will come back up in March 2011.

Harvesting Weeds by Cutting or by Suction: Cutting weeds turned out to not be such a good idea because cuttings from some weeds grow by themselves. A 'suction' method around the amphitheatre and boardwalk was tried. It worked well. This method 'sucks' the weeds out of the sediment and catches them in bags. This is a faster way than pulling the weeds out by hand. The demonstration drew a large audience and property owners are encouraged to consider suction harvesting weeds in front of their properties.

The Village's 'weed boat', a cutter, may not be used again because we now know some cuttings grow into plants. But, a pontoon boat was donated and the Village is exploring building its own suction weed harvester to put in the lake in 2011.

Sediment Sampling: While the lake is down the Village is sampling the arsenic content of sediments around the lake. This will allow us to determine which areas may not have to be taken to a toxic landfill and which sediments may be placed on adjacent lands. If this is possible, the cost savings would be dramatic and may allow the Village to remove sediments in key areas.

Sediment Removal: Following the sediment sampling and while the lake is down, the Village may be able to engage in sediment removal. Whether through dredging, drag-lines or front end loaders the lower lake level presents an opportunity to remove sediment. The limiting factor will be cost.



The annual fireworks over Maple Lake rival the beauty and excitement of any 'big city' fireworks

What's Being Done? ...continued from previous page...

Geese Deterrence: A single goose can pass two pounds of waste a day. That is a lot of 'fertilizer' on the lake or on the shore of the lake. This goose fertilizer is good for growing lake weeds. There are ways to deter the geese.

The Village stopped mowing to the waters edge and has started growing a buffer strip along our shorelines. Geese don't like these buffer strips because they think a predator may be in them. Property owners should do the same thing.

Whatever you do, please do not feed the geese!

The Village allows dogs to run loose on maple Island to chase geese off the island. You can take your dog to the island and let them run loose. However, remember, children may be on the island and your dog must still be under your control as you are liable for your dog.

If you spot a nest around the waters edge, watch when the goose lays eggs. When the goose leaves the nest and you safely can, rub some salad oil on the eggs. This will stop the egg from fertilizing. Removing the egg will result in the goose laying another egg, oiling is preferred.

Some property owners find success with twine stretched along the waters edge. They put old CD discs or foil on the twine. Some even partially inflate a swimming pool alligator float and anchor it off shore so the head remains slightly above water. Evidently some geese think the gator is alive as it moves with the breeze. Again, whatever you do, please do not feed the geese!



In the picture to the right you can see the sediment build-up that is coming into Maple Lake. This is likely where the most arsenic laden sediment is also located. Sampling the sediments (now underway through October 2010) will determine arsenic levels and dictate options for sediment removal or treatment (aeration/ air sparging).



Aeration or Air Sparging: The Village and the Maple Lake Association are funding efforts to add air diffusers throughout portions of the lake. Just as 'good bugs' help break down garden compost, these aquatic 'good bugs' will break down the organic material in the sediment. In some areas of the lake the sediment is more than 50% organic material. Aeration adds air at the sediment level so the good bugs have enough oxygen while they feast. Where this has been employed in other lakes, there has been a significant decrease in sediment build-up. The question for Maple Lake is whether or not all the new sediment coming in will just fill in any reduction of sediment.

What is the Drain Commissioner Doing?

The Van Buren County Drain Commissioner has jurisdiction over the Gates Drain (Briggs Pond, the south branch of the Paw Paw River and all of its tributaries). The Drain Commissioner has the authority and the responsibility to pursue sound watershed management practices that will benefit the Paw Paw River. Currently, the Drain Commissioner is exploring long term solutions and deciding which methods would have the best impact on reducing sediments entering the watershed.

There are long term solutions. They involve efforts throughout the 445 square miles of the Paw Paw River watershed (the area that drains into the Paw Paw River). These include:

1. Restoring wetland areas so the sediment in waters can settle out before they reach the main river stream. Restoring some wetlands would also catch sediments that flush into the river during rain events as the sediment heavy rain runoff would flood the wetlands.
2. Buffer strips between agricultural fields and the waters edge would also prevent sediments and nutrients from washing into the river channel.
3. Terracing along stream banks, ditches, drains and the river channel would protect against stream bank erosion.
4. Using non-phosphorous fertilizer would also reduce the amount of nutrients coming into the river.
5. Installing rain gardens to catch storm water runoff before it dumps into the river or lake would also reduce sediments and nutrients as well as reduce other pollutants from entering the water system.



When we think of Paw Paw, we think of Maple Lake.

It is a part of the Village's identity. It is part of our history and our future.

When we think of Maple Lake, it is often in the past tense. But, saving Maple Lake requires one to think of the future!

