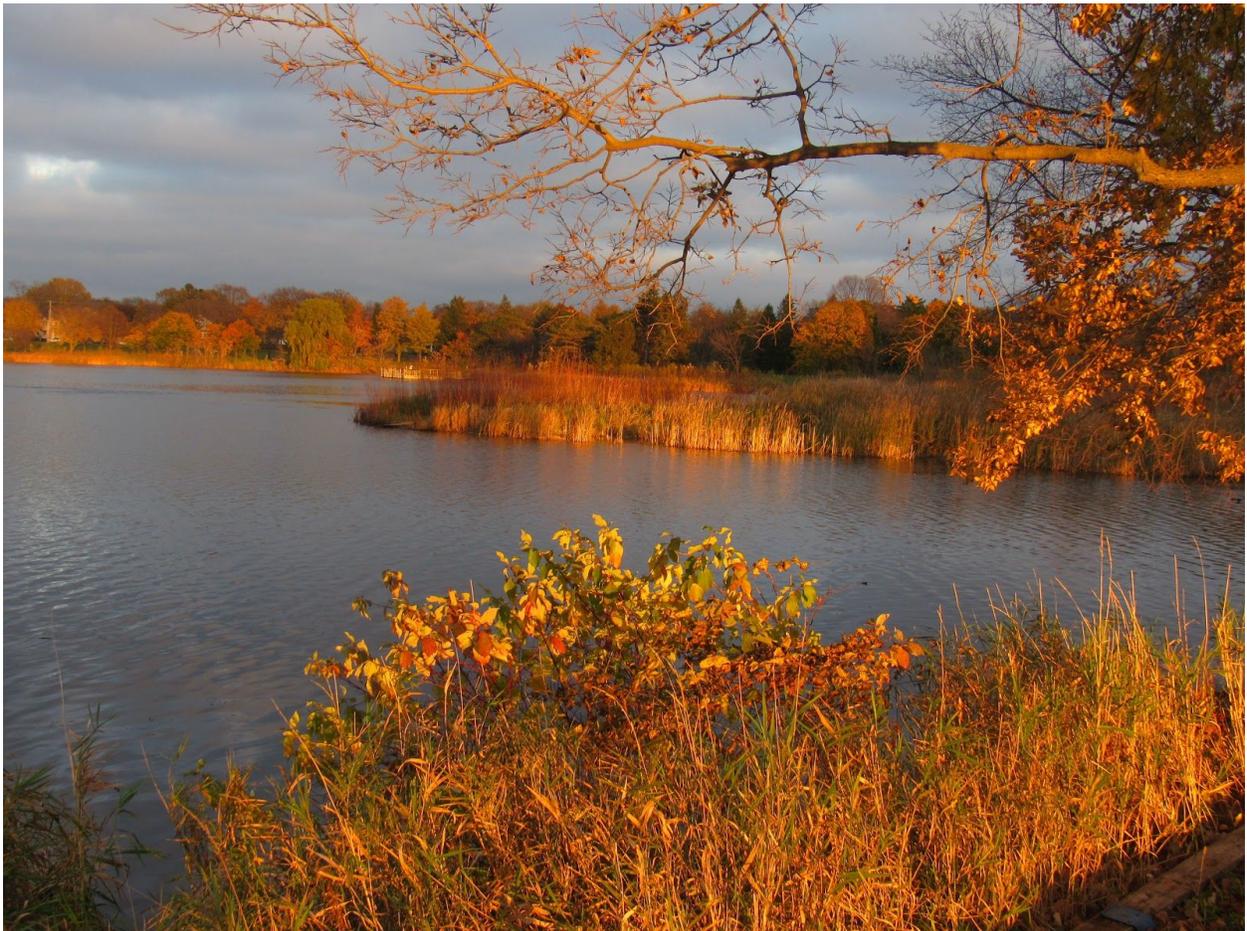


LAKE HIAWATHA STEWARDSHIP REPORT

A summary of stewardship duties
from 2015-2017

by Sean Connaughty



Lake Hiawatha is a 55 acre lake in south Minneapolis, it is part of the Chain of Lakes and a key part of the Minnehaha Creek Watershed. The waters of Lake Hiawatha flow and change with Minnehaha Creek. The water flows from Lake Hiawatha to the Mississippi River and on to the Gulf of Mexico. Lake Hiawatha is a beautiful place, with diverse wildlife where one can find, solitude and open spaces. Lake Hiawatha is also a place that is struggling with pollution and ecological imbalance. I've spent the last 3 years working intensively at Lake Hiawatha and incorporating my efforts into my artistic practice.

SEAN CONNAUGHTY - LAKE HIAWATHA STEWARDSHIP SUMMARY 2015-2017:

This effort contributed a total of **63** volunteers who spent **879** hours picking up trash at Lake Hiawatha. Many other volunteers have also collected trash from the Lake over the same time period. (The MCWD conducted several cleanups which are not included in the following counts):

Trash cleanup volunteer hours breakdown:

1. Sean Connaughty 648 hours
2. Others who joined me on my trash cleanups: 231 hours

Trash cleanup volunteers who accompanied Sean:

Penny Fuller FOLH, Kyle Samejima FOLH, Joel Fuller FOLH, Judith, Callie, Matt, David, Carly, Russ, Ryan Seibold FOLH, Martin, Ryan M, Trudy, Kate and Mark.

Group events:

Summer Stretch Camp Group from Hope Lutheran Church, 8/2/2017. duration: 3 hours. 32 students from 6th- 9th grade. There were 4 chaperones present including instructor Carolyn Swizsc. All activities were coordinated with MPRB rep Sherry Brooks. Grabbers, bags and gloves were provided by MPRB. We removed 60 lbs of garbage or 3 full bags. Discussion led by me and question and answer session with students. Students watched my "Is This Yours?" PSA prior to arriving as a primer.



Earth Day Cleanup Volunteers: 4/22/2017 collected by Earthday Clean up volunteers. Led by Penny Fuller (FOLH) 80 lbs. of trash removed 4 full bags. 15 volunteers - 3 hours

Continued SUMMARY OF LAKE HIAWATHA TRASH CLEANUP 2015-2017:

Trash clean up volunteer hours:

Sean Connaughty – 648 hours

Penny Fuller – 45 hours

Hope Lutheran Church camp group- 96 hours

Earth Day Cleanup – 45 hours

Helpers with Sean – 45 hours

Trash cleanup hours total - 879 hours

Lake Hiawatha trash cleanup weight and quantity:

Total number of bags removed since 2015 – **225 bags**

Each bag weighs minimum 20 lbs.

Trash weight total - 4,500 lbs. = 2.25 tons

Cleaning duties occur seasonally from March 15th to November 15th. Trash was removed from the shore and shallow water by hand and grabber and from the Lake by kayak. At the end of each cleaning session every full bag of trash is photographed with the Lake as backdrop.



The collected trash was disposed of in the Park's trash receptacles with agreement from Park staff.

Over the past three years cleaning sessions averaged 2 times per week.

It takes a minimum of three hours of labor to collect 20 lbs. of trash.

Cleaning season is 9 months long - from March 15th to November 15th.

Approximately 72 cleanup sessions were conducted yearly

Total of 216 trash cleanup sessions conducted since 2015 at Lake Hiawatha



The amount of trash that has been removed from Lake Hiawatha in the past three years is staggering. I am aware of at minimum 6,000 documented pounds of trash that were taken out of the Lake since 2015. That includes the 1,690 lbs. removed in the 2017 Lake Hiawatha cleanup by the Minnehaha Creek Watershed District and the 4,500 lbs. that I have removed. So, that is 2,000 lbs for each year. In the next 5 years 10,000 lbs of trash will enter the Lake without mitigation.

Additional volunteer activities:

POLLUTION AND WILDLIFE OBSERVATIONS:

In addition to my trash collecting duties, I noted and documented conditions at Lake Hiawatha and surrounding parkland. I documented the diversity of wildlife residents and migratory visitors. I also documented instances of wildlife mortality. I also noted algal blooms, water levels, water clarity, sources of pollution. I studied patterns of trash accumulation and made comparisons between trash arriving from Minnehaha Creek vs. trash arriving from The 43rd street pipe storm sewer outfall (north pipe).

Noting wildlife mortality: Confirmed instances of anthropogenic wildlife mortality: 8 Bowfin, left to die on shore by fishermen, A fish suffocated within an oversized condom, 15 raccoons drowned in flooded storm sewer pipes washed into the Lake, 2 dead adult turtles were found on the golf course after fairway spraying in spring 2014. Five Beavers trapped and killed by golf course contractors in winter of 2014/2015. I have observed waterfowl eating plastic and styrofoam/polystyrene on many occasions. It is very common to find pieces of foam trash and other trash items that show evidence of being eaten by animals. Additional instances of wildlife mortality without notable cause were also noted: Approximately 10 dead waterfowl, several additional dead turtles, raccoons, squirrels, rats, possum, voles, mice and fish were found. I noted the arrival of Great Horned Owls and coyote at Lake Hiawatha. I observed mink at the Lake and have heard several anecdotal reports of otters at the Lake. A family of fox has disappeared from the park. I noted the disappearance of frogs from Lake Hiawatha. I observed frogs when I moved to the area in 2009, after the flood of 2014 Frogs were never observed again. Additionally I have never seen salamanders or snakes at Lake Hiawatha, though I observed them at nearby Mother Lake. I have noted a continued population of American Toads at Lake Hiawatha. I have occasionally observed crawfish.



Beavers: The above photos show images captured from the winter of 2014-2015. I observed these men contracted by the MPRB installing a live trap beneath the ice at Lake Hiawatha in front of the beaver lodge near the output of groundwater pumping into Lake Hiawatha. They succeeded in killing 5 beavers. The beavers were trapped in a cage under the water and were therefore drowned. The purpose of the trapping was to preserve planted trees on the golf course, but I also noted that the beavers had not touched any of the planted/curated trees at HGC. The beavers had only harvested scrub trees that grow along the shore of the Lake. I feel it is incumbent on those charged with management of this parkland to work with natural systems and habitat and end the practice of trapping and killing beavers. Protecting planted trees near the shore with a protective girdle is not difficult and the beavers did no damage to planted trees and did not impede waterflow. Given that there are many species of animals which share habitation in beaver lodges and that muskrats, mink and otter may share these dens, there is a risk that they may be inadvertently trapped as well. Healthy wildlife populations at Lake Hiawatha should be celebrated, not extinguished. Some beavers have survived this trapping and remain at Lake Hiawatha. Since the trapping, they have abandoned the lodge at the pumping output and have relocated. Friends of Lake Hiawatha and myself will be closely monitoring the beaver population and their activities. We ask the MPRB not to trap beavers or other wildlife at the parkland, and in the event the MPRB feels it is absolutely necessary to trap, then live traps and relocation should be used. We also ask that future trapping be publicly disclosed and discussed beforehand. The wildlife populations at Lake Hiawatha are a community asset and are deeply valued by many in the community. We as a community can make some adaptations to the way we relate to the ecology and habitat at Lake Hiawatha. It is known that beavers are beneficial to a healthy ecology.



The above photos show ducklings attempting to eat trash items at Lake Hiawatha. Photo courtesy Penny Fuller (Friends of Lake Hiawatha)



Above: Two dead adult turtles found on golf course fairway- June 2014.

Below: In some instances I have been able to rescue animals. I found this turtle caught on a fishing line, I was able to remove the hook and release it:



Invasive species: I have also watched for the presence of invasive species in the Lake. I have watched for the presence of Zebra Mussels. In 2015 I found about 10, in 2016, I found about 5 and in 2017, I found 3. The mussels were almost always attached to a piece of trash I removed from the Lake. They were most commonly attached to golf balls or aluminum cans and sometimes attached to lumber.

POLLUTANTS IMPACTING LAKE HIAWATHA: Trash, sediment, bacteria, chemical and nutrient pollution.

Bacteria: Lake Hiawatha and Minnehaha Creek are listed by the MPCA as impaired for e-coli bacteria. Beach closings due to high bacteria levels happen every year. In the summer of 2017 alone , I discovered and removed over **70 diapers** from Lake Hiawatha. All were found within 100 yards of the north pipe outfall. Many individual diapers were found as well as several bags - some of them containing up to 12 diapers. I notified the City Public Works department's Katrina Kessler and the MPRB's Rachael Crabb of my discovery. It is common to find two or three diapers per cleanup, but the large quantity of diapers in individual bags was a new development.





It is common to discover toxic/hazardous materials amongst the trash items in Lake Hiawatha. When cleaning, especially by kayak, I will scan the Lake first for toxic items and then follow up with a more thorough cleaning. As you can see in the photo below, I have saved many of the hazardous materials removed from the Lake. This makes me question the fact that trash is not considered a pollutant in Minnesota. There are no measurement regimes or TMDLs for trash. This despite the fact that it is clearly aesthetically displeasing and is a threat to human safety, water quality and wildlife. If there were measurement systems for trash, Lake Hiawatha would certainly be listed as impaired. The most common toxic trash item is cigarette lighters which average 8 per bag, Cigarette lighters contain butane which is dispersed into the water when the seal is broken. The second most common toxic trash item is automotive product containers containing oil, antifreeze, various fluids etc. It is also common to find syringes, condoms, diapers, spray paint, bug spray, insecticides, petroleum lubricants, adhesives, hand sanitizers, butane containers, bleach containers, cosmetics, health and beauty products, pharmaceuticals, air

fresheners, etc. Clearly there is a need to remove these materials from the Lake promptly in order to minimize the dispersal of toxins into the water. Secondly an effective mitigation system should be installed in order to keep these materials out of the watershed.

Though these overtly toxic materials are common, far more common are the countless pieces of plastic and styrofoam litter that come from products we consume, products sold in local businesses, fast food restaurants and convenience stores. These materials will remain indefinitely, breaking into smaller and smaller bits, as is evidenced in the soil on the shores of Lake Hiawatha. Embedded in the soil are strata of millions of plastic and styrofoam bits accumulated from decades past that cannot be extracted and will become the anthropocenic fossil record for [future](#) archaeologists.

1. Toxic and Hazardous Trash:

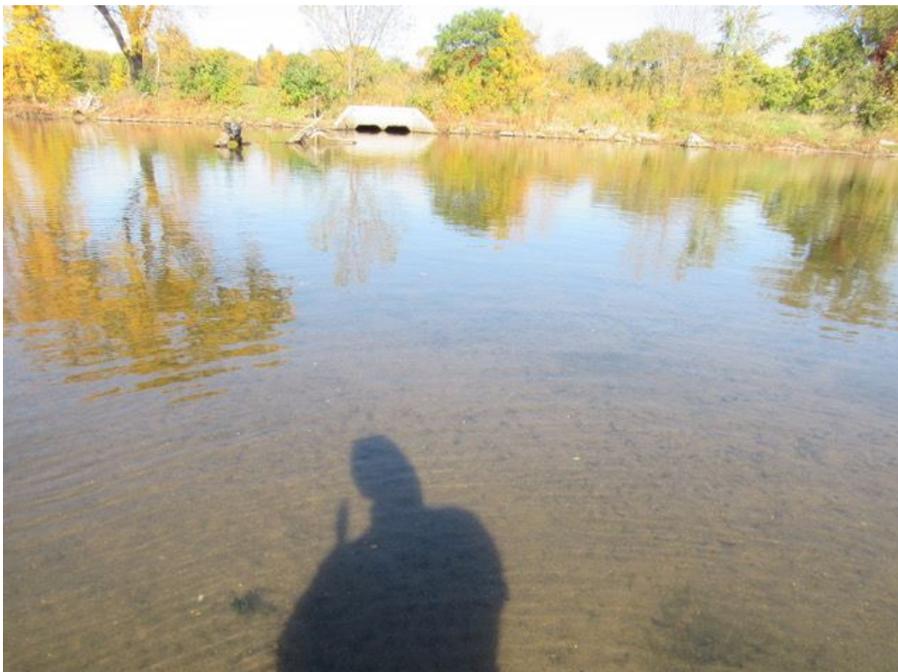


Items that are dangerous to human health are also found such as hypodermic needles, which pose a health risk to park visitors. Note: all necessary caution was used in the collection of these syringes.

Hypodermic needles found in Lake Hiawatha:



2. Sediment: standing on the sediment delta in front of the north pipe



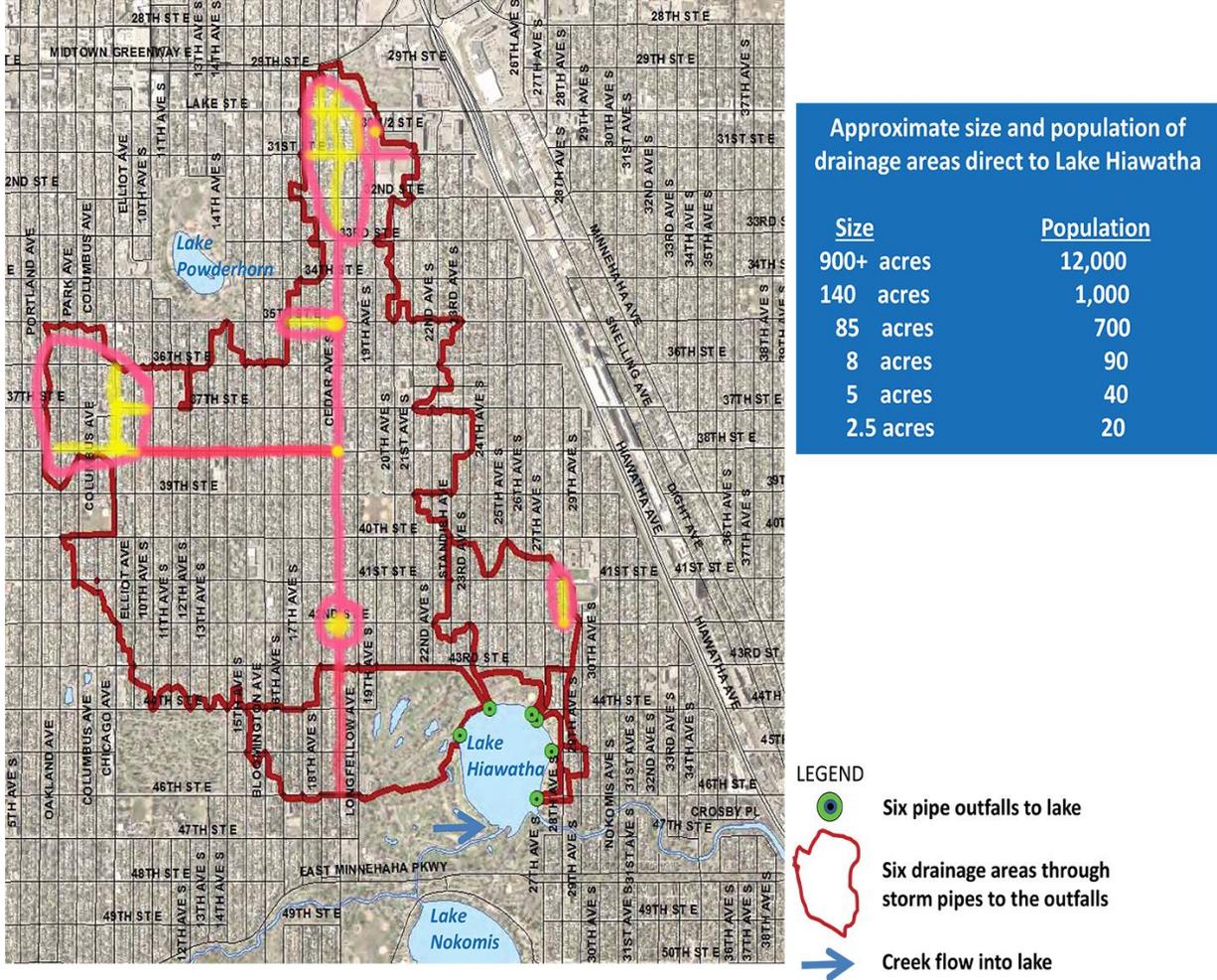
Sediment poses an additional problem for Lake Hiawatha. In addition to sediment from Minnehaha Creek, the north pipe is a source of enormous quantities of sediment, which has already altered the lake bottom considerably. A large delta of sediment made up mostly of sand has formed in front of the outfall of the north pipe. This delta of sediment extends several hundred feet out into Lake Hiawatha. Important to note also that phosphorous binds to sediment particles. I suggest future mitigation efforts could capture sediment prior to its entrance into the Lake utilizing natural processes which cause land building as seen in natural delta systems.

3. Phosphorous and algal blooms at Lake Hiawatha. The Lake is also listed as impaired for phosphorous by the MPCA and receives excess nutrients/phosphorous from three major sources, the Creek, the north pipe and groundwater pumping. I have observed blue green algae blooms in the Lake many times, occurring more frequently in the late summer and especially a day or two after a significant rainfall.

This is a photo of an algae bloom on the shoreline of Lake Hiawatha on a sunny day after a rainfall:



The north pipe and Lake Hiawatha’s sub watershed (trash hotspot map):



The map shows the scale of the subwatershed emptying directly into Lake Hiawatha. The largest of these subwatersheds, ‘the north pipe’, empties more than 900 acres of urban streets directly into Lake Hiawatha without mitigation. The litter and pollution from many busy thoroughfares such as Cedar ave., Chicago ave., 38th st. and Lake st. empty directly into Lake Hiawatha and subsequent watersheds via the north pipe. Pink marks show areas of high concentrations of litter, yellow- highest concentration.

2. 2016 STORM DRAIN STENCILING:

working with the City of Minneapolis stenciling program I stenciled 175 storm drains in Lake Hiawatha's sub-watershed in the summer of 2016. Part of my stenciling effort was cleaning up the streets in the area. In conversation with Katrina Kessler (City Public Works) I shared with her the areas that had high concentrations of litter. (see map above) The City has used this data to target the areas with increased street sweeping increased trash receptacles and adopt a drain programming:



3. 2017 WATER CLARITY MEASUREMENTS-

Secchi disk readings were measured by kayak bi-weekly. Approximate average secchi depth was 5 feet. The results were gathered and submitted to the MPCA as part of their volunteer program. I share the results here. I also took depth measurements from the center of the Lake while doing the secchi readings. The Lake depth consistently measured 15-16 feet in the center area.

Line	Date	Time_hh:mm	Secchi_Depth_ft	Bottom?	Physical_Appearance	Recreational_Suitability	Water_Color	Notes
Ex.	5/10/17	1:15 PM	5.5	B		2	Green	Very windy
1	5/3/17	12:00 PM	4.3			3	Green	cloudy, still
2	5/22/17	12:30 PM	4.5			3	Green	sunny, light wind
3	6/1/17	10:00 AM	4.5			3	Green	sunny, still
4	6/10/17	9:11 AM	5			3	Green	overcast, light wind
5	6/15/17	11:00 AM	6.15			3	Stained	sunny, brisk wind
6	6/19/17	9:00 AM	5.15			3	Stained	overcast and calm
7	6/21/17	1:00 PM	5.9			3	Stained	sunny, light wind
8	6/26/17	12:00 PM	5.35			3	Stained	partly sunny, light wind
9	7/15/17	2:00 PM	5.75			3	Stained	sunny, light wind
10	7/20/17	5:00 PM	5.5			3	Stained	sunny, calm
11	7/24/17	12:00 PM	4.75			3	Green	partly sunny, still
12	7/27/17	12:30 PM	5.15			3	Green	sunny, light wind
13	8/1/17	1:00 PM	5.95			3	Stained	sunny, light wind
14	8/3/17	12:00 PM	5.15			3	Green	overcast, windy
15	8/8/17	10:00 AM	5.25			3	Green	sunny, light wind
16	8/12/17	4:00 PM	4.85			3	Green	sunny, light wind
17	8/27/17	3:00 PM	4.75			3	Green	overcast, light wind
18	9/2/17	9:30 AM	3.75			4	Sediment	overcast, still
19	9/16/17	10:00 AM	5.8			3	Green	partly cloudy, light wind
20	9/23/17	4:00 PM	5.95			3	Stained	cloudy, light wind
21	9/30/17	10:00 AM	5.8			3	Stained	sunny, light wind
22	10/3/17	5:00 PM	2.25			4	Sediment	sunny, light wind, after rainstorm
23	10/4/17	5:00 PM	3.25			4	Sediment	sunny, calm
24	10/7/17	5:30 PM	5.25			3	Stained	sunny, light wind
25	10/8/17	3:00 PM	6			3	Stained	sunny, light wind
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OBSERVATIONS AND RECOMMENDATIONS:

GROUNDWATER PUMPING

The flood of 2014 caused damage to the golf course, when water overtopped the berm and flooded the golf course. It was learned that the MPRB had been pumping groundwater in amounts far exceeding the amount permitted by the DNR. Due to the flooding and the revelation of the amount of groundwater being pumped. Ultimately the MPRB announced they would be reducing the amount of pumping at Lake Hiawatha. This would necessitate a major reconfiguration of the parkland and the public uses of it. The water table will be changed in this reconfiguration. The MPRB is currently pumping water at a rate of at least 240 million gallons annually. The water being pumped consists of golf course runoff, storm sewer runoff, groundwater and water that has returned from the Lake.



Above: photos from the flood of 2014

GROUNDWATER PUMPING:



Land subsidence (sinking) on the parkland has necessitated a growing system of pumps in order to maintain a dry parkland.

What is the impact of groundwater pumping on Lake Hiawatha?

1. Pollutants and nutrients: The Barr study showed considerable pollutants in the pumped water. Despite the claim of 'negligible impact' on water quality, the Barr report shows total phosphorous levels to be significantly higher than the levels found in Lake Hiawatha. Lake Hiawatha is under a TMDL because it is impaired by phosphorous. Water containing large amounts of phosphorous is being pumped into Lake Hiawatha at a rate of 240 million gallons annually. I believe the claim of negligible impact is made only by comparing it to phosphorous

quantities entering the Lake via Minnehaha Creek. The Park and City share an obligation to reduce phosphorous impairment at Lake Hiawatha. No tests have been conducted to measure pesticides in the pumped water, the soil or in the Lake itself.

2. Soil subsidence/land subsidence: It is known that groundwater pumping or de-watering causes soil subsidence, causing the soil to sink because of the removal of support below it, already we have seen that the golf course has sunk since it was built in 1929. As the land has sunk, more and more pumping has been required over the years to maintain a dry golf course. There is no reason to believe that this process will stop and that greater pumping will not be required in the future to maintain the status quo.

3. Expense and energy consumption: It takes a lot of electricity and resources to pump at this rate. It also requires the additional expense of maintenance, repair and monitoring.

4. Upsetting of the natural balance: The tenuous balance of a dry golf course is maintained by intensive human intervention and engineering. The reduced pumping scenario to be implemented by the MPRB is a much more sustainable solution and reduces dependence on engineered solutions, allowing natural systems to take over and lessen the need for constant human intervention.

Below is a screenshot from the Barr study- the part that tested the water in the ponds and what comes out of the pipes into the Lake. I have been seeking an unbiased answer as to the impact of this on the Lake, not a comparison to phosphorous loads from the Creek or the storm sewer. Let's look at this data on its own and how 240 million gallons of it annually might impact the Lake and subsequent watersheds. particularly as it relates to phosphorous levels as the City pursues its goals of reducing phosphorous in our water, and to meet the goals of the phosphorous TMDLs. These results show higher levels of several contaminants in the pumped water than the levels measured in the Lake itself. This includes the 'total phosphorous' category. If the quantities of phosphorous being pumped into the Lake at the rate of 240 million gallons a year are higher than the levels in the Lake which is listed as impaired. How does that equal 'negligible impact' ?

Test results from the Barr Engineering study of the pumped water from 2015/2016:

Table 3 Water Quality Monitoring Summary – January 2016

Water Quality Parameter	MW-1	MW-2	MW-3	MW-4	Pond E	Lake Hiawatha
Bicarbonate Alkalinity, as Ca, in mg/L	310	380	310	222	306	179
Chloride, in mg/L	82.7	63.6	116	116	135	154
E. Coli, in MPN/100ml	<1	<1	<1	<1	5	2
Nitrate and Nitrite as N, in mg/L	0.058	2.42	0.045	0.045	0.479	0.259
Silica, in mg/L	36.3	16.1	28.5	30.7	29.3	6.02
Soluble Reactive Phosphorus, mg/L	0.005	0.006	0.004	0.004	0.004	0.005
Sulfate, in mg/L	<5	79.6	63.3	<5	50.5	10.3
Total Kjeldahl Nitrogen (TKN), in mg/L	23.1	1.19	<0.5	1.86	2.18	0.991
Total Phosphorus, in mg/L	0.342	0.011	0.021	0.118	0.076	0.028
Diesel Range Organics (DRO), in ug/L	110	<100	<100	<93	<93	<93
Aluminum, in mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Calcium, in mg/L	90	210	130	77	120	57
Iron, in mg/L	8.8	0.081	1.3	2	3	0.23
Magnesium, in mg/L	24	45	36	18	31	22
Potassium, in mg/L	2.7	2.9	4.3	3.6	4.8	4
$\delta^2\text{H}$ of water, % relative to VSMOW	48.1	55.6	61.9	38.7	55.5	45.9
$\delta^{18}\text{O}$ of water, % relative to VSMOW	6.14	8	8.98	4.11	7.55	5.7

The MPRB commissioners an elected body representing our park districts and have made the decision to reduce pumping at Lake Hiawatha from 240 million gallons annually to 94 million gallons.

When groundwater pumping levels are reduced the water table will change. Water elevations between the golf course and Lake Hiawatha will equalize. The result will be that much of Hiawatha Golf Course will be inundated with water.

These changes present opportunities for development of improved stormwater management, development of climate resiliency and increased ecological integrity. In the zones that will become new wetlands.

from the MPRB's 2018 Hiawatha Golf Course Property Master Plan Update:

“In August, MPRB Commissioners approved a resolution directing MPRB staff to apply for a permit from the MN Department of Natural Resources (DNR) that conforms to a reduced pumping scenario, and directs staff to begin a public process to amend the Nokomis-Hiawatha Regional Park Master Plan to accommodate changes to the park made necessary by the reduced groundwater pumping scenario. No date or timeline to conclude this work was included in the resolution. However, it was suggested that the depth and breadth of community engagement work necessary to amend the Nokomis-Hiawatha Regional Park Master Plan should allow the golf course to continue operating through at least the 2019 golf season.”

WATER QUANTITY

The problems we are facing at Lake Hiawatha are largely anthropogenic, stemming from the overzealous engineering of the past, when moving water downstream was the prime objective of engineering efforts. Now we are reaping the consequences. Lake Hiawatha was once known as Rice Lake, it was an extensive system of wetlands with the capacity to hold and absorb water, it was also a vital habitat for wildlife and a source of sustenance for the Oceti Sakowin people. The absorptive and flood storing capacity of these wetlands was taken away when the Lake was dredged and the surrounding wetlands were filled and made into a golf course. Taking away wetlands and replacing them with impervious surfaces has been endemic throughout the

Minnehaha Creek Watershed. Add to the mix climate change and storms with greater severity and frequency. This results in the severe water quality and quantity issues culminating at Lake Hiawatha and subsequent downstream watersheds who rely on the very same water for drinking.

The water levels at Lake Hiawatha vary dramatically based on many factors. Water at Lake Hiawatha has a residence time of only one to four days. This is much less than any other Lake in the watershed. This means that water is already moving rapidly through the Lake.

Despite the ecological challenges, Lake Hiawatha remains one of the few remaining habitats capable of sustaining a complex chain of wildlife inhabitants. Preserving this biodiversity, restoring water quality and increasing the flood mitigating capacity of the land are the major goals of the MPRB and MCWD as they cope with a complex and deeply problematic watershed.

There is a jurisdictional conundrum facing Lake Hiawatha and much of the watershed. As water makes its way through the watershed it crosses many jurisdictional boundaries. Different public agencies are responsible for the infrastructures which regulate water flow. Water has no regard for jurisdiction. Upstream contributors of pollution pay little attention to their impact on communities and habitats downstream.

HERBICIDES, PESTICIDES AND FERTILIZERS USAGE

Herbicides are applied directly to Lake Minnetonka both by lakeshore property owners and by our public agencies. The herbicide *triclopyr* is used to kill lake weeds. In the debate over the use of these herbicides at Lake Minnetonka, there was little or no discussion about the impact on downstream communities who rely on the very same water as a source for drinking water. I am not aware of any testing data for chemicals that has been conducted at Lake Hiawatha. I did find a test by the USDA which tested one location on Minnehaha Creek at 32nd avenue . This is just below Lake Hiawatha. The test showed high levels of the herbicide triclopyr. Why were high levels of the herbicide triclopyr found in Minnehaha Creek at 32nd avenue? This is the same herbicide that is used to treat Lake Minnetonka. Where did it come from? Could it have come all the way from Lake Minnetonka? Or did it come from the golf course? It makes me question the claims of the rapid dissipation of the chemical. Below is an excerpt from the Minnesota

Department of Agriculture's 2015 Water Quality Monitoring Report.

Table 3-0. 2015 surface water samples with a concentration above 50 percent of an applicable reference value.

Location Name	Site Code	PMR	Date	Chemical	Concentration (ng/L)	Numeric Reference Value Note
Dry Weather Creek	DW1	6	5/20/2015	Acetochlor	1,870	Above 50% of 3,600 ng/L chronic standard
Sand Hill River	SH1	1	6/8/2015	Acetochlor	2,330	Above 50% of 3,600 ng/L chronic standard
Bois de Sioux	BDS	1	5/14/2015	Acetochlor	2,400	Above 50% of 3,600 ng/L chronic standard
Shakopee Creek	S16	6	6/22/2015	Acetochlor	2,400	Above 50% of 3,600 ng/L chronic standard
Three Mile Creek	TC4	7	5/13/2015	Acetochlor	2,440	Above 50% of 3,600 ng/L chronic standard
Rock River	RO1	7	5/11/2015	Acetochlor	2,560	Above 50% of 3,600 ng/L chronic standard
Sleepy Eye Creek	PL2	8	5/18/2015	Acetochlor	3,140	Above 50% of 3,600 ng/L chronic standard
Dry Weather Creek	DW1	6	5/18/2015	Acetochlor	3,210	Above 50% of 3,600 ng/L chronic standard
Shakopee Creek	S16	6	5/20/2015	Acetochlor	4,270	Above 3,600 ng/L chronic standard
Bois de Sioux	BDS	1	5/12/2015	Acetochlor	4,380	Above 3,600 ng/L chronic standard
Three Mile Creek	TC4	7	5/12/2015	Acetochlor	4,630	Above 3,600 ng/L chronic standard
Shakopee Creek	S16	6	5/18/2015	Acetochlor	5,840	Above 3,600 ng/L chronic standard
Pipestone Creek	PSC	7	5/11/2015	Acetochlor	12,100	Above 3,600 ng/L chronic standard
Beauford Ditch	BD1	8	6/22/2015	Atrazine	6,170	Above 50% of 10,000 ng/L chronic standard
Pipestone Creek	PSC	7	6/23/2015	Atrazine	6,470	Above 50% of 10,000 ng/L chronic standard
Fish Creek	FC1	Urban	7/28/2015	Carbendazim	552	Above 50% of 990 ng/L USEPA OPP reference value
Pipestone Creek	PSC	7	8/5/2015	Chlorpyrifos	40.8	Above 50% of 41 ng/L chronic standard
Three Mile Creek	TC4	7	8/10/2015	Chlorpyrifos	70.4	Above 41 ng/L chronic standard
Dry Weather Creek	DW1	6	8/7/2015	Chlorpyrifos	77.5	Above 41 ng/L chronic standard
Chetomba Creek – EMAP	10EM046	8	8/3/2015	Chlorpyrifos	94.5	Above 83 ng/L acute standard
Sleepy Eye Creek	PL2	8	8/10/2015	Chlorpyrifos	99.0	Above 83 ng/L acute standard
Beauford Ditch	BD1	8	8/14/2015	Chlorpyrifos	117	Above 83 ng/L acute standard
Beaver Creek	BC1	7	8/10/2015	Chlorpyrifos	184	Above 83 ng/L acute standard
Lac Qui Parle River	LQ1	6	8/5/2015	Chlorpyrifos	196	Above 83 ng/L acute standard
Minnehaha Creek	MH1	Urban	7/28/2015	Triclopyr	15,800	Above 50% of 19,000 ng/L USEPA OPP reference value

<http://www.mda.state.mn.us/chemicals/pesticides/~media/Files/chemicals/maace/2015wqmreport.pdf>

The result is that water problems go unaddressed. There needs to be a system of oversight and clear designation of responsibility for water that can cross jurisdictional divisions.

If you walk right down to edge of Lake Hiawatha, you will probably see a lot of trash accumulated on the shore. Remember that volunteers have removed at minimum 6,000 lbs. of trash from the Lake since 2015. In that time volunteers have spent over 1,000 hours picking up trash. If an unprecedented effort like that cannot keep up with the accumulation of trash in the Lake, this clearly demonstrates the need for immediate and effective mitigation at Lake Hiawatha.

One of the MPRB's responsibilities is to keep the parkland free of trash. Isolating and capturing the trash in a small area makes more sense economically than trying to pick up the trash from the entire circumference of the Lake and downstream Creek and River.

“OPEN CHANNEL”

I have attended the MPRB's public meetings regarding Lake Hiawatha since 2014 and I participated in the community engagement processes. The park's 4 year long community engagement process helped develop the plans for mitigation that the parks ultimately presented to the public. Their presentation showed the “open channel” as a feature in both of the groundwater pumping scenarios.

What would the “open channel” look like?

It would “daylight” the pipe, which would empty into a catchment pond. There trash would be captured from the storm water. The water would then pass through a meandering channel through the golf course, where it would drop sediment, and slow the water. The channel would then pass through wetlands which would help filter out pollutants in the storm water. Finally the water would enter the Lake much cleaner and free of trash. It is critical to isolate the trash and pollutants before they reach the Lake. This will not only vastly improve the water quality at Lake Hiawatha, but will also improve it for communities downstream who rely on the very same water as a drinking source.

Resident Great Horned Owl at Lake Hiawatha:



Resident Snapping Turtle:



CHAPTER 2.

Artworks and documents created by artist Sean Connaughty

Mitigating Factors - Ark of the Anthropocene and the flood of 2014

In 2014 I designed and constructed a large scale sculpture called the [*Ark of the Anthropocene*](#). The ark is a human-scale biosphere float. It is a self sustaining ecosystem contained within a spherical structure that is designed to float in water. The ark stems from a contemplation of the dramatic changes approaching the global ecology. With rising sea levels comes the disappearance of land mass. The ark serves as a prototype for new greenspaces in response to global land loss. Floating biospheres could create new spaces for ecosystem preservation, agriculture or habitation. In September 2014 the *Ark of the Anthropocene* was launched in Lake Superior as part of my exhibition at The Duluth Art Institute. I had hoped to launch the Ark in Lake Hiawatha after the exhibition in Duluth. I worked for two years on proposals, funding and permissions for a Lake Hiawatha launch of the *Ark of the Anthropocene*. Though the MPRB declined to adopt my proposal, my investigation of the Lake led to the following discoveries and artworks. In the process of planning and site investigation I began to notice the ecological problems facing Lake Hiawatha. I noticed massive quantities of trash littering the shore. In 2015 I began to pick it up with the intention of cleaning up the Lake. Little did I know how complex and difficult achieving that goal would become. I recently realized that the weight of trash removed from Lake Hiawatha now surpasses the weight of the “Ark of the Anthropocene”, which weighs 4,000 lbs. The volume of trash removed from Lake Hiawatha now exceeds the volume of the ark tenfold. On the eve of the inaugural display of the “Ark of the Anthropocene” at The Weisman Art Museum came the torrential rains which caused the flooding of Hiawatha Golf Course in 2014. This flood set into motion events which would intermingle with my own efforts to improve conditions at Lake Hiawatha.



1. 2015 Test Ball

I placed a marked ball into the storm drain at my residence and found it in Lake Hiawatha after the next rain event. This precipitated extensive and continuing community conversation about Lake Hiawatha. This action set in motion for me a series of ongoing activities and artworks that aim to lead to permanent and comprehensive mitigation for the north pipe sewer that empties my community's litter and pollution directly into the Lake and downstream watersheds. Sharing this personal discovery helped raise community awareness of Lake Hiawatha and how trash and pollution from our streets empties directly into the Lake. A petition was created asking for effective mitigation with 1000 signatures.



2. 2015 “Lake Hiawatha – anthropogenic midden survey”

Sandbox Theatre, 42nd street, Standish Ericsson neighborhood September 2015. In an archaeological survey of the trash I removed in the summer of 2015 (2000 lbs.) A 10% sample was sorted, examined and displayed in an exhibition I created working with a collective group of artists, designers and sustainability designers. In addition to displaying the trash collection, the exhibition explored the history of Lake Hiawatha (Rice Lake) and the importance of the Chain of

Lakes to the Dakota people prior to colonization. The exhibition also highlighted the diversity of wildlife inhabitants currently residing at Lake Hiawatha.

One of the goals of the midden survey exhibition was to convince the City of Minneapolis and the MPRB that they must work together to finally mitigate the 43rd street pipe storm sewer system of South Minneapolis. The exhibition was timed to coincide with the MPRB's 2015 public meeting discussing options for the future of Lake Hiawatha and its surrounding parkland in 2015.

A space near Lake Hiawatha was rented for the exhibition. A local space made it easier for community members to attend the exhibition. The exhibition attracted hundreds of visitors, and was the subject of considerable press including comprehensive articles by the Star Tribune, City Pages and a news broadcast by local news station. Local businesses donated to help cover the costs of the exhibition.

Below are several images from the 'midden survey' exhibition:





Students from Northrup School visited the exhibition:



3. 2016 Lake Hiawatha Trash Survey - 2015 document:

I worked with archaeologist Carol Nordstrom, to create a scientific survey of six bags of trash collected from the entire circumference of Lake Hiawatha. The contents of the bags were cleaned, sorted and counted. We recorded the materials, the brand names and types of products found. The results were published in a comprehensive report. The materials were listed from most numerous to least. The most numerous items in order were: Styrofoam/polystyrene, snack wrappers, plastic bottles, plastic drinking straws and bottle caps. Among the most common brands found were Swisher Sweets, Snickers, Nestle Pure Life water and Cheetohs. The hope is that the survey can be a useful document for researchers in understanding the nature of storm sewer trash and establishing a methodology for creating a trash TMDL.

<http://forums.e-democracy.org/groups/mps-staneric/files/f/j1MWf29NpA8rAD1QHzaq4kxr7IN-yfL-2zAWioD/IDENTIFIED%20ARTIFACTS%20Lake%20Hiawatha%202015.pdf>

With Craig Johnson, Annette Walby, Amy Dritz, Carol Nordstrom and Andy Powell.

4. 2016 “Is This Yours?” PSA: filmed, edited and published a public service announcement designed to raise awareness about storm sewer pollution in our waters. The PSA incorporated the data from the trash survey as well as footage of wildlife, and pollution at Lake Hiawatha. In September of 2016, the PSA was displayed publicly on a continuous loop in 18 different locations throughout the community. Places where the PSA was displayed included, the Weisman Museum, The University of Minnesota, Hennepin Center for the Arts and Hiawatha Park Center. Thanks to Martin Gonzales for the invaluable assistance.

Is This Yours? PSA: <https://www.youtube.com/watch?v=AQUfo3O1810>

These are the flyers that were created and posted around the community:

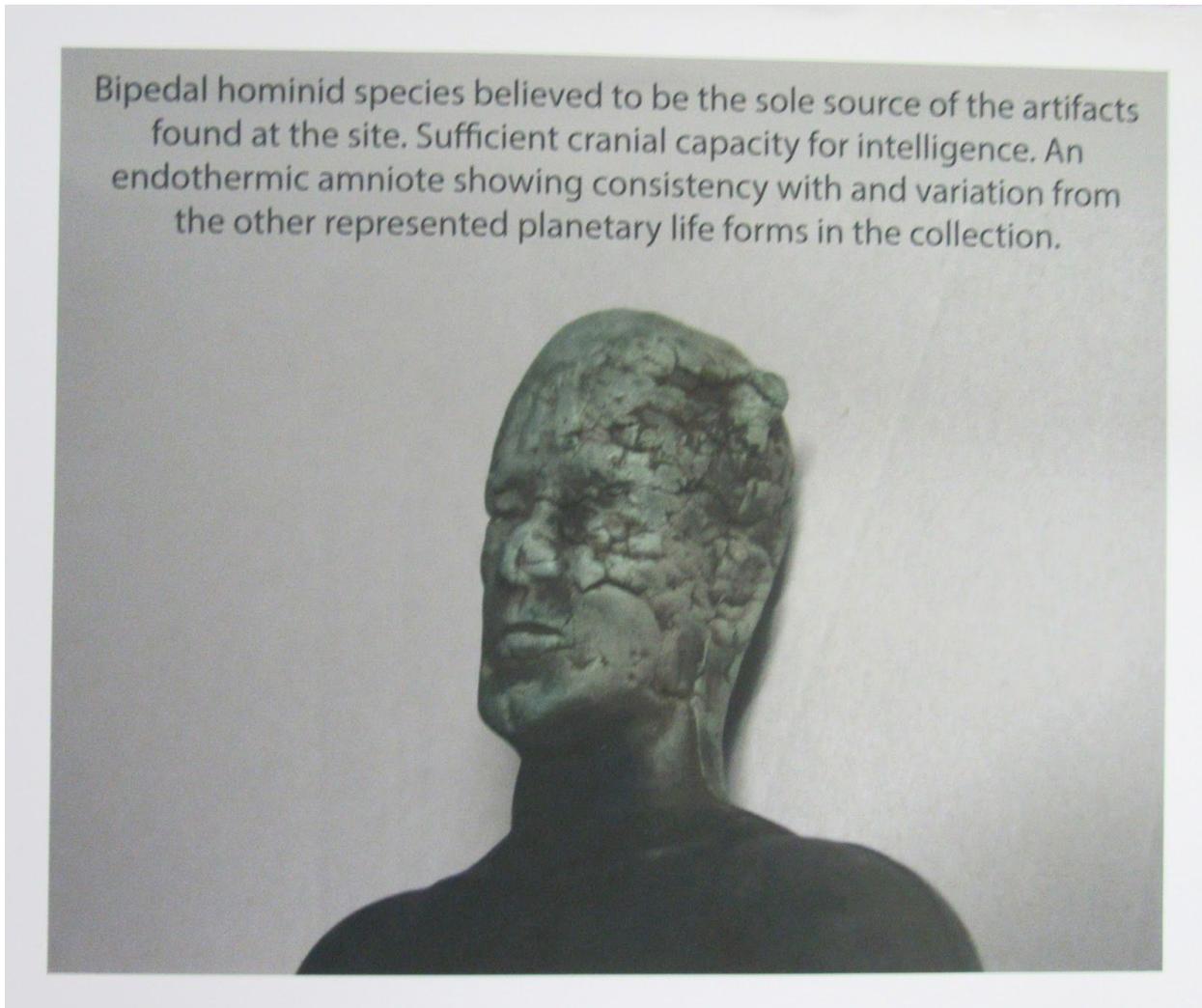




5. “anthropocenic midden survey- preliminary report” 2016

A document and exhibition, at Form and Content Gallery, Minneapolis, MN. In this artwork, archaeologists from the distant future study our civilization through the trash artifacts found at Lake Hiawatha. In the exhibition a series of images superimposed with text excerpts from their "preliminary report" document. The document deciphers clues found in the trash to form a hypothesis on the nature of our civilization. The images are 22x30” images printed on rag paper, the works are displayed in series. Lacking the Earth-based contexts we take for granted, the archaeologists glean insights from our trash that we might be overlooking.

<http://vortexnavigationcompany.com/index.html>



6. 2017 “Lake Hiawatha - chemical analysis”: A document and investigation into the presence and impact of chemical contaminants in our watershed, based on the limited data recorded by our public agencies. Though there was no data I could find on chemicals in Lake Hiawatha, there was the discovery of high levels of the herbicide triclopyr in Minnehaha Creek at 32nd ave. This is just below Lake Hiawatha. I believe the use of herbicides in our watershed is of concern, especially the extensive use of herbicides on golf courses that are adjacent to our waters and I am also concerned about the use of triclopyr in Lake Minnetonka to combat invasive milfoil. I found no discussion of the downstream impact of the use of these chemicals in the official studies and community debates that occurred regarding their use. I would suggest that future discussions about using chemicals at Lake Minnetonka include a strong consideration for the downstream impact, including the impact on drinking water sources for communities downstream. Conversely, the same consideration must be given for the pollution sources that originate on

Lake Hiawatha parkland. The impact of historic and continued use of pesticides on the property has not been studied, but disappearances of amphibians and complete absence of frogs and salamanders on the property should be noted because they are indicators of water health and may be tied to the presence of pesticides in the water. Additionally the use of these chemicals on the lawns of residences and businesses in our subwatershed should also be reduced or eliminated.

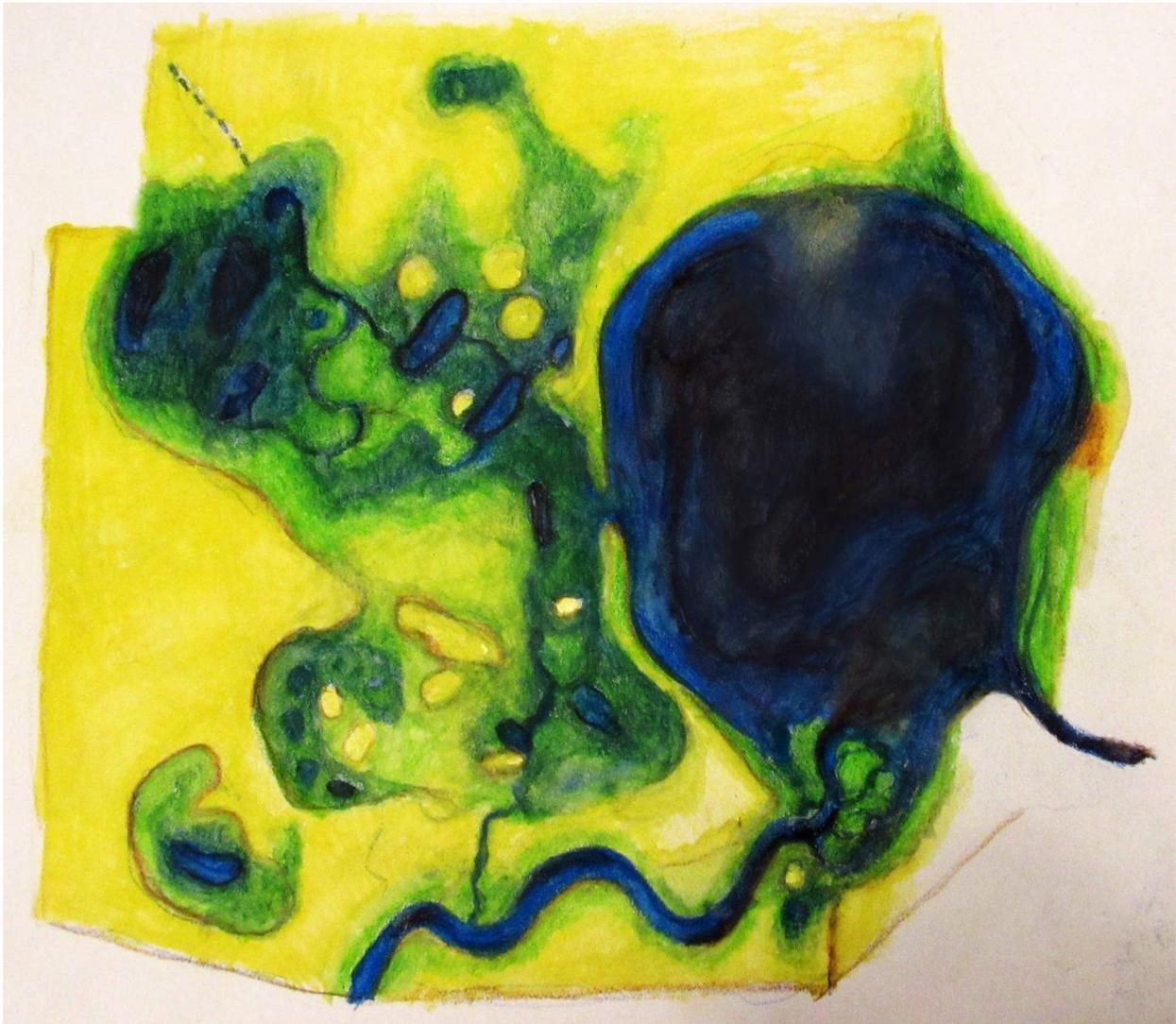
<https://docs.google.com/document/d/1FIJBGhJPASnOIZfXssbjTPoZ-jh5T028SRPEJpCriA/edit?usp=sharing>

The photo below shows my collection of lawn chemical sign holders removed from Lake Hiawatha since 2015:



Lawn Services in Lake Hiawatha's subwatershed and the golf course have used chemicals that kill weeds, insects and a variety of diseases are sold separately and in combination with fertilizers such as 'weed and feed'. These formulations may include organophosphates, carbamates, phenoxy and benzoic acid herbicides like 2,4 D, MCPP, and MCPA, pyrethroids and organochlorines. How is this impacting wildlife populations at Lake Hiawatha and drinking water sources downstream?

Drawing by Sean Connaughty 2018. Based on MPRB projections of the changed water table in a reduced pumping scenario:



When groundwater pumping levels are reduced the water table will change. Water elevations between the golf course and Lake Hiawatha will equalize. The result will be that some of Hiawatha Golf Course will be inundated with water.

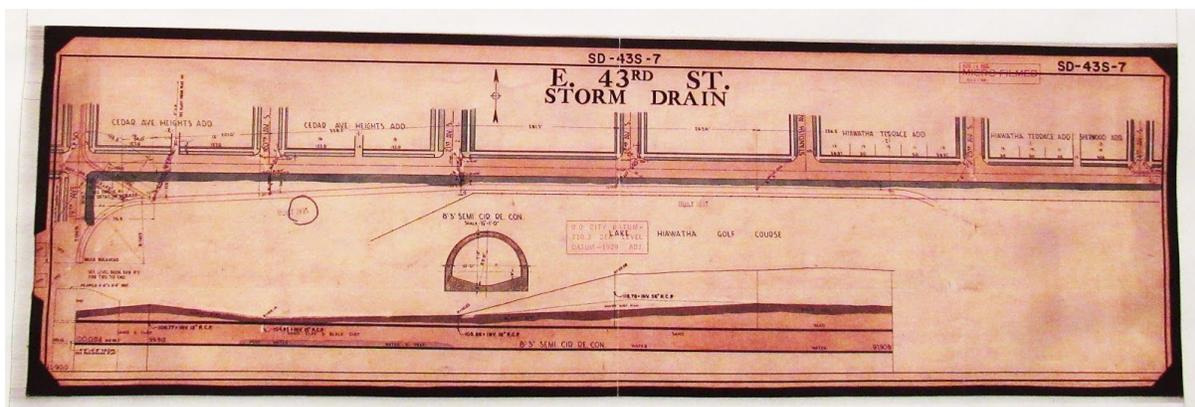
Regardless of public use decisions, these changes present opportunities for development of improved stormwater management, development of climate resiliency and increased ecological integrity within the zones to become wetland.

MPRB’s 2018 Hiawatha Golf Course Property Master Plan Update:

“In August, MPRB Commissioners approved a resolution directing MPRB staff to apply for a permit from the MN Department of Natural Resources (DNR) that conforms to a reduced pumping scenario, and directs staff to begin a public process to amend the Nokomis-Hiawatha Regional Park Master Plan to accommodate changes to the park made necessary by the reduced groundwater pumping scenario. No date or timeline to conclude this work was included in the resolution. However, it was suggested that the depth and breadth of community engagement work necessary to amend the Nokomis-Hiawatha Regional Park Master Plan should allow the golf course to continue operating through at least the 2019 golf season.”

HISTORY - RESEARCH - RICE LAKE - LAKE HIAWATHA

Below is a platt map from the 1930’s The “north pipe” or 43rd street pipe storm sewer outfall was constructed in 1935. The north pipe has gone unchanged since it was constructed.



The photo below was taken before the construction of Hiawatha Golf Course in 1929:



Lake Hiawatha History: (compiled and written by the *Lake Hiawatha anthropocenic midden survey*'s research team 2015)

“The land that encompasses the present day Chain of Lakes and the confluence of the Mississippi and Minnesota Rivers, was, prior to 1854, the spiritual center and home of the Dakota Sioux tribe. The community settled on the shores of Bde Maka Ska and actively foraged, farmed, and hunted for survival. Plant species that they would have foraged include: blueberries, wild spikenard, wild turnips, spatterdock root, water lily, wild rice, acorns, and bittersweet vine. They farmed very selectively using a no till, no drill method. As white settlers encroached on their land they became involved in the fur trade, primarily harvesting muskrat and beaver pelts.”

By the late 1830's, the Dakota had already been significantly pushed from the area as white settlers established themselves and sought to convert them to Christianity. In 1854, the land was surveyed by the Federal Bureau of Land Management and the names of European landowners appear on the parcels adjacent to the Lake. Minnesota was established as a State on May 11, 1858. Through a series of treaties that were not honored through the corrupt fur trading practices of European fur traders, the Dakota endured decades of hardship and starvation. In August of 1862 the Dakota chose to fight back. Known as the Dakota War of 1862, this uprising brought about the deaths of countless people on both sides. The first attack was by a small Dakota hunting party. They killed five white settlers. The Dakota finally surrendered to the United States Army in December of 1862 at which point the white settlers held about one thousand Dakota women and children as prisoners. 300 Dakota warriors were slated for the death penalty. Many of the sentences were commuted by Abraham Lincoln. On December 26, 1862, 38 Dakota men were hanged in the largest mass execution in American History. In 1863, the Dakota were expelled from Minnesota and relocated in Nebraska and South Dakota. The United States Congress abolished their remaining reservations.

The City of Minneapolis was established in 1856 and incorporated in 1867. In 1883, the Minneapolis Board of Park Commissioners appoints 12 new commissioners and landscape architect Horace Cleveland is hired and proposes a vast park system that encompasses the chain of lakes including Minnehaha Creek and touching on the Mississippi River. Mother Lake is dredged and renamed Lake Nokomis and Rice Lake is renamed as Lake Hiawatha. Hiawatha was an actual historical Iroquois chief whose name was used in the poem by Henry Wadsworth Longfellow "the Song of Hiawatha" The poem has little or nothing to do with the historical Iroquois chief in its content.

Although the shoreline of Lake Hiawatha has been altered over time, Cleveland's vision of a series of open green spaces connecting the urban areas of Minneapolis remains. Tiny vestiges of the open oak barren forest remain and the Dakota have made a return to heal the landscape. Minneapolis' diverse community of today has come together to create a clean Lake Hiawatha."

