Final Project Report for:

2023 Lake Hiawatha Boom Project

Completed: December 31, 2023

Prepared For:

Minneapolis
City of Lakes

250 South 4th Street
Minneapolis, MN 55415

Prepared By:

OSPREY INITIATIVE

2350 Halls Mill Rd

Mobile AL, 36606

Contract Number: COM0006803

1. Project Overview

Through funding from the River Network and the City of Minneapolis, Minnesota, Osprey Initiative installed and maintained a tandem litter boom system on Lake Hiawatha from June 6 to November 28, 2023. The lake is in Minneapolis, North of the Minneapolis-St. Paul Airport, within the Ericsson Community. The lake is bordered by several city-owned amenities: including a golf course, public beach, park, and tennis courts.

The litter collection device was located on the North end of the lake in front of a concrete stormwater outfall that passes under the Hiawatha Golf Course. The device was comprised of three components: an energy reducing float line and two litter booms. The energy reduction line disrupted the turbulent flow out of the stormwater culvert and slowed down any material being carried. The first boom line further slowed the water and began to collect floating litter. The final boom collected any materials that may have bypassed the first two lines. This triple interception design was selected to account for dramatic change in water volume caused by heavy rain and significant storm events. A large amount of stormwater passes through the culvert and the flow can transition from calm to chaotic very quickly.

The original project scope dictated eight (8) months of maintenance on the trap. Due to the June installation date and the severe winters in the Great Lakes area, this was not feasible this year. Osprey Initiative and the City of Minneapolis came to an agreement to incorporate a shoreline tactical cleanup of the perimeter for the lake in addition to six (6) months of trap maintenance. The tactical cleanup work was done during the weeks alternating with the device cleanout visits.

Osprey Initiative field technicians serviced the device a minimum of two times each month. During these visits, the technicians removed all litter and recyclables from the trap and the surrounding area. They also skimmed the surface area within the boom system for organic material and reset the boom anchors, as needed. The collected organic debris was placed in receptacles on the shoreline for Friends of Lake Hiawatha for their studies.

At the end of November, the device was uninstalled and placed in storage on the shoreline just inland from the stormwater culvert. The removal and storage of the boom over the winter months will protect it from potential damage caused by moving ice. Additionally, when the lake is frozen, there is very little surface litter movement. It is Osprey's hope that the maintenance contract will be renewed, and the device will be reinstalled in the spring of 2024.

Throughout the project, the litter and recyclables from the device and ongoing tactical cleanup were sorted, weighed, and categorized according to material condition and type. This information was recorded on Osprey's field data sheets. A synthesis of that information is presented in the final report below, along with recommendations for future litter abatement efforts.

2. Goals and Objectives

There were several goals for this project. The first was to see if a litter collection device located at the stormwater outfall of Lake Hiawatha would successfully stop material from entering the lake. A secondary goal was to document the quantity and types of litter collected from the device during the project period utilizing a modified EPA Escaped Trash Assessment Protocol (ETAP). A third was to educate the community about waterborne litter with in-person engagement and several educational signs that were installed on the adjacent shoreline. An additional goal of performing a tactical cleanup of the perimeter of the lake was added after the

initial scope of work was created. The final, unofficial goal was for the Osprey technicians to facilitate volunteer cleanup days at the site for representatives from the Water Stewards program and Friends of Lake Hiawatha.

3. Measurables and Outcomes

Osprey believes that this project has been successful in achieving the goals outlined in Section 2. The boom system withstood heavy rains and several large storm systems. The addition of a series of anchors along the boom lines improved the aesthetic appearance of the trap and kept the wind from blowing it back towards the shore.

The device captured just under 140 pounds of material and prevented that litter from entering the Lake Hiawatha ecosystem. The perimeter tactical cleanups collected another 127 pounds of material that was already in the lake or along the shoreline. The total volume removed was just over 57 cubic feet, which is similar size to a large commercial standup freezer. This information can be seen below in *Table 1: Lake Hiawatha Overall Litter Boom Data – Final Report*.

The technicians recorded general weight and volume data and the ETAP information throughout the project. The ETAP data covers the condition and type of material found, as well as the percentage of each category. A summary of that information and corresponding pie charts are available below in Section 4. Litter Breakdown.

The educational signage installed at the park and golf course complimented the device installation and maintenance. The Freshwater Society also created and distributed several informative videos discussing the project and the importance of addressing litter in our environment. Additionally, the Osprey technicians engaged with any community members who showed interest in the project and had several positive interactions with park visitors.

The technicians performed a partial tactical cleanup of the circumference of the Lake Hiawatha shoreline. There are a few sections where access is not feasible due to heavy vegetation and steep drop-offs in the depth of the lake. The shoreline cleanup was added to the scope of work partway through the contract. Given a full eight-month season of maintenance, a sweep of the entire perimeter could be performed, where accessible.

The last goal of engaging with volunteers was the only objective where the project fell short. On several occasions, the technicians prepared for volunteers to come out and help with the cleanouts and observe the data collection process. This included bringing extra field supplies and data sheets. However, no one attended these events. Section 5. Recommendations and Conclusion provides some ideas for improving this outcome.

Lake Hiawatha Overall Project Data – Final Report							
	Amount - Recycle		Amount - Litter		Amount - Total		Debris
Litter Boom	Lbs.	cf	Lbs.	cf	Lbs.	cf	Lbs.
Lake Hiawatha							
Jun-23	5.98	4.50	58.48	15.50	64.46	20.00	0.00
2023 Q2 Total	5.98	4.50	58.48	15.50	64.46	20.00	0.00
Jul-23	3.10	1.00	15.26	3.85	18.36	4.85	0.00
Aug-23	2.40	2.75	18.70	2.75	21.10	5.50	0.00
Sep-23	1.08	0.10	7.90	0.46	8.98	0.56	0.00
2023 Q3 Total	6.58	3.85	41.86	7.06	48.44	10.91	0.00
Oct-23	4.02	1.75	12.63	2.00	16.65	3.75	0.00
Nov-23	1.00	0.50	7.04	1.75	8.04	2.25	0.00
2023 Q4 Total	5.02	2.25	19.67	3.75	24.69	6.00	0.00
Litter Boom Total	17.58	10.60	120.01	26.31	137.59	36.91	0.00
Tactical Cleanup	7.10	4.45	119.86	16.25	126.96	20.70	2.00
Project Total	24.68	15.05	239.87	42.56	264.55	57.61	2.00

Table 1: Lake Hiawatha Overall Litter Boom Data – Final Report

4. Litter Breakdown

This section will interpret the data regarding the condition and types of material that were collected during the 2023 Lake Hiawatha project implementation. The eight (8) pie charts below are a graphic representation of the litter profiles for both the litter boom cleanouts and the shoreline tactical cleanups. The Condition Breakdown charts identify the material as either "Intact," "Partially Degraded," or "Degraded." This refers to the structural integrity of each item and can also determine if it is new or has been in the environment for quite a while. The ETAP litter profile is comprised of six (6) main categories: Glass, Metal, Paper, Plastic, Styrofoam, and Other. The percentage of each category collected is shown in the charts labeled Major Category Breakdown. Within those categories, "Plastic" and "Other" were the most prominent. The final charts show the more detailed fractionation of the subcategories within the "Plastic" and "Other" categories.

Condition

Generally, most items collected at Lake Hiawatha were "Degraded" for both the device cleanouts and the shoreline cleanups. When we consider that the stormwater culvert conveys water from a larger geographic footprint, this makes sense. Litter may sit along roadsides and in ditches for a long time before enough rain falls to move it into the stormwater channels. The results for the shoreline cleanups are even more distinct, with 88% of the material being either "Degraded" or "Partially Degraded." Given that this is the first time Osprey has conducted a cleanup of the perimeter of the Lake, it is probable that much of this litter has been sitting in the water and shoreline vegetation for years. With the continued interception at the stormwater culvert, it is likely that there will be a reduction in new material entering the lake. This intervention, paired with ongoing tactical cleanups should reduce the recurring litter along the shoreline.

Major Categories

Plastic was the most common category found through both the device maintenance and tactical cleanups. This lines up with historical data and information from other litter interception projects. Interestingly, the plastic percentage for the shoreline cleanup was much higher than the litter trap (75% vs. 60%). There are several theories for this. Plastic tends to stay floating and wash up on the shoreline so it is easier to identify than those materials that may sink or be buried in the sediment, such as glass or metal. It also holds up better than both paper and Styrofoam. Although Styrofoam persists at the microplastics level, it degrades from its "Intact" state relatively quickly due to UV degradation and other environmental factors.

The second most prevalent major category for both efforts was "Other." This is a catch-all for items that do not easily fit into one of the other groupings. It includes everything from toiletries and medications to sporting equipment and cigarettes. We will dive into the composition of "Other" materials in the "Other Subcategories" section.

Plastic and Styrofoam Subcategories

This section reflects a strong trend towards drink receptacles: "Water Bottles," "Beverage Bottles and Containers," and "Bottle Caps" make up 41% of the "Plastic" category for device maintenance and 31% for the shoreline cleanup. These percentages reflect the items by count, not by volume or weight. For litter that originates within the park, this is typical as users are often carrying water or drink bottles with them while exercising and recreating. These are also common items found on the sides of roads. They are easily transportable by rain and tend to collect in calm eddies and sloughs. Thus, they are very prevalent in stormwater systems.

The other two most common subcategories were "Hard Fragments" for both efforts and "Food Wrappers" and "Bags and Film" for the shoreline cleanup. The high percentage of "Hard Fragments" is not unexpected, given that most of the material was designated as either "Degraded" or "Partially Degraded." The food wrappers and bags collected along the shoreline were often caught in vegetation such as marsh grasses and tree roots, keeping them from being swept out into deeper sections of the lake where they could not be inventoried.

Other Subcategories

Within the "Other" category, the device maintenance and shoreline cleanup show a distinct difference. The litter boom site saw "Cigarettes/Tobacco Packaging" as the most dominant subcategory at 57%. This includes cigarette butts, chewing tobacco, cigars, and marijuana related paraphernalia and packaging. When not utilizing a trash can, smokers generally dispose of their butts on hard surfaces where they can be ground out. This often equates to sidewalks, parking lots, and roads. Cigarette butts are a small, lightweight, floatable litter item and only require a small amount of rain to be moved into the stormwater system. This has resulted in the Lake Hiawatha outflow becoming a collection point for this material.

Conversely, the shoreline tactical cleanup recorded "Sports Equipment" as the most common subcategory (47%), with golf balls comprising a large portion of that percentage. The Hiawatha Golf Course wraps around more than half of the perimeter of the lake, making this an unsurprising statistic. The Osprey technicians cleaned both the vegetative buffer and shallow portions of the water's edge during the tactical cleanups. As such, they were able to retrieve items that most recreational users would not attempt to recover.

Figure 1: Lake Hiawatha - Litter Boom
Condition Breakdown
June - November 2023

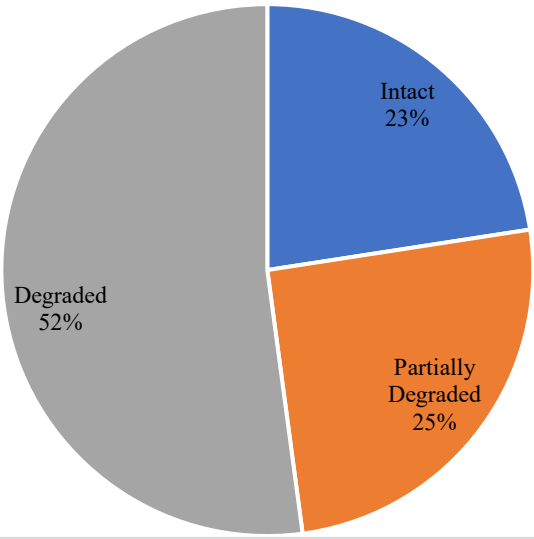


Figure 2: Lake Hiawatha - Litter Boom
Major Category Breakdown
June - November 2023

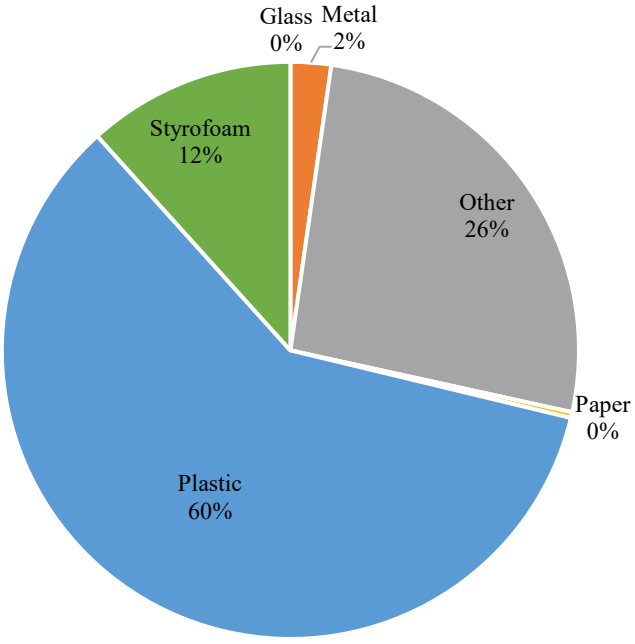


Figure 3: Lake Hiawatha - Litter Boom
Plastic and Styrofoam Breakdown
June - November 2023

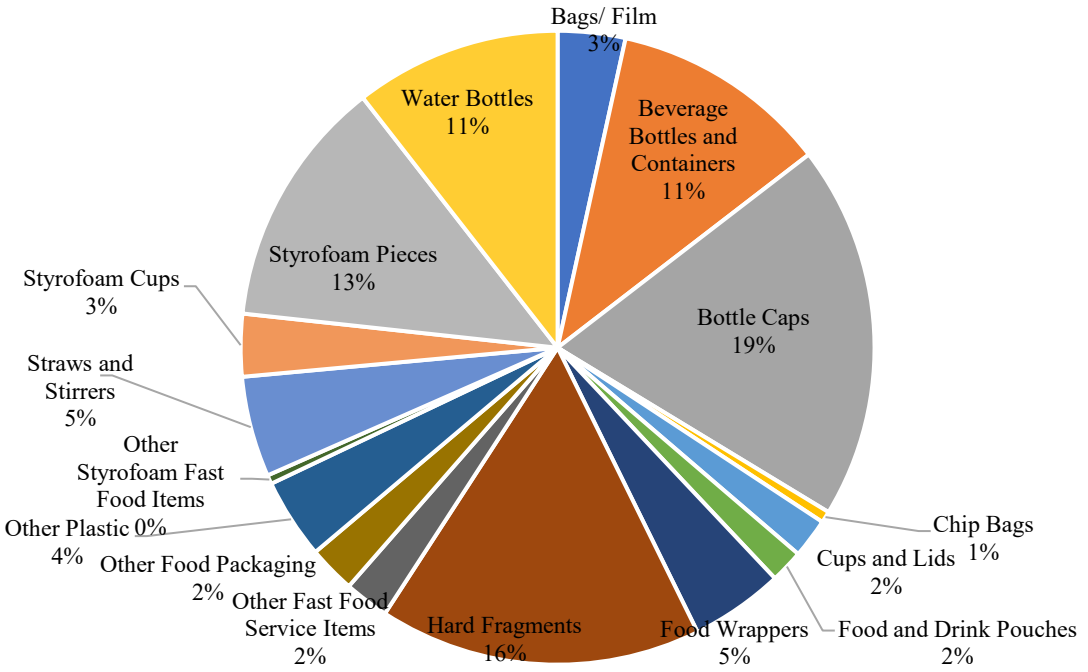


Figure 4: Lake Hiawatha - Litter Boom
Other Category Breakdown
June - November 2023

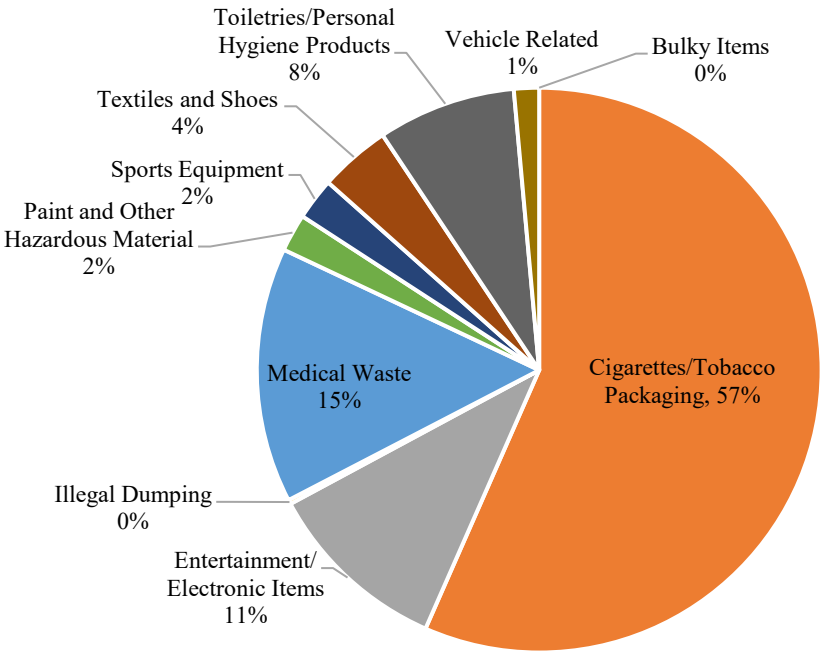


Figure 5: Lake Hiawatha - Tactical Cleanup
Condition Breakdown
September - November 2023

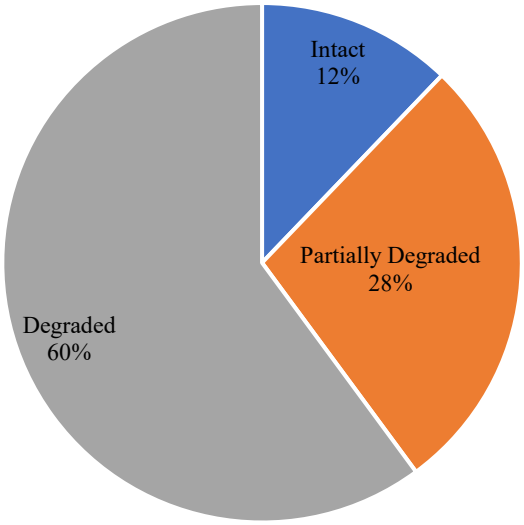


Figure 6: Lake Hiawatha - Tactical Cleanup
Major Category Breakdown
September - November 2023

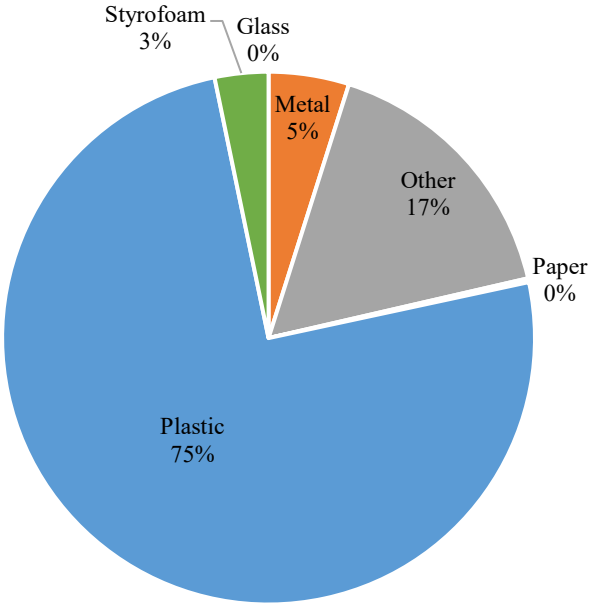


Figure 7: Lake Hiawatha - Tactical Cleanup
Plastic and Styrofoam Breakdown
September - November 2023

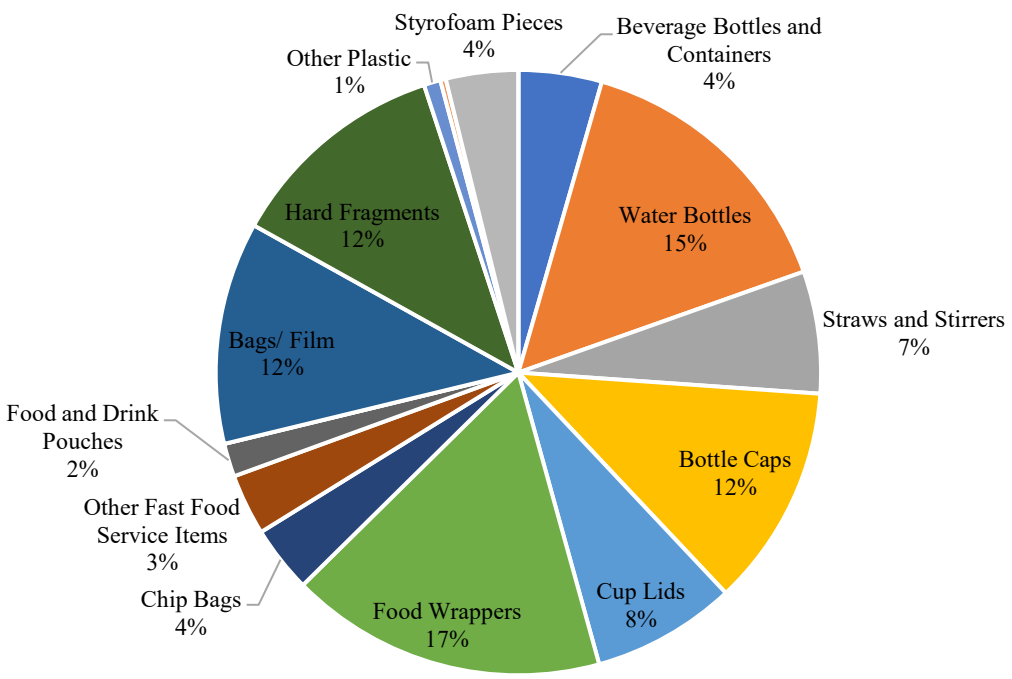
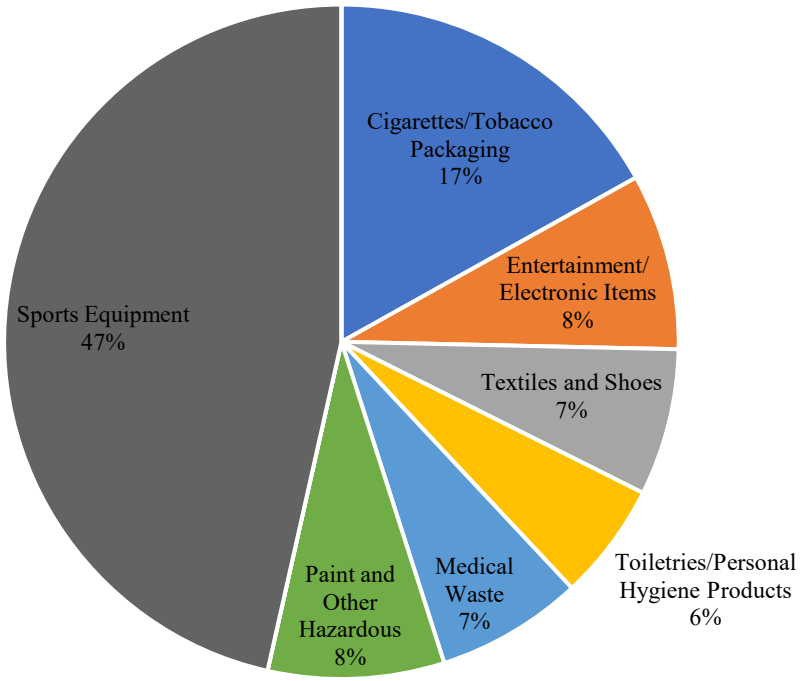


Figure 8: Lake Hiawatha - Tactical Cleanup
Other Category Breakdown
September - November 2023



5. Recommendations and Conclusion

A continuation of the Lake Hiawatha Boom Project is proposed for 2024. Osprey recommends that this be executed with several modifications. These changes come from a combination of field observations and discussions with the 2023 Osprey Field Technicians who performed the device maintenance and shoreline cleanups.

- The 2023 project was shorter than expected due to the June installation date. The 2024 device installation and project kickoff should be scheduled for spring, to align with the ice melt and the reopening of the Hiawatha Golf Course. This will allow for a full eight months of maintenance.
- The shoreline tactical cleanup should commence along with the device installation and maintenance, to follow a similar alternating week schedule as the 2023 project. This will ensure that the project team is at Lake Hiawatha each week for any unforeseen issues.
- Access to the project site should be exclusively through the Hiawatha Golf Course if the course management is still amenable to that arrangement. The Osprey technicians established a good relationship with the representatives working in the club house. The golf course has ample parking, easy waste disposal options, restrooms, and access to golf carts for transporting tools and collected litter.
- Osprey technicians should be given magnetic placards (or some other form of identification) acknowledging that the project has an affiliation with the City of Minneapolis. This measure, along with access through the golf course, should minimize any negative interactions with park visitors.
- Like the 2023 project cycle, a large kickoff event with a tactical cleanup is a great way to showcase the partnership and foster community engagement. Osprey encourages local politicians and decision makers to be included in the list of invitees.
- Volunteer events should be more structured and pre-planned. This will allow the technicians to better prepare for the number of participants and timeframe, as well as supplies required. If these can be paired with existing events put on by Freshwater Society, Friends of Lake Hiawatha, or other civic groups, it is likely that they will be more successful.
- If there is interest, Osprey can provide more specific data collection related to a variety of metrics. This could include tracking locally relevant items being collected (i.e. to-go containers from specific restaurants or bags from certain stores), in-depth brand audits, or mapping of dispersal concentrations of material along the shoreline.
- If there is interest in pursuing the source of the litter entering Lake Hiawatha through the stormwater culvert, Osprey would be happy to coordinate with the Surface Water and Sewer Department to research additional possible upstream intervention sites.

The 2023 Lake Hiawatha Boom Project has been a success in all the standard metrics of litter collection and community engagement. It has furthered the discussion of what viable litter reduction projects may look like. It has also opened the possibility of additional installations throughout other area lakes and rivers. These opportunities would not be possible without the assistance of the entire Minneapolis project team. Special thanks to the City of Minneapolis and the Freshwater Society for the technical and financial support of this project. Osprey Initiative looks forward to working with you all again in 2024, and beyond.