

## South Shore Beach

### *Goal: Improving beach health for swimming and recreation*

#### Background

- *South Shore Beach is considered chronically contaminated and has been cited as one of the worst beaches in the Great Lakes and US.*
- *Major improvements are needed to assure a safe and healthy beach for swimming.*
- *Studies of water movement and water quality suggest greater water exchange at the rocky beach compared with the existing beach and 40 times lower bacterial contamination levels on average than the existing beach.*

In 1999, the City of Milwaukee received a grant from the EPA to increase monitoring of recreational beaches around Milwaukee, WI. The bacteria *E. coli*, found in the gut of almost all warm blooded animals and birds, is used as an indicator for fecal pollution. Nearly daily monitoring of South Shore Beach revealed this fecal pollution indicator was above the EPA recommended limit nearly 60% of the days tested. Since then monitoring has continued, and some years have been better than others. For example, from 2010 through 2015, the number of advisory days at South Shore ranged from a low of 34 in 2011 (31%) to a high of 74 days in 2015 (69%). The difference in a particular year's water quality is influenced by several factors, including the number of days there is rainfall.

Since 2001, researchers from the McLellan Lab at the School of Freshwater Sciences, UWM have used extensive field surveys and molecular testing methods to unravel causes of poor water quality at South Shore Beach. These studies revealed that there are multiple sources of contamination. The majority of the fecal pollution originates from bird waste, where gulls, ducks, and geese deposit *E. coli* into the sand and water, and on imperious surfaces like the parking lot. Birds can carry bacteria and protozoa that can cause diseases in humans, so this type of waste is not harmless.

Human waste has also been intermittently detected at low levels. Illicit discharges from boaters and/or leaking sewer lines are two possible explanations and are being investigated. In addition, there are more large-scale, regional sources of fecal pollution during heavy rain that impact not only South Shore, but also many of Milwaukee's beaches. Combined sewer overflows (CSOs) occur when there is extreme rainfall 1-2 times per year and beaches close to the harbor or CSO outfalls are contaminated affected. Human waste presents a serious health hazard as it carries disease-causing organisms.



Pictured above: South Shore just south of the beach where geese, gulls and ducks congregate.

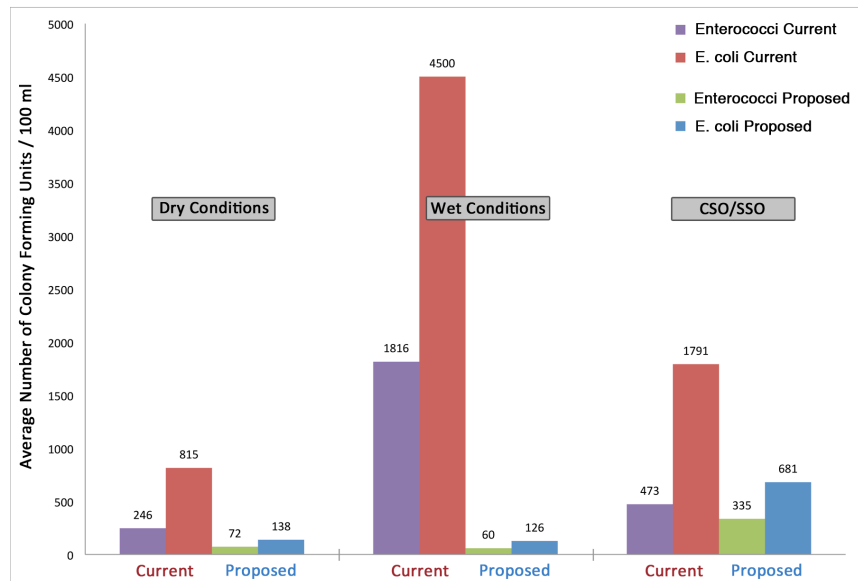
Water circulation is also an issue within the marina. Pollution that is washed into the water is not easily removed at South Shore beach. The beach is enclosed by a breakwall with minimal water circulation. Around the Great Lakes, beaches in highly developed areas and within breakwall structures are notoriously have poor water quality. Dye studies by the McLellan lab have revealed there is a dominant along shore current, with little exchange with the deeper water off the beach. The rocky beach, just 150 meters to the south of the existing beach, is opposite an opening in the breakwall and closer to the end of the breakwall, which improves circulation. Prevailing currents during two summers of study were from the south to the north, which brings lake water with less pollution to the rocky beach. The exact current patterns vary day to day, however field observations and studies of water movement suggest water exchange is greater at the rocky beach compared with the existing beach.



Pictured Above: Fluorescein dye released at the shoreline quickly dispersed along the shore with little mixing with off shore waters.

The existing beach and the rocky beach, just 150 meters to the south, were monitored side by side for the past 12 years. The rocky beach was found to have on average 40 time better water quality than the existing beach for both *E. coli* and enterococci, another fecal bacteria indicator recommended by the EPA (graph below). These results are due to a combination of fewer pollution inputs and more water circulation.

Bar graph: *E. coli* and enterococci were measured on the same day at the current beach and the proposed beach (rocky beach). Water quality was 40 times better on average in dry weather, after rainfall, and. Combined sewer overflows impact both beaches equally. *Data from Russell Ave Technical Report (2016) Fisher et al.*



## Management Recommendations and Current Activities

- *Moving the beach should create a better, cleaner beach*
- *Proposed work would build upon the master plan*
- *No beach is completely bacteria free*
- *There is no one solution to the problem, but rather a group of actions that we can take based on the most current data.*

Plans to deal with the runoff from the parking lot have been developed as part of the Master Plan for South Shore Park. The plans call for green infrastructure to capture and filter runoff from the impervious surfaces. Best management practices such as grooming the sand and bird deterrents are currently in use at the beach.

However, given the large number of pollution sources at South Shore Beach, it would be difficult to reduce runoff and bird waste to zero in that area. Low water circulation exasperates any pollution entering the beach. There are fewer pollution inputs and likely better water exchange at the rocky beach to the south of the existing beach, and even with no improvements to the area, the rocky beach has 40 times lower *E. coli* levels on average than the existing beach (see bar graph). Reducing runoff with green infrastructure, checking for failing sewer lines, and educating boaters about proper disposal of sanitary waste will improve water quality, however, intensive monitoring surveys to map pollution footprints, and measurements of currents within the South Shore breakwall demonstrate that moving the beach to the south is worth further exploration to create a clean and healthy beach. Identifying a site more conducive to having a swimming beach, along with aggressively pursuing best management practice to reduce pollution with the immediate area are a group of actions that would improve recreational opportunities at South Shore Beach.

## Next Steps

- Milwaukee County, along with multiple partners will begin to study the possibility relocating the beach to the south.
- Public outreach and input will be sought during the process.

## Partners & Funders

Milwaukee County Parks  
Wisconsin DNR  
School of Freshwater Sciences  
MillerCoors

MMSD  
Fund for Lake Michigan  
Wisconsin Sea Grant

*This fact sheet was prepared by the McLellan Lab, School of Freshwater Sciences and the Wisconsin DNR office of the Great Lakes.*