NONPOINT SOURCE SUCCESS STORY

Illinois

Mill Creek BMP Implementation Addresses Dissolved Oxygen (DO) and pH Impairments

Waterbody Protected

Mill Creek , in northeastern Illinois, was impaired due to dissolved oxygen and pH. Illinois placed 12.97 miles of the creek on the Clean Water Act (CWA) Section 303(d) list of impaired waters in 2016 based on water sample analysis. The Lake County Stormwater Commission oversaw two grants, Des Plaines River Watershed BMP Implementation and Planning Program (2015) and the Lake County Countywide BMP Implementation Program (2017) that improved the water quality of Mill Creek. The 2015 project updated the Mill Creek watershed-based plan. Both projects implemented a series of Best Management Practices (BMPs) including bioswales, grassed waterways, filter strips, conservation tillage, stream buffers, and shoreline stabilization which produced measurable improvements in water quality. Illinois removed Mill Creek from the CWA Section 303(d) list of impaired waters in 2020/22 for dissolved oxygen and pH.

Water Quality Challenge

Mill Creek (IL_GW-02) drains a 30.9-square-mile subwatershed of the Des Plaines River Watershed in north central Lake County. Mill Creek flows north to its confluence with North Mill Creek. It then flows east to the Des Plaines River in Wadsworth. The creek was listed as impaired for dissolved oxygen and pH in 2016. The land uses in the watershed are primarily residential, commercial, and some agricultural land. Though the source of impairment is unknown for pH and dissolved oxygen, the dissolved oxygen impairment is primarily caused by excessive nutrients and organic matter from runoff, leading to decomposition that depletes oxygen levels.

In Illinois, general use waters at all locations must maintain sufficient dissolved oxygen concentrations to prevent offensive conditions. Quiescent and isolated sectors of general use waters, including wetlands, sloughs, backwaters, and waters below the thermocline in lakes and reservoirs, must be maintained at sufficient dissolved oxygen concentrations to support their natural ecological functions and resident aquatic communities. The minimum concentration for dissolved oxygen must be greater than 5.0 mg/L at all times and pH must be within the range of 6.5 to 9.0 except due to natural causes.

Figure 1. Shoreline at Chesapeake Landing Pond prior to project, note erosion and turfgrass to water's edge along entire shore.

Project Highlights

The 2015 project updated the CWA Section 319(h) funds supported a 2015 update to the Mill Creek watershed-based plan and and both projects implemented BMPs implementation from 2015-2019 to improve water quality in Mill Creek. The 2015 and 2017 CWA sSection 319(h) projects addressed sediment, total suspended solids, phosphorus, and nitrogen pollutant contributions to Mill Creek. , implementingThese projects implemented site-specific BMP action recommendations from the Mill Creek Watershed-Based Plan to stabilize erosion, remove sediment, and reduce associated pollutant contributions.

The Des Plaines River Watershed BMP Implementation and Planning Program (2015) developed a watershed-based plan for the Upper and Lower Des Plaines River (IL_G-36). The plan updated five existing watershed-based plans (North Mill Creek –Dutch Gap Canal Watershed-Based Plan, Mill Creek Watershed and Flood Mitigation Plan, Indian Creek Watershed Plan, Bull Creek/Bulls Brook Watershed-Based Plan, and Buffalo Creek Watershed-Based Plan) and integrated them under an expanded planning area. This project also implemented BMPs in the Mill Creek sub-watershed including (2,565 linear feet of bioswales, 7.1 acres of grassed waterways (including tile repair), 2.6 acres of filter strips, and 34 acres of conservation tillage).

The Lake County Countywide BMP Implementation Program (2017) installed BMPs in the Mill Creek watershed at the Chesapeake Landing Pond that stabilized 1,350 linear feet of eroding shoreline and established a 0.5 acre buffer of native vegetation around an existing wet detention basin in Grayslake, Illinois.

Figure 2. Shoreline at Chesapeake Landing Pond following bank re-shape and buffer seeding.

Best Management Practice	Number Installed	Units	Comments
Grassed Waterway	7	AC	
Streambank & Shoreline Protection	1350	FT	
Subsurface Drain	30	FT	
Vegetated Swales	2565	LINEAR FEET	
Filter Strip	.5	AC	
Filter Strip	2.6	AC	
Conservation Tillage	34	AC	

Results

The Illinois EPA assessed water quality in Mill Creek to determine whether it should remain on the CWA Section 303(d) list of impaired waters. Based on the impairment criteria, results showed that the creek was no longer impaired for dissolved oxygen or pH due to no standard violation in new data for

2020 cycle. At this time, pollutant levels had dropped enough to justify removing Mill Creek from the 303(d) list. These improvements can be partly attributed to BMPs reducing nonpoint source runoff, the primary source of these pollutants, but also due to the watershed-based plans that set important goals and objectives for strategically reducing nonpoint source pollutant loadings to the Mill Creek watershed.

The BMPs implemented in these projects resulted in estimated pollutant reductions of 10 tons of sediment per year, 40 pounds of phosphorus per year, 55 pounds of nitrogen per year, and 35,000 pounds of total suspended solids. Data collected by the Illinois Environmental Protection Agency (IEPA) at two monitoring sites on June 6th, 2018, supports the delisting for dissolved oxygen (Figure 3) and pH (Figure 4). IEPA and the local watershed group will continue to monitor progress and determine what additional work may be necessary.

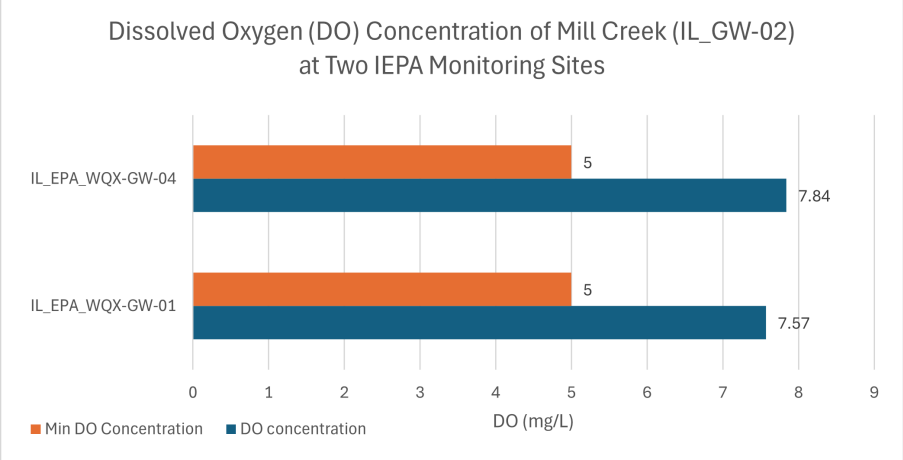

Figure 3. Dissolved oxygen concentration of Mill Creek at two IEPA monitoring stations. Data collected on June 6th, 2018.

Partners and Funding

Partner Type	Agency	Funding	Notes
Federal	IEPA CLEAN WATER ACT SECTION 319	$658,162	2015 319 Award Funds
Federal	IEPA CLEAN WATER ACT SECTION 319	$363,962	2017 319 Award Funds
State	Illinois Department of Transportation	-	Participate in watershed planning process
State	ILLINOIS EPA SURFACE WATER SECTION	-	Provided water quality monitoring and assessment
State	Illinois Tollway Authority	-	Participate in watershed planning process
City	Village of Gurnee	-	Participate in watershed planning process
City	Village of Lindenhurst	-	Participate in watershed planning process
City	Village of Libertyville	-	Participate in watershed planning process
City	GRAYSLAKE COMMUNITY PARK DISTRICT	-	Participate in BMP implementation
County	Lake County Public Works	-	Participate in watershed planning process
County	Lake County Department of Transportation	-	Participate in watershed planning process
County	COLLEGE OF LAKE COUNTY	-	Participate in BMP implementation
County	Lake County Forest Preserve District	-	Participate in watershed planning process and BMP implementation
County	Lake County Emergency Management Agency	-	Participate in watershed plan development
County	Lake County Health Department	-	Participate in watershed plan development

Other	Bull Creek – Bulls Brook Watershed Council	-	Participate in watershed planning process
Other	Diamond Lake Preservation Alliance	-	Participate in watershed planning process
Other	Buffalo Creek Clean Water Partnership	-	Participate in watershed planning process
Other	Conserve Lake County	-	Participate in watershed planning process
Other	Libertyville-Mundelein Historical Society	-	Participate in watershed planning process
Other	LOCAL PARTNERS	$327,855	2017 319 Match Funds - Many partners contributed to match funds
Other	Third Lake Management Committee	-	Participate in watershed planning process
Other	Village of Buffalo Grove	-	Participate in watershed planning process
Other	Loch Lomond Property Owners Association	-	Participate in watershed planning process
Other	LOCAL PARTNERS	$751,242	2015 319 Match Funds - Many partners contributed to match funding
Other	Prairie Crossing Charter School	-	Participate in watershed planning process
Other	Libertyville Open Space District	-	Participate in watershed plan development
Other	North Shore Water Reclamation District	-	Participate in watershed planning process
Other	Mundelein Park District	-	Participate in watershed planning process
Other	Gages Lake Lakes Committee	-	Participate in watershed planning process
Private Sector	Northwater Consulting	-	Participate in watershed planning process
Private Sector	TEMPEL FARMS	-	Participate in watershed planning process

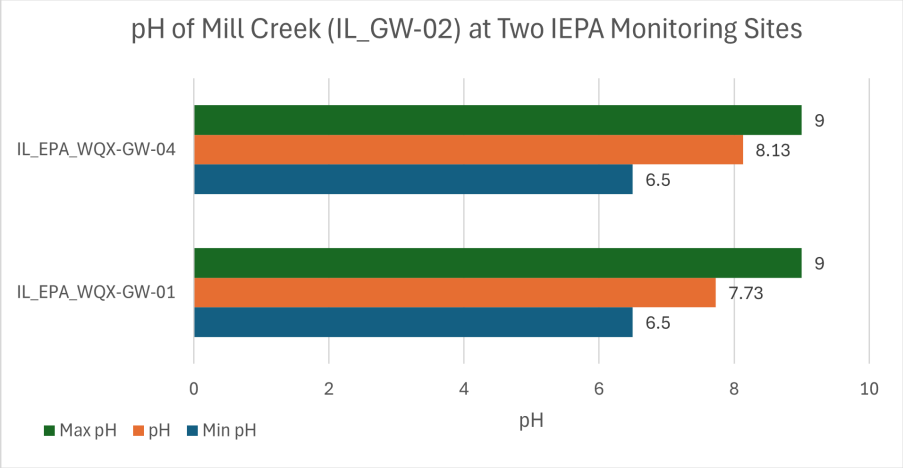

Figure 4. pH of Mill Creek at two IEPA monitoring stations. Data collected June 6th, 2018.

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