down to earth

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Project Spotlight: Woodsyde Stormwater and Stream Restoration

By Elizabeth Spencer, Watershed Restoration Engineer

As fall is arriving, the Bureau of Resource Management is excited to complete the final stage of construction at the Woodsyde Stormwater and Stream Restoration Project site, where hundreds of trees, shrubs, and herbaceous wetland plants are now being planted. Although this final work will take the least time, it is one of the most rewarding to bring years of assessments, design, and construction to completion.

The Woodsyde project includes the retrofit of two separate stormwater management facilities and the restoration of approximately 1,900 linear feet of the adjacent stream channel between Piney Ridge Parkway and Avonshire Court in Sykesville. The two stormwater management facilities were originally constructed to address stormwater runoff from the Woodsyde Estates residential subdivision. The smaller facility, adjacent to Ash Grove Court, was a small sand filter that collected stormwater runoff from approximately 9 acres; the larger structural facility, adjacent to Piney Ridge Parkway, manages approximately 50 acres in what was originally a shallow marsh facility.

These facilities did not provide adequate storage to buffer the impacts of the stormwater runoff from eroding the receiving stream channels. As a result, the once very small stream was eroded vertically by 8-10 feet, with the top of bank width now 30 – 35 feet across.

While the tiny stream once allowed flood flows to reach the floodplain on an annual basis, the eroded gully contained nearly all flood flows, taking with them the banks and a high concentration of nutrients and sediment.

The best solution for managing the stormwater was to retrofit the two existing facilities to maximize management with an improved design. Although this solution addressed current stormwater needs, the highly eroded stream channel downstream would require years, perhaps decades, of continued erosion and loss of sediment before the stream could establish a stable system.

Resource Management has been addressing most stormwater issues with management facilities that can be situated closest to the source of the runoff from impervious area. This typically minimizes environmental disturbance. Further, our monitoring results are showing that the once-eroded receiving streams are passively healing with improved management from our stormwater facilities. Due to the degree of erosion at this site, however, the passive approach would have ultimately led to greater total environmental disturbance.

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https://www.carrollcountymd.gov/government/directory/land-resource-management/resource-management/

Protecting and managing Carroll County's natural resources for the pleasure and enjoyment of its Citizens

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Century Engineering was contracted for the stormwater retrofit and stream design. The County received $50,000 from the National Fish and Wildlife Foundation to help fund project design. The stream design approach was to raise the stream as much as possible while providing a sustainable stream and floodplain system and minimizing forest impacts of construction. The majority of the stream bed was raised by 5-6 vertical feet, with the channel meandering mostly within the original channel footprint. The nested floodplain terrace was designed to convey the majority of the 50-year storm event.

The restored channel has low banks to allow the rooting system of floodplain vegetation to extend into the nutrient rich hyporheic zone. Grade control log structures, cut-off sills, and clay channel plugs were also designed to raise the groundwater table for floodplain reconnection and nutrient processing. The new plantings will complete the construction phase for Magstone Construction; however, the larger rewards will be visible as the stream and floodplain system settles and becomes more established over the next two to three years. The County received a grant award from the Maryland Department of the Environment Bay Restoration Fund towards construction of this project.

before

after

Grant funding for this project provided by:

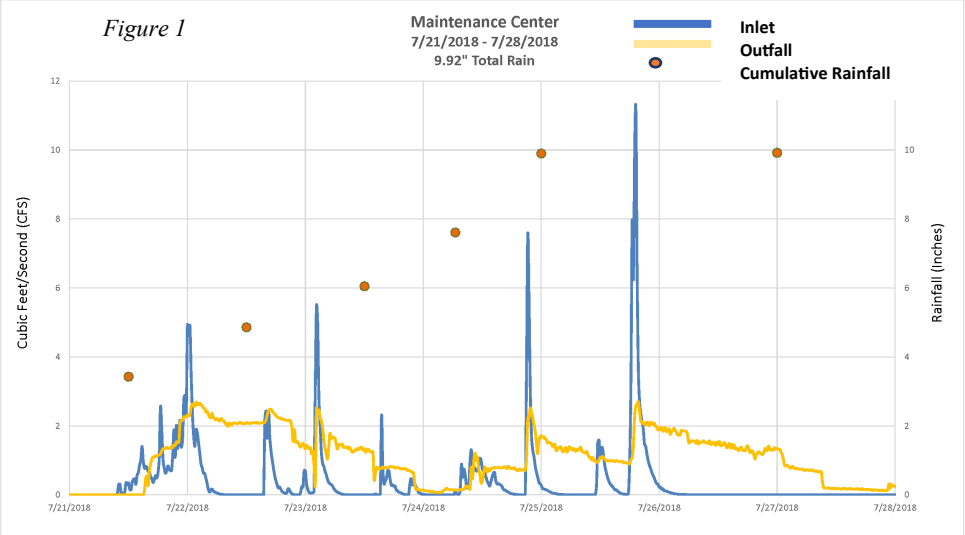
NATIONAL FISH AND WILDLIFE FOUNDATION NFWF

Maryland Department of the Environment

Testing Innovative Ways to Remove Phosphorus from Stormwater Runoff

By Byron Madigan,
Water Resource Supervisor

Figure 1



The Carroll County Bureau of Resource Management, through the National Fish and Wildlife Foundation's (NFWF) Innovative Nutrient and Sediment Reduction (INSR) program received a research monitoring grant to measure changes in influent and effluent concentrations of nutrients from stormwater runoff. The primary objective of this before and after study is to determine the difference in dissolved phosphorus and total phosphorus mass removal from stormwater runoff between a standard sand filter design and an enhanced sand filter design utilizing an additive to the sand media.

The Center for Watershed Protection developed the monitoring plan for this project, based on the Maryland Department of Environment's (MDE) innovative/alternative best management practice (BMP) monitoring requirements. For statistical purposes, the monitoring plan requires a minimum of 30 storms with a cumulative rainfall of 15" for both the traditional and enhanced filter. The County has concluded monitoring of the traditional filter. The iron rich media conversion was completed, so storm event monitoring of the enhanced filter will begin. County staff will be conducting all sampling through the use of automated sampling equipment.

For this study, the enhanced sand filter design utilizes an iron (Fe) additive sourced from Charah Solutions, a "national leading provider of environmental services and byproduct sales". Kibler Construction performed the media conversion, which involved incorporating 5 percent (by volume) of the iron rich material into the upper six inches of the sand filter media.

Theoretically, the enhanced media will increase the removal of total phosphorus from stormwater runoff as the phosphate will bond with oxygen and iron as it passes through the aerobic zone forming an insoluble iron-orthophosphate compound that will precipitate out into the sand as nodules. It is expected that the iron enhanced filter will remove 85%-90% of phosphates from stormwater as it passes through the filter. According to MDE's accounting for stormwater wasteload allocations, the current standard filter, which is designed to treat 2.5" of runoff from paved areas, reduces 62% of the total phosphorus. Maximizing treatment depths also provides channel protection volume by reducing the magnitude, duration and frequency of erosive flows as seen in Figure 1 during a week in the summer of 2018 when the facility received 9.92" of rain beginning on July 21st.

The goal of this study is to provide the results of monitoring to MDE and the Chesapeake Bay Program to adopt the enhanced sand filter design as an approved BMP.

Post storm event

Stable outfall discharge dewatering facility

Iron rich media (above); media being added to the sand filter (right)

Kid's Corner

Word Search

C	I	D	E	R	Y	L	E	R	P
I	O	Y	X	A	U	V	T	N	U
H	A	R	V	E	S	T	G	O	M
F	A	Z	N	O	O	H	N	T	P
F	U	L	L	M	O	O	N	E	K
L	T	V	Y	S	A	U	B	L	I
C	U	G	T	H	E	Z	J	E	N
Y	M	P	T	R	E	C	E	K	P
L	N	W	Q	S	A	S	U	S	I
M	D	E	T	N	U	A	H	E	E

Word List

Autumn
Cider
Corn Maze
Full Moon
Ghost
Harvest
Haunted
Pumpkin Pie
Skeleton

Watch the video [Why Do Leaves Change Color](https://www.youtube.com/watch?app=desktop&v=Xk4-6II8l5Q)

https://www.youtube.com/watch?app=desktop&v=Xk4-6II8l5Q

(source Maryland Department of Natural Resources)

Fall Word Scramble

ttera	_ _ _ _ _
ncor eamz	_ _ _ _ _ _ _ _ _
leleawonh	_ _ _ _ _ _ _ _ _ _
kpnupim	_ _ _ _ _ _ _
lapsep	_ _ _ _ _ _
worecarsc	_ _ _ _ _ _ _ _ _
dicer	_ _ _ _ _
vealse	_ _ _ _ _ _

Word List

Halloween
Apples
Pumpkin
Cider
Corn maze
Leaves
Treat
Scarecrow