

# Land as Nature Intended It

## Stream Restoration Efforts Restore Watersheds, Improve Water Quality

*by Beth Forbes, Stormwater Program Manager*

### Why Our Streams Changed

Five hundred years ago, Gaithersburg looked much different. Geomorphologists (the people who study the nature and history of landforms and the processes that create them) tell us that before settlers began clearing land for farming, our streams were more broad, flowing through braided channels surrounded by wetland bogs and marshes. Once farmers cleared the land, significant changes to the environment began to take place. Rainfall took topsoil from the plowed fields towards the streams. Mills, along with their mill ponds and channelized mill races, were constructed to grind the grains grown on the farms. Early farming activities changed the basic shape and functions of the streams throughout the region.

Jumping forward a century or so, the 1972 Clean Water Act gave federal and state governments the power to regulate pollution. Through the Act, the Environmental Protection Agency controls pollution within municipalities by requiring Municipal Separate Storm Sewer System (MS4) pollution discharge permits. The City of Gaithersburg's 5-year permit requires that we provide watershed restoration to a significant area of the City. One of the restoration options we have is to reconstruct streams to decrease erosion while at the same time improving climate resiliency.

Can humans recreate the streams that existed 500 years ago? Not exactly. But we can remove the sediments that have accumulated in the stream valleys since that time. We





can also make the streams more resilient to the high-intensity storm flows that are expected as the impacts of climate change increase.

## Restoring Streams in the 21st Century

Whetstone Run in Blohm Park presented an opportunity to return a stream closer to its pre-colonial state and simultaneously earn credits towards the City's MS4 goals. In 2013-2014, an environmental consultant prepared watershed plans for the City's three major watersheds. In addition to looking for locations for potential sites for "upland" water pollution control facilities, the consultant walked miles of streams to identify sections where the local habitat and general stream health were compromised.

Sections of Whetstone Run and Watkins Mill Run in Blohm Park were recommended for restoration as part of the Middle Great Seneca Creek Watershed Study. The banks of Whetstone Run were high, up to five feet in some places. A standard restoration, or a spot treatment by placing stones in critical areas, would not have worked at this location. The banks were composed of fine sediment, not native soil, which isn't sufficiently stable for those types of treatment.

The bottom of Whetstone Run's channel, or thalweg, had been eroding through this deep sediment layer. It is estimated that about 550 tons of sediment a year was washing away from the stream banks down to Great Seneca Creek, the Potomac River and, eventually, the Chesapeake Bay. The nutrients attached to those sediments, in particular nitrogen and phosphorus, were also flowing to the Bay.

In other areas of the Piedmont Physiographic Province – the foothills of the Appalachian Mountains – these deep stream valley sediments appear to be the result of mill ponds constructed more than a hundred years ago. As the mills were removed, their upstream ponds that stored water for moving the mill wheel filled in with sediments. Whether or not there was a mill site on Whetstone Run isn't clear from researching the Montgomery County maps of the late 19th Century. While there was a Watkins Mill, it was located on Cabin Branch, another tributary of Great Seneca Creek. The sediments in the Whetstone Run's stream valley seem to be solely the detritus of farming activities.

Whether or not a stream restoration project can be stable without additional controls in place upstream is a matter of contention in the scientific community. In the case of the projects in Blohm Park, these upstream controls were already in place. Lake Whetstone, a pond owned by the Montgomery Village Foundation and operated by Montgomery County,

*(Continued from page 17)*

# Land as Nature Intended It

*(Continued from page 7)*

provides water quantity control upstream of Whetstone Run. A wet pond within the park provides quantity control for the lower segment of the Watkins Mill Run restoration. A handful of small ponds are located upstream of the upper segment of Watkins Mill Run.

## Wetlands + Cooler Streams = Healthier Ecosystem

Ecologists know that aquatic life prefers cooler waters. Shade from trees is one way to keep a stream's flow cool. To preserve as many trees as possible, the project's design on Watkins Mill Run upstream of the wet pond incorporated a very narrow access road. In some sections, the actual stream channel was used as the access. Each day, a pump-around was set up, the channel was repaired, and at the end of the day, stream flow was reestablished to access the newest part of the restored channel. This narrow access kept the tree impacts to a minimum during construction, allowing the stream to be shaded from the sun's direct rays for most of the day.

While there was a lot of tree impact to Whetstone Run to remove the legacy sediments, the project's design incorporates two features that help keep the stream's flow from becoming too warm for aquatic life. One feature is the toe wood that is installed at the stream's meanders (pictured here). Many trees felled on-site for the project were reused in structures that



provide shade for aquatic life. Until trees reestablish in the floodplain area, fish and other aquatic life will find respite from the sun under these structures.

Another feature to promote cooler waters in Whetstone Run is the size of the new channel. In its earlier state, the channel banks were so steep and high that the stream flow rarely rose out of its banks. Now a smaller channel holds an average day's flows up to the top of the banks. Even during small storms, flow will spill over these banks and saturate the surrounding area. With wetlands surrounding the channel, it is hoped that the groundwater and stream flow will become more connected. The exchange of stream flow with the groundwater will help keep the water temperature lower in the stream.

In addition to toe wood, the impacted trees were reused as structures called floodplain grade control. Tree trunks and

limbs, now hidden from view beneath the biodegradable matting and plantings, were placed in parallel lines across the stream valley perpendicular to the stream flow. The flow that escapes the banks during storm events is guided by these structures to spread across the valley floor.

The spreading of the stream flow during and after storm events will create new wetland areas, about 1.5 acres more in the case of this project. Wetlands are great for water quality, acting as natural water purifiers as the wetland plants uptake the nutrients formerly destined for the Bay. Wetlands also allow the flow of water to spread out and slow down, thereby minimizing erosion of the streams downstream from the project. By holding on to storm flows long after the storm has passed, adjacent wetland areas will help the stream retain its base flow during periods of drought.

Wetlands are a tremendous benefit to the ecology of Gaithersburg. According to the National Park Service, about one-third of the plant and animal species listed as threatened or endangered in the U.S. depend on wetlands for their survival. Migratory birds are especially drawn to wetlands. Many species of amphibians and reptiles depend on wet environments to survive. Perhaps the most important reason for creating wetlands is to create a carbon sink in their hydric soils. These soils can store carbon and limit the atmospheric carbon in greenhouse gases responsible for much of climate change.

The project area was replanted in April, 2021, and already wetland species that weren't part of the planting plan – cat-tails, willows, and pickerelweed – have been observed and will be allowed to remain. During the post-construction monitoring, the status of the plantings and the extent of invasive species will be noted, observed, and treated if necessary.

There are many post-construction monitoring elements required by the U.S. Army Corps of Engineers and the Maryland Department of the Environment as part of their permits. The third post-construction year will require an especially thorough monitoring. That's when a study of the extent of the new wetlands must be completed. The stability of the structures will be monitored annually as long as the project is considered a part of the required watershed restoration.

## More Watershed Restoration to Come

The City has recently begun work at Diamond Farms Park, its fourth stream restoration project. When finished, the Solitaire Court stream restoration should complete the major watershed restoration improvements required by the City's 5-year permit.

These projects will take a few years before they completely re-vegetate. It took decades – or sometimes more than a century – for the streams to change their shapes as a result of human development. It will take a few years before the vegetation and the functionality of the new wetland area is fully established.

Other improvements to Blohm Park to allow visitors to enjoy the wetlands are being planned. Learn more about all of the City's watershed restoration projects conducted by the Public Works Department at [gaithersburgmd.gov](http://gaithersburgmd.gov).