

Report on Stream Health in Montgomery County, Maryland 2010-2015



ANS Water Quality Monitoring Program

Executive Summary

The Audubon Naturalist Society is pleased to offer this report of water quality data collected by its volunteer monitors. Since the early 1990s, the Audubon Naturalist Society (ANS) has sponsored a volunteer water quality monitoring program in Montgomery County, Maryland, and Washington, DC, to increase the public's knowledge and understanding of conditions in healthy and degraded streams and to create a bridge of cooperation and collaboration between citizens and natural resource agencies concerned about water quality protection and restoration.

Every year, approximately 180-200 monitors visit permanent stream sites to collect and identify benthic macroinvertebrates and to conduct habitat assessments. To ensure the accuracy of the data, the Audubon Naturalist Society follows a quality assurance/quality control plan. Before sampling, monitors are offered extensive training in macroinvertebrate identification and habitat assessment protocols. The leader of each team must take and pass an annual certification test in benthic macroinvertebrate identification to the taxonomic level of family.

Between 2010 and 2015, ANS teams monitored 28 stream sites in ten Montgomery County watersheds: Paint Branch, Northwest Branch, Sligo Creek, Upper Rock Creek, Watts Branch, Muddy Branch, Great Seneca Creek, Little Seneca Creek, Little Bennett Creek, and Hawlings River. Most of the sites are located in Montgomery County Parks; three are on private property; and one is in Seneca Creek State Park. In each accompanying individual site report, a description of the site is given; the macroinvertebrates found during each visit are listed; and a stream health score is assigned. These stream health scores are compared to scores from previous years in charts showing both long-term trends and two-year moving averages. In addition, data collected in habitat assessment surveys is presented. This report summarizes and analyzes the data collected during this period.

Problems observed by ANS monitoring teams

In many stream reaches monitored by the ANS teams, declining water and stream habitat quality have been observed over time. Excessive stormwater volumes and velocities undercut stream banks. This erosion causes sediment to be discharged farther downstream, and causes trees on the top of the banks to fall over, further destabilizing the channel. As described by EPA (<u>https://www3.epa.gov/caddis/ssr_urb_urb2.htm</u>), this problem is termed the Urban Stream Syndrome, in which streams "are simultaneously affected by multiple sources, resulting in multiple, co-occurring and interacting stressors." Two of the most prevalent stressors are loss of urban forest lands and tree canopy, and increase in pavement levels in a given watershed.

Additional urban factors and stressors observed at some sites by the ANS monitors include: sewer pipeline repair projects of the Washington Suburban Sanitary Commission; energy utility

power line cuts; and impoundments. In several locations, stream health declines downstream of these projects have been documented by ANS monitors, and are described in the report. On the positive side, streams located in rural, low-density areas and within large, forested parks showed better than average water quality.

Stream Protection and Restoration - Recommended Solutions

The prime solution to the Urban Stream Syndrome – declining stream biological health as documented by ANS monitoring teams at many stream reaches in Montgomery County – is to reduce pavement and add more trees. We must protect and restore more forest acres; plant more trees; remove pavement where possible; and wherever it can't be removed, install green stormwater retrofits with priority given to tree- and plant-based practices. These should include: trees planted through Tree Montgomery and the RainScapes Programs; demonstration projects that document the volume credit that MDE should grant to trees as stormwater ponds. Giving priority to these approaches will further Montgomery's compliance with its stormwater "MS4" permit. We recommend that these tree- and native plant-based practices be applied through the Treatment Train approach. In this approach, priority is given to projects located at or near the top of a drainage area, applying retrofits to sites on hilltops and hillslopes prior to installing floodplain and stream channel restoration projects. We also recommend reforms to upgrade the reforestation and native plant restoration protocols for utility power lines and sewer line repair projects.

We urge you to share this data publicly on your website and to incorporate it into the MS4 report. We also recommend using it to frame stream restoration decisions. Finally, we hope to partner with you to promote increasing tree cover as a preferred stormwater practice.

ANS Monitoring Program Methodology

Site visits take place during the months of April, July, October, and optionally during the winter (December – February). Since 2011, ANS monitors have followed the benthic macroinvertebrate sampling protocol of the Maryland Biological Stream Survey (MBSS). Within a designated 75-meter reach, they use a D-net to take 20 one-foot square samples in the best available habitat for macroinvertebrates. Unlike the MBSS protocol, however, ANS teams identify benthic macroinvertebrates to the taxonomic level of family in the field, and in some cases they have the option to identify them to genus level. After findings are recorded, most of the macroinvertebrates are returned to the stream. Teams are asked to preserve and send in for identification and verification any macroinvertebrates that they are unable to identify, that cannot be identified with certainty in the field, or that are uncommon.

In addition, monitoring teams conduct habitat assessment surveys and measure air and water temperature and pH. They use the same forms as Montgomery County's Department of Environmental Protection (DEP): spring and summer habitat data sheets, based on forms from the MBSS, as well as DEP's Habitat Assessment Field Data Sheet for Riffle/Run Prevalent Streams. ANS monitors fill out the latter at every site visit.

Stream Health Ratings

Data from each monitoring visit is analyzed using the family-level benthic index of biotic integrity (BIBI) developed for the family-level Maryland Stream Waders Program, which gives a stream health score on a scale of 1 to 5.

The map below shows the location of the ANS monitoring sites and indicates an average water quality rating for the period 2011-2015. This is the time period that monitors were using the MBSS sampling protocol. Following DEP's practice, water quality at each site has been given a color rating of poor (red), fair (yellow), good (green), or excellent (blue). In general, streams located in more rural areas or within large parks with limited impervious cover show better water quality than those in more urbanized areas.

Only two ANS sites received an excellent rating for this period: Dark Branch, located in Little Bennett Regional Park, and the mainstem of Ten Mile Creek upstream of West Old Baltimore Road. Two other sites rated excellent between 2013 and 2015: the unnamed tributary of Ten Mile Creek, on which DEP's station LSTM204 is located, and the mainstem of Rock Creek upstream of Muncaster Mill Road. DEP calls the latter the "Fraley Farm Mainstem", to which it also gives an "excellent" rating. Although DEP gives Dark Branch a "good" rating, it serves as a reference stream for Montgomery County Parks. Ten Mile Creek serves as a reference stream for Montgomery County DEP.



ANS monitoring sites in Montgomery County

Eight ANS sites averaged "good" during 2011-2015. These sites are on Ten Mile Creek, Bucklodge Branch, Wildcat Branch, Hawlings River, the mainstem of Rock Creek, and the Good Hope Tributary of Paint Branch. Like the sites that rated "excellent", these sites are located in large, undeveloped parks or rural areas. DEP, too, rates them "good" or "excellent".

There is less agreement on ratings for sites that ANS has found to be more impaired. Eleven ANS sites averaged "fair" during the 2011-2015 period. In contrast, DEP gives a "good" rating to eight of their watersheds and a "fair" rating to only three: Dayspring Creek, the North Branch of Rock Creek at Meadowside Nature Center, and Northwest Branch at Kemp Mill Road.

Some of the ANS sites that averaged "fair" did receive a "good" rating at times during this period, but not consistently. This was the case for the two ANS sites on Northwest Branch at Ednor Road and Sandy Spring; the sites on North Branch of Rock Creek at Bowie Mill Road and Kengla Conference Center; and on Goshen Branch. Ratings at both the North Branch at Kengla Conference Center and Goshen Branch declined during this period following construction for sanitary sewers and stream restoration.

On the other hand, the ANS site on Great Seneca Creek at Riffle Ford Road has not received a higher rating in spring than "fair" since 1996 and frequently rated "poor". It did receive a "good" rating in summers 2012 and 2013, perhaps because more sensitive macroinvertebrates drifted in from upstream. The ANS site on Muddy Branch downstream of River Road, which has consistently rated "fair", has not received a rating of "good" since 2003.

Water quality at six of the ANS sites averaged "poor" during 2011-2015. In the case of Sligo Creek, both ANS and DEP agree on this rating. Very few macroinvertebrates are found at the ANS site, which is downstream of fairly dense development and bordered by Sligo Creek Parkway.

The other ANS sites with a "poor" rating are in watersheds that DEP rated either "fair" or "good". Yet a "poor" rating is consistent with the extent of human disturbance in the subwatersheds of the ANS monitoring sites. Countryside Tributary of Paint Branch, Mill Creek tributary of Rock Creek, the unnamed tributary of Northwest Branch at Meadowside Drive in Silver Spring, and Fallsreach Tributary of Watts Branch are all in narrow stream valley parks downstream of suburban development built before modern stormwater controls. Major roadways are located in some of their watersheds. The ANS site on Gunner's Branch, which is now closed, was just downstream of the dam for Gunner's Lake. The stream in this location was periodically scoured and eroded by discharge from the lake, leaving little good habitat for macroinvertebrates.

Differences in ratings can occur on the same stream. The ANS site on Hawlings River upstream of Zion Road rated lower than the ANS site on Hawlings River approximately ½ mile downstream, in Rachel Carson Conservation Park. Since 1998, Hawlings River upstream of Zion Road has downcut into sandy, clayey soil, a poor substrate for benthic macroinvertebrates. Its floodplain is covered with invasive multiflora rose. In contrast, the substrate at the Hawlings River site in the conservation park is composed primarily of cobbles and boulders, a much more favorable substrate; it is well-forested; and the team found no invasive plants. This may help explain the disparity between the DEP and ANS ratings. It also suggests that improvements should be made in the subwatersheds of the ANS sites with lower ratings to bring them in line with DEP's ratings for their watersheds as a whole.

Special Protection Areas

Montgomery County has set up Special Protection Areas (SPAs) to provide greater protection to high quality or unusually sensitive water resources that are threatened by land use changes. ANS has nine monitoring sites within three of the Special Protection Areas: Upper Rock Creek SPA, Upper Paint Branch SPA, and Clarksburg SPA.

Although these areas have been given zoning and other protections, not all of our sites in the SPAs exhibit good water quality, and their ratings are sometimes at variance with those of DEP.

Reasons for the differences appear to include human and natural changes to vegetated riparian buffers; drainage from more dense imperviousness than the SPA now allows; outdated or nonexistent stormwater management facilities in older communities; and exempt sewer construction within the stream valley itself.

1. Upper Rock Creek Special Protection Area

a. Mainstem of Rock Creek

One success story is the improving water quality of the Rock Creek mainstem upstream of Muncaster Mill Road. The surrounding area is a natural, undisturbed valley of trees and old fields. ANS data shows improving water quality from fair in springs 2005-2008, to good in springs 2009-2013, and to excellent in springs 2014-2015. DEP also has found this "Fraley Farm Mainstem" to have excellent water quality.



Mainstem of Rock Creek upstream of Muncaster Mill Road

The Audubon Naturalist Society has another site on the Rock Creek mainstem at the Agricultural History Farm Park. It, too, has achieved good and excellent ratings at times, but was only fair in 2015. The site is bordered by a narrow strip of trees surrounded by lawn on one side and crops on the other. Fallen riparian trees caused loss of shading in summer 2012. Then, clearing of invasive plants by park personnel in 2014 left large stretches of the banks bare of vegetation. That same year, a beaver moved in and dammed the creek.



ANS site on Rock Creek at the Agricultural History Farm Park



Beaver Dam on Rock Creek at the Agricultural History Farm Park

We recommend installing streambank protection following removal of invasive plants, so that runoff does not impair the banks further. In addition, the stream in this location would benefit from a wider riparian buffer. We recommend planting native trees and shrubs on both banks to achieve the buffer widths recommended in the County's Environmental Guidelines.

b. North Branch of Rock Creek

Two of the ANS sites in the Upper Rock Creek Special Protection Area are on the North Branch of Rock Creek. One is upstream of Bowie Mill Road in Olney, and the other is at the Kengla Conference Center in Derwood.

Upstream of Bowie Mill Road, the North Branch itself serves as the boundary of the SPA. On the SPA side of the creek are farms and homes on large lots with an 8% limit on imperviousness. On the other is a residential subdivision of homes on smaller lots with no imperviousness limit. Because only one side of the creek is protected, it does not receive the full benefits of the SPA. As a result, average water quality at the ANS site was only "fair" from 2011-2015, although it rated "good" in spring 2015.



Monitoring the North Branch of Rock Creek at Bowie Mill Road

For the North Branch at the Kengla Conference Center, ANS monitoring data showed negative change in water quality to "poor/fair" in 2008-2009 during construction of the ICC upstream.



Top soil washed away and tree roots exposed by flooding in 2014 on the North Branch of Rock Creek at Kengla Conference Center

Water quality improved to "good" in 2010, but declined to "fair" in 2015 following floods and sewer reconstruction by WSSC in the floodplain the summer year before. During floods, topsoil was washed away, a bank with several trees collapsed, and sewer construction materials were swept into a logjam that stretched across the stream. This site appears to be highly responsive to construction within the watershed. It remains to be seen whether water quality here will rebound following completion of the sewer reconstruction.

2. Upper Paint Branch Special Protection Area

The Audubon Naturalist Society has two monitoring sites in the Upper Paint Branch Special Protection Area, one on Good Hope Tributary and the other on the Countryside Tributary to the Upper Mainstem.

ANS began monitoring the Good Hope Tributary in spring 2011. The site, located in a wooded floodplain dotted with skunk cabbage, is downstream of the ICC. Water quality ranged from "good" in spring 2011 to "fair" in spring 2015.

The Countryside Tributary of Paint Branch is a small stream located in a narrow wooded area of a neighborhood park downstream of an older stormwater pond. Downspouts from residences drain directly into the park. Briggs Chaney Road parallels the stream, in some places is less than 50 meters away.



Good Hope Tributary of Paint Branch

Although DEP gives the Upper Mainstem of Paint Branch a "good" rating, the ANS site has consistently rated "poor". In the last few years ANS monitors have found very few macroinvertebrates, almost all tolerant to pollution. On occasion, baseflow is so low that the stream cannot be monitored. We recommend inspection of the stormwater pond to determine

whether it is still functioning properly and remediation of outdated stormwater controls on Briggs Chaney Road and in the subdivision.



Countryside stormwater pond



Outdated stormwater culvert from Briggs Chaney Road to Countryside Tributary

3. Clarksburg Special Protection Area, Ten Mile Creek

ANS now has three sites on Ten Mile Creek, two on private property and one in Black Hill Regional Park. Water quality ranged from good to excellent at these three sites.

ANS teams have monitored the unnamed tributary adjacent to West Old Baltimore Road since 1997. This site is downstream of DEP's monitoring station LSTM204. It is partly within a pasture and partly within a small wooded area. In early 2011, MCDOT widened West Old Baltimore Road, cutting into an old berm that separated it from the stream. In September of that year, floods from Tropical Storm Lee washed away much of the rest of the berm. Now the stream flows over the road when it floods, and runoff from the road washes into the stream during average rain events. We recommend evaluating whether to reconstruct the berm.



Only a few stones remain from a berm that separated West Old Baltimore Road from Ten Mile Creek until 2011

In 2009, ANS started monitoring the mainstem of Ten Mile Creek upstream of the ford on West Old Baltimore Road. This site is just below DEP's monitoring station LSTM303B. In the last few



Two-lined salamander eggs at Ten Mile Creek

years, several storms have changed the water flow around the island in the upper part of the reach and undermined mature trees. A formerly ephemeral stream at the top of the reach has now become intermittent. This change has implications for the newly adopted Ten Mile Creek Amendment to the Clarksburg Master Plan, which requires expanded buffers for intermittent streams. It should be noted for planning and zoning purposes.

Monitoring the mainstem of Ten Mile Creek in Black Hill Regional Park has been a project of a group of students from the Global Ecology Program of Poolesville High School. The site has been monitored only a handful of times. Water quality has ranged from "good" to "fair". The stream is dynamic but no change is expected in the foreseeable future.

Effect of Stream Restoration

Several of the streams we monitor were restored between 2010 and 2015. Restoration has had mixed results, as can be seen in this chart. Water quality at some of the streams has stayed generally within the same range. At Goshen Branch, though, it has declined.



Goshen Branch was restored between fall 2011 and summer 2012 under ICC Compensatory Mitigation Project SC-2. Subsequently, water quality declined from "good" in 2010 to "poor" in 2013-2015. Coastal Resources, Inc., which has been monitoring Goshen Branch for the State Highway Administration, has also found negative change in the rating for benthic macroinvertebrates. In a paper delivered at the Maryland Water Monitoring Council's Annual Conference on November 13, 2015, Sean Sipple of Coastal Resources also noted a change in functional feeding groups of the benthic community from scrapers to filterers. *See* <u>http://www.dnr.maryland.gov/streams/MWMC/pdfs/2015_Conference/Sipple_Presentation_fi</u> nalSean.pdf.

ANS data shows this, as well. At site visits since restoration, the ANS team has also found an increase in algae and fine sediment deposition along the entire reach. In fall 2013, a beaver built a dam at the top of the reach and appeared to have cut down trees planted for the restoration. The beaver abandoned the dam by spring 2014. Trees replanted since then seem to be surviving. We will continue to study Goshen Branch to determine the cause(s) of the negative change and to see if water quality improves.



Restoring Goshen Branch



Newly planted trees at Goshen Branch

Northwest Branch downstream of Randolph Road was restored several years ago. ANS opened its monitoring site downstream of this earlier restoration project in 2010. Since ANS began monitoring, the team has found both banks to be unstable, especially the left bank (looking downstream). In early 2013, the left bank downstream of the ANS site did collapse and was subsequently restored. Despite this effort, the left bank at the ANS site continues to be only marginally stable and may need to be restored in the future. Water quality is fair.

Over the years, the banks of Northwest Branch upstream of Ednor Road in Woodlawn Park had become unstable and highly eroded, with several mature trees undercut and falling. DEP, in collaboration with the Maryland-National Park and Planning Commission (M-NCPPC) and the U.S. Army Corps of Engineers, restored 2,000' of this stream in summer and fall 2013. The banks were stabilized; stream habitat was restored with logs, tree root balls, boulders, and riprap; wetlands were created; and grasses and trees were planted on the banks. By spring 2014, the grasses were coming up, and sand bars had formed along each bank. Water quality had started to improve by 2015, but was still "fair".

ANS is partnering with DEP to monitor the Fallsreach Tributary of Watts Branch for the MS4 permit. ANS opened its site in 2010 to record baseline data for DEP's Fallsreach/Fallsberry Restoration Project. Our site is located downstream of two stormwater ponds and a powerline cut. DEP did restore one of the stormwater facilities in summer 2014 and plans to restore the second one and the streambed between them in 2017. It is too early to tell what effect restoration will have. Water quality remains poor, although ANS monitors did find a greater abundance of benthic macroinvertebrates in 2015 than in most previous years.

One of the goals of the project is to reestablish a riparian buffer within the restoration area. The benefits of restoration upstream may not be realized downstream unless a vegetated corridor is also installed in the powerline cut to connect the restored segment with the rest of the tributary. A riparian buffer of small trees and shrubs in the powerline cut would reduce the volume and velocity of runoff from the powerline cut; it would moderate water temperatures; and it would provide more favorable habitat for aquatic life. To do so would mean ceasing mowing near the stream and planting a riparian buffer of native shrubs and small trees in an area that meets or exceeds the County's Environmental Guidelines for stream buffers. The same technique should be applied to the mainstem of Watts Branch, which has become severely eroded. The picture below shows that it, too, lacks protective riparian vegetation.

Planting native shrubs within powerline cuts has been used at the Patuxent Wildlife Refuge, leading to increased species diversity. The US Fish and Wildlife Service recommends that this technique be adopted throughout the nation.



ANS monitoring site on Fallsreach Tributary, showing the powerline cut with Watts Branch on the left and Fallsreach Tributary on the right

Effect of Impoundments on Water Quality

In addition to Fallsreach Tributary of Watts Branch, ANS monitored three sites just downstream of impoundments -- on Gunner's Branch, Countryside Tributary of Paint Branch, and Dayspring Creek. Except for Dayspring Creek, water quality at Fallsreach Tributary, Gunner's Branch, and Countryside Tributary was poorer than DEP's rating for each watershed as a whole. Because our findings at Countryside Tributary of Paint Branch and Fallsreach Tributary of Watts Branch have already been discussed, we will focus on Gunner's Branch and Dayspring Creek in this section. Both are tributaries of Great Seneca Creek.

Between 1995 and 2010, the Audubon Naturalist Society monitored Gunner's Branch just downstream of Gunner's Lake and the railroad crossing. Heavy runoff from the lake had so incised the stream and undercut massive trees that the site had to be abandoned after the 2010 season. The vertical banks were as high as the monitors were tall, and the fallen trees required climbing into and out of the stream at several locations, which was hard for them to do. Water quality was



Gunner's Branch downstream of Gunner's Lake

consistently poor, as compared to DEP's rating of "fair" for the entire watershed. We recommend that this location be evaluated for streambank protection.

The ANS monitoring site on Dayspring Creek is downstream of a dry stormwater pond built in the mid-1990s to serve the Seneca Crossing subdivision, a residential community of 450 units. On occasion, the stormwater pond exceeds its capacity during storms and causes flooding downstream. This pond should be evaluated for an increase in storage capacity.



Overflow on Dayspring Creek from Seneca Crossing Stormwater pond upstream

Effect of High Flows during and after Storms

The metropolitan area experienced severe weather during this period, including "Snowmaggedon" in 2010, followed by a dry summer and fall; Hurricane Irene and Tropical

Storm Lee in 2011; Hurricane Sandy in 2012; and several short, but intense storms in 2013 and again in late spring and summer 2014. ANS teams throughout the County noted significant changes to their streams as a result. Erosion from high flows can be so severe that banks collapse, riparian trees are undercut and fall, stream channels change, and point bars are enlarged. Streambank erosion on many third and fourth order streams is particularly severe. At Watts Branch in Potomac, shown on the right, mean bank



Streambank erosion at Watts Branch in Potomac

erosion is estimated to be seven meters high. Erosion on the right bank of Muddy Branch is now two meters high.



Trees felled by high runoff

Another striking change has been loss of riparian trees. In addition to the trees brought down at Gunner's Branch by high flows from Gunner's Lake, successive storms between 2011 and 2014 washed out all riparian trees on Great Seneca Creek upstream of Riffle Ford Road. By fall 2015, there were no longer any trees within 15 feet of the banks. At Watts Branch in Potomac, the largest fallen trees can be seen in satellite images. Twenty more trees are expected to fall soon at this location.

Loss of trees can lead to stream blockages and loss of shading. On Muddy Branch downstream of River Road, high flows created a large blockage of multiple downed trees in summer 2014. On Rock Creek at the Agricultural History Farm Park, riparian trees that fell in summer 2012 caused loss of shading for the stream. In spring 2014, downed trees and branches on Countryside Tributary of Paint Branch blocked access to the established reach to such a degree that it could not be monitored.

On the North Branch of Rock Creek at Kengla Conference Center, a bank downstream of the monitoring site collapsed in summer 2014.

On Dark Branch, an undercut bank collapsed after a heavy rain in 2015. A 30foot stretch of riffle was washed away. Teams at other sites reported unstable banks, as well.

Some of the collapsed or unstable banks have been restored. A collapsed bank on Northwest Branch near Kemp Mill Road



Collapsed bank on the North Branch of Rock Creek, Derwood

was restored in 2013, although banks upstream of the restoration continue to be unstable. Also in 2013, highly unstable banks on Northwest Branch upstream of Ednor Road were regraded.

High flows have damaged human infrastructure, as well. High flows and fast currents eroded banks, washed out a hiking trail, and exposed drainage pipes at Great Seneca Creek upstream of Riffle Ford Road in winter 2012. As stated above, flooding from storms in 2011 washed away the berm separating West Old Baltimore Road from a tributary of Ten Mile Creek.

Low Baseflow

Despite higher flows following storms, many of our teams also found low base flow during dry periods, usually in the summer and fall, but occasionally in spring. Sometimes, flow was so low that streams could not be monitored. This was the frequently the case at Countryside Tributary of Paint Branch even though it is downstream of a wet stormwater pond.

Low flow can even be a problem at larger 3rd and 4th order streams. A dry spell in summer and fall 2010 led to limited abundance of macroinvertebrates at the ANS monitoring site on the mainstem of Ten Mile Creek, a 3rd order stream. Underlying the watershed is fractured rock. The adjacent tributary is reputed to never run dry because it is fed by springs.

At Wildcat Branch, another 3rd order stream, low flows were encountered in spring and fall 2012, fall 2013, summer 2014, and summer and fall 2015. During these periods, few macroinvertebrates were found. No reason has been given for these frequent low flows, but they may be caused by depletion of groundwater.

Farther downstream, at the ANS site on Great Seneca Creek at Riffle Ford Road, a 4th order stream, monitors observed low baseflow during many of the same seasons, but also remarked that water flow at their site alternates between high and low. Variable flow on the Sandy Spring Tributary of Northwest Branch has often made sampling difficult.

Sanitary Sewer Reconstruction

The Washington Suburban Sanitary Commission (WSSC) is currently engaged in a six-year sanitary sewer reconstruction project. Most sanitary sewers in Montgomery County are gravity-fed and located alongside streams because they are the lowest points in the landscape. This includes many of the streams that ANS monitors. ANS teams have encountered temporary sewer lines and pumping stations; heavy equipment and newly-cut construction access roads; and trees cut down near their sites.

We recommend frequent inspection of sewer reconstruction sites. In summer 2014, when sewers along the North Branch of Rock Creek were being reconstructed, construction debris and trees cut down for the construction access road were allowed to wash into the stream.

They formed a logjam, which caused flooding during storms. Monitors also observed heavy equipment operating without mandatory silt fencing along the bank.



Logjam of construction materials and tree trimmings from reconstruction of sanitary sewers on the North Branch of Rock Creek at Kengla Conference Center



Heavy equipment operating without mandatory silt fencing during sewer reconstruction on the North Branch of Rock Creek



Exposed and broken sewer pipes at Countryside Tributary

On the Countryside Tributary of Paint Branch, monitors discovered exposed and broken sewer pipes in the stream. They should be inspected to determine whether any discharge is flowing into the stream. If they are no longer in use, they should be removed.

High pH

Although water pH throughout Montgomery County tends to be neutral or slightly basic, several teams have reported higher readings, most notably on Northwest Branch at Kemp Mill Road, where pH has been recorded as high as 8.0, usually in the spring. Monitors also got a reading of pH >8.0 on Bel Pre Branch near its confluence with Northwest Branch in spring 2013. Other sites with high pH readings were Watts Branch (>7.6 – the upper limit of the pH test kit -- in spring 2012, fall 2013, and summer 2015); Great Seneca Creek at Riffle Ford Road (pH >7.6 in winter 2013, spring 2015, and fall 2015); Wildcat Branch (pH >7.6 in



Testing pH

spring 2012); Muddy Branch (pH >7.6 in summer and fall 2015); and Sligo Creek (pH of 7.8 in spring and fall 2015).

Suds, Foam, and Oil Sheen on the Water

Five teams reported finding suds, foam, or oil sheen on the water at their sites. At Dayspring Creek, patches of suds were observed one week after pretreatment of roads with salt in winter 2012; after Hurricane Sandy in fall 2012; and after rain in fall 2013. In fall 2015, teams at Goshen Branch and Dark Branch found whitish clumps of foam. Monitors observed a rainbow sheen on the water at Sandy Spring Tributary of Northwest Branch in spring 2012. And at Mill Creek, scum and oil sheen were seen in a thick mass of algae in fall 2010.

Presence of Algae

Nine monitoring teams reported finding algae at their sites. Algae were described as "green and filamentous" (North Branch of Rock Creek at Kengla, Great Seneca Creek, and Goshen Branch); "brown and stringy" (Mill Creek, Great Seneca Creek, Wildcat Branch, and Goshen Branch); "brown and furry" (North Branch of Rock Creek at Kengla); "rust-colored" (Mill Creek); "fine and golden-brown" (Northwest Branch at Meadowside Drive); "silty" (Bucklodge Branch); and simply "brown" (mainstem of Watts Branch). Although algae may be present in many streams in late winter to spring before the trees leaf out, algae were found in summer and fall at some of these sites. Of particular concern has been the occurrence and persistence of algae at Goshen Branch, where it had not been seen before restoration. Algae also occurred following restoration at the Ednor Road site on Northwest Branch, but had disappeared by fall 2015.

ANS monitors are interested in learning more about the types of algae they are finding and the implications for their streams. They anticipate using an app being developed by the Interstate Commission on the Potomac River Basin to help identify and report the algae.

Invasive Plants

Twenty-five teams submitted reports about invasive plants at their monitoring sites. Only one of them reported an absence of invasive plants, our team monitoring the Hawlings River in Rachel Carson Conservation Park. The most wide-spread invasive was Japanese stiltgrass. Twenty-four teams found Japanese stiltgrass at their sites. The majority of teams said that stands of stiltgrass were extensive.

Another very common invasive is multiflora rose, which was found at 23 sites. Because multiflora rose is a perennial, stands of it can spread and become extensive over time. This is what happened at the ANS site on Hawlings River in a stream valley park upstream of Zion Road. Both banks of the stream are covered with multiflora rose extending well into the

floodplain. One of our monitors, who is a Weed Warrior, tried to cut it back, but found that the job was too great an undertaking for a single person. A plan should be devised to eradicate this stand of multiflora rose.

Mile-a-minute was found at a majority of sites. Japanese honeysuckle was also common. Garlic mustard was not mentioned as frequently, perhaps because it is a spring plant that often dies back before summer monitoring, when invasive plants are recorded. Other invasives noted were barberry, Oriental bittersweet, thistle, bamboo, privet, Japanese knotweed, porcelainberry, wineberry, kudzu, English ivy, periwinkle, crown vetch, wintercreeper, perilla, dodder, and wavyleaf basketgrass.

Beavers

A resurgence of beavers appears to be taking place throughout the county. From 2012 to 2015, monitoring teams at Countryside Tributary of Paint Branch, Northwest Branch, Rock Creek, Goshen Branch, and Bucklodge Branch reported finding beaver activity, from dams to cut-down trees. On Rock Creek at the Agricultural History Farm Park, part of the reach was submerged when a beaver began building a dam. After the team shifted the reach downstream, the beaver built a new dam that again flooded the reach, making it impossible to monitor. In the subdivision adjacent to Countryside Tributary, residents found beaver damage to landscaping trees. The beavers do not seem to stay in the same place for a long period of time. They tend to move away after a year or two.



An abandoned beaver dam