Conococheague Priority Projects Plan
Detailed Assessment Excerpt for StoryMap

2.4 Assessment Summary

Site assessments of the watershed were completed in November 2021 and February 2022. Conditions varied throughout the assessment watersheds of the Conococheague Creek based on existing land use, historic impacts, and location within the watershed.

Chambersburg Borough and several of the surrounding municipalities are developed areas with a mixture of commercial, residential, and industrial land use. Mercersburg to the west and Greencastle Borough to the south also have more developed land use. Outside of these more urban areas, agriculture is the dominant land use in Franklin County. Runoff from both urban areas and agricultural lands adversely impact water quality within the Conococheague Creek Watershed.

The following sections provide descriptions of the conditions observed in the Conococheague' s three HUC10 subwatersheds for reference. However, similar existing conditions were consistently observed throughout the subwatersheds based roughly on the scale of the area draining to a given point of interest and the encroachments and land uses at that location. Therefore, impairments and appropriate opportunities are better categorized between the upland and smallest headwater areas; the mid-sized reaches connecting the headwaters to the receiving streams; and the higher order receiving streams of the lower watershed. These distinctions based on position within the landscape – small-scale; mid-scale; and large-scale catchments and their associated impairments – even more than differences between any given subwatershed, define the various impairments and opportunities for enhancement encountered within the Conococheague watershed.

2.4.1 West Branch Conococheague Creek

The Licking Creek and Lower West Branch Conocheague Creek HUC12 subwatersheds are located in the southwest corner of the West Branch Conococheague Creek. Many of the headwater tributaries in these subwatersheds start in the steep forested hillsides and drain into the flat open valley areas dominated by agriculture.

Licking Creek consists of 1st, 2nd, and 3rd order streams of varying stability. Most of the headwater streams of the upper watershed originate in steep forested areas before quickly entering the flatter agricultural areas, while some of streams originate from agricultural drainages in the valley's rolling topography. These small-scale agricultural reaches often exhibit negligible incision or bank erosion, despite minimal vegetative buffer along the streambanks. Further downstream, the larger 2nd and 3rd order streams of the middle watershed frequently revealed high vertical banks prone to erosion as a

result of historic mill dams, stream manipulation, and resultant legacy sediment build-up. Licking Creek has a Total Maximum Daily Load (TMDL) Plan for sedimentation within the watershed. A TMDL Plan establishes the maximum allowable amount of a given pollutant, determines pollutant reduction targets necessary to comply with maximum thresholds, and allocates reductions necessary to various pollutant sources.

Johnston Run is a tributary to the West Branch Conococheague Creek that is located within the Lower West Branch subwatershed. Most of the headwaters and downstream areas of Johnston Run occur in open agricultural areas, with only the upper-most portions of a few small tributaries originating in forested mountains. The central portion of the stream runs through the town of Mercersburg, which is one of the most densely populated communities in western Franklin County. It is contained within a concrete channel for over 500 feet as it approaches the borough and continues downstream of Main Street. Johnston Run has high vertical banks throughout the areas upstream of Mercersburg. These conditions persist downstream of the urbanized areas and appear to be the result of historic stream manipulation and legacy sediment accumulation. Additionally, current agricultural activity, confinement from existing infrastructure (i.e. roadways, utilities) and urban stormwater runoff are likely contributing to the sediment, nutrient, and pathogens impairments that the Pennsylvania Department of Environmental Protection (PADEP) has identified along the stream. Mercersburg Borough has the Johnston Run Watershed Management Plan prepared in 2014. The plan identifies channel erosion as the source of more than 50% of the total suspended sediment loading in the watershed.

Figure 1: Johnston Run - Eroded Banks as Seen from Walking Trail

The Middle, Upper, and Headwaters West Branch Conococheague Creek HUC12 subwatersheds have a larger portion of forested land compared to the Licking Creek and the Lower West Branch Conococheague Creek; however, the flat open valley areas are still primarily agriculture.

Figure 2: Unnamed Tributary to West Branch Conococheague Creek – Opportunities for a Buffer and Animal Exclusion Fencing in a Small-Scale Catchment

Within the Middle West Branch Conococheague Creek, the small first order headwater streams typically flow from the forested hillsides. PADEP does not identify these streams as impaired and the majority of these reaches appeared to be fairly stable during the visual assessment, despite minimal vegetated riparian buffers and livestock exclusion fencing. These practices would improve floodplain ecology and achieve pollutant load reductions.

Dry Run is located within the Upper West Branch Conococheague Creek HUC10 in an area that is zoned primarily for agriculture. PADEP identifies this stream as aquatic life impaired for sediment as a result of agricultural activities. There is an existing TMDL for sedimentation for Dry Run.

Throughout the subwatersheds within the West Branch Conococheague Creek HUC10, the mainstem of the West Branch had segments of varying instability. There are long reaches of the mainstem that have vertical banks over 4 feet tall and areas of significant erosion that may ultimately impact existing road infrastructure. There are several documented historical mill dams along the reach and the high vertical eroding banks are evidence of this continued impairment. There are opportunities for larger “catchment-scale” restoration projects throughout the West Branch Conococheague Creek that would help to improve water quality, stabilize the system, and protect infrastructure, not only by eliminating erosive conditions throughout a given reach, but also by serving as a catchment to recruit incoming pollutants and process them within the restored floodplain wetlands.

2.4.2 Rocky Spring Branch – Back Creek

The Campbell Run-Back Creek HUC12 subwatershed contains mostly flat, open, valley areas that are mostly utilized for agriculture. Campbell Run consists of 1st, 2nd, and 3rd order streams of varying stability. The 1st order streams appear relatively stable with minimal incision or erosion. There are some narrow riparian buffers in these small-scale catchments, but there is opportunity for improvement through buffers and livestock exclusion. Transitioning to the mid-scale watershed, mild to moderate bank erosion can be seen in outside meander bends of in the 2nd and 3rd order streams. Downstream of Lincoln Highway West, these conditions worsen as three branches come together in a forested area. In this watershed, severe bank erosion is observed throughout the channel's unstable meanders. The 3'-4' bank heights are mostly vertical or undercut and slumping. This condition, resulting from extensive legacy sediment impairments, persists downstream to the confluence with Back Creek. The overbank conditions and land uses speed up erosion rates. The land use is primarily grazing pasture or hay meadow, while some parcels are row cropped through the floodplain. Most of the reach does not currently have riparian buffers or exclusion fencing. Where buffers do exist, they are relatively thin and often limited to one side of the channel. These buffers are not able to entirely address erosive conditions as the trees are perched upon legacy sediments. In several locations, fence rows were undercut or there were fence posts falling into the stream due to bank erosion and lateral migration. Floodplain restoration practices are feasible throughout much of this reach and would serve to achieve substantial nutrient load reductions through eliminating onsite erosion and restoring nutrient-processing floodplain wetlands to mitigate incoming pollutants and allow sediment to settle before the water reenters the stream system.

Figure 3: Eroded streambanks along Campbells Run downstream of Pioneer Drive

Within the Dennis Creek-Back Creek HUC12 subwatershed, the majority of the streams within the small-scale catchments flow through agricultural areas. According to PADEP, Wilson Run harbors a limited wild trout population due in part to its mountain headwaters and limestone springs in the upper watershed. However, as Wilson Run flows further downstream through the agricultural Great Valley it becomes impaired due to

sedimentation and it loses its wild trout population. While there are many reaches with little or no riparian buffer, forested buffers become more prevalent near the confluence with Back Creek compared to other watersheds assessed. In the small catchments upstream in the watershed, there is some mild bank erosion in specific locations, but most banks are relatively stable and vegetated. There are more buffers and exclusion fences present than in most of the other sub-watersheds, but there are certainly opportunities for more. In a downstream section of Dennis Creek, the stream is evident legacy sediment accumulation with vertical eroding banks up to 4' high in outside meander bends. Exclusion fencing and a forested riparian buffer are present, but not effective enough at this scale to address the primary source of pollutant loading (bank erosion), as evident by the undercut trees and fenceposts. The condition persists well downstream where the channel enters an unassessed forested area.

Because Wilson Run is listed as impaired for a pollutant, PADEP would normally develop a "Total Maximum Daily Load" (TMDL). However, PADEP, in cooperation with the Franklin County Conservation District, has proposed the development of an Advance Restoration Plan (ARP) for Wilson Run, as an alternative to the TMDL. The ARP would prescribe sediment reduction goals specific to the watershed. This comprehensive and hyper-focused plan would help facilitate funding opportunities to be voluntarily adopted by willing landowners. If the restoration of this watershed is successful, then a TMDL for sediment will not be needed.

Figure 4: Eroding Banks and Undercut Buffer Plantings on Wilson Run

More forested riparian buffers are present in Dennis Creek than in any of the surrounding agricultural subwatersheds. Similar to the other subwatersheds, there were historical mill damming operations that resulted in observed legacy sediment accumulation, particularly approaching the confluence with Back Creek. In general, water quality improvements are feasible throughout the subwatershed.

The mainstem of Back Creek exhibited similar channel incision and floodplain disconnection observed in many of the contributing systems. The mainstem is more subject to infrastructure encroachments from utilities, roads, bridges, and buildings. Some portions of Back Creek have become over-widened to a point of arrested degradation where the widened channel reduces flow energy and erosion rates enough to support vegetation. At these locations the banks are relatively stable compared to the tributary reaches, but ecological function remains impaired due to the persisting floodplain disconnection. There are still long reaches of Back Creek with substantial erosion, and in these areas, the erosive conditions can be more problematic than the smaller tributaries in terms of threats to existing development. Excessive erosion is present immediately downstream of Route 30. This reach passes through a residential area, resulting in property loss along several residential yards. This reach is on the boundary of Hamilton and St. Thomas Townships and is within the urbanized area. Further upstream, severe bank erosion occurs where the channel parallels the Hamilton Ruritan Grounds upstream of Edenville Road. Throughout this reach and continuing to the Fort McCord Road crossing bank heights range from 4.5’ to 6’. Looking upstream from Fort McCord Road towards the confluence with Rocky Spring Branch, the unconfined floodplain is maintained as grazing pasture with no buffer or livestock exclusion fencing. The channel is incised within legacy sediments, with bank erosion occurring along all banks. This reach would be suitable for floodplain restoration and wetland creation practices.

Figure 13: Bank erosion along Back Creek downstream of Route 30

Portions of St. Thomas Township and Hamilton Township’s respective MS4 regulated areas run through the Rocky Spring Branch – Back Creek watershed. These MS4 areas have a mixture of agricultural lands and suburban residential developments (“Urbanized Area” per U.S. Census Data). There were segments of varying instability within the urbanized area, with some areas being fairly stable and others highly unstable with moderate to severe erosion. The proposed BMPs for Hamilton Township’s MS4 PRP are identified on the Existing Conditions Map.

The upper reaches of Rocky Spring Branch are located in Letterkenny Township on restricted land owned by the United States Department of Defense. Therefore, site assessments were not completed within the upper portion of Rocky Spring Branch. The downstream portion of Rocky Spring Branch is located in Hamilton Township within a predominantly agricultural area. This lower reach of Rocky Spring Branch has high vertical banks, and areas of moderate to severe erosion are present.

2.4.3 Conococheague Creek

The Headwaters Conococheague Creek and Rocky Mountain Creek HUC12 subwatersheds are both forested headwaters to the Conococheague Creek that are located predominantly in Adams County. These subwatersheds drain into the Mountain Creek-Conococheague Creek HUC12 subwatershed where the headwaters are located within forested hillsides that drain into the flat, open valley areas that are zoned primarily for agriculture. The more urbanized areas of Guilford Township and Greene Township are located further downstream within the Mountain Creek-Conococheague Creek subwatershed. There were segments of varying instability within the urbanized area with some areas being fairly stable and others highly unstable with moderate to severe erosion. Specific water quality BMP opportunities were noted at Norlo Park, the Scotland School Campus, and the Wilson College Campus in this subwatershed. These opportunities are presented in detail in the Priority Project Opportunities. Greene Township has identified MS4 PRP BMP opportunities within the Mountain Creek-Conococheague Creek subwatershed, as shown on the Existing Conditions Map.

The Falling Spring Branch-Conococheague Creek HUC12 subwatershed is a large subwatershed that contains a mixture of agricultural lands and developed areas. Falling Spring Branch, for the most part, is in exceptional condition compared to the remainder of similarly sized reaches in the watershed. Extensive fish habitat and bank stabilization efforts have been made by watershed partners as detailed in the stakeholder's section. This reach is an important resource for local anglers. Elsewhere in the sub-watershed, there are relatively small unnamed tributaries to the Conococheague Creek that are subject to extreme runoff conditions where stormwater is concentrated through culverts beneath the I-81 and CSX Railroad corridor. Several of these reaches exhibit severe erosion and floodplain disconnection.

The mainstem within this subwatershed is highly encroached upon throughout Chambersburg Borough and exhibits evidence of extensive stream manipulation including ditching and legacy sediment accumulations around historical mill dams. Much of this reach would benefit from restoration practices to address the legacy sediment impairment and restore floodplain wetlands. However, restoration practices at this scale can require extensive upfront costs and therefore targeted projects with strong stakeholder support should be chosen to create catchment-scale projects that address onsite erosion and provide treatment for incoming pollutant loading.

MS4 areas for Antrim, St. Thomas, Hamilton, Guilford, and Green Townships and Chambersburg Borough are within this subwatershed with multiple PRP BMP projects identified in this drainage area, as shown on the Existing Conditions Map.

Figure 14: Confluence of Falling Spring Branch at the Conococheague Creek

Figure 15: Muddy Run - Open Agricultural Area with Eroded Banks

The Muddy Run HUC12 subwatershed consists of predominantly agricultural areas in Antrim Township; however, there are urban and suburban areas towards the downstream portions of the watershed in and around Greencastle Borough. Many of the headwaters are within relatively flat open areas with limited buffer vegetation. Within the middle and large-scale watershed areas, many of the streams show evidence of moderate to severe erosion.

The Rockdale Run-Conococheague Creek HUC12 subwatershed has a mixture of agricultural, urban, suburban, and industrial areas in Antrim Township. There is evidence of moderate to severe erosion within the headwaters and further downstream within the middle and large-scale watershed areas. Antrim Township has identified multiple MS4 PRP BMP opportunities within this subwatershed, as shown on the Existing Conditions Map.