

Pre-Construction Survey of Benthic Macroinvertebrates
Grassy Creek Project, Spruce Pine
May, 2015

Station Locations. Four collection locations were selected to assess the current conditions of this feature prior to construction.

- Site 1. This is the most upstream location in Grassy Creek and is above the restoration reach. This site, which is near 'Woody's Chair Shop', was selected as a reference; however it is apparent that there are local landuse perturbations. Most of the riparian canopy has been removed and grass has been planted and mowed to the stream. Many of the pools have been filled with sediment.
- Site 2. This location is within the restoration reach of Grassy Creek, but in the reach that will not be realigned (reach 1). Habitat will be enhanced, banks stabilized and native vegetation planted along the reach. Much of stream right is shopping center/parking, while stream left is relatively stable bank and mature canopy.
- Site 3. This location is within the restoration reach that will be realigned (Reach 2). Grassy Creek in Reach 2 will also have habitat enhancement and native riparian vegetation planted. Following construction this site will be moved to the new stream feature. This site is currently below the large stormwater channel, but has a relatively stable riparian/bank habitat on stream left.
- Site 4. This is the most downstream location at the bridge at Carters Ridge Road (off of NC 226). The reached surveyed as a very short reach above a tributary confluence and a large upstream pool.

Collection Methods. The collection method was selected to mimic those used by the NC Division of Water Quality (NCDWR 2013). These methods include collection of a kick net sample from the riffle habitat, a sweep net sample from a productive bank area, a leaf pack and conducting visual inspection of all habitat types for rare or cryptic organisms. All taxa (rather than just EPT taxa) are "picked" in the field and preserved for identification. This method is termed the Qual 4 collection method in the DWR protocol document. Organisms are then categorized as Abundant (10 or more specimens), Common (3 to 9 specimens) and Rare (less than 3 specimens). Because these samples were collected in May a seasonal correction (essentially subtracting a suite of spring/winter stoneflies) must be done before the EPT numbers can be used to assign a bioclassification.

Results. A summary of the data are found on Table 1 and a complete list of all taxa collected can be seen in Appendix 1. The most abundant taxa at all locations were mayflies, particularly *Ephemerella dorothea*. However there was a fairly significant difference in taxa richness values between locations. Site 2, which is located in the restoration reach but will not be realigned, had the greatest number of EPT taxa and the greatest number of intolerant taxa (those taxa that have a Biotic Index value of ≤ 2.5),

but had a slightly higher Biotic Index (suggesting lower water quality). Recall that this site is immediately behind the shopping center. Site 3, which is also behind the shopping center and will be realigned, had the second greatest number of EPT taxa following seasonal correction. Interestingly these two sites were the only two sites that had specimens within the Pteronarcidae family of stonefly shredders and received Good bioclassifications.

Table 1. Benthic Macroinvertebrate Taxa Richness. Grassy Creek, Mitchell County. May 2015.				
	Site 1	Site 2	Site 3	Site 4
Ephemeroptera	11	15	12	14
Plecoptera	7	7	6	6
Trichoptera	11	12	11	7
Misc. Diptera	5	7	5	4
Diptera; Chironomidae	7	10	6	9
Coleoptera	3	4	5	3
Odonata	3	4	2	2
Oligochaeta	1	1	1	1
Megaloptera	1	2	0	1
Crustacea	1	0	1	0
Mollusca	2	1	2	0
Total Taxa Richness	52	63	51	47
EPT Taxa Richness	29	34	29	27
Seasonal Correction	26	31	28	23
EPT Abundance	92	103	95	54
# Taxa = ≤ 2.5	22	26	22	17
NC Biotic Index	2.88	3.26	2.9	3.36
Bioclassification	G/F	Good	Good	G/F

The upstream reference (Site 1) and the most downstream location (Site 4) were given Good/Fair bioclassifications. Site 1 had 26 EPT taxa after seasonal correction and very close to the 28 taxa cutoff for a Good bioclassification. However the loss of its riparian canopy and the effects of local runoff are likely sources of perturbation. Clearly water quality conditions deteriorate at the downstream site. Taxa richness, # of intolerant taxa and EPT abundance are all lower than all other sites.

Reference

NC Division of Water Resources. Standard Operating Procedures for Benthic Macroinvertebrates. Biological Assessment Unit. December, 2013.