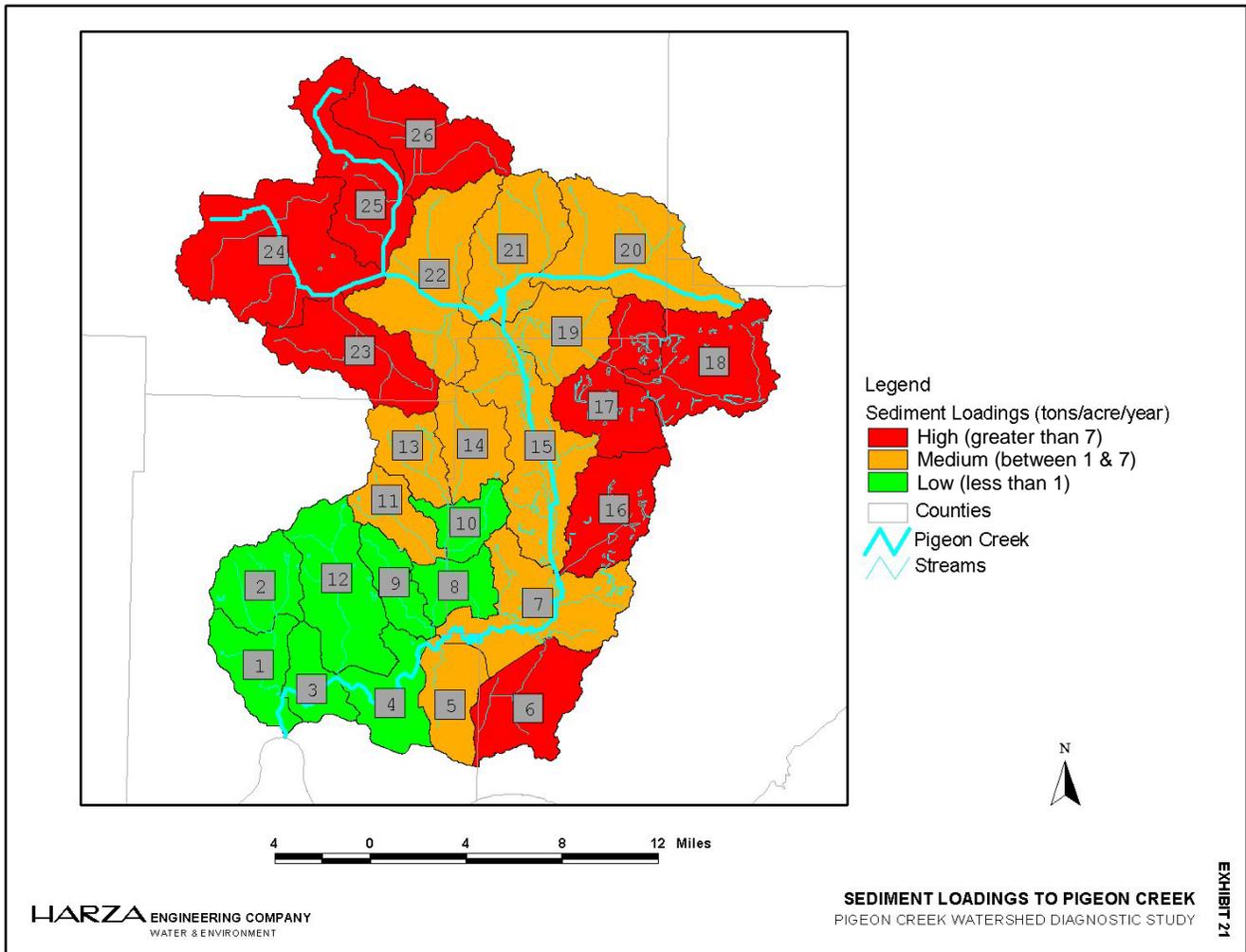


5. Identifying Sources: Identify the source of the stressors and threats.

- As stated in Item 4, sedimentation from soil erosion has been identified as the greatest stream contaminant. According to the Harza study, the majority of the stressor originates from agriculture (subwatersheds 23-26) and mining (subwatersheds 16-18) although erosion from ag/urban development (subwatershed 6) is an increasing problem. The map below indicates the subwatersheds of Pigeon Creek where soil loss is most prevalent (Figure 12).

Figure 12: sediment loading



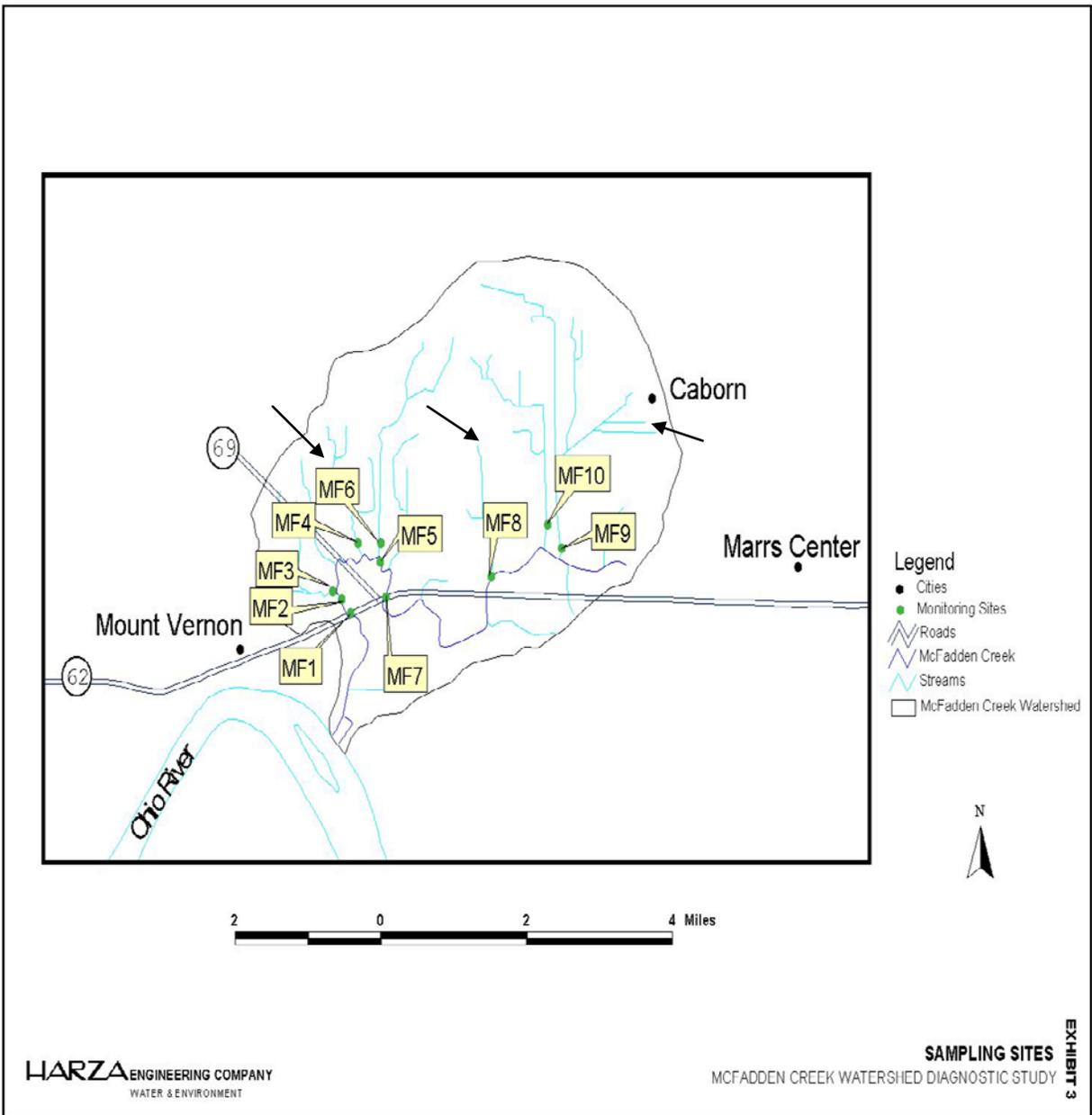
The Harza data for McFadden Creek indicates that sedimentation from soil erosion originates from agriculture. The concentration of highly-erodible soil in the higher elevations of the watershed can be identified as the source. The data indicates the problem on a stream reach scale, as indicated in Table 11 below:

Table 11
SUBSTRATE QUALITY SCORING

Site	Waterbody	Silt Cover (points)	Extent of Embeddness (points)
MF-1	McFadden Creek	Silt normal (0)	Moderate (-1)
MF-2	McFadden Creek	Silt normal (0)	Low (0)
MF-3	Second Tributary*	Silt moderate (-1)	Moderate (-1)
MF-4	Fourth Tributary*	Silt normal (0)	Low (0)
MF-5	McFadden Creek	Silt moderate (-1)	Moderate (-1)
MF-6	Fifth Tributary*	Silt moderate (-1)	Moderate (-1)
MF-7	McFadden Creek	Silt normal (0)	Low (0)
MF-8	McFadden Creek	Silt moderate (-1)	Moderate (-1)
MF-9	Eleventh Tributary*	Silt moderate (-1)	Moderate (-1)
MF-10	Tenth Tributary*	Silt heavy (-2)	Extensive (-2)

- In addition, three livestock operations have been identified in McFadden Creek watershed. While it is not possible to make an exact determination based upon such limited data, these facilities may be contributing E. coli and nutrients to the stream. Facilities include a hog operation, a turkey raising and processing facility, and one dairy. These are indicated on the map below.

Figure 13: Location of livestock operations in McFadden Creek watershed



Another prevalent stressor in Highland – Pigeon watershed is loss of riparian habitat- leading to decreased aquatic life use support(ALUS) and aesthetic value. This stressor is caused by human alteration of the landscape, mainly for agricultural use, but destruction of habitat in developing areas is also a factor. In combination with the sedimentation problem, this has resulted in 100% of the streams in the eight-digit watershed being impaired- to some degree- for aquatic life use support. Harza ranked the subwatersheds in the Pigeon Creek basin according to degree of impairment, the First Quartile being the least impaired, and the Fourth being the most impaired:

Table 12

RELATIVE TRIBUTARY BIOTIC INTEGRITY

First Quartile		Second Quartile		Third Quartile		Fourth Quartile	
Site	Water Body	Site	Water Body	Site	Water Body	Site	Water Body
SF3	Smith Fork	PC4	Pigeon Creek	WF2	West Fork	HC1	Hurricane Creek
BG1	Big Creek	PC5	Pigeon Creek	WF3	West Fork	PC8	Pigeon Creek
BG2	Big Creek	PC12	Pigeon Creek	PC13	Pigeon Creek	BC3	Bluegrass Creek
PC15	Pigeon Creek	SC1	Squaw Creek	PC1	Pigeon Creek	WD1	Weinsheimer Ditch
SF1	Smith Fork	WF1	West Fork	PC3	Pigeon Creek	PC7	Pigeon Creek
SF2	Smith Fork	PC2	Pigeon Creek	BC1	Bluegrass Creek	BC2	Bluegrass Creek
PC14	Pigeon Creek	PC11	Pigeon Creek	LP1	Little Pigeon Creek	PC6	Pigeon Creek
SA1	Sand Creek	PC16	Pigeon Creek	LC2	Locust Creek	PC9	Pigeon Creek
LP2	Little Pigeon Creek	LC1	Locust Creek	UN1	Unnamed Tributary	SD1	Stollberg Ditch

- A third identified stressor is E. coli bacteria. This stressor can be traced to both point and nonpoint sources. Permitted point sources include EWSU's eight CSO discharges to lower Pigeon Creek, five industrial dischargers, and six municipal wastewater treatment plants (WWTP). The CSOs are addressed under the context of the SRCER (Appendix C). The five industrial discharges appear to be minor contributors of pollutants to Pigeon Creek, with generally good compliance records. In general, the municipal WWTPs in the watershed do not have acceptable performance records and require expansion, upgrading, and/or additional operator training. Three municipal WWTPs are currently being upgraded, but more should be studied for possible upgrade or expansion.
- The Chandler WWTP has a history of poor compliance, but has been upgraded, so pollutant discharges from this point source may be reduced at the present.
- The Haubstadt WWTP also has a history of poor compliance. At the time of Harza's Diagnostic Study, there were still some indications of operational problems. This WWTP has since been upgraded to reduce wet weather overflows and improve effluent quality.
- The Fort Branch WWTP also has noncompliance reports to its records. We measured high coliform bacteria concentrations, high nitrates, ammonia and supersaturated dissolved oxygen conditions downstream of this facility. Plans for expansion or upgrading have been talked about for several years, but no action for improvement has been taken.
- The Elberfeld WWTP has numerous noncompliance reports in the EPA's Permit Compliance System database. It has recently been expanded.
- Nonpoint sources of E. coli are much harder to identify and quantify. From limited visual observance, malfunctioning home septic systems are a problem, but as to the magnitude of their contribution of E. coli to the streams of the watershed, much more study needs to be done.

