Appendix A: Soil Classification

Soil is a complex material whose properties are of importance in many applications, and it can be characterized and classified in many ways. The primary importance of soil classification in modeling non-point source pollution risks is its tendency to be eroded, and the features of soil that are most related to erodibility are its texture and its content of rock fragments. These two characteristics are used to classify and name soils throughout the watershed.

Soil texture is determined by the proportion (by weight) of three basic types of soil particles, sand, silt, and clay. These three materials vary from place to place, but generally sand particles feel gritty and can be seen individually with the naked eye; silt particles feel smooth whether wet or dry and individual particles cannot be seen without magnification; and clay is made up of very fine particles and is usually sticky to the touch (soils.usda.gov/technical/manual/contents/chapter3_index.html). The diagram below shows the classification and names for various proportions of these three soil components:
Rock fragments may be included within soils of various textures. Based on size and shape, the rock fragments in the Colorado-Lower Gila Watershed are categorized as gravels (spherical or cube like, 2-75 mm diameter), cobbles (spherical or cube like, 75-250 mm diameter), and flagstones (flat and 150-380 mm long). Depending on how much of the soil volume is made up of included rock fragments, the soil name is modified by “extremely” (more than 60%), “very” (between 35 to 60%), just the rock fragment designation itself (15 to 35%), or no rock fragment designation (0 to 15%).

The soil texture designations in Figure 1-7 are based on the two characteristics of texture and included rock fragments, so that, for instance, “very flaggy silt loam” has proportions of sand, silt, and clay that put it in the category of “silt loam” (see illustration above) and also include 35 to 60 percent flagstones; “clay loam” has the appropriate mix of sand, silt, and clay to fall in the “clay loam” category and contains less than 15% by weight of rock fragments.