Talpa Hills Soil Samples

Soil samples were collected from three locations along the lower west slope of the Talpa Hills, at the following coordinates:

Site 1: 36° 20.886' N, 105° 34.934' W
Site 2: 36° 20.819' N, 105° 34.955' W
Site 3: 36° 21.177' N, 105° 34.418' W

Samples were collected on 20 Feb '23 and sent to the Colorado State University Soil Testing Laboratory, Denver, CO the following day. Approximately three weeks later I received the soil analysis results.

All three sites are alkaline, with two (Sites 2 and 3) strongly alkaline, having a pH greater than 7.9. This is important because at these pH values, iron is very insoluble and thus extremely difficult for plants to acquire. Important because iron is essential for chlorophyll synthesis.

If one were to attempt to introduce plants, as a reclamation strategy, not only would iron be a problem, but also nitrogen. CSU suggests that nitrogen be added to the soils to support plant growth (1.2 lbs/1000 sq ft of soil). Without boring you with the math, these would be about 1.5 tons on nitrogen fertilizer per 50 miles of trail – to revegetate the disturbed areas on either side of the trails.

Obviously, one would need to irrigate the introduced plants as well. So, given the low availability of iron and the need for nitrogen and water amendments, revegetation is probably not a viable reclamation strategy.

Additionally, and most significantly, CSU notes that for each of these sites, "soil has a low wet aggregate stability due to the high content of sand." The soils at each of the sites have at or above 50% sand content, with the remainder equally divided between silt and clay. What this means is that when these soils become wet, they fall apart. Such as happens during a rain storm or snow melt – the soils become unstable, they become mud.

So, not only are the areas disturbed on either side of the proposed trails unstable, but so are the trails themselves, because the trails are composed to the parent soil material – 50% sand, 50 % silt/clay.

Currently, soils in the lower Talpa Hills are only moderately stabilized by the presence of small rocks and pebbles scattered about the surface – acting as an "aggregate", somewhat similar to the aggregate in concrete, but with a much less binding strength than concrete aggregate. Once these surface rocks and pebbles are disturbed, the surface soil losses what little stability there is.

Given what has been learned about the instability for the areas tested, and what also may be true for the entire proposed area, I suggest that sample analysis should be performed along any proposed trail system.

Finally, given the instability of soils tested, I suggest that "maintenance" discussions become front and center during each of the proposed trail systems. To include how many person hours are needed per mile of trail per year, who is responsible and accountable for maintenance – legally. And so on.

In other words, no trail system should exceed its maintenance requirements.

Larry E. Hersman, Ph.D.
Soil/Geo Microbiologist, retired
Bioscience Division
Los Alamos, National Laboratory

414 Este Es Place
Taos, NM 87571