

Natural Resources Conservation Service

Soil and Plant Science Division

Soil Survey Region 5



Buffalo, WY MLRA Soil Survey Office

Soil Pit for the Plant Science Class at Buffalo High School

Purpose

Nothing enhances learning like hands-on science. Our purpose is to increase knowledge and retention of the soil-plant relationships through hands-on learning. In service of that purpose, we dug a soil pit on the high school grounds to allow for multiple classes to make use of the resource.

In the Buffalo school system, we start them early on learning about soils and natural resources. We give presentations every year at the Future Farmers of America school exposition at the stockyard, and at the grade school, where we pull 3" soil tubes and go over concepts about soil genesis. By the time the students are in high school, we can delve into the more complicated aspects of the soil-plant continuum.

The Buffalo High School soil pit yielded massive prismatic structure exceeding 20 inches (50 centimeters) in length and 10 inches (25 centimeters) in width. Proximity to a leaky irrigation canal has created an artificial water table that caused the concentration of salts at the base of the prismatic structure by capillary action. The pH of the soil was 8.2, indicating carbonate concentration. When we measured the electrical conductivity (EC), it pegged our Hanna EC meter at 4.0, and was likely higher than that. This EC reading indicates that gypsum and sodium salts likely were present in high amounts in this soil profile. These soil and hydrology conditions allowed for a great teaching opportunity about irrigation in the arid west and how salt concentrations are related to irrigation practices.

Other concepts we cover include soil organic matter, its benefits and origin; the direct relationship of range condition (grazing) and grass rooting depth; how sodium affects water infiltration of water into the soil profile; how salts affect available water content (AWC) and negative matrix pressure of a soil; where and how nutrients are stored in soils in plant available form; and how pH affects the availability of nutrients in the soil to the plants living there.

Key Outcomes

Hands-on learning of:

- Soil textures by feel methods
- Electric conductivity and pH in soils
- Salt accumulation and capillary action
- Soil hydrology, irrigation canals, and salt buildup
- Soil structure
- Argillic horizon formation
- Surface horizon formation in a prairie soil
- Cation and Anion nutrient exchange on the diffuse double layer





Joe Dyer, NRCS Soil Scientist, digs and teaches simultaneously.



Zach Byram (left) of the Clear Creek Conservation District helps a student get the proper soil moisture content for "texture by feel" classification methodology.

