



Soil Health Systems Approach

Paying Dividends

During Drought

By Jay Fuhrer, Soil Health Specialist



Mike Small starting to windrow a hayland field.

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– Becky Small, Moffit

This summer, North Dakota has experienced extreme heat mixed with very little rainfall, causing drought conditions to occur especially on the western side of the state. Currently, 43 percent of the state is in extreme drought, with just over seven percent in exceptional drought, according to the United States Department of Agriculture (USDA). These conditions can be particularly detrimental to farmers and ranchers who rely heavily on weather conditions for the growth of their crop and the health of their cattle.

The Natural Resource Conservation District (NRCS) provides multiple programs and conservation plans that can help aid farmers and ranchers in implementing conservation practices in their operations that can be beneficial during times of drought. The Small Angus Ranch is an example of a ranching operation that took advantage of the USDA-NRCS plans and programs and has seen both environmental and financial benefits through their implementation.

Small Angus Ranch

The Small Angus Ranch is located southeast of Moffit, N.D., with most of the ranch located in Burleigh County and a portion in Emmons County. The ranch is owned and operated by Mike and Becky Small along with their children Andrew, Anna, Bethany, and William. Mike's mother Mary, and brother, Ken, are also part of the ranch. It is primarily a cow/calf operation growing hay and forage grain.

Ten years ago, the Smalls began writing out their ranch goals and completing a conservation plan with the NRCS, which included the five soil health principles.

- Soil Armor
- Minimize Soil Disturbance
- Plant Diversity
- Continual Live Plant/Root
- Livestock Integration

Implementation of Soil Health Principles

The Smalls already no-tilled their corn acres; however, they then secured a no-till drill for their small grains as well. By removing tillage from their practices, they were able to keep cover on the soil surface and minimize soil disturbance, securing the first two soil health principles, soil armor and minimize soil disturbance. Soon after, cover crops and diverse hayland seedings were added to supply additional plant diversity, which added the third and fourth soil health principles, plant diversity and continual live plant/root. The hayland acres also became part of the drought plan, as they can double for pastures during years of low grass production.

Simultaneously, the rangeland management was moved from season-long grazing to a rotational grazing system. The original six pastures became 35 pastures, allowing for short grazing exposure periods and long recovery periods. Over- and under-utilization was reduced by creating smaller pastures using single electric wire cross fences, along with livestock pipelines and tanks. Soon the perennial root systems expanded and additional grazing forage was produced. Now the fifth soil health principle, livestock integration, was on the ground, with the cover crops providing the bridge between the grazing system and the cropping system.

The Smalls have used a number of monitoring tools over the years for livestock, soils, and plants:

- Monitoring livestock using the Nutritional Balancer program. This includes sending in frozen manure samples to determine the quality of grass or rations consumed. The Smalls also Body Condition Score the livestock to monitor their overall condition.
- Testing soils to monitor the inorganic nutrient, organic nutrient, and the soil biology. This allows them to adjust fertility rates accordingly.
- Using forage analysis as another tool to assure livestock ration needs are met.
- Monitoring pollinators using transect lines.

Benefits of Plan Operation

The Smalls implemented the conservation plan with financial assistance from the Environmental Quality Incentive Program (EQIP) and the Conservation Stewardship Program (CSP). Some of the major practices implemented by the Smalls through the NRCS programs are: wells, pipelines, tanks, cross fences, cover crops, hayland plantings, Nutritional Balancer, and others. “During these drought conditions, we wouldn’t be able to make it without having the grazing system already in place, complete with the water tanks, and livestock pipeline supplying fresh water,” said Mike Small.

The Small Angus Ranch has been impacted by the 2017 drought, as have numerous other North Dakota ranchers and farmers. However, the Smalls have made their soils more resilient by implementing the soil health principles. By adding cover to reduce erosion, minimizing soil disturbance, adding plant diversity and cover crops, as well as hayland plantings and integrating livestock, their soils now hold more water and nutrients. They are quick to point out the environmental and financial benefits provided by both EQIP and CSP programs. Participating with USDA-NRCS programs allowed them to implement their plan in a shorter timeframe and as a systems approach.

“Over the past years it has been wonderful to see how programs like EQIP and CSP have improved our pastures, soils, and overall farm,” Becky Small said. “This year when rainfall has been scarce, I am so deeply grateful for the management alternatives we have in place as a result of these programs, which will ultimately help us save our cow herd.”

For more information about conservation planning and what NRCS can do for you, visit your local USDA-NRCS Service Center.

Hayland field ready for baling on the Small Ranch.



Oats emerging in residue left from no-till farming practices.





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