

CONSERVATION CROPPING SYSTEMS PROJECT

16th ANNUAL REPORT
2017



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Kelly Cooper Farm Manager
Matt Olson Senior Technician

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PROJECT Description Update

In 2017 the Conservation Cropping Systems Project (CCSP) embarked on a new mission. We will now work exclusively within producer's operations. We finished the demonstration and associated research projects at the Forman site over the course of the 2017 cropping season. One research project conducted by NDSU will gather data from a cover crop project in the spring of 2018 and with that the Hanson family who have so generously allowed us to rent their land over the last 15 years will

resume operations on the demonstration farm site in Forman. We cannot thank them enough for the many years of conservation promotional work we have done at the Forman site that would not have been possible without their cooperation.

Our new project began in the spring of 2017 with a cooperative agreement that was made with Charnell Haak, a producer in Dickey County. Livestock became a large part of the CCSP project with our new cooperator. Our focus for this new venture was to become a leaner, producer-driven operation that fully integrates our sponsors and conservation partners into our producer's operations. What we have done so far includes facilitating our new producer to become involved with NRCS by obtaining an EQIP contract to upgrade his pasture to a managed grazing system. This includes cross fencing, water pipelines, and tanks. We introduced him to the Ducks Unlimited personnel who are working with him on perimeter fencing. We have introduced him to experts with in NDSU/SDSU extension, NRCS, Soil Conservation Districts, and Seed Suppliers to help him make decisions of cover crop mixes for full season grazing and inter-seeding row crops.

Further in this report will cover more of our details of the 2017 season along with plans for the 2018 season utilizing a new grant that will allow us to extend our project to more producers.

PROJECT PURPOSE

Our goal is to work directly with producers to profitable farming methods, machinery, and philosophies that promote soil and water conservation.

PROJECT SPONSORS

The Conservation Cropping System Project is funded through the sponsorship of governmental, corporate and private parties. The Wild Rice Soil Conservation District is the principle cooperating district, supplying office space and other facilities for the project. The other soil conservation districts supplying board member leadership in North Dakota are from Ransom, Richland, and Dickey counties. In South Dakota, the districts from Marshall and Day counties also supply leadership from area board members. Other cooperating agencies are the Natural Resources Conservation Service (NRCS), North Dakota State University (NDSU), and South Dakota State University (SDSU). Sponsorship is either as a cash donation, in-kind or both. There are four levels of sponsorship: Platinum (\$10,000 or greater), gold (\$5,000 - \$9,999), silver (\$2,500 - \$4,999) and bronze (\$500 - \$2,499). We wish to thank our sponsors for their support! Without them this project would not exist.

2017 Project Sponsors

Platinum

North Dakota Community Foundation
North Dakota Corn Council
North Dakota Soybean Council
Titan Machinery

Gold

Agtegra Cooperative
Ducks Unlimited
Pioneer Hybrids
Richland County SCD
Wild Rice SCD

Silver

Bayer Crop Science
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Special Thanks

Bear Creek Flying Service
Day County SCD
Domine Sales & Service
Environmental Protection Agency
In Loving Memory of Bill Smith
Joe's Ag Supply
Marshall County SCD
Natural Resources Conservation Service
North Dakota Department of Health
North Dakota State University
Ransom County SCD
Walt Albus



Figure 1. Aerial view of the Conservation Cropping Systems Project with all small plots.

			Nc1	32alf	Jww1	8alf		
			Na1	33alf	Jps1	9alf		
			Na1	34alf	Jc1	10alf		
			Nww1	35alf	ip 1s	ip 1s alf		
				alf planted fall 2016				
				ip 2s	ip 2s			
			ip 4c	ip4c	Bsw1	14alf		
			Dsw1	39alf	Bs1	15alf		
		Hc1_6	71	Ds1	40corn	Bc1	16corn	
		KHc1	72	Dc1	41corn	Bww1	17corn	
		KHww1	73	KHs1	42 NDSUsoy	Asw1	18soy	
		Hs1	74		43 NDSUcorn	As1	19Corn	
		OA1c	75		44 NDSUalf	Ac1	20Corn	
		Hc1_8	76		45 NDSUsoy	Aww1	21Corn	
		XX1c	77	Qc2	46 Missycorn	Csw1	22Corn	
		XX1c	78jascom	Qsw1	47soy	Cs1	23soy	
		Fs1	79jascom	Esw1	48soy	Cc1	24soy	
		Nsw1	80jascom	Es1	49soy	Cww1	25asoy	
		Qc1	81jascom	Fc1	50soy	ip 3cc	soy	
		Aww1	82jascom	XXhay	51alf			



Figure 2. Plot map 2017.

AGRONOMIC PRACTICES AND YIELD

A detailed outline of agronomic practices used is listed in Figure 4.

Forman Site:

Spring Wheat: “Prosper” spring wheat was planted April 23, 2017 at 120 lbs./acre with a John Deere 2090 drill. Harvest was August 7, 2017. The drill was pulled by CaseIH MX340 with RTK autosteer. The Combine used was a 4400 John Deere.

Corn: Croplan 3337VT2P/RIB was seeded with a JD 7200 8 row planter in the nitrogen/sulfur research plot and the bulk plots on May 5, 2017 with a population of 32,000. Fertilizer at planting was 111 lbs. nitrogen, 45 lbs. phosphorus, and 11 lbs. sulfur including 5 gallons 10-34 in-furrow. Harvest was October 27. Strip tilling was done with a CaseIH NTX 5310 on May 5, 2017. 7200 John Deere planter and strip till machine pulled by CaseIH MX340 with RTK autosteer. Combine used was a 4400 John Deere.

Soybeans: Pioneer P09T74R2 soybeans were planted May 7, 2016 at 150K population on the rotation plots. 8 gallons 10-34-0 applied 2X2 for 32 lbs. P. Planter was 7200 John Deere Planter pulled by MX340 with RTK autosteer. Combine used was a 4400 with 15ft flex-head October 18, 2017.

Alfalfa: Magnum IV alfalfa was seeded in the fall of 2016 on approximately 5 acres. Drill used was John Deere 1590 pulled by MX340 with RTK autosteer.

Charnell’s site, Dickey County:

Pioneer P9188AM Corn on 20 acres was strip tilled and seeded May 12 with a JD 7200 8 row planter pulled by a CaseIH Magnum 340 with RTK autosteer. Corn was cut for silage with a yield of 21.89 tons/acre. Four rows of corn were left and combined which yielded 152 Bu/acre.

On the remaining 30 acres, a full season cover crop grazing mix was planted on May 3rd and 4th with an Amity twin disk drill with deep banders. Below is the species that were planted and the rate at which they were seeded.

- 25 lbs. Oats
- 25 lbs. Barley
- 25 lbs. Spring Triticale
- 4 lbs. Italian rye grass
- 1 lbs. Rape
- 1 lbs. Berseem clover
- 1 lbs. Phacelia
- 25 lbs. Peas

The small seeded mix was seeded with the regular seeding disks, and the peas were seeded through the deep banders. Drill was pulled by the CaseIH Magnum 315 with RTK autosteer.

Over the course of the summer clippings were taken to estimate the grazing biomass produced. Figure 3 on the following page shows the dry weight of the forage clipped and the date on which the clipping occurred. Using that information, we were able to derive an estimated lbs./acre of forage produced. The area was subdivided into 6 paddocks. 28 cow calf pairs and 1 bull were turned out and rotated through the paddocks beginning June 16th and were pulled out August 13th.

The full season cover crop was sprayed out with glyphosate due to annual weed pressure and a fall cover crop mix was seeded August, 15 at a rate of 92.5 lbs./acre with the Amity drill and CaseIH 340. The mix consisted of 90 lbs./acre winter rye, 1 lb./acre of annual ryegrass, and 1.5 lbs./acre of sorghum. The same number of cattle were turned back in mid-September but there was not enough growth on the rye to sustain the 28 cow/calf pairs. One of the cells only lasted a day.

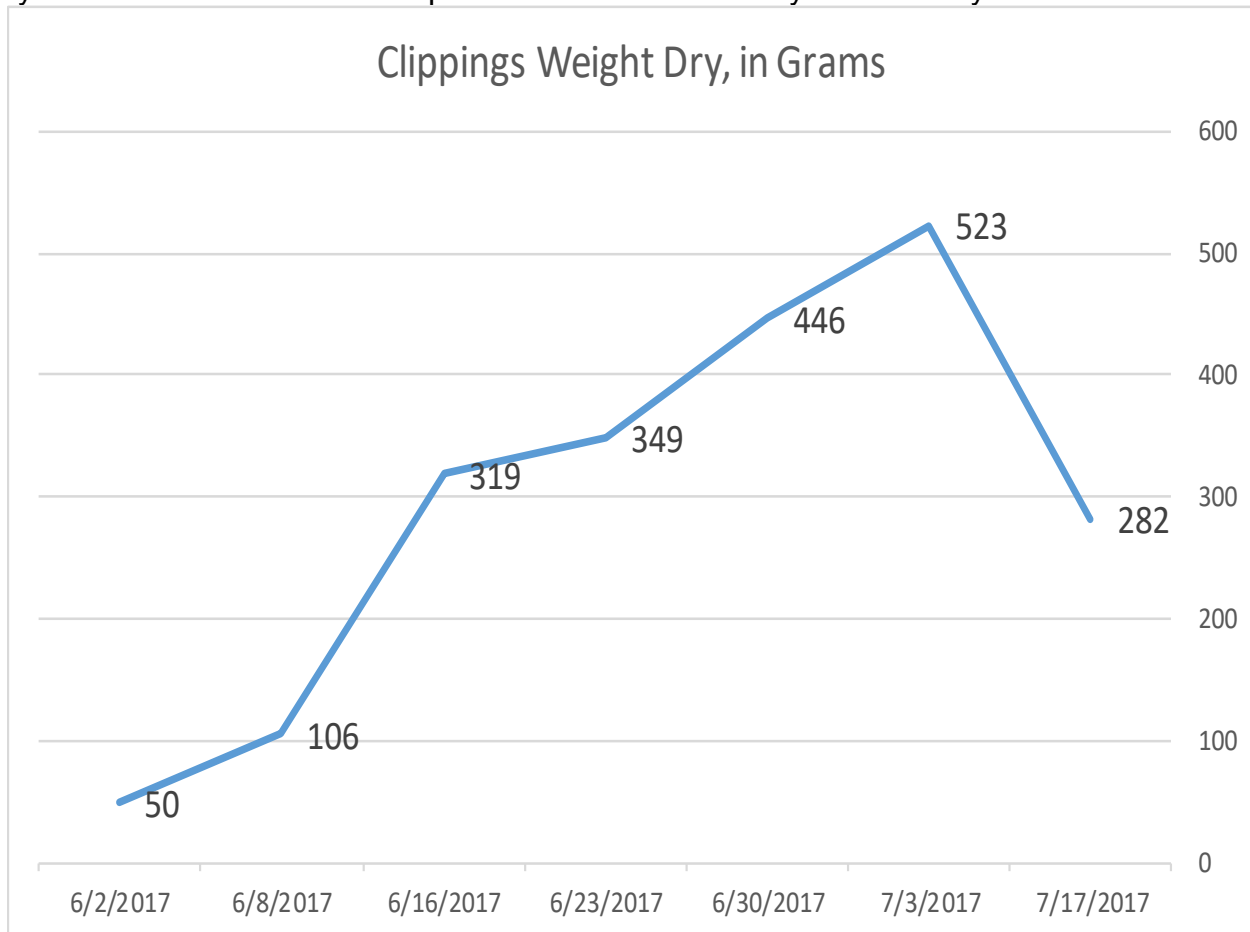


Figure 3. The above weight in grams translates to lbs./acre.

Crop	Planting Date	Harvest Date	Planting Rate	Chemical	Rate	Date
Alfafla(establish)	8/9/2016		20#	32oz RU preplant		
Dairyland Magnum V						
Only 2 of the alfalfa plot were kept after plot rearrangement. Alfafla was planted around the 2 existing Plots and through a low area. This planting will possible be planted to corn in 2017 or 2018.						
	Planting	Harvest	seeding rate	Roundup Ultra Max	32oz	04/22/17
HRSW	4/23/2017	8/7/2017	120	Huskie Complete	13.8 oz	06/01/17
Prosper						
	Planting	Harvest	population			
Corn	5/11/2017	10/27/2017	32,000	Roundup Ultra Max	32 oz	05/31/17
At Forman				Diflex	7 oz	05/31/17
Croplan 3337VT2P/RIB				Atrazine	1/4 pt	05/31/17
				Interlock	4 oz	05/31/17
At Oakes				ams	10lbs/100	05/31/17
				Preference	8oz/100	05/31/17
				Roundup Ultra Max	32oz	06/26/17
Strip tilling done 5/11/17				Laudis	3 oz	06/26/17
				Interlock	4 oz	06/26/17
				ams	10lbs/100	06/26/17
				Preference	8oz/100	06/26/17
	Planting	Harvest				
Soybean	5/11/2017	10/19/2017	150,000	3 oz Valor+1 pt Dual		05/06/17
Croplan				Roundup Ultra Max	32 oz	05/06/17
				Interlock	4 oz	05/06/17
				Preference	1 pt	05/06/17
				Roundup Ultra Max	32 oz	06/26/17
				Cadet	0.5 oz	06/26/17
Fertilizer						
Corn received 111 lbs nitrogen at planting						
Corn also received 45 lbs P., 25 lbs 2 x 2, 19.7 lbs infurrow, both as 10-34 and 1 pint zinc chelate infurrow.						
Spring Wheat at planting 100 lbs 18-46-0, stream barred with 120 lbs n 5/17/17						
Soybeans 8 gallons 10-34-0 2x2						

Figure 4. Crop Inputs and timing Forman site.

Precipitation and temperature at the Oakes Irrigation Research Site.

Month	Precipitation			Average daily temperatures		
	2017	15-year average	25-year average	2017	15-year average	25-year average
	-----inches-----			-----°F-----		
April	1.18	1.54	1.56	44	44	43
May	1.46	3.39	3.06	56	56	56
June	2.14	4.46	4.10	67	67	67
July	0.88	2.55	3.16	72	71	71
August	3.86	2.60	2.37	65	69	69
September	2.85	2.43	2.75	60	61	60
October	0.74	2.09	2.21	47	47	47

Table 2. Growing degree units¹ at the Oakes Irrigation Research Site.

Month	2017	10-year average	15-year average	25-year average
May	310	306	302	303
June	513	507	505	503
July	648	649	652	639
August	476	583	576	581
September	366	387	384	376
Total	2313	2432	2419	2401

¹Growing degree units = (Tempmax + Tempmin)/2 - 50. If Tempmax is greater than 86, then Tempmax = 86. If Tempmin is less than 50, then Tempmin = 50. Temperature is in degrees F.

Table 3. Dates of last and first frosts.

	2017	10-year average	15-year average	25-year average
Last frost in Spring				
32 °F or less	2-May	10-May	6-May	4-May
28 °F or less	29-Apr	27-Apr	27-Apr	27-Apr
First frost in Fall				
32 °F or less	9-Oct	4-Oct	4-Oct	2-Oct
28 °F or less	9-Oct	10-Oct	9-Oct	8-Oct
Frost free period (days)	160	147	151	151

Figure 5. Crop Inputs and timing Forman site.
The above table compliments by Leonard Besseman.

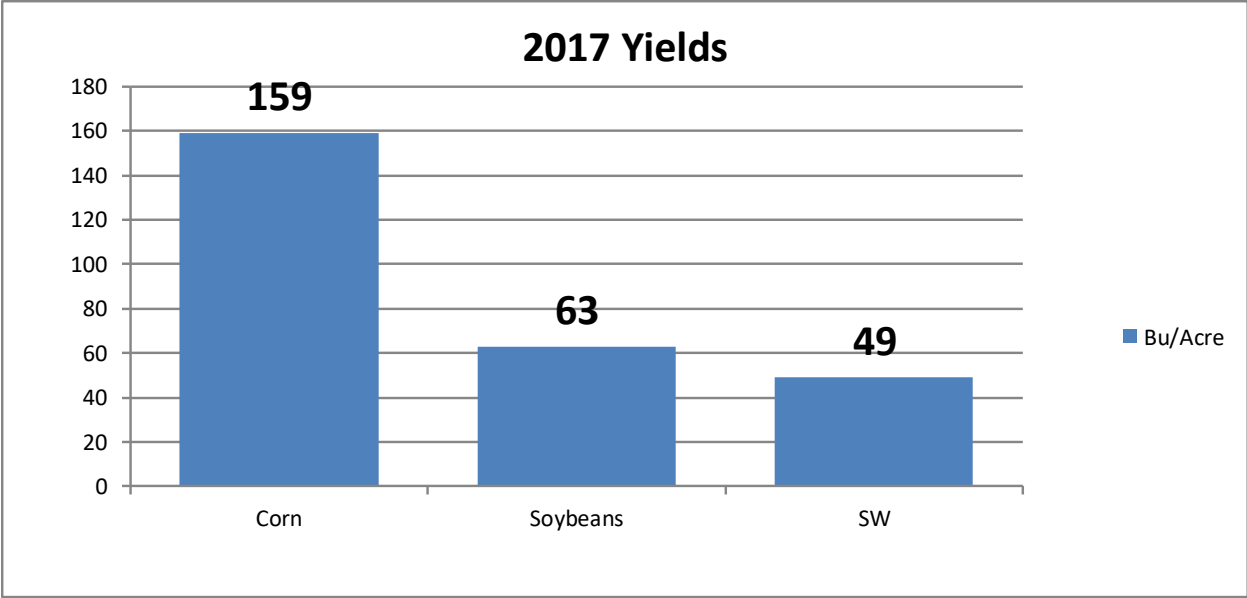


Figure 6. Crop yields at CCSP Forman Site in 2017.

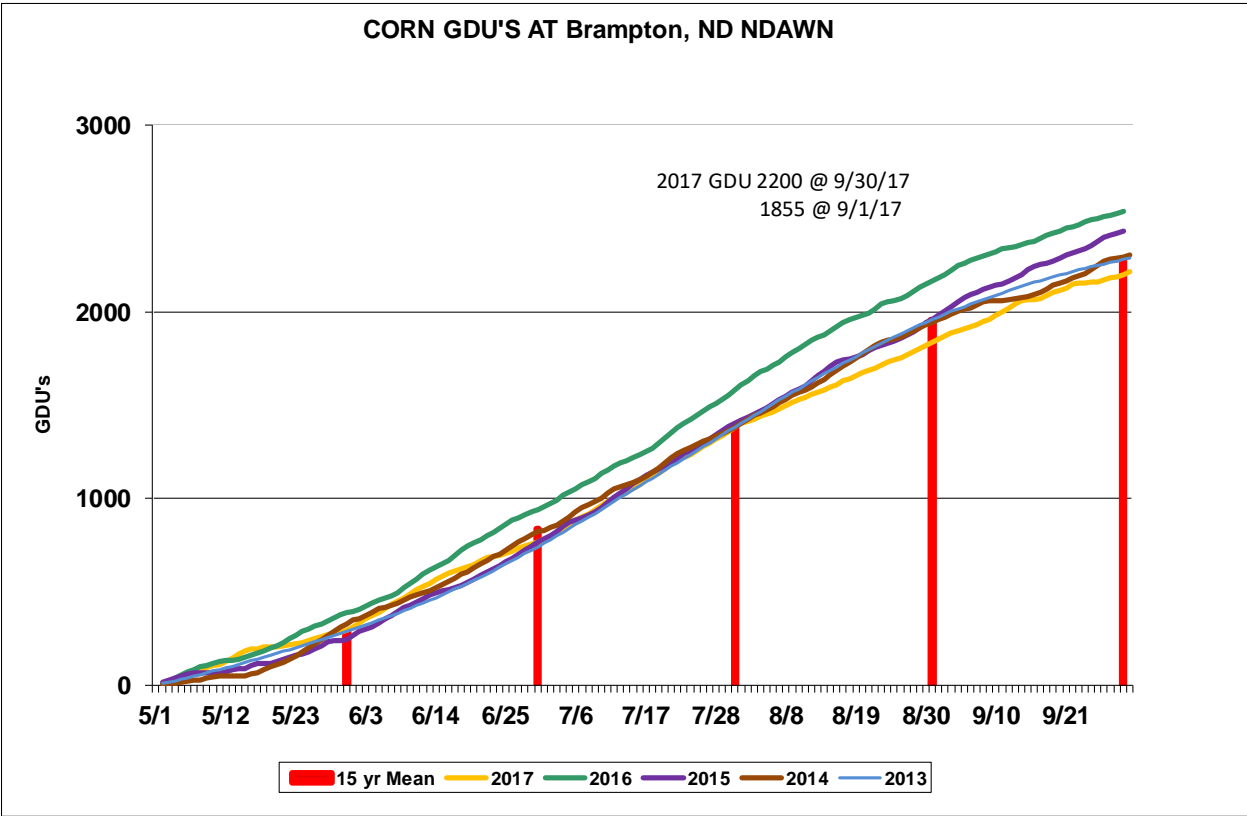


Figure 7. Growing Degree Days from the Brampton N Dawn.

Crop and Weather Discussions 2017.

2017 brings us another year of good growing conditions at Oakes and Forman. We were fortunate to have some rains early which got the crops going, however our rainfall was sparse as well. As you can see by the GDU chart provided in Figure 7., 2017 finished considerably cooler than the preceding four years. In evaluating the weather data provided in Figure 5, it is interesting to note that we did not get a killing frost until late which allowed both corn and beans to mature, and test weights were good. Temperatures were average up until mid-August when thankfully we; and most of the state, received much needed precipitation. With the lack of rain, storms with damaging winds and hail were absent as well. White mold was not an issue unless you had late planted beans. The moderate heat and low humidity during early flower kept diseases like white mold and scab to a minimum. Soybean aphids were at low levels for the most part locally. I did hear of some localized spraying. The major discussion of 2017 was Dicamba drift, which in the end caused little if any actual yield damage. Many producers were looking at the excellent yields in fields that appeared to have significant damage as evidenced by curled leaves and wondered how the high yields could be possible. Good yields aside, many new restrictions are being placed on spraying Dicamba in 2018. Whether following the new guidelines will stop the mostly cosmetic symptoms remains to be seen. Harvest weather for row crops was good. Early wheat harvest went well, but if things got pushed past the second week in August there were many delays. The first killing frost was October 10th and the ground froze early in November with 5 days where lows reached the single digits. All in all, it was a good year in the Oakes and Forman areas. We were very lucky to miss the devastating dry conditions experienced to our west.

The North Dakota weather network "[NDAWN](https://ndawn.ndsu.nodak.edu)" is a source of current and historical weather covering the state. This year inversion sensors will be installed on several stations to assist with Dicamba spraying. All sites update information every 5 minutes and there is no subscription fee. All sites are properly located and utilize professional grade weather sensors. For an overview of the system click [here](#) or go to <https://ndawn.ndsu.nodak.edu/help-overview.html>.

2018 and beyond.

Moving forward in 2018, our project has been awarded a grant through the Natural Resources Conservation Service to expand our pilot project created through our cooperative work with the producer in Dickey County. CCSP has sought out two additional producers in our project area to partner with to enhance their conservation ideas on their own farm or ranch. This grant is only possible by the continued support of our current sponsors as the grant does require match for funds requested.

2018 and beyond (cont.)

The goal of these cooperator driven sites is to encourage them to try something new, something they have been thinking about doing, or maybe even a modification of a practice they are already doing. We want flexibility and innovation to be the main drivers. We know variability rules in weather and climate. We want to encourage practices that are economic, durable and regenerate soil.

Outreach is a major point of emphasis with these sites as well as we are eager to change the method of how we have been doing field days. Under the old model we were inviting people to come look at what we have done on our field. Whereas with our new method we will be inviting people to a producer's field to see what new, innovative techniques the producer is integrating into their operation.

The last major positive of this method is the longevity factor. With the new model, the goal is to work with producers to assist them in adopting new and innovative conservation techniques and show that there are positive economic and soil health benefits.

Final comments from the Farm Manager.

“Ultimately, the only wealth that can sustain any community, economy or nation is derived from the photosynthetic process – green plants growing on regenerating soil.”

— Allan Savory

With CCSP adding livestock, I have been energized by the realization of how important animals are to a conservation system. I was fortunate to hear Allan Savory speak this summer out in a pasture near Bismarck at a meeting sponsored by the Burleigh County Soil Conservation District. Allan has been involved in conservation all his life and covering multiple continents. He has had many twists and turns as he has worked to find ways to keep wildlife and natural systems functioning in a way that provides economic enhancements for the local people as well. He talks with great passion about how he at first saw raising livestock as an absolute threat to the natural world. After years of working in and around national parks and ranches, he concluded that when properly managed, livestock fit into the system just as the buffalo and other herding animals have done for millennia. This system in his opinion is the most efficient for producing food and offers the best chance to sustain human life indefinitely.

I must admit, when one looks at the expense and effort it takes to grow crops fed to animals, would it not be more efficient just to bring those animals to the field? For years we have looked at pastures and even to a large extent forage crops; as low tech, low input, forgotten assets. What happens when the cow comes to the field, instead of the field going to the cow? For one thing, manure management is taken care of. Nutrients are returned to the soil, quickly I might add. We know the process works. The prairie was doing just fine on its own, growing lots of meat, for millennia. That's a long time.

Disease of both the animals and the plants should be reduced. How do the economics look? We desperately need a rotation, and a 3rd crop to soybeans and corn would be a huge deal, especially if it will lessen erosion. That alone should improve yields in both corn and beans long term. I think like everything else, we need to seriously look at the species grown for grazing, and the real challenge is we need to look at a diverse mix, not just one species such as only “sorghum” for instance. We need to think what species will be productive early, mid-season, and late. We also need to look at the land. Are there low spots, high spots, salt areas etc.? This raises the complexity, but also brings an opportunity to maximize the potential of every acre in every field. This allows for a farmer/rancher to go back to the future, where prescription or cook book farming techniques don’t work. Back to the time where decisions were made by experience, intuition, and knowledge. In our first try at Oakes, we essentially turned 30 acres of cropland into a similar grazing experience of 130 acres pasture. I know we can do better. Kenny Miller, the 2017 Leopold winner, is getting very good results grazing irrigated pasture. I look forward to the new adventure with livestock.

I am constantly amazed at the amount of information generated by NDSU and other entities. So much is learned. It appears to me the challenge is how to implement the knowledge. I was profoundly taken aback this winter when discovering large corporations in agriculture who make it their business to absorb knowledge are making some radical changes in how they operate. Much of the corporate actions involving environmental issues have for the most part struck me as PR. I see companies placating to a public who for the most part has a very vague and misinformed idea of how food is produced. I have learned major companies are taking steps of trying to find ways of getting their growers to limit soil erosion/ and improve soil health. At first this seemed to follow the same path of showmanship. However, this I found out, was not for PR but because as an immortal entity, corporations are worried about the long-term ability to source product. Obviously, if soil is eroded and depleted to the point food production is limited in either quantity or quality, it poses a serious business problem. Certainly, as I look at current markets, we don’t have any shortages. At this moment in time the opposite is true; however, times do change, and the wise take advantage of knowledge and position themselves properly.

Quote from Wendel Berry sums up my thoughts:

“The soil is the great connector of lives, the source and destination of all. It is the healer and restorer and resurrector, by which disease passes into health, age into youth, death into life. Without proper care for it we can have no community, because without proper care for it we can have no life.”

Kelly Cooper, CCSP Farm Manager.

Note: If you would like to read this report electronically, it will be available at www.notillfarm.org.