

## Planting #131

2019 Planting History

Prepared by Riley Nylin

Name: Flagg and Carthage Planting

### 62.9 Acres Total

Dry: 16.9 acres

Dry Mesic: 29 acres

Mesic: 12 acres

Combine: 5 acres

### Site Conditions

General Location – located on the corner south of E. Flagg Rd. and west of S. Carthage Rd.

GPS: 41°55'3.6" N, 89°19'0.2" W

Elevation: 731 ft – 775 ft

County: Ogle

### Soil Types

According to the Web Soil Survey for the planting area, soil types include:

Soil Type	Acres in AOI	Percent of AOI
La Hogue loam, 0 to 2 percent slopes	21.8	34.7%
Warsaw loam, 2 to 5 percent slopes	7.2	11.4%
Odell silt loam, 0 to 2 percent slopes	17.7	28.1%
Wyanet silt loam, 5 to 10 percent slopes, eroded	11.5	18.3%
Wyanet silt loam, 2 to 5 percent slopes	0.1	0.2%
Comfrey loam, 0 to 2 percent slope, frequently flooded	4.4	7.0%
Senachwine silt loam, 5 to 10 percent slope, eroded	0.1	0.2%
<b>Totals for Area of Interest</b>	<b>62.9</b>	<b>100.0%</b>

**Figure 1:** Soil types present within the planting. Source: NRCS.

\*Above are basic descriptions, a complete soil test is needed to determine specific soil characteristics. For additional information, see Soil Web Survey website: <http://websoilsurvey.nrcs.usda.gov/app/>

Refer to Figures 6 & 7 that show the location of the soil types within the planting.

### Topography

The general topography of the planting consists of a few rolling hilltops that slope downwards towards Clear Creek which runs along the southern edge of the planting. There are previous waterways and eroded drainage areas that will be restored to wetland scrapes in the near future.

## **Agricultural History**

This site has been in agriculture for years and was in soybeans before the crew planting. The strip of land surrounding Clear Creek was unplanted this past year and therefore had become overgrown with agricultural weeds, the crew did not plant these wet areas. The land surrounding the southern portion of the 17.9 acre area is still in CRP and consists of low quality species. Because of this, the crew planted these southern 5 acres with combined seed mixes.

## **Site Preparations**

The soybeans were harvested in mid-October with whole plants and seed left behind in wet areas that the farmer could not get to, these amounted to a very small portion of the planting area. There was also small remains of plant litter left behind throughout the field. Since the soil was previously worked by the farmer, there was no need for mowing or burning the crop stubble.

The weather for the 2019 season was overall very wet, with a colder spring and an early onset winter. Because of the short fall, we had received a few snowfall events prior to planting. The week of planting, the area received a couple inches of snow.

Since this planting is predicted to have weed problems in the areas surrounded by CRP and those that will be converted to wetland scrapes, we planted combined seed mixes instead of using our higher quality hand picked seed.

## **Planting the Seed**

The planting began on November 13<sup>th</sup>, 2019 and was completed on November 18<sup>th</sup> by noon.

Weather: The winds were variable from 0 to 10 mph. There were trace amounts of snow that occurred between the first and second day of planting and was cloudy or partly cloudy throughout the entire span of planting. The first and second day (11/13 & 11/14) there was a couple inches of snow on the ground which made it easy to tell which areas had been planted and how much seed we were dropping. The frozen ground also offered a solid surface so driving around was relatively easy. The third day (11/15) started out with a couple inches of snow again but as the day went on it began to warm up and the snow slowly melted. On the fourth day of planting (11/18), the ground had thawed, and the snow was gone leaving behind very muddy conditions. We had to take out UTVs this day to avoid getting stuck. Small ruts were left on the outer boundaries of the field where it was most wet.

The area was seeded using three broadcast seeders attached to the white truck, silver truck, and 2020 Z-truck for the first three days (11/13-11/15). After that, we had to use three of the blue UTVs to plant because of the field becoming very muddy. The crew members who participated in planting were Riley Nylin, Amanda Contreras, and Tyler Pellegrini. We used digital radios to frequently communicate with each other.

The site entrance to the planting is located on S. Carthage Rd. by the three grain bins, directly south of the planting. On November 13<sup>th</sup>, we began seeding the portion of the 45 acre planting that is located to

the east of the waterway in Figure 7. The three trucks traveled in clockwise rotations starting from the southeastern corner headed west. The strategy was to complete the specified area following the concentric circles of our tracks in the snow. The specified areas divided by seed mix type were planted one at a time starting with mesic. When we had completed that section of the planting we moved to the west side of the waterway and followed the same pattern of seeding. We then continued to plant the whole 45 acre planting in this manor with the remaining dry, dry mesic, and rye mixes.

When the 45 acre portion of the planting was finished, we decided to go ahead and plant the 17.9 acre portion with the remainder of the 2019 handpicked species. For this section, Amanda and Riley started to plant dry mesic seed over the entire acreage in counter-clockwise circles. At this same time, Tyler began to plant combined seed mixes onto the southern 5 acres of the planting that are outlined in teal in Figure 8. Amanda and Riley finished the planting with dry seed mix on the tops of the hills in this area.

Both areas were surrounded by a rye border that spanned three truck widths wide and went around the outer border of the whole planting. Riley followed this up by throwing out the step-in seed mixes. The step-in species were chosen because of trace amounts picked and the species that required vert specific growing conditions. She designated these species to the areas outlined in Figure 9 and listed below in Figures 2 & 3.

Mesic Step-In Species	
Scientific Name	Common Name
<i>Spiranthes magnicamporum</i>	Great Plains Ladies Tresses
<i>Cuscuta pentagona</i>	Prairie Dodder
<i>Gentiana puberulenta</i>	Downy Gentian
<i>Strophostyles helvola</i>	Trailing Fuzzy Bean
<i>Galium boreale</i>	Northern Bedstraw
<i>Pychanthemum tenuifolium</i>	Slender Mountain Mint

**Figure 2:** List of species in mesic step-in mix.

Dry / Dry Mesic Step-In Species	
Scientific Name	Common Name
<i>Geum triflorum</i>	Geum Triflorum Prairie Smoke
<i>Cyperus filiculmis</i>	Slender Sand Sedge
<i>Viola Saggitata</i>	Arrowleaf Violet
<i>Lithospermum canescens</i>	Hoary Puccoon
<i>Linum sculcatum</i>	Grooved Yellow Flax
<i>Phlox Pilosa</i>	Prairie Phlox
<i>Spiranthes cernua</i>	Nodding Ladies Tresses
<i>Patens multifida</i>	Pasque Flower
<i>Asclepias viridiflora</i>	Short Green Milkweed
<i>Polygala sanguinea</i>	Field Milkwort
<i>Asclepias amplexicaulis</i>	Sand Milkweed

**Figure 3:** List of species in dry and dry mesic step-in mix.

## Planting Mixes

Several different planting mixes were made this year, not all of them were used on this site. The handpicked mixes are broken up into five categories: Dry, Dry Mesic, Mesic, Wet, and Woodland. The Wet and Woodland Seed Mixes were saved for other plantings/overseeding areas. (See the 'Wet' section below for more details). Overall, each acre was planted at a rate of 50 lbs/acre.

On top of the handpicked mixes, the crew also used seed picked by the combine. These were labeled general combined prairie mixes or were specific species (ex. Canada Rye, Little Blue + Liatrus, and Tall Grasses). We were able to use these mixes in the areas that were designated strictly for combine mix as well as combining the specific species mixes into our handpicked seed mixes.

Going into the 2019 planting season, the crew was aware that we would be completing one planting at Franklin Creek Natural Area (FCNA Planting #130) and that the Flagg and Carthage planting was another possibility. Because of this, the crew focused on obtaining a wide range of species through the picking season, keeping diversity as the main priority. Quality was preferred over quantity, especially after the crew lost half of its members to graduate schooling. Since we knew of the FCNA site, as well as this potential new planting, the crew focused on species that would do well in mesic soils or wet conditions. When it came time to separate seed species, preference was given to the Mesic Seed Mix over the Dry Mesic Seed Mix. In past years, mesic species would simply be placed in the Dry Mesic Seed Mix.

Species Diversity				
Dry	Dry Mesic	Mesic	Wet	Woodland
63 species	71 species	50 species	57 species	34 species

**Figure 4:** Number of species in each seed mix.

### **Dry Seed Mix**

The dry seed mix was largely focused on the hilltops located on the northern section of the 45 acre portion and the eastern section of the 17.9 acre portion.

For the 45 acre section, Riley Nylin covered the western dry areas while Amanda Contreras and Tyler Pellegrini covered the eastern hilltops. Both groups drove in circles around each area until it was covered by completing a spiral in both clockwise and counterclockwise directions. They then drove in random patterns to give more coverage throughout the specified area.

For the 17.9 acre section, Riley Nylin drove along the hilltops on the eastern edge of the planting by zig-zagging back and forth, followed by random patterns.

### **Dry Mesic Seed Mix**

The dry mesic seed mix was spread throughout the entire planting, acting as a base for all the other seed mixes. The seed was planted in a similar fashion to the dry seed with a 'two-loop, then random' process used for the other mixes, beginning with the 45 acres and ending with the 17.9 acres.

Riley's seeder was 50% open which matched the seed output as Amanda and Tyler's seeder which was 75% open.

#### **Mesic Seed Mix**

The Mesic Seed Mix was spread all throughout the lower, flat areas located on the southern portion of the site and wrapping up along the waterway on both sides. This area experiences occasional flooding from the creek.

This area was the first to be seeded for the 45 acre section. All three trucks were lined up in a staggered formation, beginning at the edge and working its way toward the middle of the field. Because we were not aware of the 17.9 acre portion when we planted the 45 acres, the rest of the mesic seed mix was used up on the 45 acre portion.

#### **Wet Seed Mix**

According to initial mapping, there were soils suitable for a wet seed mix therefore, seed was set aside for this planting. When we got to the planting, we noticed that the acres that we planned on being planted with the wet seed had become overgrown with agricultural weeds because the farmer was unable to plant these areas that past season because of the very wet conditions. After we observed this, we chose not to plant these areas and save the wet seed for other purposes.

#### **Combine Seed Mixes**

The combined seed mixes were collected by Bill Kleiman and Cody Considine. To do so, they drove the combine through the prairie and collected all the seed species within an area, because of this, these seed mixes can be a bit weedier than the hand-picked mixes and therefore they are of lower quality.

We used this mix in the southern portion of the 17.9 acre section to plant about 5 acres. This was done because the area is surrounded by low quality CRP and therefore will struggle with weed competition for a few years. It was also done because we simply did not have enough seed to plant this portion at the 50 pounds/acre seeding rate that we wanted to achieve a high diversity prairie.

#### **Canada Rye Border**

Canada Rye was planted around the border of the planting, from the outer edge to about three truck widths into the planting. To do this, the trucks lined up in a staggered pattern and drove the outer edges of the plantings. We put down six barrels, which equaled about 120 pounds of Canada Rye.

### Seed Species List

Scientific Name	Common Name	Dry	Dry Mesic	Mesic	TOTAL LBS	Total lbs/ac
		Total lbs	Total lbs	Total lbs		
<i>Agrimonia parviflora</i>	Swamp Agrimony			0.010	<b>0.010</b>	<b>0.0005</b>
<i>Allium canadense</i>	Wild Onion		0.040		<b>0.040</b>	<b>0.002</b>
<i>Allium cernuum</i>	Nodding Wild Onion	2.900			<b>2.900</b>	<b>0.161</b>

<i>Amorpha canescens</i>	Leadplant	5.910	3.940		<b>9.850</b>	<b>0.493</b>
<i>Anemone canadensis</i>	Meadow Anemone			0.440	<b>0.440</b>	<b>0.021</b>
<i>Anemone cylindrica</i>	Thimbleweed	4.750			<b>4.750</b>	<b>0.264</b>
<i>Anemone virginianum</i>	Tall Thimbleweed	6.860			<b>6.860</b>	<b>0.381</b>
<i>Antennaria neglecta</i>	Field Cat's Foot	0.144			<b>0.144</b>	<b>0.008</b>
<i>Antennaria plantaginifolia</i>	Pussy Toes (Everlasting)	28.650			<b>28.650</b>	<b>1.592</b>
<i>Apocynum androsaemifolium</i>	Spreading Dogbane		1.155		<b>1.155</b>	<b>0.048</b>
<i>Apocynum sibiricum</i>	Prairie Indian Hemp		0.002		<b>0.002</b>	<b>0.0001</b>
<i>Arnoglossum atriplicifolia</i>	Pale Indian Plantain		4.400	6.600	<b>11.000</b>	<b>0.498</b>
<i>Asclepias amlexicaulis</i>	Sand Milkweed	0.014			<b>0.014</b>	<b>0.001</b>
<i>Asclepias syriaca</i>	Common Milkweed		0.683		<b>0.683</b>	<b>0.028</b>
<i>Asclepias tuberosa interior</i>	Butterfly Milkweed		0.008		<b>0.008</b>	<b>0.0003</b>
<i>Asclepias verticillata</i>	Whorled Milkweed	1.226			<b>1.226</b>	<b>0.068</b>
<i>Asclepias viridiflora</i>	Short Green Milkweed	0.010			<b>0.010</b>	<b>0.001</b>
<i>Astragalus canadensis</i>	Canadian Milk Vetch		3.100		<b>3.100</b>	<b>0.129</b>
<i>Baptisia alba</i>	White Wild Indigo			114.400	<b>114.400</b>	<b>5.448</b>
<i>Baptisia bracteata</i>	Cream Wild Indigo	2.600			<b>2.600</b>	<b>0.144</b>
<i>Besseyia bullii</i> ***	Kittentails	0.325			<b>0.325</b>	<b>0.018</b>
<i>Bouteloua curtipendula</i>	Side-Oats Grama		6.350		<b>6.350</b>	<b>0.265</b>
<i>Brickellia eupatoroides</i>	False Boneset	6.150	4.100		<b>10.250</b>	<b>0.513</b>
<i>Bromus kalmii</i>	Prairie Brome		61.821	26.495	<b>88.316</b>	<b>3.838</b>
<i>Carex bicknellii</i>	Copper-shouldered oval Sedge		1.965	4.585	<b>6.550</b>	<b>0.300</b>
<i>Carex vulpinoides</i>	Brown Fox Sedge			2.350	<b>2.350</b>	<b>0.112</b>
<i>Castilleja sessiliflora</i> **	Downy Yellow Painted Cup	3.350			<b>3.350</b>	<b>0.186</b>
<i>Ceanothus americanus</i>	New Jersey Tea		0.018		<b>0.018</b>	<b>0.001</b>
<i>Chamecrista fasciculata</i>	Partridge Pea			9.600	<b>9.600</b>	<b>0.457</b>
<i>Cirsium hillii</i> ***	Hill's Thistle		0.265		<b>0.265</b>	<b>0.011</b>
<i>Coreopsis lanceolata</i>	Sand Coreopsis	5.850			<b>5.850</b>	<b>0.325</b>
<i>Coreopsis palmata</i>	Prairie Coreopsis		8.225	8.225	<b>16.450</b>	<b>0.734</b>
<i>Coreopsis tripteris</i>	Tall Coreopsis		10.500	15.750	<b>26.250</b>	<b>1.188</b>
<i>Crocanthemum bicknellii</i>	Rock Rose	0.015			<b>0.015</b>	<b>0.001</b>
<i>Crocanthemum canadense</i>	Common Rockrose (Frostweed)		0.641		<b>0.641</b>	<b>0.027</b>
<i>Cuscuta pentagona</i>	Prairie Dodder			0.036	<b>0.036</b>	<b>0.002</b>
<i>Cyperus lupulinus (filiculmus)</i>	Slender Sand Sedge	0.044			<b>0.044</b>	<b>0.002</b>
<i>Dalea candidum</i>	White Prairie Clover		13.700		<b>13.700</b>	<b>0.571</b>
<i>Dalea foliosa</i>	Bushy prairie clover		0.012		<b>0.012</b>	<b>0.001</b>
<i>Dalea purpureum</i>	Purple Prairie Clover		48.050		<b>48.050</b>	<b>2.002</b>
<i>Danthonia spicata</i>	Poverty Oat Grass	1.000			<b>1.000</b>	<b>0.056</b>
<i>Desmodium canadense</i>	Showy Tick Trefoil		0.016		<b>0.016</b>	<b>0.001</b>
<i>Dichanthelium leibergii</i>	Prairie Panic Grass		0.078		<b>0.078</b>	<b>0.003</b>
<i>Dichanthelium perlongum</i>	Long-stalked Panic Grass		0.008		<b>0.008</b>	<b>0.0003</b>
<i>Dichanthelium scribnerium</i>	Scribner's Panic Grass		0.164		<b>0.164</b>	<b>0.007</b>
<i>Dichanthelium villosissimum</i>	Woolly White Panic Grass	0.443			<b>0.443</b>	<b>0.025</b>
<i>Dodecatheon meadia</i>	Shooting Star		2.080	3.120	<b>5.200</b>	<b>0.235</b>
<i>Drymocalis arguta</i>	Prairie Cinquefoil		6.550	6.550	<b>13.100</b>	<b>0.585</b>
<i>Echinacea pallida</i>	Pale Purple Coneflower		116.715	272.335	<b>389.050</b>	<b>17.831</b>
<i>Eragrostis spectabilis</i>	Purple Love Grass	0.055			<b>0.055</b>	<b>0.003</b>
<i>Erigeron strigosus</i>	Daisy Fleabane		5.150		<b>5.150</b>	<b>0.215</b>

<i>Eryngium yuccifolium</i>	Rattlesnake Master			57.250	<b>57.250</b>	<b>2.726</b>
<i>Euphorbia corollata</i>	Flowering Spurge	12.119			<b>12.119</b>	<b>0.673</b>
<i>Euthamia graminifolia</i>	Smooth Grass-leaved Goldenrod			10.700	<b>10.700</b>	<b>0.510</b>
<i>Galium boreale</i>	Northern Bedstraw			0.040	<b>0.040</b>	<b>0.002</b>
<i>Gaura biennis (longiflora)</i>	Common Gaura		0.038		<b>0.038</b>	<b>0.002</b>
<i>Gentiana alba</i>	Cream Gentian			10.600	<b>10.600</b>	<b>0.505</b>
<i>Gentiana andrewsii</i>	Bottle Gentian			1.600	<b>1.600</b>	<b>0.076</b>
<i>Gentiana purberulenta</i>	Prairie Gentian			0.011	<b>0.011</b>	<b>0.001</b>
<i>Geum triflorum</i>	Prairie Smoke	0.012			<b>0.012</b>	<b>0.001</b>
<i>Hasteola suaveolens</i>	Sweet-scented Indian Plantain			3.000	<b>3.000</b>	<b>0.143</b>
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower			1.950	<b>1.950</b>	<b>0.093</b>
<i>Helianthus occidentalis</i>	Western Sunflower; Naked S.		6.850		<b>6.850</b>	<b>0.285</b>
<i>Helianthus pauciflorus</i>	Prairie Sunflower	1.724			<b>1.724</b>	<b>0.096</b>
<i>Heliopsis helianthoides</i>	False Sunflower; " Ox-eye "		7.450	7.450	<b>14.900</b>	<b>0.665</b>
<i>Hesperostipa spartea</i>	Porcupine Grass	0.275			<b>0.275</b>	<b>0.015</b>
<i>Heterotheca camporum</i>	Plains Golden Aster	2.250			<b>2.250</b>	<b>0.125</b>
<i>Heuchera richardsonii</i>	Prairie Alum root		1.195		<b>1.195</b>	<b>0.050</b>
<i>Hieracium gronovii</i>	Hairy Hawkweed	0.853			<b>0.853</b>	<b>0.047</b>
<i>Hypoxis hirsuta</i>	Yellow Star Grass	0.018			<b>0.018</b>	<b>0.001</b>
<i>Hystrix patula</i>	Bottlebrush Grass	0.417			<b>0.417</b>	<b>0.023</b>
<i>Ionactis linariifolia</i>	Stiff Aster (Flax-Leaved)	3.650			<b>3.650</b>	<b>0.203</b>
<i>Koeleria macrantha</i>	Prairie June Grass	36.960	24.640		<b>61.600</b>	<b>3.080</b>
<i>Krigia virginica</i>	Dwarf Dandelion	0.006			<b>0.006</b>	<b>0.0003</b>
<i>Lechea stricta</i>	Bushy Pinweed	0.366			<b>0.366</b>	<b>0.020</b>
<i>Lespedeza capitata --</i>	Round-headed Bush Clover		6.950		<b>6.950</b>	<b>0.290</b>
<i>Liatris aspera</i>	Rough Blazing-star	14.200			<b>14.200</b>	<b>0.789</b>
<i>Liatris cylindracea</i>	Dwarf Blazingstar	0.237			<b>0.237</b>	<b>0.013</b>
<i>Liatris pycnostachya</i>	Gayfeather; Prairie Blazing Star		12.120	36.360	<b>48.48</b>	<b>2.236</b>
<i>Linaria canadensis</i>	Blue Toadflax	0.004			<b>0.004</b>	<b>0.0002</b>
<i>Linum sulcatum</i>	Grooved Yellow Flax	0.015			<b>0.015</b>	<b>0.001</b>
<i>Lithospermum canescens</i>	Hoary Puccoon	0.003			<b>0.003</b>	<b>0.0002</b>
<i>Lithospermum incisum</i>	fringed puccoon	0.096			<b>0.096</b>	<b>0.005</b>
<i>Lobelia siphilitica</i>	Great Lobelia			0.583	<b>0.583</b>	<b>0.028</b>
<i>Lobelia spicata</i>	Pale-spike Lobelia			0.065	<b>0.065</b>	<b>0.003</b>
<i>Lupinus perennis</i>	Wild Lupine	9.150	9.150		<b>18.300</b>	<b>0.890</b>
<i>Minuartia michauxii</i>	Stiff Sandwort	0.002			<b>0.002</b>	<b>0.0001</b>
<i>Monarda fistulosa</i>	Wild Bergamot		9.700		<b>9.700</b>	<b>0.404</b>
<i>Monarda punctata villicualis</i>	Horse Mint	2.350			<b>2.350</b>	<b>0.131</b>
<i>Oenothera biennis canescens</i>	Common Evening Primrose	0.354			<b>0.354</b>	<b>0.020</b>
<i>Onosmodium molle</i>	Marbleseed		0.764		<b>0.764</b>	<b>0.032</b>
<i>Oxalis violacea</i>	Violet Wood-sorrel	0.013			<b>0.013</b>	<b>0.001</b>
<i>Panicum capillare</i>	Old Witch Grass	2.805	0.935		<b>3.740</b>	<b>0.195</b>
<i>Parthenium integrifolium</i>	Wild Quinine (Feverfew)		34.160	51.240	<b>85.400</b>	<b>3.863</b>
<i>Pedicularis canadensis</i>	Wood Betony		1.934	1.934	<b>3.868</b>	<b>0.173</b>
<i>Penstemon digitalis</i>	Foxglove Beardtongue			10.700	<b>10.700</b>	<b>0.510</b>
<i>Penstemon grandiflorus</i>	Large Flowered Beardtongue		0.183		<b>0.183</b>	<b>0.008</b>
<i>Penstemon hirsutus</i>	Hairy Beard tongue	8.170			<b>8.170</b>	<b>0.454</b>

<b>Phemeranthes rugospermum ***</b>	Sand Fameflower	0.001			<b>0.001</b>	<b>0.0001</b>
<b>Phlox bifida</b>	Sand Phlox	0.105			<b>0.105</b>	<b>0.006</b>
<b>Phlox pilosa</b>	Prairie phlox	0.001			<b>0.001</b>	<b>0.0001</b>
<b>Physocarpus opulifolius</b>	Ninebark		0.057		<b>0.057</b>	<b>0.002</b>
<b>Physostegia virginiana arenaria</b>	Prairie Obedient Plant		0.013		<b>0.013</b>	<b>0.001</b>
<b>Plantago aristata</b>	Largebracted Plantain	0.432			<b>0.432</b>	<b>0.024</b>
<b>Polygala incarnata **</b>	Pink Milkwort		0.001		<b>0.001</b>	<b>0.0001</b>
<b>Polygala polygama obtusata</b>	Purple Milkwort		0.024		<b>0.024</b>	<b>0.001</b>
<b>Polygala sanguinea</b>	Field Milkwort		0.024		<b>0.024</b>	<b>0.001</b>
<b>Polytaenia nuttallii</b>	Prairie Parsley		0.913		<b>0.913</b>	<b>0.038</b>
<b>Pseudognaphalium obtusifolium</b>	Sweet Everlasting	0.353			<b>0.353</b>	<b>0.020</b>
<b>Ptelea trifoliata</b>	Wafer Ash, Hop Tree		0.413		<b>0.413</b>	<b>0.017</b>
<b>Pulsatilla patens</b>	Pasque Flower	0.008			<b>0.008</b>	<b>0.0004</b>
<b>Pycnanthemum tenuifolium</b>	Narrow-leaved Mountain Mint			0.001	<b>0.001</b>	<b>0.0001</b>
<b>Pycnanthemum virginianum</b>	Mountain mint			10.600	<b>10.600</b>	<b>0.505</b>
<b>Ratibida pinnata</b>	Yellow Coneflower			12.600	<b>12.600</b>	<b>0.600</b>
<b>Rhus glabra</b>	Smooth Sumac		0.214		<b>0.214</b>	<b>0.009</b>
<b>Rosa carolina</b>	Pasture Rose	1.387	0.396	0.198	<b>1.982</b>	<b>0.103</b>
<b>Rudbeckia hirta</b>	Black-eyed Susan			13.000	<b>13.000</b>	<b>0.619</b>
<b>Rudbeckia subtomentosa</b>	Sweet Blackeyed Susan			9.667	<b>9.667</b>	<b>0.460</b>
<b>Rudbeckia triloba</b>	Brown Eyed Susan		0.721		<b>0.721</b>	<b>0.030</b>
<b>Ruellia humilis</b>	Wild Petunia		1.450		<b>1.450</b>	<b>0.060</b>
<b>Sambucus canadensis</b>	Elderberry		0.027		<b>0.027</b>	<b>0.001</b>
<b>Scutellaria parvula leonardi</b>	Small Skullcap	0.107			<b>0.107</b>	<b>0.006</b>
<b>Senna hebecarpa</b>	Wild Senna		0.200		<b>0.200</b>	<b>0.008</b>
<b>Silene antirrhina</b>	Sleepy Catchfly		0.153		<b>0.153</b>	<b>0.006</b>
<b>Silene regia</b>	Royal catchfly		0.008		<b>0.008</b>	<b>0.0003</b>
<b>Silphium integrifolium</b>	Rosinweed			8.750	<b>8.750</b>	<b>0.417</b>
<b>Silphium laciniatum</b>	Compass plant			11.350	<b>11.350</b>	<b>0.540</b>
<b>Silphium perfoliatum</b>	Cup-plant			9.700	<b>9.700</b>	<b>0.432</b>
<b>Silphium terebinthaceum</b>	Prairie Dock		15.585	36.365	<b>51.950</b>	<b>2.381</b>
<b>Sisyrinchium albidum</b>	Common Blue-eyed grass		0.088		<b>0.088</b>	<b>0.004</b>
<b>Sisyrinchium campestre</b>	prairie Blue-eyed Grass		0.392		<b>0.392</b>	<b>0.016</b>
<b>Solidago missouriensis</b>	Missouri Goldenrod		0.161		<b>0.161</b>	<b>0.007</b>
<b>Spiranthes cernua</b>	Nodding Ladies Tresses		0.011		<b>0.011</b>	<b>0.0005</b>
<b>Spiranthes magnocamporum</b>	Great Plains Ladies Tresses	0.005			<b>0.005</b>	<b>0.0003</b>
<b>Strophostyles helvola</b>	Trailing Fuzzy Bean			0.013	<b>0.013</b>	<b>0.001</b>
<b>Symphotrichum novae-angliae</b>	New England Aster			14.000	<b>14.000</b>	<b>0.667</b>
<b>Symphotrichum sericeum</b>	Silky Aster	1.500	1.500		<b>3.000</b>	<b>0.146</b>
<b>Tephrosia virginiana</b>	Goat's Rue	4.300	4.300		<b>8.600</b>	<b>0.418</b>
<b>Tradescantia ohiensis</b>	Ohio Spiderwort	21.760	108.800	87.040	<b>217.600</b>	<b>9.887</b>
<b>Triosteum perfoliatum</b>	Horse Gentian			1.063	<b>1.063</b>	<b>0.051</b>
<b>Verbena hastata</b>	Blue Vervain			4.035	<b>4.035</b>	<b>0.192</b>
<b>Verbena stricta</b>	Hoary Vervain		12.250		<b>12.250</b>	<b>0.510</b>
<b>Viola pedata lineariloba</b>	Birdsfoot Violet	0.196			<b>0.196</b>	<b>0.011</b>
<b>Viola sagittata</b>	Arrow-leaved violet	0.006			<b>0.006</b>	<b>0.0003</b>
<b>Zizia aptera</b>	Heart-leaved Meadow Parsnip			1.900	<b>1.900</b>	<b>0.090</b>



Zizia aurea	Golden Alexander			20.050	<b>20.050</b>	<b>0.955</b>
<b>Seed Mixes (Combine &amp; Hand)</b>						
Little Bluestem Prairie Mixes	Combine	147.96 0	164.40 0		<b>312.360</b>	<b>15.070</b>
Dropseed Garden	Combine	49.150	19.660	29.490	<b>98.300</b>	<b>4.778</b>
Tall Grasses; Big Blue and Indian	Combine	93.390	93.390	93.390	<b>280.170</b>	<b>13.527</b>
Aster Mix; Sky Blue, Smooth Blue, etc	Combine	176.00 0	209.00 0		<b>385.000</b>	<b>18.486</b>
Canada Rye	Combine	30.000	100.00 0		<b>130.000</b>	<b>5.833</b>
Sally's Sedge Meadow Sedge Mix	Hand picked			4.005	<b>4.005</b>	<b>0.191</b>
2018 Dry Seed Mix		187.10 0			<b>187.100</b>	<b>10.394</b>
2018 Dry Mesic Seed Mix			236.25 0		<b>236.250</b>	<b>9.844</b>
<b>TOTAL Pounds</b>						
		880.10 6	1386.2 07	1032.03 2	3,298.33	
<b>NUMBER OF SPECIES</b>						
		63	71	50	184	

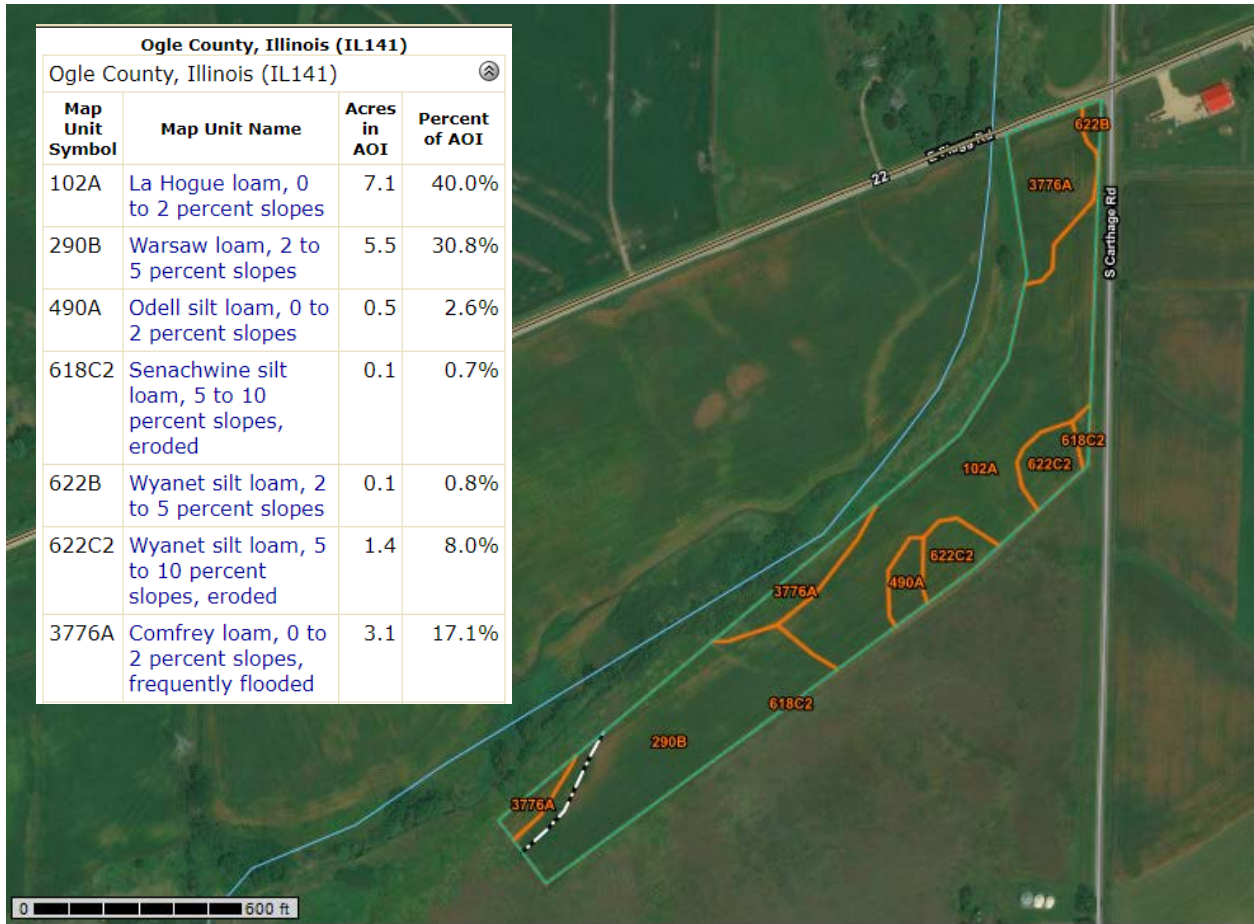
**Figure 5:** The 2019 Seed List, which names the 184 different species that were included in the mixes used for this planting. The amounts are separated by which seed mix they were added to. The crew collected a total of 241 species by hand this season.

### **Lessons Learned**

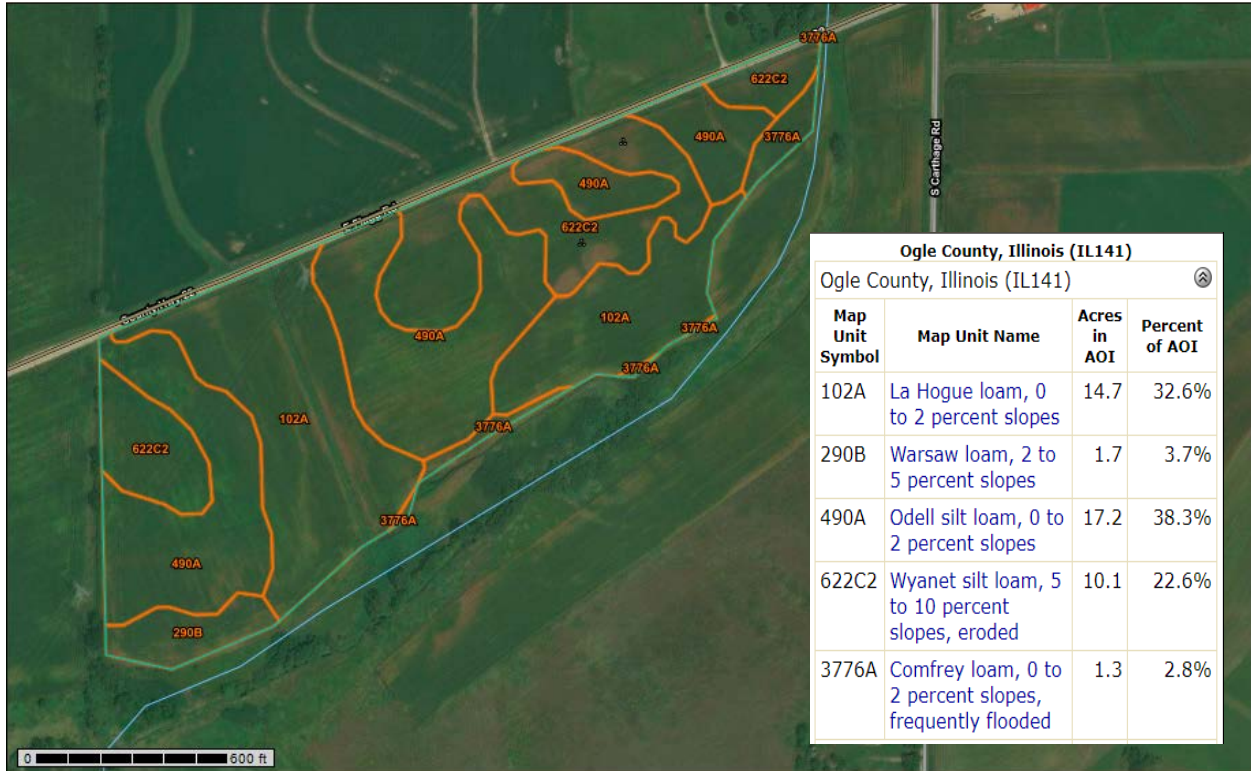
When driving the seeders on busy roads, it was helpful to strategically have the vehicle with the widest seeder driving in between the other two vehicles. This way, the driver in said vehicle can have a spotter in front and behind. Radio communication was frequent and incredibly helpful throughout the planting process. Also, checking and maintaining the seeders more frequently throughout the months before planting time is a good idea. There were no disastrous problems with them, but regular maintenance could prove to be beneficial.

We also learned that the seeder that Riley Nylin (#3) used dropped at a much quicker rate than the other two. This meant that, that seeder could be 50% open when the others would be 75% open and it would drop at about the same rate. And for the optimal spacing when driving in staggered lines, the driver should keep their seeder tire in the same path as the truck's tire in front of them. This allows for an easy line to follow in the snow as well as the proper amount of overlapping in between passes. For a full report on how to use each seeder and their unique qualities look for "Drop Seeder Descriptions – R. Nylin" under the T Drive folder "SEEDS".

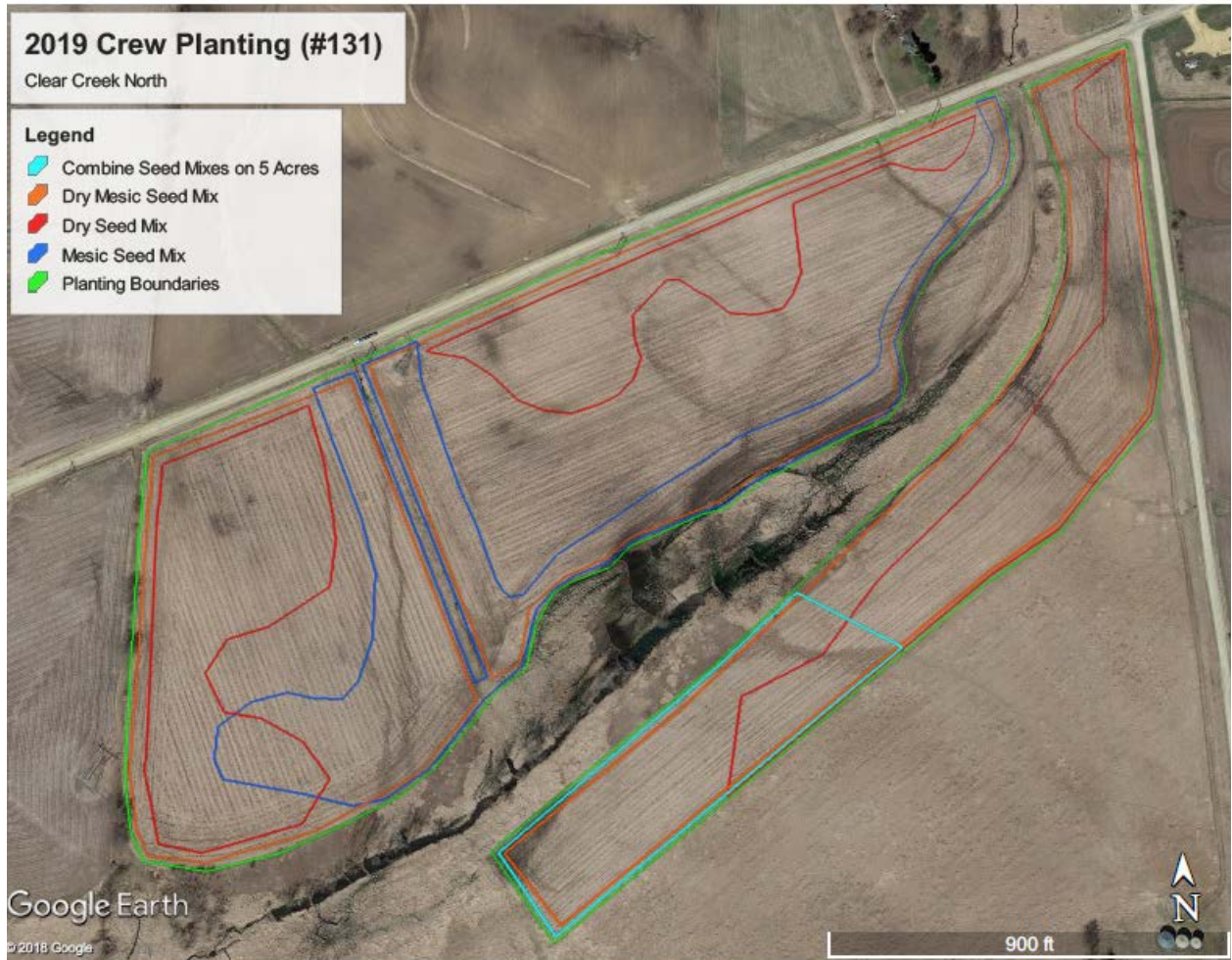
**Maps**



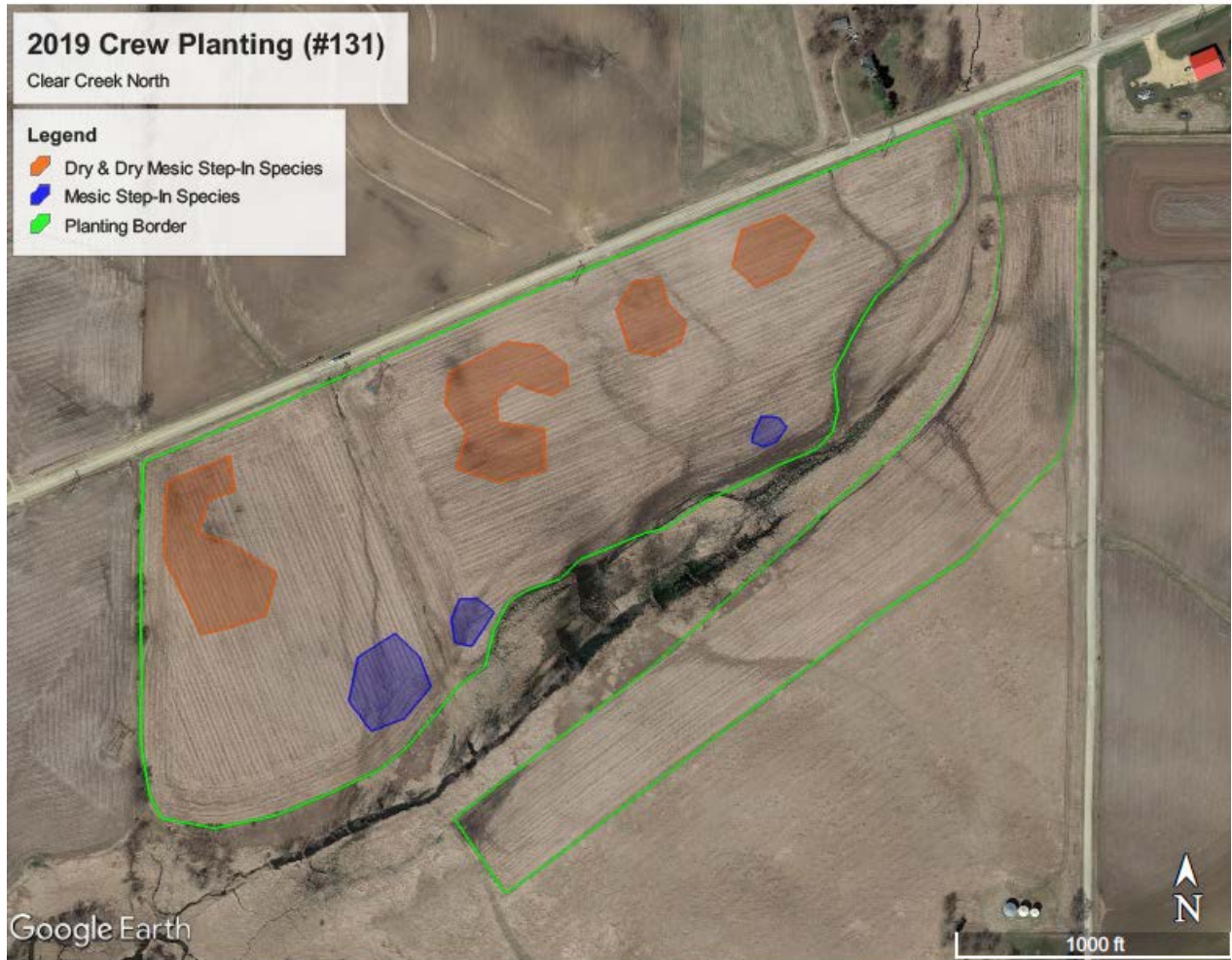
**Figure 6:** Soil types and their locations within the eastern 17.9 acres of the planting, according to the key. Source: NRCS.



**Figure 7:** Soil types and their locations within the western 45 acres of the planting, according to the key. Source: NRCS.



**Figure 8:** Map showing where the different seed mixes were planted. Source: GoogleEarth.



**Figure 9:** Map showing where the different step-in seed species were spread by hand. Source: GoogleEarth.

**Photos**



**Photo A:** Seed laying on top of the snow after being planted.



**Photo B:** Riley Nylin, Tyler Pellegrini, and Amanda Contreras filling the seeder with the dry seed mix.



Photo By: Dee Hudson

**Photo C:** The crew in three trucks planting dry mesic seed mix in a staggered pattern.





**Photo D:** The crew using the blue UTVs to plant the rye border because of the muddy conditions.