

Table 1. Location of research sites by landscape region.

| NDOR Landscape Region | Location | Year of seeding |
|------------------------------|------------------------|------------------------|
| A | Creighton (Highway 59) | 1998 |
| | Plainview (Highway 20) | 1994 |
| B | Aurora (Highway 34) | 1998 |
| | Jansen (Highway 136) | 1992 |
| C | Arnold (Highway 92) | 1998 |
| | Ragan (Highway 4) | 1995 |
| D | Crookston (Highway 20) | 1991 |
| | Nenzel (Highway 20) | 1993 |
| F | Chadron (Highway 20) | 1993 |
| | N-71 (Highway 88) | 1996 |

Figure 1. Location of study sites within landscape regions, as depicted by color.

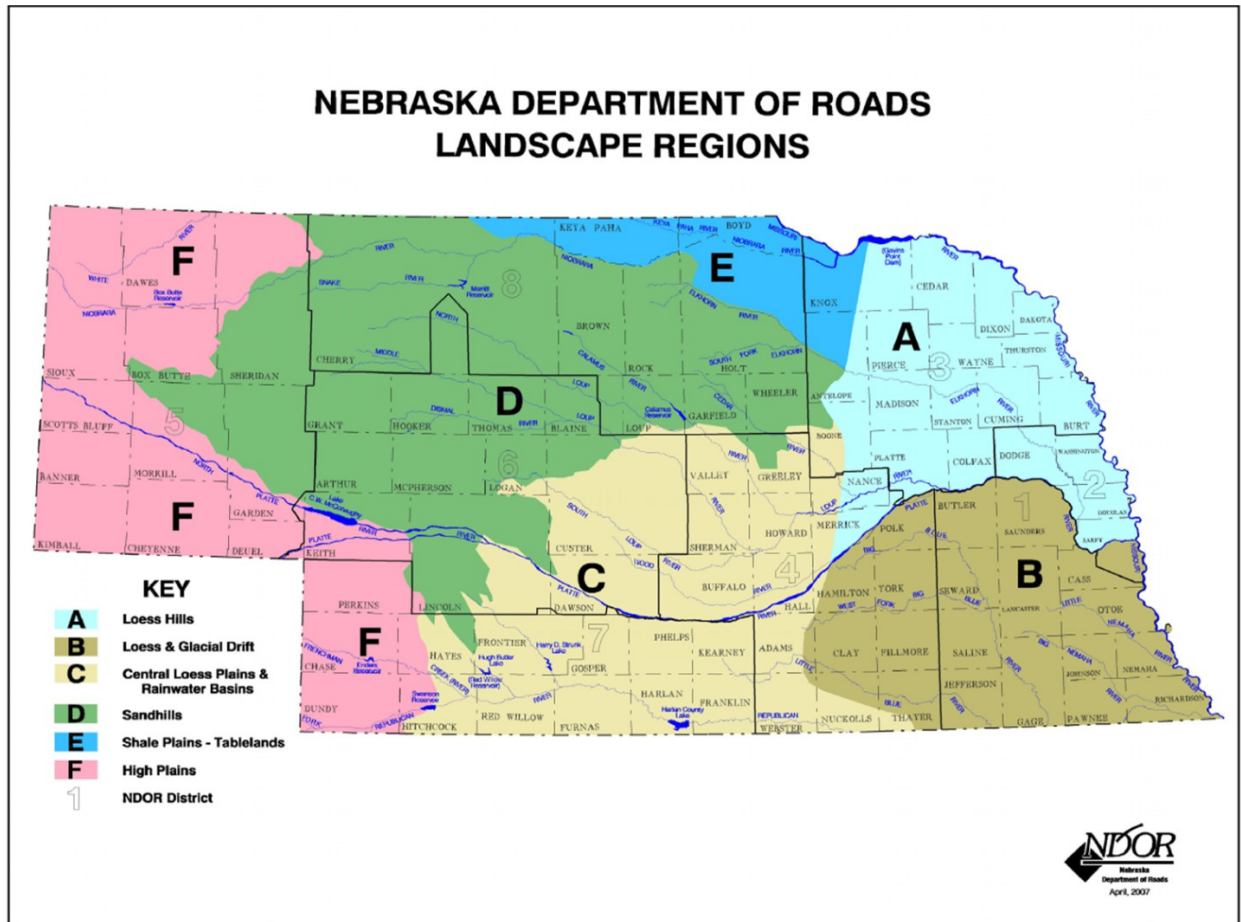


Table 2. Seeded species on backslope locations at Creighton, Jansen, Arnold, Nenzel and Chadron.

| Species | Landscape Region | | | | |
|-----------------------------|------------------|------------|------------|------------|-------------|
| | A (Creighton) | B (Jansen) | C (Arnold) | D (Nenzel) | F (Chadron) |
| Big Bluestem | X | X | | | |
| Blackeyed Susan | X | X | X | | |
| Blanket Flower | | | | | X |
| Blue Flax | X | | | | |
| Canada Wildrye | X | | | | |
| Crested Wheatgrass | | | | | X |
| Dames Rocket | X | X | X | | X |
| Evening Primrose | X | | | | |
| False Sunflower | X | | | | |
| Grayhead Prairie Coneflower | | X | | | |
| Hairy Vetch | | X | | X | X |
| Indiangrass | X | X | X | | |
| Intermediate Wheatgrass | X | X | X | | |
| Lance-leaved Coreopsis | | | | | X |
| Leadplant | X | | X | | |
| Little Bluestem | X | X | X | X | X |
| Maximilian Sunflower | | X | | | |
| Mexican Red-Hat | | | | | X |
| Oats | X | | | | X |
| Ox-Eye Daisy | | X | | | |
| Partridge Pea | X | X | | | |
| Pitcher Sage | X | | | | |
| Plains Coreopsis | | X | | | |
| Prairie Sandreed | | | | X | |
| Pubescent Wheatgrass | | | | | X |
| Purple Prairie Clover | X | X | X | | X |
| Red Clover | X | X | | | |
| Reed Canarygrass | | X | | | |
| Rocky Mountain Penstemon | | | | | X |
| Rye | | | | X | |
| Sand Bluestem | | | | X | |
| Sand Dropseed | | | | X | |
| Sand Lovegrass | X | | X | X | |
| Shell-leaf Penstemon | X | | X | | |
| Sideoats Grama | X | X | X | | X |
| Sweetclover | | | X | X | |
| Switchgrass | X | X | X | X | |
| Upright Prairie Coneflower | X | | X | | X |
| Western Wheatgrass | | | X | X | X |

Table 3. Expected rank and actual rank for seeded species at the Jansen backslope, June 2008. (Some non-seeded species were expected to invade and establish on the site.)

| Species | Expected Rank | Actual Rank |
|-------------------------|----------------------|--------------------|
| Little Bluestem | 1 | 4 |
| Intermediate Wheatgrass | 2 | 2 |
| Indiangrass | 3 | 6 |
| Switchgrass | 4 | 5 |
| Sideoats Grama | 5 | 12.5 |
| Grayhead Coneflower | 6 | 12.5 |
| Non-seeded species | 7 | 1 |
| Red Clover | 8 | 3 |
| Other seeded grasses | 9 | 8 |
| Purple Coneflower | 10 | 12.5 |
| Blackeyed Susan | 11 | 12.5 |
| Other seeded forbs | 12 | 7 |
| Partridge Pea | 13 | 12.5 |
| Plains Coreopsis | 14 | 12.5 |
| Hairy Vetch | 15 | 12.5 |
| Dames Rocket | 16 | 12.5 |

Table 4. Relative species composition of shoulder sites in Nebraska for all landscape regions.

| Species | Seeding Rate (lbs of PLS/acre) | June 2008 | August 2008 | June 2009 | August 2009 |
|--------------------------|--------------------------------------|-------------|-------------|-------------|-------------|
| | | % | | | |
| Seeded | | 25.8 | 30.8 | 32.6 | 38 |
| Western Wheatgrass | 4 to 8 | 8.3 | 12.2 | 13.9 | 19.8 |
| Blue Grama | 2 | 0 | 1.9 | 1.8 | 1.3 |
| Buffalograss | 3 to 6 | 8.9 | 12.1 | 8.7 | 11 |
| Tall Fescue | 8 to 20 | 8.6 | 4.5 | 7.9 | 5.9 |
| Birdsfoot Trefoil | 4 to 5 | 0 | 0.1 | 0.3 | 0 |
| Oats | 10 | 0 | 0 | 0 | 0 |
| Perennial Rye | 8 to 10 | 0 | 0 | 0 | 0 |
| Non-seeded | | 75.6 | 71.5 | 70.9 | 64.2 |
| Downy Brome | | 3.1 | 1.4 | 1.1 | 0.4 |
| Kentucky Bluegrass | | 17.3 | 9.1 | 17.8 | 12.1 |
| Intermediate Wheatgrass | | 9.2 | 5.2 | 0.9 | 0.9 |
| Sand Dropseed | | 4.5 | 2.7 | 3.2 | 5.7 |
| Smooth Bromegrass | | 17.9 | 14.2 | 16.8 | 13.8 |
| Warm-Season Tall Grasses | | 4.2 | 7.9 | 6.4 | 7.8 |
| Kochia | | 6.3 | 6.4 | 7.3 | 2.9 |
| Russian Thistle | | 1.5 | 2.1 | 1.8 | 2.2 |
| Western Ragweed | | 2.5 | 7.9 | 1.9 | 5.7 |
| Other Grasses and Forbs | | 9.1 | 14.6 | 13.7 | 12.7 |

Table 5. Relative ground cover of shoulder sites in Nebraska for all landscape regions based on MSP method.

| | 2008 | | 2009 | |
|--------------------|-------------|-------------|-------------|-------------|
| | June | August | June | August |
| | % <hr/> | | | |
| Litter | 73.3 | 66.6 | 76.3 | 67.9 |
| Bare Ground | 22.8 | 31.4 | 22.6 | 30.6 |
| Plant Hits | 3.9 | 2 | 1.1 | 1.5 |

Table 6. Relative species composition by standing crop of shoulder sites in Nebraska, August 2009, based on weight.

| Species | Seeding Rate (lbs of PLS/acre) | Landscape Region | | | | |
|----------------------------|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | | A | B | C | D | F |
| | | % | | | | |
| Seeded | | 28.1 | 54.1 | 46.8 | 0.3 | 28.8 |
| Western Wheatgrass | 4 to 8 | 27.5 | 26.7 | 7.9 | 0.3 | 10.1 |
| Blue Grama | 2 | 0.5 | 1.5 | 0 | 0 | 5.2 |
| Buffalograss | 3 to 6 | 0 ^b | 1.7 ^b | 26.6 ^a | 0 ^b | 13.5 ^b |
| Tall Fescue | 8 to 20 | 0.1 ^b | 20.4 ^a | 12.4 ^b | 0 ^b | 0 ^b |
| Birdsfoot Trefoil | 4 to 5 | 0 | 3.8 | 0 | 0 | 0 |
| Oats | 10 | 0 | 0 | 0 | 0 | 0 |
| Perennial Rye | 8 to 10 | 0 | 0 | 0 | 0 | 0 |
| Non-seeded | | 71.9 | 45.9 | 53.2 | 99.7 | 71.2 |
| Downy Brome | | 0 | 0 | 0.3 | 0 | 0.2 |
| Kentucky Bluegrass | | 21.8 ^a | 2.0 ^b | 5.4 ^b | 5.3 ^b | 0.8 ^b |
| Intermediate Wheatgrass | | 0 | 0 | 0 | 0 | 1.3 |
| Sand Dropseed | | 0 | 0 | 0.5 | 3.7 | 18.7 |
| Smooth Bromegrass | | 31.1 ^a | 0.9 ^b | 27.2 ^a | 16.6 ^b | 7.7 ^b |
| Warm Season Tall Grasses | | 2.1 ^b | 36.0 ^a | 3.3 ^b | 46.2 ^a | 4.7 ^b |
| Kochia and Russian Thistle | | 0.1 | 0 | 0 | 6.1 | 0.1 |
| Western Ragweed | | 3 | 1.3 | 0 | 1.5 | 10.4 |
| Other Grasses and Forbs | | 13.9 | 5.8 | 16.4 | 20.2 | 27.3 |

Table 7. Kendall's tau rank correlation scores based on MSP.

| Region | Site | June 2008 | August 2008 | June 2009 | August 2009 |
|--------|-----------|-----------------|-----------------|-----------------|-----------------|
| A | Creighton | 0.5201* | 0.38191 | 0.34171 | 0.56097* |
| | Plainview | 0.17056 | 0.08528 | 0.08528 | 0.04264 |
| B | Aurora | 0.4949* | 0.39451* | 0.4111* | 0.55201* |
| | Jansen | 0.52296* | 0.4949* | 0.39973* | 0.47216* |
| C | Arnold | 0.32757 | 0.18257 | 0.38103 | 0.03616 |
| | Ragan | 0.0252 | 0.24343 | 0.18257 | 0.03616 |
| | Crookston | | | | |
| D | n | 0.22111 | 0.25042 | 0.22111 | 0.42212 |
| | Nenzel | 0.62312* | 0.54272* | 0.62312* | 0.5201* |
| F | Chadron | 0.12792 | 0.25042 | 0.44877 | 0.040452 |
| | N-71 | 0.185 | 0.32375 | 0.25584 | 0.17056 |

*Indicates significant correlation ($p=0.05$)

Table 8. Comparison of the actual and expected rank order at Aurora backslope location based on MSP.

| Species | Expected Rank | Actual Rank | | | |
|-------------------------|---------------|-------------|-------------|-----------|-------------|
| | | June 2008 | August 2008 | June 2009 | August 2009 |
| Little Bluestem | 1 | 3 | 7 | 10.5 | 4 |
| Intermediate Wheatgrass | 2 | 1 | 2 | 4 | 2 |
| Indiangrass | 3 | 5 | 5 | 1 | 1 |
| Switchgrass | 4 | 4 | 4 | 3 | 5 |
| Sideoats Grama | 5 | 11.5 | 12 | 10.5 | 6 |
| Grayhead Coneflower | 6 | 11.5 | 8 | 5 | 11.5 |
| Red Clover | 7 | 2 | 3 | 2 | 3 |
| Other Seeded Grasses | 8 | 7 | 1 | 10.5 | 11.5 |
| Purple Coneflower | 9 | 11.5 | 12 | 10.5 | 11.5 |
| Blackeyed Susan | 10 | 11.5 | 12 | 10.5 | 11.5 |
| Other Seeded Forbs | 11 | 6 | 6 | 10.5 | 7 |
| Partridge Pea | 12 | 11.5 | 12 | 10.5 | 11.5 |
| Plains Coreopsis | 13 | 11.5 | 12 | 10.5 | 11.5 |
| Hairy Vetch | 14 | 11.5 | 12 | 10.5 | 11.5 |
| Dames Rocket | 15 | 11.5 | 12 | 10.5 | 11.5 |

Table 9. Comparison of the actual and expected rank order at Jansen backslope location based on MSP.

| Species | Expected Rank | Actual Rank | | | |
|-------------------------|---------------|-------------|-------------|-----------|-------------|
| | | June 2008 | August 2008 | June 2009 | August 2009 |
| Little Bluestem | 1 | 6 | 2 | 8 | 2 |
| Intermediate Wheatgrass | 2 | 1 | 1 | 1 | 1 |
| Indiangrass | 3 | 5 | 8 | 5 | 7 |
| Switchgrass | 4 | 2 | 5 | 2 | 3 |
| Sideoats Grama | 5 | 7 | 6 | 7 | 9 |
| Grayhead Coneflower | 6 | 8 | 7 | 6 | 6 |
| Red Clover | 7 | 12.5 | 9 | 9 | 10 |
| Other Seeded Grasses | 8 | 3 | 3 | 3 | 4 |
| Purple Coneflower | 9 | 10 | 10 | 10 | 11 |
| Blackeyed Susan | 10 | 11 | 11 | 11 | 12 |
| Other Seeded Forbs | 11 | 4 | 4 | 4 | 5 |
| Partridge Pea | 12 | 12 | 12 | 12 | 13 |
| Plains Coreopsis | 13 | 13 | 13 | 13 | 14 |
| Hairy Vetch | 14 | 14 | 14 | 14 | 8 |
| Dames Rocket | 15 | 15 | 15 | 15 | 15 |

Table 10. Comparison of the actual and expected rank order at Creighton backslope location based on MSP.

| Species | Expected Rank | Actual Rank | |
|--------------------------------|----------------------|--------------------|--------------------|
| | | June 2008 | August 2009 |
| Little Bluestem | 1 | 3 | 2 |
| Indiangrass | 2 | 1 | 1 |
| Intermediate Wheatgrass | 3 | 2 | 4 |
| Other seeded grasses | 4 | 4 | 3 |
| Other Forbs | 5 | 5 | 5 |
| Switchgrass | 6 | 8.5 | 7 |
| Pitcher Sage | 7 | 8.5 | 9 |
| Red Clover | 8 | 6 | 6 |
| Partridge Pea | 9 | 8.5 | 9 |
| Dames Rocket | 10 | 8.5 | 9 |

Table 11. Comparison of the actual and expected rank order at Nenzel backslope location based on MSP.

| Species | Expected Rank | Actual Rank | | | |
|--------------------|---------------|-------------|-------------|-----------|-------------|
| | | June 2008 | August 2008 | June 2009 | August 2009 |
| Switchgrass | 1 | 2 | 3 | 2 | 3 |
| Little Bluestem | 2 | 1 | 1 | 1 | 1 |
| Prairie Sandreed | 3 | 3 | 4 | 3 | 5 |
| Sand Bluestem | 4 | 4 | 2 | 4 | 2 |
| Sand Dropseed | 5 | 5 | 5 | 5 | 4 |
| Western Wheatgrass | 6 | 8 | 8 | 8 | 8.5 |
| Sand Lovegrass | 7 | 8 | 8 | 8 | 6 |
| Sweetclover | 8 | 8 | 8 | 8 | 8.5 |
| Hairy Vetch | 9 | 8 | 8 | 8 | 8.5 |
| Rye | 10 | 8 | 8 | 8 | 8.5 |

Table 12. Relative species composition of Plainview backslope, Region A, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 94.3 | 66.7 | 89.0 | 90.9 |
| Big Bluestem | 1.9 | 13.3 | 0.0 | 0.0 |
| Eastern Gamagrass | 11.3 | 6.7 | 41.1 | 39.8 |
| Indiangrass | 3.8 | 6.7 | 0.0 | 0.0 |
| Intermediate Wheatgrass | 0.0 | 0.0 | 0.0 | 1.1 |
| Little Bluestem | 0.0 | 0.0 | 0.0 | 0.0 |
| Switchgrass | 67.9 | 33.3 | 39.7 | 44.3 |
| Pitcher sage | 0.0 | 0.0 | 4.1 | 1.1 |
| Wild Rose | 9.4 | 6.7 | 4.1 | 4.5 |
| Non-seeded | 5.7 | 33.3 | 11.0 | 9.1 |
| Canada Goldenrod | 0.0 | 13.3 | 2.7 | 2.3 |
| Other Grasses and Forbs | 5.7 | 20.0 | 8.2 | 6.8 |

Table 13. Relative species composition of Creighton backslope, Region A, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----%----- | | | |
| Seeded | 19.3 | 23.9 | 10.3 | 22.1 |
| Big Bluestem | 2.8 | 5.1 | 2.9 | 4.1 |
| Indiangrass | 5.5 | 0.0 | 1.5 | 7.6 |
| Intermediate Wheatgrass | 5.5 | 6.5 | 0.0 | 3.4 |
| Little Bluestem | 2.8 | 8.7 | 3.7 | 4.8 |
| Switchgrass | 0.0 | 0.0 | 0.0 | 0.7 |
| Red Clover | 0.7 | 0.7 | 0.7 | 0.7 |
| Other Seeded Forbs | 2.1 | 2.9 | 1.5 | 0.7 |
| Non-seeded | 80.7 | 76.1 | 89.7 | 77.9 |
| Tall Fescue | 65.5 | 68.1 | 67.7 | 66.9 |
| Orchardgrass | 1.4 | 5.1 | 16.2 | 6.2 |
| Other Grasses and Forbs | 13.8 | 2.9 | 5.9 | 4.8 |

Table 14. Relative species composition of Aurora backslopes, Region B, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|---------------|--------------|--------------|--------------|
| | ----- % ----- | | | |
| Seeded | 24.68 | 18.30 | 14.38 | 23.97 |
| Big Bluestem | 1.3 | 3.9 | 0.0 | 0.0 |
| Indiangrass | 2.5 | 2.6 | 2.6 | 8.2 |
| Intermediate Wheatgrass | 5.7 | 3.3 | 3.3 | 5.5 |
| Little Bluestem | 4.4 | 0.7 | 0.7 | 2.1 |
| Sideoats Grama | 0.0 | 0.0 | 0.0 | 1.4 |
| Switchgrass | 3.2 | 2.6 | 2.6 | 2.1 |
| Grayhead Coneflower | 0.0 | 0.7 | 0.7 | 0.0 |
| Maximillian Sunflower | 2.5 | 1.3 | 1.3 | 0.7 |
| Red Clover | 5.1 | 3.3 | 3.3 | 4.1 |
| Non-seeded | 75.3 | 81.7 | 85.6 | 76.0 |
| Tall Fescue | 62.0 | 60.7 | 55.6 | 56.2 |
| Orchardgrass | 7.6 | 15.7 | 18.8 | 17.8 |
| Other Grasses and Forbs | 5.7 | 5.3 | 11.3 | 2.1 |

Table 15. Relative species composition of Jansen backslopes, Region B, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 91.5 | 89.4 | 69.7 | 76.5 |
| Big Bluestem | 8.5 | 7.1 | 10.6 | 9.4 |
| Indiangrass | 4.3 | 0.0 | 7.6 | 2.4 |
| Intermediate Wheatgrass | 50.0 | 45.9 | 22.7 | 22.4 |
| Little Bluestem | 3.2 | 16.5 | 0.0 | 14.1 |
| Sideoats Grama | 2.1 | 5.9 | 1.5 | 1.2 |
| Switchgrass | 14.9 | 5.9 | 16.7 | 10.6 |
| Black-eyed Susan | 0.0 | 0.0 | 0.0 | 3.5 |
| Grayhead Coneflower | 1.1 | 1.2 | 1.5 | 3.5 |
| Maximillian Sunflower | 7.4 | 7.1 | 9.1 | 9.4 |
| Non-seeded | 8.5 | 10.6 | 30.3 | 23.5 |
| Western Wheatgrass | 0.0 | 0.0 | 19.7 | 1.2 |
| Carex sp. | 0.0 | 1.2 | 3.0 | 4.7 |
| Bindweed | 3.2 | 0.0 | 0.0 | 2.4 |
| Stiff Sunflower | 2.1 | 4.7 | 4.6 | 2.4 |
| Other Grasses and Forbs | 3.2 | 4.7 | 3.0 | 12.9 |

Table 16. Relative species composition of Arnold backslope, Region C, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 37.5 | 41.1 | 69.2 | 66.7 |
| Indiangrass | 3.1 | 1.8 | 9.6 | 0.0 |
| Intermediate Wheatgrass | 3.1 | 0.0 | 0.0 | 0.0 |
| Little Bluestem | 3.1 | 1.8 | 3.8 | 0.0 |
| Sideoats Grama | 1.6 | 0.0 | 0.0 | 0.0 |
| Switchgrass | 26.6 | 37.5 | 53.8 | 66.7 |
| Western Wheatgrass | 0.0 | 0.0 | 1.9 | 0.0 |
| Non-seeded | 62.5 | 58.9 | 30.8 | 33.4 |
| American Deervetch | 15.6 | 19.6 | 1.9 | 10.0 |
| Big Bluestem | 3.1 | 3.6 | 0.0 | 3.3 |
| Lemon Scurfpea | 3.1 | 1.8 | 7.7 | 0.0 |
| Prairie Sandreed | 4.7 | 7.1 | 0.0 | 3.3 |
| Sand Dropseed | 4.7 | 0.0 | 3.8 | 0.0 |
| Scribner's Panicum | 1.6 | 1.8 | 5.8 | 3.3 |
| Carex sp. | 6.3 | 3.6 | 0.0 | 0.0 |
| Western Ragweed | 4.7 | 5.4 | 0.0 | 0.0 |
| Other Grasses and Forbs | 18.68 | 16.0 | 11.6 | 13.4 |

Table 17. Relative species composition of Ragan backslope, Region C, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|----------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 45.2 | 62.5 | 59.0 | 51.4 |
| Indiangrass | 6.5 | 20.0 | 30.8 | 17.1 |
| Little Bluestem | 3.2 | 7.5 | 0.0 | 0.0 |
| Switchgrass | 25.8 | 35.0 | 23.1 | 34.3 |
| Western Wheatgrass | 0.0 | 0.0 | 5.1 | 0.0 |
| Sweetclover | 3.2 | 0.0 | 0.0 | 0.0 |
| Upright Prairie Coneflower | 6.5 | 0.0 | 0.0 | 0.0 |
| Non-seeded | 54.8 | 37.5 | 41.0 | 48.6 |
| Big Bluestem | 16.1 | 20.0 | 5.1 | 22.9 |
| Prairie Cordgrass | 12.9 | 15.0 | 23.1 | 20.0 |
| Stiff Sunflower | 6.5 | 0.0 | 7.7 | 0.0 |
| Other Grasses and Forbs | 19.4 | 2.5 | 5.1 | 5.7 |

Table 18. Relative species composition of Nenzel backslope, Region D, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|---------------------------|-------------|-------------|-------------|-------------|
| | -----%----- | | | |
| Seeded | 49.3 | 50.6 | 45.9 | 59.1 |
| Little Bluestem | 20.3 | 23.5 | 26.4 | 35.1 |
| Prairie Sandreed | 8.1 | 3.6 | 4.4 | 3.5 |
| Sand Bluestem | 8.1 | 10.2 | 3.8 | 9.4 |
| Sand Dropseed | 4.1 | 3.6 | 2.5 | 4.1 |
| Sand Lovegrass | 0.0 | 0.0 | 0.0 | 0.6 |
| Switchgrass | 8.8 | 9.6 | 8.8 | 6.4 |
| Non-Seeded | 50.7 | 49.5 | 54.2 | 41.0 |
| Fourpoint Eveningprimrose | 2.0 | 2.4 | 0.0 | 0.0 |
| Green Sagewort | 6.1 | 4.8 | 3.0 | 3.5 |
| Indiangrass | 0.7 | 0.0 | 3.8 | 2.3 |
| Lemon Scurfpea | 0.0 | 0.0 | 10.1 | 0.6 |
| Missouri Goldenrod | 2.7 | 3.6 | 0.0 | 0.0 |
| Purple Prairie Clover | 1.4 | 3.0 | 1.3 | 3.5 |
| Prairie Junegrass | 15.5 | 8.4 | 9.4 | 10.5 |
| Carex sp. | 0.0 | 1.2 | 5.7 | 1.8 |
| Six-weeks Fescue | 3.4 | 1.2 | 0.0 | 0.0 |
| Western Ragweed | 4.1 | 3.0 | 1.9 | 7.0 |
| Other Grasses and Forbs | 14.8 | 21.8 | 18.9 | 11.7 |

Table 19. Relative species composition of Crookston backslopes, region D, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----%----- | | | |
| Seeded | 23.4 | 25.3 | 37.3 | 44.6 |
| Little Bluestem | 2.1 | 2.4 | 2.4 | 1.4 |
| Prairie Sandreed | 4.3 | 0.0 | 8.4 | 6.8 |
| Sand Bluestem | 9.6 | 10.8 | 14.5 | 27.0 |
| Sand Dropseed | 3.2 | 6.0 | 2.4 | 4.1 |
| Sand Lovegrass | 0.0 | 0.0 | 0.0 | 0.0 |
| Switchgrass | 0.0 | 1.2 | 0.0 | 5.4 |
| Western Wheatgrass | 4.3 | 4.8 | 9.6 | 0.0 |
| Non-Seeded | 76.6 | 74.8 | 62.7 | 55.5 |
| Annual Sunflower | 4.3 | 1.2 | 2.4 | 4.1 |
| Carex sp. | 7.4 | 4.8 | 3.6 | 0.0 |
| Clammy Groundcherry | 4.3 | 0.0 | 0.0 | 0.0 |
| Cudweed Sagewort | 3.2 | 6.0 | 6.0 | 2.7 |
| Downy Brome | 18.1 | 26.5 | 9.6 | 12.6 |
| Intermediate Wheatgrass | 6.4 | 1.2 | 0.0 | 0.0 |
| Needleandthread | 3.2 | 3.6 | 9.6 | 6.8 |
| Prairie Junegrass | 4.3 | 1.2 | 4.8 | 6.8 |
| Six-weeks Fescue | 2.1 | 0.0 | 0.0 | 0.0 |
| Wild Rose | 3.2 | 3.6 | 3.6 | 5.4 |
| Western Ragweed | 5.3 | 0.0 | 3.6 | 6.8 |
| Other Grasses and Forbs | 14.9 | 26.6 | 19.3 | 10.4 |

Table 20. Relative species composition of Chadron backslopes, region F, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 67.4 | 72.7 | 86.3 | 93.9 |
| Blue Grama | 0.0 | 0.5 | 0.5 | 0.6 |
| Crested Wheatgrass | 0.0 | 0.0 | 1.6 | 0.0 |
| Little Bluestem | 19.8 | 31.1 | 27.5 | 30.0 |
| Pubescent Wheatgrass | 25.7 | 17.5 | 22.0 | 38.9 |
| Sideoats Grama | 16.0 | 11.5 | 22.0 | 23.3 |
| Western Wheatgrass | 0.0 | 4.4 | 9.3 | 0.6 |
| Purple Prairie Clover | 5.9 | 7.7 | 3.3 | 0.6 |
| Non-seeded | 32.6 | 27.3 | 13.7 | 6.1 |
| Downy Brome | 13.9 | 4.4 | 3.9 | 1.7 |
| Sand Dropseed | 2.7 | 1.5 | 0.5 | 0.0 |
| Western Ragweed | 1.6 | 1.1 | 0.5 | 0.3 |
| White Clover | 5.9 | 1.6 | 0.0 | 0.0 |
| Yellow Sweetclover | 1.6 | 2.7 | 2.2 | 1.1 |
| Other Grasses and Forbs | 7.0 | 16.0 | 6.6 | 3.0 |

Table 21. Relative species composition of N-71 backslopes, Region F, based on MSP.

| Species | June 2008 | August 2008 | June 2009 | August 2009 |
|-------------------------|-------------|-------------|-------------|-------------|
| | -----% | | | |
| Seeded | 4.1 | 9.8 | 8.9 | 13.8 |
| Crested Wheatgrass | 0.7 | 3.7 | 1.9 | 1.9 |
| Little Bluestem | 0.0 | 0.6 | 0.6 | 0.0 |
| Pubescent Wheatgrass | 2.7 | 5.5 | 3.8 | 8.1 |
| Sideoats Grama | 0.0 | 0.0 | 0.0 | 0.6 |
| Western Wheatgrass | 0.7 | 0.0 | 2.5 | 3.1 |
| Purple Prairie Clover | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-seeded | 95.9 | 90.2 | 91.1 | 86.3 |
| Downy Brome | 31.5 | 28.8 | 14.0 | 6.9 |
| Sand Dropseed | 11.0 | 18.4 | 21.7 | 28.1 |
| Curlycup Gumweed | 8.2 | 8.6 | 1.9 | 5.0 |
| Russian Thistle | 0.0 | 0.0 | 0.0 | 7.5 |
| Slender Greenthread | 0.0 | 0.0 | 7.6 | 0.0 |
| Snow-on-the-Mountain | 4.8 | 0.6 | 3.2 | 5.6 |
| Western Ragweed | 6.2 | 3.7 | 2.5 | 3.8 |
| Kochia | 18.5 | 18.4 | 22.9 | 15.6 |
| Yellow Sweetclover | 6.2 | 3.7 | 4.5 | 1.3 |
| Other Grasses and Forbs | 9.6 | 8.0 | 12.7 | 12.5 |

Table 22. Kendall's tau rank correlation based on species composition by weight in August, 2009.

| Region | Site | August 2009 |
|--------|-----------|-----------------|
| A | Creighton | 0.18699 |
| | Plainview | 0.18091 |
| B | Aurora | 0.41876* |
| | Jansen | 0.47001* |
| C | Arnold | 0.31032 |
| | Ragan | 0.24343 |
| D | Crookston | 0.36599 |
| | Nenzel | 0.48617* |
| F | Chadron | 0.40452 |
| | N-71 | 0.28894 |

*Indicates significant correlation

Table 23. Comparison of the actual and expected rank order at Aurora backslope location, based on weight during August, 2009.

| Species | Expected Rank | Actual Rank |
|-------------------------|----------------------|--------------------|
| Little Bluestem | 1 | 6 |
| Indiangrass | 2 | 1 |
| Switchgrass | 3 | 5 |
| Intermediate Wheatgrass | 4 | 4 |
| Partridge Pea | 5 | 12.5 |
| Grayhead Coneflower | 6 | 12.5 |
| Red Clover | 7 | 3 |
| Other Seeded Forbs | 8 | 2 |
| Hairy Vetch | 9 | 12.5 |
| Purple Coneflower | 10 | 12.5 |
| Other Seeded Grasses | 11 | 12.5 |
| Sideoats Grama | 12 | 7 |
| Blackeyed Susan | 13 | 12.5 |
| Dames Rocket | 14 | 12.5 |
| Plains Coreopsis | 15 | 12.5 |

Table 24. Comparison of the actual and expected rank order at Jansen backslope location, based on weight during August, 2009.

| Species | Expected Rank | Actual Rank |
|-------------------------|----------------------|--------------------|
| Little Bluestem | 1 | 9 |
| Indiangrass | 2 | 5 |
| Switchgrass | 3 | 3 |
| Intermediate Wheatgrass | 4 | 1 |
| Partridge Pea | 5 | 14 |
| Grayhead Coneflower | 6 | 8 |
| Red Clover | 7 | 7 |
| Other Seeded Forbs | 8 | 2 |
| Hairy Vetch | 9 | 14 |
| Purple Coneflower | 10 | 14 |
| Other Seeded Grasses | 11 | 4 |
| Sideoats Grama | 12 | 6 |
| Blackeyed Susan | 13 | 10 |
| Dames Rocket | 14 | 14 |
| Plains Coreopsis | 15 | 14 |

Table 25. Comparison of the actual and expected rank order at Nenzel backslope location, based on weight during August, 2009.

| Species | Expected Rank | Actual Rank |
|--------------------|----------------------|--------------------|
| Little Bluestem | 1 | 1 |
| Switchgrass | 2 | 2 |
| Prairie Sandreed | 3 | 7 |
| Western Wheatgrass | 4 | 10 |
| Sand Bluestem | 5 | 3 |
| Sweetclover | 6 | 10 |
| Hairy Vetch | 7 | 6 |
| Sand Lovegrass | 8 | 5 |
| Sand Dropseed | 9 | 4 |
| Rye | 10 | 10 |

Table 26. Relative species composition of Plainview backslopes, Region A, based on weight.

| Species | August 2009 |
|----------------|--------------------|
| | % |

| | |
|-------------------------|-------------|
| Seeded | 98.7 |
| Eastern Gammagrass | 50.4 |
| Indiangrass | 0.5 |
| Switchgrass | 38.4 |
| Pitcher sage | 5.1 |
| Wildrose | 4.3 |
| Non-seeded | 1.3 |
| Other Grasses and Forbs | 1.3 |

Table 27. Relative species composition of Creighton backslopes, Region A, based on weight.

| Species | August 2009 |
|---------|-------------|
| | % |

| | |
|-------------------------|-------------|
| Seeded | 26.2 |
| Big Bluestem | 7.5 |
| Indiangrass | 0.6 |
| Intermediate Wheatgrass | 1.4 |
| Little Bluestem | 5.0 |
| Switchgrass | 8.1 |
| Purple Prairie Clover | 1.3 |
| Red Clover | 2.3 |
| Non-seeded | 73.8 |
| Orchardgrass | 8.3 |
| Tall Fescue | 45.0 |
| Timothy | 11.6 |
| Other Grasses and Forbs | 9.0 |

Table 28. Relative species composition of Aurora backslopes, Region B, based on weight.

Species **August 2009**

| | % |
|-------------------------|-------------|
| Seeded | 33.4 |
| Indiangrass | 18.0 |
| Intermediate Wheatgrass | 2.2 |
| Little Bluestem | 1.0 |
| Sideoats Grama | 0.7 |
| Switchgrass | 1.0 |
| Maximillian Sunflower | 6.6 |
| Red Clover | 3.9 |
| Non-seeded | 66.6 |
| Tall Fescue | 38.8 |
| Orchardgrass | 25.6 |
| Other Grasses and Forbs | 2.2 |

Table 29. Relative species composition of Jansen backslopes, Region B, based on weight.

| Species | August 2009 |
|----------------|--------------------|
|----------------|--------------------|

| | % |
|-------------------------|-------------|
| Seeded | 96.5 |
| Big Bluestem | 12.3 |
| Indiangrass | 6.0 |
| Intermediate Wheatgrass | 26.5 |
| Little Bluestem | 0.6 |
| Sideoats Grama | 2.3 |
| Switchgrass | 20.9 |
| Blackeyed Susan | 0.3 |
| Dames Rocket | 0.0 |
| Grayhead Coneflower | 1.7 |
| Hairy Vetch | 0.0 |
| Maximillian Sunflower | 23.2 |
| Red Clover | 1.9 |
| Non-seeded | 4.5 |
| Other Grasses and Forbs | 4.5 |

Table 30. Relative species composition of Arnold backslopes, Region C, based on weight.

| Species | August 2009 |
|---------|-------------|
|---------|-------------|

| | % |
|-------------------------|-------------|
| Seeded | 86.6 |
| Indiangrass | 1.3 |
| Intermediate Wheatgrass | 2.0 |
| Little Bluestem | 2.9 |
| Switchgrass | 77.2 |
| Sideoats Grama | 2.2 |
| Purple Prairie Clover | 1.1 |
| Non-seeded | 13.4 |
| Other Grasses and Forbs | 13.4 |

Table 31. Relative species composition of Ragan backslopes, Region C, based on weight.

| Species | August 2009 |
|-------------------------|--------------------|
| | % |
| Seeded | 74.1 |
| Indiangrass | 38.2 |
| Little Bluestem | 3.5 |
| Switchgrass | 32.4 |
| Non-seeded | 26.9 |
| Big Bluestem | 21.9 |
| Other grasses and forbs | 4.2 |

Table 32. Relative species composition of Nenzel backslopes, Region D, based on weight.

| Species | August 2009 |
|-------------------------|-------------|
| | % |
| Seeded | 64.0 |
| Hairy Vetch | 0.6 |
| Little Bluestem | 43.7 |
| Prairie Sandreed | 0.3 |
| Sand Bluestem | 7.3 |
| Sand Dropseed | 3.2 |
| Sand Lovegrass | 1.3 |
| Sweetclover | 0.0 |
| Switchgrass | 7.6 |
| Non-seeded | 36.0 |
| American Licorice | 5.5 |
| Clammy Groundcherry | 6.9 |
| Pitcher Sage | 4.6 |
| Prairie Junegrass | 10.1 |
| Other Grasses and Forbs | 9.1 |

Table 33. Relative species composition of Crookston backslopes, Region D, based on weight.

| Species | August 2009 |
|-------------------------|-------------|
| | % |
| Seeded | 40.7 |
| Little Bluestem | 0.5 |
| Sand Bluestem | 14.3 |
| Sand Dropseed | 4.0 |
| Sand Lovegrass | 7.6 |
| Switchgrass | 14.3 |
| Non-seeded | 59.3 |
| American Licorice | 10.6 |
| Cudweed Sagewort | 5.2 |
| Wild Rose | 11.1 |
| Needleandthread | 10.4 |
| Prairie Junegrass | 10.1 |
| Other Grasses and Forbs | 11.9 |

Table 34. Relative species composition of Chadron backslopes, Region F, based on weight.

| Species | August 2009 |
|-------------------------|-------------|
| | % |
| Seeded | 95.6 |
| Crested Wheatgrass | 1.3 |
| Little Bluestem | 37.8 |
| Pubescent Wheatgrass | 32.6 |
| Sideoats Grama | 18.7 |
| Western Wheatgrass | 3.6 |
| Purple Prairie clover | 1.6 |
| Non-seeded | 4.4 |
| Other Grasses and Forbs | 4.4 |

Table 35. Relative species composition of N-71 backslopes, Region F, based on weight.

| Species | August 2009 |
|-------------------------|--------------------|
| | % |
| Seeded | 30.7 |
| Crested Wheatgrass | 7.6 |
| Little Bluestem | 3.2 |
| Pubescent Wheatgrass | 15.6 |
| Purple Prairie clover | 2.9 |
| Sideoats Grama | 1.4 |
| Non-seeded | 69.3 |
| Annual Sunflower | 6.9 |
| Downy Brome | 8.7 |
| Curlycup Gumweed | 6.2 |
| Fringed Sagebrush | 7.8 |
| Prairie Sandreed | 10.4 |
| Sand Dropseed | 16.1 |
| Other Grasses and Forbs | 13.3 |