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.

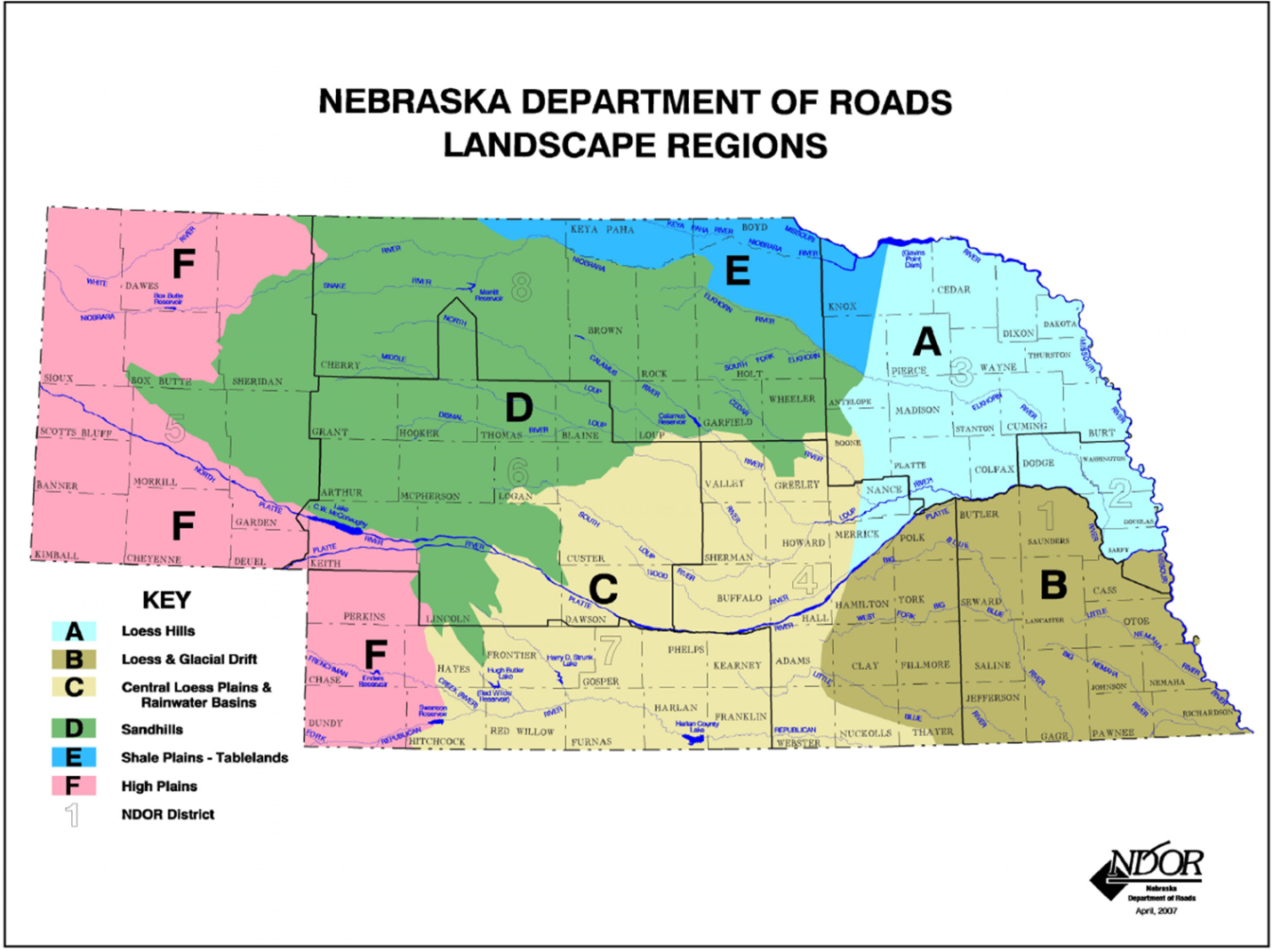


Table 2. Seeded species on backslope locations at Creighton, Jansen, Arnold, Nenzel and Chadron.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  | **Landscape Region** | | | | |
| **Species** |  | **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** |
| **Maximillian 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** |  |
| **Pubsecent 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** |
|  | **────────────────%────────────────** | | | |
| **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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  | Landscape Region | | | | |
| **Species** | **Seeding Rate (lbs of PLS/acre)** | **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 | 0b | 1.7b | 26.6a | 0b | 13.5b |
| Tall Fescue | 8 to 20 | 0.1b | 20.4a | 12.4b | 0b | 0b |
| 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 |  | 21.8a | 2.0b | 5.4b | 5.3b | 0.8b |
| Intermediate Wheatgrass |  | 0 | 0 | 0 | 0 | 1.3 |
| Sand Dropseed |  | 0 | 0 | 0.5 | 3.7 | 18.7 |
| Smooth Bromegrass |  | 31.1a | 0.9b | 27.2a | 16.6b | 7.7b |
| Warm Season Tall Grasses |  | 2.1b | 36.0a | 3.3b | 46.2a | 4.7b |
| 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 |
| **D** | **Crookston** | 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 Rageweed | 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-Mountian | 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 |