Appendices

APPENDIX A
MAJOR LAND RESOURCE AREA DESCRIPTIONS

We are using the NRCS methodology that incorporates the state and transition model to describe the rangeland vegetation for the entire project area.

Major Land Resource Areas (MLRA) are large geographic areas that contain similar dominant physical characteristics of land use, elevation and topography, climate, water, soils, and potential natural vegetation.

Within the MLRA, ecological site descriptions (ESD) are defined as "a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation."

In this analysis, we followed the predicted plant community type changes expected under continuous heavy grazing and continuous season-long grazing as well as clipping by prairie dogs and the expected change to plant communities with long-term prairie dog removal. Within each ESD the plant community just "below" historic climax plant community (HCPC) and the plant community expected to occur with an established long-term prairie dog colony are described. A complete description of all plant communities within each ESD can be found in the administrative record and on the NRCS website http://efotg.nrcs.usda.gov .

MLRA 60A - Pierre Shale Plains covers the Fall River Ranger District and the Oglala National Grassland. Five ecological site descriptions, of the total 27 sites within MLRA 60A, dominate these areas.

MLRA 64 – Mixed Sandy and Silty Tableland covers the majority of the Wall Ranger District. Six ecological site descriptions, of the total 25 sites found in MLRA 64, dominate these areas.

MLRA 63A - Northern Rolling Pierre Shale Plains (NRCS draft form only, Jan. 07) covers the entire Fort Pierre National Grasslands. Three ecological site descriptions dominate this area.

Table A-1. Dominant ecological sites by geographic area.

MLRA 60A	MLRA 64	MLRA 63A
Oglala Geographic Area Clayey 13-16" P. Z. Shallow Clayey Clayey 16-18" P.Z.	Wall North Geographic Area Clayey 17-20" P. Z. Thin Claypan Shallow Clay	Fort Pierre Geographic Area Clayey Thin Upland Shallow Clay
Fall River Northeast Geographic Area Shallow Clayey Thin Upland Clayey 16-18" P. Z.	Wall Southeast Geographic Area Loamy 17-20" P. Z. Thin Claypan Badlands Overflow	
Fall River West Geographic Area Clayey 13-16" P. Z. Shallow Clayey Clayey 16-18" P.Z.	Wall Southeast 3.63 Loamy 17-20" P.Z. Badlands Overflow Thin Claypan	
Fall River Southeast Geographic Area Clayey 13-16" P.Z. Dense Clay Thin Claypan	Wall Southwest Geographic Area Shallow Clay Badlands Overflow Dense Clay	

Table A-1, cont.

MLRA 60A	MLRA 64	MLRA 63A
Fall River Southeast 3.63 Clayey 13-16" P.Z. Shallow Clayey Dense Clay	Wall Southwest 3.63 Dense Clay Loamy 17-20" P.Z. Shallow Clay	

Ecological Site and Plant Community Descriptions for Geographic Areas (GA)

Clayey 17 – 20 P.Z. – MLRA 64: Wall North GA

This site occurs on nearly level to steeply sloping uplands. The common features of soils in this site are the silty clay to clay-textured subsoils and slopes of 0 to 20 percent. The soils in this site are well drained and formed in alluvium, colluvium, and residuum derived primarily from shale. The silt loam to clay surface layer is 3 to 7 inches thick.

Five plant communities are currently described for this ecological site.

- Western Wheatgrass/Blue Grama/ Buffalograss Plant Community

  This plant community evolved under continuous season-long grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 80 percent grasses and grass-like species, 10 percent forbs, and 10 percent shrubs.

  Dominant grasses include western wheatgrass, blue grama, and buffalograss. Grasses of secondary importance include sedge, sideoats grama, green needlegrass, and needleandthread. Forbs commonly found in this plant community include fringed sagewort, cudweed sagewort, prairie coneflower, and western yarrow. Shrub canopy ranges from 0 percent to 10 percent. When compared to the Western Wheatgrass/Green Needlegrass Plant Community, blue grama and buffalograss have increased. Green needlegrass and sideoats grama have decreased, and production of mid and tall warm-season grasses has also been reduced.

  This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

  Total annual production ranges from 900 to 2,500 pounds per acre with a relative value of 1,600 pounds per acre.

- Blue Grama/Buffalograss Sod Plant Community

  This plant community evolved under heavy continuous season long grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 80 percent grasses and grass-like species, 10 percent forbs, and 10 percent shrubs.

  Dominant grasses include blue grama and buffalograss. Grasses of secondary importance include sedge and western wheatgrass. Forbs commonly found in this plant community include fringed sagewort, wild parsley, and scarlet globemallow. Shrub canopy ranges from 0 percent to 10 percent. When compared to the Western Wheatgrass/Green Needlegrass Plant Community, blue grama and buffalograss are dominant on this plant community. Cool season grasses have decreased significantly.

This vegetation state is very resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term prescribed grazing.

Total annual production ranges from 600 to 1,500 pounds per acre with a relative value of 1,100 pounds per acre.

Loamy 17 – 20 P.Z. – MLRA 64: Wall SW 3.63, Wall SE GA, Wall SE 3.63

This site occurs on gently undulating to moderately steep rolling plains and low hills.

The features common to all soils in this site are the very fine sandy loam to silt loam textured surface soils and slopes of 0 to 30 percent. The soils in this site are well to somewhat excessively drained and formed in soft siltstone, sandstone, or alluvium. The surface layer is 4 to 15 inches thick.

Six plant communities are currently described for this ecological site.

- Blue Grama/Buffalograss/Western Wheatgrass Plant Community

  This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 80 percent grasses and grass-like species, 15 percent forbs and 5 percent shrubs. The dominant grasses include blue grama, buffalograss, western wheatgrass, and threadleaf sedge. Other grasses may include needleandthread, sideoats grama, prairie junegrass, red threeawn, bluegrass, little bluestem and big bluestem. The dominant forbs include scurfpeas, western ragweed, sagewort, scarlet globemallow, and other perennial aster species. Dominant shrubs in this community include western snowberry and wild rose. Broom snakeweed may also be present in significant amounts. Compared to the Western Wheatgrass/Needleandthread Plant Community, the shortgrass species including blue grama and buffalograss have increased. The cool season species including western wheatgrass and needlegrasses have decreased in composition. Annual bromes, wooly Indianwheat, and other annual grasses and forbs can invade the site. While plant diversity is relatively high, the structure of the community is dominated by shortgrasses.

  Total annual production ranges from 1,200 to 2,000 pounds per acre with a relative value of 1,600 pounds per acre.

- Threeawn/Annuals Plant Community

  This plant community developed under continuous heavy grazing by livestock and/or prairie dog clipping and foraging and/or disturbance. The potential plant community is made up of approximately 80 percent grasses and grass-like species and 15-20 percent forbs. The dominant grasses include threeawn, cheatgrass, and panicum species. Other grasses may include little bluestem, blue grama, buffalograss, sedges, western wheatgrass, and sixweeks fescue. The dominant forbs include fringed sagewort, fetid marigold, western ragweed, pussytoes, prostrate verbena, and other invader-like species. Other plant species, from adjacent ecological sites, can become minor components of this plant community. This plant community is susceptible to invasion of Canada thistle and other non-native species because of the relatively high percent of bare ground.

  Total annual production ranges from 400 to 1,000 pounds per acre with a relative value of 700 pounds per acre.

Badlands Overflow – MLRA 64: Wall SE GA, Wall SW GA, Wall SE 3.63

This site occurs in the eroded badlands on nearly level areas that receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

The soils of this site are very deep, well drained soils that formed in sodium-enriched alluvium. These soils typically have dispersive characteristics due to the high content of sodium. This feature tends to cause these soils to be naturally erosive, as the aggregate stability is low in the surface and structure is lacking in all horizons.

Five plant communities are currently described for this ecological site.

- Wheatgrass/Needlegrass/Prairie Sandreed/Shrubs Plant Community

  This plant community is a result of continuous season-long grazing, natural erosion, and/or deposition. Western wheatgrass and/or thickspike wheatgrass increase. Switchgrass, big bluestem, and green needlegrass decrease, while prairie sandreed and needleandthread will increase. Other grasses and grass-likes include tall dropseed, little bluestem, sideoats grama, inland saltgrass, and blue grama.

  Total annual production ranges from 1,500 to 2,500 pounds per acre with a relative value of 2,000 pounds per acre.

- Wheatgrass/Inland Saltgrass/Knotweed Plant Community

  This plant community develops with heavy, continuous season-long grazing by livestock and/or foraging and clipping by prairie dogs. The vegetation is mainly made up of western wheatgrass and/or thickspike wheatgrass, inland saltgrass, and knotweed. Most other species are either greatly diminished or absent. Silver sagebrush, rose, and broom snakeweed may survive under these extreme conditions.

  Total annual production ranges from 300 to 900 pounds per acre with a relative value of 600 pounds per acre.

Shallow Clay – MLRA 64: Wall SW GA and Wall N GA

This site occurs on gently to steeply sloping hills, plains, and ridges. The soils in this site are well drained and formed in alluvium or residuum weathered from claystone or shale. The surface layer is three to eight inches thick. The bedrock which occurs at 10 to 20 inches is impervious shale which is virtually impenetrable to plant roots. The soils have a slow to very slow infiltration rate.

Four plant communities are currently described for this ecological site.

- Western Wheatgrass/Grama/Sedge Plant Community

  The potential vegetation is about 80 percent grasses and grass-likes, 10 percent forbs and 10 percent shrubs. The major grasses and grass-likes include western wheatgrass, blue grama, and sedge. Other grasses occurring on this plant community include sideoats grama, little bluestem, threeawn and needleandthread. Forbs commonly occurring include yarrow, cudweed sagewort, goldenpea, prairie coneflower and scurfpea. Shrubs commonly found include big sagebrush, fringed sagewort, and broom snakeweed.

  When compared to the HCPC, blue grama and sedges have increased. Green needlegrass, little bluestem and sideoats grama have decreased. Production of cool-season grasses has also been reduced. Non-native species such as cheatgrass, salsify, curlycup gumweed, thistle, and sweetclover will likely invade this plant community.

Total annual production ranges from 800 to 1,600 pounds per ace with a relative value of 1,200 pounds per acre.

- Grama/Sedge Plant Community

  This plant community is made up of approximately 90 percent grasses (primarily short, warm season grasses), 5 percent forbs, and 5 percent shrubs. The dominant grasses or grass-likes include blue grama, buffalograss, and sedge. Other grasses may include western wheatgrass, prairie junegrass, threeawn, and annual brome. The dominant forbs include slimflower scurfpea, pussytoes, curlycup gumweed, and scarlet globemallow. The dominant shrubs are fringed sagewort and plains pricklypear.

  Total annual production ranges from 600 to 1200 pounds per acre with a relative value of 900 pounds per acre.

Dense Clay – MLRA 64: Wall SW GA, and Wall SW 3.63

The site developed under Northern Great Plains climatic conditions, including natural influences of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions, grazing management and fire.

These soils are high in clay and have a low available water capacity. The shrink-swell potential is very high, resulting in cracks greater than 2 inches wide during dry periods. Western wheatgrass with its strong rhizomes and high drought tolerance is able to thrive in these soils. Western wheatgrass dominates the site and production is closely related to the vigor of western wheatgrass. Slickspots are sometimes associated with this site. Slickspots are bare ground areas that are affected by high sodium concentrations. The soil factors are the dominant influence and grazing management does not affect these areas.

Two plant communities are currently described for this ecological site.

- Western Wheatgrass Plant Community

  The interpretive plant community for this site is the Western Wheatgrass Plant Community. This is also considered the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and occasional fire. This plant community is well suited for grazing by domestic livestock and can be maintained with prescribed grazing, prescribed burning, or areas receiving occasional short periods of rest. The potential vegetation is about 85 percent grasses or grasslike plants, 10 percent forbs, and 5 percent shrubs. Cool season grasses dominate the plant community. The major grasses include western wheatgrass and green needlegrass. The plant diversity is low. Other grasses and grass-like species occurring may include Sandberg bluegrass, buffalograss, blue grama, sideoats grama, and sedge. The dominant forbs include biscuitroot, wild parsley, scarlet globemallow, and American vetch. Shrubs that may occur on the plant community include brittle cactus and plains pricklypear.

  This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. However two to three years of drought can greatly reduce the vigor and abundance of the green needlegrass and western wheatgrass, increasing the percent bare ground and creating moderate to high soil erosion potential. The actual plant composition may not be greatly changed, however the production of this plant community varies greatly with fluctuations in precipitation. Water infiltration is low and runoff is moderate to high because of the high clay content in the soil. Plant litter is properly distributed with some movement off-site and natural plant mortality is low.

  Total annual production ranges from 900 to 2,000 pounds per acre with a relative value of 1,500 pounds per acre.

- Western Wheatgrass, Bare Ground Plant Community

  This plant community develops under droughty conditions or heavy continuous grazing. The potential vegetation is made up of 90 percent grasses and grass-likes, 5 percent forbs and 5 percent shrubs. The grass component is almost entirely western wheatgrass. Other perennial grasses are generally not found. Forbs found in this plant community include pennycress, curlycup gumweed, sweetclover, and annual forbs. Shrubs found include brittle cactus and plains pricklypear.

  When compared to the HCPC, the vigor, production and basal density of the grasses has been reduced. Often the site will be bare ground with a few sprigs of western wheatgrass, and cheatgrass will likely invade this plant community. The plant diversity is extremely low. Due to the low basal density, soil erosion hazards are high. Moving this plant community toward the HCPC can be accomplished through prescribed grazing and favorable climatic conditions.

  Total annual production ranges from 500 to 1000 pounds per acre with a relative value of 800 pounds per acre.

Thin Claypan – MLRA 64: Wall N, Wall SE 3.63, Wall SE GA

The common features of soils in this site are the very fine sandy loam to clay textured subsoils and slopes of 0 to 6 percent. The soils in this site are moderately well to well drained and formed in alluvium or residuum derived from soft sandstone, siltstone, or shale. The silt loam to loam surface layer is 1 to 4 inches thick.

In this analysis, we followed the predicted plant community type changes expected under continuous heavy grazing and continuous season-long grazing as well as clipping by prairie dogs and the expected change to plant communities with long-term prairie dog removal.

Two plant communities are currently described for this ecological site.

- Western Wheatgrass/Blue Grama Plant Community

  This is the interpretive plant community for this site, and it is also considered the Historic Climax Plant Community (HCPC). This site evolved with grazing by large herbivores and occasional prairie fires. This plant community can be found on areas having a history of proper grazing management, including adequate recovery periods between grazing events. The potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs and 10 percent shrubs. The rhizomatous wheatgrasses dominate the plant community, while blue grama is also prevalent. Other grasses and grass-like plants occurring on the site include green needlegrass, needleandthread, buffalograss, Sandberg bluegrass, and sedges. Significant forbs include scarlet globemallow, cudweed sagewort and heath aster. Shrubs occurring in this plant community include cactus, big sagebrush, saltbush, and fringed sagewort.

  Total annual production ranges from 500 to 1,500 pounds per acre with a relative value of 500 pounds per acre.

- Blue Grama/Cactus Plant Community

  This plant community can develop from the adverse effects of heavy continuous grazing and/or annual, spring seasonal grazing. Short grasses and cactus increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

Blue grama and cactus are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, sedge, buffalograss, inland saltgrass, needleandthread, prairie junegrass, and annual grasses. Forbs such as brome snakeweed, cudweed sagewort, heath aster, and western yarrow may also be present. Some non-native species will begin to invade this plant community including salsify, sweetclover, and annual bromes. There is usually more than 25 percent bare ground.

Total annual production ranges from 300 to 900 pounds per acre with a relative value of 500 pounds per acre.

Clayey 13-16" P.Z. – MLRA 60A: Oglala GA, Fall River W GA, Fall River SE GA, Fall River SE 3.63

This site occurs on nearly level to steep uplands. The soils in this site are well drained and formed in alluvium, colluvium, and residuum derived primarily from shale. The silty clay to silt loam surface layer is two to seven inches thick.

Seven plant communities are currently described for this ecological site.

- Western Wheatgrass/Blue Grama/Buffalograss Plant Community

  This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 70-85 percent grasses and grass-like species, 10-15 percent forbs, and 5-10 percent shrubs. The dominant grasses include blue grama, buffalograss, and western and/or thickspike wheatgrass. Other grasses may include green needlegrass, prairie junegrass, and Sandberg bluegrass. Significant forbs include scarlet globemallow, wild parsley, biscuitroot, phlox, golden pea, deer vetch, asters, and milkvetch. The significant shrubs that occur include big sagebrush, cactus, broom snakeweed, and rose.

  Compared to the HCPC, the shortgrass species, especially blue grama and buffalograss have increased. The cool season species including western wheatgrass and green needlegrass have decreased in composition. Annual bromes, curlycup gumweed, sweet clover, and other annual grasses and forbs can invade the site. While plant diversity is relatively high, short grasses dominate the structure of the community.

  Total annual production ranges from 700 to 2,100 pounds per acre with a relative value of 1,600 pounds per acre.

- Blue Grama/Buffalograss Sod Plant Community

  This plant community develops under heavy continuous season-long grazing by livestock and/or clipping and foraging by prairie dogs, and with continuous seasonal grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 75-90 percent grasses (primarily short, warm season grasses), 5-10 percent forbs, and 5-15 percent shrubs. The dominant grasses include blue grama and buffalograss. Other grasses may include western wheatgrass, prairie junegrass, threeawn, and annual brome. The dominant forbs include slimflower scurfpea, pussytoes, curlycup gumweed, and scarlet globemallow. The dominant shrub is plains pricklypear.

Compared to the HCPC, short grasses have increased, and cool season mid-grasses have diminished greatly. Some forbs and cactus have either increased and/or invaded the site. Plant diversity is low. This plant community is very stable.

Total annual production ranges from 400 to 900 pounds per acre with a relative value of 650 pounds per acre (Note: production values were used from the Blue Grama/Buffalograss/Three Awn Plant Community in the analysis, but no vegetation write-up exist for this plant community in the ESD descriptions).

Shallow Clayey – MLRA 60A: Oglala GA, Fall River NE GA, Fall River W, and Fall River SE 3.63

This site typically occurs on gently to steeply sloping uplands. The soils in this site are well drained and formed in shale. The surface layer is one to six inches thick. The bedrock which occurs at 10 to 20 inches is impervious shale which is virtually impenetrable to plant roots. The soils have a slow to very slow infiltration rate.

Four plant communities are currently described for this ecological site.

- Western Wheatgrass/Grama/Sedge Plant Community

  This plant community develops under continuous season-long grazing by large herbivores. The potential vegetation is about 80-90 percent grasses and grass-likes, 5-15 percent forbs, and 5-10 percent shrubs. The major grasses and grass-likes include western wheatgrass, blue grama, and sedge. Other grasses occurring on this plant community include sideoats grama, little bluestem, needleandthread, and threeawn. Forbs commonly occurring include yarrow, cudweed sagewort, goldenpea, prairie coneflower, and scurfpea. Shrubs commonly found include fringed sagewort and broom snakeweed.

  When compared to the HCPC, blue grama and sedges have increased. Green needlegrass, little bluestem, and sideoats grama have decreased. Production of cool-season grasses has also been reduced. Nonnative species such as cheatgrass, salsify, curlycup gumweed, thistle, and sweet clover will likely invade this plant community.

  Total annual production ranges from 700 to 1,300 pounds per acre with a relative value of 1,000 pounds per acre.

- Grama/Sedge Plant Community

  This plant community develops under heavy continuous grazing by livestock and/or foraging and clipping by prairie dogs, or with continuous seasonal grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 85-95 percent grasses (primarily short, warm season grasses), 1-5 percent forbs, and 5-10 percent shrubs. The dominant grasses or grass-likes include blue grama, buffalograss, and sedge. Other grasses may include western wheatgrass, prairie junegrass, threeawn, and annual brome. The dominant forbs include slimflower scurfpea, pussytoes, curlycup gumweed, and scarlet globemallow. The dominant shrubs are fringed sagewort and plains pricklypear.

  Total annual production ranges from 400 to 800 pounds per acre with a relative value of 600 pounds per acre.

Thin Upland – MLRA 60A: Fall River NE GA

This site occurs on gently sloping to very steep uplands. The soils in this site are well drained and formed in soft siltstone, sandstone, or loess deposits. The loam to silty clay loam surface layer is four to seven inches thick. The soils have a moderate to moderately slow infiltration rate. These soils are typically calcareous at or near the surface; however, carbonates are not always distinguishable in the upper layers.

Three plant communities are currently described for this ecological site.

- Little Bluestem/Grama Plant Community

  This plant community develops under continuous seasonal grazing or continuous season-long grazing and a low fire frequency. This plant community can also result from extended periods of non-use and no fire. Little bluestem dominates this plant community, as it takes advantage of soil disturbance (resulting from hoof action, or increased bare ground due to reduced plant vigor under non-use and no fire).

  Other significant grasses or grass-likes include blue grama, sideoats grama, and sedge. Forbs commonly found in this plant community include cudweed sagewort, purple coneflower, and dotted gayfeather. Significant shrubs include fringed sagewort and rose. The potential vegetation is about 80-90 percent grasses or grass-like plants, 5-10 percent forbs, and 5-10 percent shrubs. Although production remains relatively high, little bluestem plants often become "wolfy," and largely unavailable to most herbivores.

  Total annual production ranges from 800 to 1,700 pounds per acre with a relative value of 1,200 pounds per acre.

- Blue Grama/Sedge Plant Community

  This plant community is a result from heavy grazing by livestock and/or clipping and foraging by prairie dogs over many years. Diversity is diminished, as the short grasses become dominant in the plant community. The grazing tolerant blue grama and sedges replace little bluestem, western wheatgrass and the needlegrasses. Sideoats grama remains in the plant community, but is less productive because of competition and grazing pressure. Due to low palatability, cudweed sagewort, milkvetch, heath aster, and green sagewort become more prevalent in the plant community. Fringed sagewort is the dominant shrub in this plant community. The potential vegetation is about 75-85 percent grasses or grass-like plants, 5-15 percent forbs, and 5-10 percent shrubs.

  Total annual production ranges from 400 to 1,200 pounds per acre with a relative value of 800 pounds per acre.

Clayey 16-18" P.Z. – MLRA 60A: Fall River NE GA, Fall River W GA, and Oglala GA

This site occurs on gently undulating to rolling uplands. The soils in this site are well drained and formed in shale, residuum from shale or alluvium. The surface layer is 3 to 11 inches thick. The texture of the profile ranges from silty clay loam to clay. The soils have a low to moderate infiltration rate.

Seven plant communities are currently described for this ecological site.

- Western Wheatgrass/Buffalograss/Blue Grama Plant Community

  This plant community develops under continuous seasonal grazing (i.e., grazing an area during the same season every year) or from over utilization during extended drought periods. The potential vegetation is made up of approximately 80-90 percent grasses and grass-like species, 5-10 percent forbs, and 5-10 percent shrubs. The dominant grasses include blue grama, buffalograss, and western and/or thickspike wheatgrass. Other grasses may include green needlegrass, prairie junegrass, and Kentucky bluegrass. Significant forbs include scarlet globemallow, wild parsley, biscuitroot, phlox, golden pea, deer vetch, asters, and milkvetch. The significant shrubs that occur include cactus, broom snakeweed, and rose.

  Total annual production ranges from 800 to 2,400 pounds per acre with a relative value of 1,800 pounds per acre.

- Buffalograss/Blue Grama Sod Plant Community

  This plant community develops under heavy continuous season-long livestock grazing and/or clipping and foraging by prairie dogs, and with continuous seasonal livestock grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 80-90 percent grasses (primarily short, warm season grasses), 5-10 percent forbs, and 5-10 percent shrubs.

  The dominant grasses include blue grama and buffalograss. Other grasses may include western wheatgrass, prairie junegrass, threeawn, and annual brome. The dominant forbs include slimflower scurfpea, pussytoes, curlycup gumweed, and scarlet globemallow. The dominant shrub is plains pricklypear.

  Total annual production ranges from 400 to 900 pounds per acre with a relative value of 700 pounds per acre.

Dense Clay - MRLA 60A: Fall River SE 3.63, Fall River SE GA

The soils in this site are moderately well to well drained and formed in clayey alluvium or residuum from soft shale. The clay surface layer is one to five inches thick. The soils have a slow to very slow infiltration rate except after dry periods when initial uptake may be rapid due to cracking of the surface.

Two plant communities are currently described for this ecological site.

- Wheatgrass Plant Community

  The plant community upon which interpretations are primarily based is the Wheatgrass Plant Community. This is also considered the HCPC. This plant community can be maintained with prescribed grazing, prescribed burning, or areas receiving occasional short periods of deferment. The potential vegetation is about 80-90 percent grasses or grass-like plants, 5-10 percent forbs, and 5-10 percent shrubs. Cool season grasses dominate the plant community. Major grasses include native wheatgrass such as western wheatgrass, Montana wheatgrass, and thickspike wheatgrass. The plant diversity is low, being dominated by the wheatgrasses. Other grasses and grass-like species occurring on the plant community may include native bluegrasses, buffalograss, blue grama, and sedge. The dominant forbs include biscuitroot, wild parsley, scarlet globemallow, and western yarrow. Shrubs that may occur on the plant community include big sagebrush, cactus, greasewood, saltbush, birdfoot sagebrush, and winterfat. In the central to eastern portions of the MLRA, greasewood will decrease with grazing pressure, while in the western portion greasewood encroaches from adjacent sites and will increase with grazing pressure.

Total annual production ranges from 800 to 1,800 pounds per acre with a relative value of 1,300 pounds per acre.

- Wheatgrass, Bare Ground Plant Community

  This plant community develops under droughty conditions, heavy spring grazing, or long-term heavy continuous grazing. The potential vegetation is made up of 70-85 percent grass, 10-20 percent and 0-10 percent shrubs. The grass component is almost entirely native wheatgrasses. Other perennial grasses are generally not found. Forbs found in this plant community include pennycress, annual mustards, curlycup gumweed, and sweet clover. Generally, the shrub component has dropped out. When compared to the Wheatgrass Plant Community, annual and biennial forbs may occur. The vigor and basal density of the native wheatgrasses has been severely reduced. Often, the site will bare ground with a few sprigs of wheatgrass and cheatgrass will likely invade this plant community. Production of cool season grasses has been greatly reduced. Warm season grasses, such as blue grama and buffalograss, comprised a very minor percentage of the Wheatgrass Plant Community disappear along with green needlegrass and perennial forbs in this plant community. As this plant community deteriorates even further, it will be dominated by birdfoot sagebrush and cheatgrass.

  Total annual production ranges from 400 to 800 pounds per acre with a relative value of 600 pounds per acre.

Thin Claypan – MLRA 60A: Fall River SE

The soils in this site are moderately well to well drained and formed in soft sandstone, siltstones, shales, and alluvium. The fine sandy loam to clay loam surface layer is one to five inches thick. The extremely hard clayey Btn horizon has round-topped or “bun shaped” columnar or prismatic structure. These Btn horizons are high in sodium. The soils have a moderate to slow infiltration rate and very slow saturated hydraulic conductivity. Wet surface compaction can occur with heavy traffic. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about nine percent.

Two plant communities are currently described for this ecological site.

- Western Wheatgrass/Blue Grama Plant Community

  The plant community upon which interpretations are primarily based is the Western Wheatgrass/Blue Grama Plant Community. This is also considered to be the HCPC. This plant community can be found on areas having a history of proper grazing management, including adequate recovery periods between grazing events. The potential vegetation is about 75-90 percent grasses or grass-like plants, 5-10 percent forbs, and 5-15 percent shrubs. The rhizomatous wheatgrasses dominate the plant community, while blue grama is also prevalent. Other grasses and grass-like plants occurring on the site include green needlegrass, needleandthread, buffalograss, sandberg bluegrass, and sedges. Significant forbs include scarlet globemallow, cudweed sagewort, and heath aster. Shrubs occurring in this plant community include cactus, big sagebrush, saltbush, and fringed sagewort. This plant community is well adapted to the Northern Great Plains climatic conditions.

  Total annual production ranges from 500 to 1,200 pounds per acre with a relative value of 900 pounds per acre.

- Blue Grama/Cactus Plant Community

  This plant community can develop from the adverse effects of heavy continuous grazing and/or annual, spring seasonal grazing. Short grasses and cactus increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama and cactus are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, sedge, buffalograss, inland saltgrass, needleandthread, prairie junegrass, and annual grasses. Forbs such as brome snakeweed, cudweed sagewort, heath aster, and western yarrow may also be present. Some nonnative species will begin to invade this plant community including salsify, sweet clover, and annual bromes. There is usually more than 25 percent bare ground. This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama.

  Total annual production ranges from 300 to 900 pounds per acre with a relative value of 500 pounds per acre.

Thin Upland – MLRA 63A: Fort Pierre

Thin Upland ecological range site is currently in draft form. Rick Peterson, NRCS-Kadoka, SD, indicates that this site is similar to Thin Upland in MLRA 60A, but more field work is to be completed before the final version is published. The following information has been provided by the NRCS in draft form.

Four plant communities are currently described for this ecological site.

- Little Bluestem/Western Wheatgrass/Grama Plant Community

  Total annual production ranges from 1,200 to 2,400 pounds per acre with a relative value of 1800 pounds per acre.

- Grama/Sedge/Threeawn Plant Community

  Total annual production ranges from 600 to 1300 pounds per acre with a relative value of 900 pounds per acre.

Shallow Clay – MLRA 63A: Fort Pierre

The soils in this site are well drained and formed in shale. The surface layer is 2 to 8 inches thick. The bedrock which occurs at 10 to 20 inches is impervious shale which is virtually impenetrable to plant roots. The soils have a slow to very slow infiltration rate. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 10 percent. Low available water capacity and very slow permeability strongly influences the soil-water-plant relationship.

Four plant communities are currently described for this ecological site.

- Western Wheatgrass/Grama/Sedge Plant Community

  This plant community develops under continuous season-long grazing by large herbivores. The potential vegetation is about 75percent grasses and grass-likes, 15percent forbs and 10percent shrubs. The major grasses and grass-likes include western wheatgrass, blue grama, and sedge. Other grasses occurring on this plant community include sideoats grama, little bluestem, threeawn

and needleandthread. Forbs commonly occurring include yarrow, cudweed sagewort, prairie coneflower, and scurfpea. Shrubs commonly found include fringed sagewort, rose, yucca and broom snakeweed.

When compared to the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community, blue grama and sedges have increased. Green needlegrass, little bluestem and sideoats grama have decreased. Production of cool-season grasses has also been reduced. Non-native species such as cheatgrass, salsify, curlycup gumweed, thistle, and sweetclover will likely invade this plant community.

Total annual production ranges from 900 to 1,800 pounds per acre with a relative value of 1300 pounds per acre.

- Grama/Sedge Plant Community

  This plant community develops under heavy continuous grazing, or with continuous seasonal grazing with concentrated use in the early part of the growing season (as in calving/lambing pastures). It is made up of approximately 60 percent grasses (primarily short grasses and grass-likes), 15 percent forbs, and 15 percent shrubs. The dominant grasses or grass-likes include blue grama, buffalograss, and sedge. Other grasses may include western wheatgrass, prairie junegrass, and threeawn. The dominant forbs include scurfpea, pussytoes, cudweed sagewort, and scarlet globemallow. The dominant shrubs are fringed sagewort and broom snakeweed.

  Compared to the Western Wheatgrass/Green Needlegrass/Sideoats Grama Plant Community, short grasses have increased, and the cool-season mid grasses have diminished greatly. Some forbs and cactus have either increased and/or invaded the site. Plant diversity is low. This plant community is very stable. Generally, this plant community will require significant management inputs and time to move it away from this plant community. On-site soil erosion is low. Infiltration is low, and runoff is high. Typically the runoff is very clean, but off-site areas can be significantly impacted due to the increased runoff.

  Total annual production ranges from 600 to 1,200 pounds per acre with a relative value of 900 pounds per acre.

Clayey - MLRA 63A: Fort Pierre GA

This site occurs on nearly level to steeply sloping uplands. The soils have a loam to clay surface layer that is 3 to 9 inches thick and silty clay loam to clay textured subsoils. The slopes are 0 to 30 percent.

Four plant communities and five vegetative states are currently described for this ecological site.

- Western Wheatgrass/Blue Grama/Buffalograss Plant Community

  This plant community evolved under continuous seasonal grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 80 percent grasses and grass-like species, 10 percent forbs, and 10 percent shrubs.

  Dominant grasses include western wheatgrass, blue grama, and buffalograss. Grasses of secondary importance include sideoats grama, sedge, green needlegrass, and Needleandthread. Forbs commonly found in this plant community include cudweed sagewort, prairie coneflower, and western yarrow. Shrub canopy ranges from 0 percent to 10 percent.

  When compared to the Western Wheatgrass/Green Needlegrass Plant Community, blue grama and buffalograss have increased. Green needlegrass and sideoats grama have decreased, and production of mid and tall warm-season grasses has also been reduced.

  Total annual production ranges from 1,200 to 2,400 pounds per acre with a relative value of 1800 pounds per acre.

- Threeawn/Annuals Plant Community

  This plant community develops under continuous heavy livestock grazing and/or foraging and clipping by prairie dogs or other excessive disturbances (i.e., heavy use areas, defoliation by rodents, etc.). The potential plant community is made up of approximately 50 percent grasses and grass-like species 10-25 percent forbs, and 5-25 percent shrubs. The dominant grasses include threeawn and annual brome grasses. Other grasses may include little bluestem, blue grama, buffalograss, sedges, and western wheatgrass. The dominant forbs include fetid marigold, western ragweed, prostrate verbena, pussytoes, and other annual invader-like species. The dominant shrubs include fringed sagewort and cactus. This plant community is susceptible to invasion of Canada thistle and other non-native species because of the relatively high percent of bare ground. Compared to the Western Wheatgrass/Needleandthread Plant Community, red threeawn, annual brome grasses, and percent of bare ground has increased. Western wheatgrass, needlegrasses and other cool season grasses and grass-like species have decreased as have the warm season species including big bluestem, sideoats grama, blue grama, and buffalograss. Plant diversity is low (plant richness may be high, but areas are often dominated by a few species and evenness is lacking).

  Total annual production ranges from 400 to 1,100 pounds per acre, with a relative value of 700 pounds per acre.