
TO: Foxtail Wind, LLC

FROM: Dale Bennett

DATE: October 3, 2015 (Revised July 2017)

SUBJECT: Foxtail Wind Energy Center – Dakota Skipper Habitat Suitability Resurvey

Introduction and Purpose

Tetra Tech, Inc. (Tetra Tech) contracted Wenck Associates, Inc. to map potential habitat for the Dakota skipper butterfly, a species listed as threatened under the federal Endangered Species Act in 2014, at the proposed Foxtail Wind Energy Center (Project) in Dickey County, North Dakota. The Project Area was surveyed in 2014 to determine the presence and quality of native prairie and potential Dakota skipper and Poweshiek skipperling habitat, a species that is also listed and has similar habitat requirements. A rough delineation of potential habitat was completed at that time.

Field surveys focusing specifically on Dakota skipper habitat were conducted August 3 - 4, 2015. The Survey Area was defined as 12 parcels which had been identified as having Excellent/Likely habitat or Good/Possible habitat during the 2014 surveys on which Foxtail, LLC (Foxtail) had tentatively planned to place turbines. Surveys were conducted in portions of the following sections:

- Section 13 and 24, Township 130, Range 66
- Sections 8, 19, 20, 29, and 31, Township 130, Range 65
- Section 32 and 29, Township 131N, Range 65W

Surveyed parcels are shown in Figure 1.

Methods

The Dakota skipper is an obligate user of native, undisturbed high-quality prairie with limited dispersal. In North Dakota, the Dakota skipper is known or believed to occur in 19 counties, however no records of occurrence exist for Dickey County (USFWS, 2017a). The USFWS has described two types of potential habitat for this species: Type A and Type B. Type A habitat is low wet-mesic prairie that occurs on near-shore glacial lake deposits. Type B habitat occurs primarily on rolling grassland over gravelly glacial moraine deposits and is dominated by native tallgrass prairie species. Bluestem grasses and needlegrasses dominate these prairies; purple coneflower (*Echinacea angustifolia*) is typical of high quality sites that support this skipper, although it also uses other flowers for nectar. Only Type B habitat is potentially present within the Project Area. A detailed description of habitat characteristics can be found in *Dakota Skipper: Guidance for Interagency Cooperation under Section 7(a)(2) of the Endangered Species Act* (USFWS, 2015b).

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Exhibit 8 - Dakota Skipper Habitat Suitability Resurvey
Foxtail Wind, LLC

While the emphasis of this survey was habitat for the Dakota skipper, the survey results can reasonably be applied to the Powesheik skipperling as well. Habitat for this species is high quality tallgrass and mixed grass prairie in both upland, dry areas and low, moist areas; nectar sources include prairie flowers such as purple coneflower (*Echinacea angustifolia*), blackeyed susan (*Rudbeckia hirta*) and palespike lobelia (*Lobelia spicata*). Because limited research has been done on the Powesheik skipperling, it is not certain which plant species are necessary for the larvae to develop although it is known that they select native, fine-stemmed grasses and sedges such as little bluestem (*Schizachyrium scoparium*) and prairie dropseed (*Sporobolus heterolepis*) (USFWS, 2014). These are similar food sources as for the Dakota skipper. Habitat areas of this type were mapped as potential Dakota skipper habitat, and this likely took in habitat for the Powesheik skipperling as well. Further, there are only two counties in North Dakota where the Powesheik skipperling is known or suspected to occur (USFWS 2017b).

2014 Survey Methods

The purpose of the 2014 field survey was twofold; 1) to identify native prairie remnants within the entire Project Area and 2) to evaluate the overall butterfly habitat quality of the identified native prairie. Each parcel was visually surveyed to determine if it contained remnant native prairie or tame grassland that had been previously cultivated based on the composition of native or non-native species, presence of forbs, topography and other factors. Grassland quality was then determined by evaluating plant diversity, current grazing level, and dominant composition (native or non-native) to define three levels of grassland quality – poor, good, and excellent.

In parcels that were identified as good to excellent, surveyors then determined if appropriate habitat was present for the Dakota skipper and, based on habitat preference similarities, the Powesheik skipperling. This determination involved visually assessing landforms and dominant plant species from a public right-of-way vantage point to see if potential habitat was present. If potential habitat was present in the survey area, the surveyor marked that parcel as good or excellent. A precise delineation of habitat (GPS delineated polygons) was not conducted during the 2014 survey, and access to the tax parcels involved was not obtained. This was appropriate since the 2014 surveys covered the entire Project Area, including parcels where no Project infrastructure was planned.

2015 Survey Methods

Surveys in 2015 expanded on the results of the 2014 surveys, and focused on the portions of the Project Area which had been preliminarily identified as having potential conflicts between good or excellent habitat and proposed locations of turbines. Access to individual tax parcels with such potential conflicts was obtained, and survey methods included walking across the entire 2015 Survey Area using a combination of random undirected traverses through unlikely habitat (intuitive controlled) and systematic transects through areas of potential habitat and diverse communities (Nelson, 1985; USFS, 2015).

Surveys focused on areas of potentially suitable habitat for the Dakota skipper based on the characteristics of Type B habitat. This involved noting areas of native prairie, ideally dominated by little bluestem and/or needlegrasses (*Hesperostipa spartea*, *H. comata*, or *Nassella viridula*) which typically occurs in patches on mid to upper slopes of rolling grassland. Woody vegetation and plant communities on flat topography with few forbs were assumed to not be potential habitat for Dakota skipper.

Areas determined to be unlikely habitat were documented by taking a photo and recording general plant community notes of dominant species composition. Areas determined to be potential habitat for the Dakota skipper (i.e. that met the criteria for Type B habitat) were delineated using a sub-meter accurate GPS unit (Trimble GeoXT, 6000 Series); notes on general plant community composition were taken to show species diversity and abundance. Within potential Dakota skipper habitat, plant species composition, cover, degree of woody encroachment, and grazing pressure were documented.

Criteria for Suitable and Unsuitable Habitat

Criteria for suitable and unsuitable habitat are given in Table I, and are based on the USFWS protocol (USFWS, 2015b). If an area exhibited any one of the parameters listed under “Unsuitable Habitat”, it was excluded as potentially suitable Dakota Skipper habitat. Thus, to be considered “Potentially Suitable” habitat, an area must exhibit all or most of the parameters for the criteria that have been quantified.

Table I. Criteria used to Determine Suitability of Potential Dakota Skipper Habitat

Criteria	Unsuitable Habitat	Potentially Suitable Habitat
Disturbance/Development	Cropland, planted (tame) hayland, previously cultivated land, farmyards, oil and gas development, roads, industrial sites, gravel or paved surfaces, cities/towns	Undisturbed (remnant, untilled) high quality prairie; Native grassland cut for hay
Land Cover/Vegetation Community Type	Non-native grasslands, weedy roadsides, reconstructed (reclaimed/restored) prairie; wooded areas; shrub-covered floodplains; shrub thickets (e.g., dense western snowberry, buffaloberry patches); wetlands, waterbodies; bare, eroded areas	Native grassland communities, specifically wet-mesic tallgrass prairie to dry-mesic mixed grass prairie
Larval Food Source	None present.	At least one larval food source species present, with combined relative cover of bunchgrasses >25%.
Nectar Source	None present.	At least one nectar species present and abundant (many individual plants scattered throughout the site) or the absolute cover of forb species present is greater than 10%.
Woody Encroachment	Combined relative cover of woody species is >25%.	Combined relative cover of woody species is <25%.
Invasive Species	Combined relative cover of non-native, invasive species is >50%.	Combined relative cover of non-native, invasive species is <50%.
Grazing Pressure	Current grazing is heavy (>50% vegetation removed).	Current grazing is light to moderate (0-50% vegetation removed). Combined relative cover of grazing increasers is <25%.
Fire	Not quantified. Past and present fire that eliminates native grasses and forbs.	Not defined.

Criteria	Unsuitable Habitat	Potentially Suitable Habitat
Haying	Early haying that removes flowers of nectar sources.	Late haying after flight period.
Soil Types	Not defined.	Not quantified. In general: glacial in origin; surface textures loamy sands, sandy loams, clay loams, or loams
Landform-Aspect	Not defined.	Not quantified. In general: glacial moraine deposits, rolling hills, north to east facing slopes, and steep topography.
Hydrologic Regime	Not quantified. In general, flooding; groundwater depletion, alteration, contamination	Not quantified. In general, mesic to well-drained.

In each area mapped as Potentially Suitable habitat, the quality of that habitat was determined. Using methods similar to those used in the 2014 survey, each Potentially Suitable habitat area was evaluated for plant diversity, current grazing level, and dominant composition (native or non-native) to define three levels of grassland quality – Poor/Unlikely, Good/Possible, and Excellent/Likely.

- Poor/Unlikely habitat was heavily grazed, had moderate to heavy invasion of non-native species, and surrounded by either poor quality or existing disturbances (e.g. roads).
- Good/Possible habitat was lightly grazed, had moderate to low invasion from native species, and was surrounded by similar quality native prairie.
- Excellent/Likely habitat would have light grazing, little to no invasion from non-native species (0-25%) and would be surrounded by similar excellent native prairie.

Results and Discussion

Site photos are shown in Appendix A and field data sheets are found in Appendix B. The 2015 Survey Area included 2,141 acres, of this, 2,111.2 acres, or 98.6%, was found to be unsuitable habitat. Good/Possible habitat made up 26.0 acres or 1.2 %, and 3.8 acres, or 0.4%, was found to be Poor/Unlikely habitat. In the 2014 survey, some areas were tentatively determined to contain Excellent/Likely habitat. However, in the more detailed 2015 surveys, none of the areas surveyed were found to contain Excellent/Likely habitat. Results of the 2014 and 2015 survey efforts were used to inform a field-based micrositeing effort conducted in 2017.

Potential habitat for the Dakota skipper was present mostly in the eastern portion of the 2015 Survey Area in Sections 19, 20, and 29, T130N, R65W. This portion of the Survey Area was on the edge of the prairie coteau, which sloped east to flatter land used for agriculture. The steep rolling hills of the prairie coteau are used for cattle grazing and ranching. Smooth brome (*Bromus inermis*), a non-native grass species, was abundant throughout this area; this species spreads aggressively, aided by cattle grazing. In general, habitat for the Dakota skipper was confined to hillsides that had good forbs diversity, were dominated by little bluestem (*Schyzachyrim scoparium*) and porcupine grasses (*Hesperostipa spartea*), and had low occurrence of smooth brome.

In Section 19, T130N, R65W, scattered areas of Good/Possible habitat were found in the eastern portion of the section. However, most of the area was composed of hillsides dominated by smooth brome. Cattle grazing also appeared moderate to heavy throughout this area. Cattle grazing, combined with the high abundance of non-native species, made these hillsides unsuitable Dakota skipper habitat.

In Section 24, T130N, R66W, no potential habitat was found. Grazing appeared heavy in low areas, and moderate on hillsides. The entire section was largely dominated by smooth brome, with some hillsides dominated by porcupine grass. Forb abundance and diversity were low in this area, likely as a result of grazing.

The northern portion of Section 13, T130N, R66W had some potential habitat along hills bordering a lake. Little bluestem dominated these areas, and forb diversity and abundance was good. The rest of this section appeared to be moderately grazed, and dominated by smooth brome.

Parcels in Section 31 and Section 8, T130N, R65W and Section 32, T131N, R65N all contained unsuitable habitat for the Dakota skipper. Hillsides in these areas were either heavily grazed, had significant woody encroachment from western snowberry (*Symphoricarpos occidentalis*), or were dominated by smooth brome. Some remnant little bluestem was present, but habitat had been degraded by grazing pressure and encroachment from non-native species and western snowberry.

Section 29, T131N, R65W appeared to be partially hayed on the eastern portion of the surveyed tract, with the western portion containing native grassland. With past haying, suitable habitat was not present in the eastern portion of the survey area. On the west side, one hillside with little bluestem was present with diverse forbs. However, habitat was marginal in this area due to encroachment from smooth brome, western snowberry, and sweet clover (*Melilotus officinalis*) on the edges of this feature. to food sources for the Dakota skipper.

Conclusion

The majority of the Project Area was not suitable habitat for the Dakota skipper due to invasion of non-native species, heavy grazing, and woody encroachment. However, scattered areas of potential Type B Dakota skipper habitat were documented, primarily in the eastern portion of the survey area. None of the turbine locations, as proposed in 2015, were within mapped areas of potential Type B habitat. The results of the 2015 survey effort were provided to Foxtail in the form of ESRI Shapefiles for use in avoidance during micro-siting conducted in 2017.

References

- Nelson, J. 1985. Rare Plant Surveys: Techniques for Impact Assessment. *Natural Areas Journal* 5: 18-30.
- USFWS. 2013. Dakota Skipper Range Maps. Available at:
http://www.fws.gov/northdakotafieldoffice/gis/gis_dkskip.htm.
- USFWS. 2014. Poweshiek Skipperling (*Oarisma Poweshiek*) Fact Sheet.
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October, 2014.

USFWS. 2017a. US Counties within North Dakota in which the Dakota Skipper is known or is believed to occur.

<https://ecos.fws.gov/ecp0/profile/countiesByState?entityId=3412&state=North%20Dakota>

USFWS. 2017b. US Counties within North Dakota in which the Poweshiek Skipperling is known or is believed to occur.

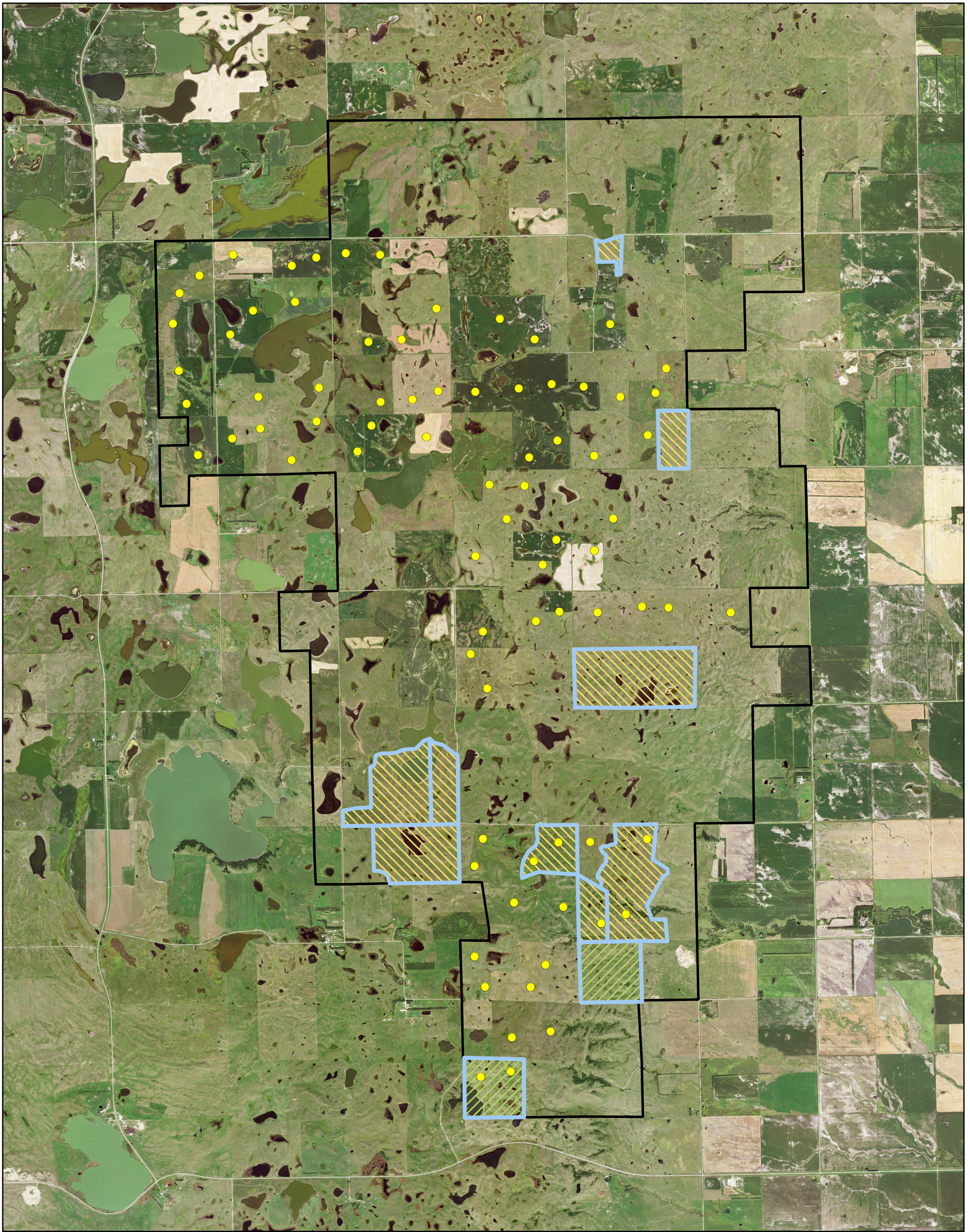
<https://ecos.fws.gov/ecp0/profile/countiesByState?entityId=10147&state=North%20Dakota>

USFWS. 2015b. Dakota Skipper: Guidance for Interagency Cooperation under Section 7(a)(2) of the Endangered Species Act Version. Draft Version, February 2015. Available at:

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FIGURES

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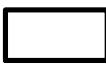


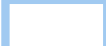

1:50,000 NAD 1983 StatePlane North Dakota South FIPS 3302 Feet 0 0.5 1 2 Miles

Figure 1
Foxtail Wind Energy Center

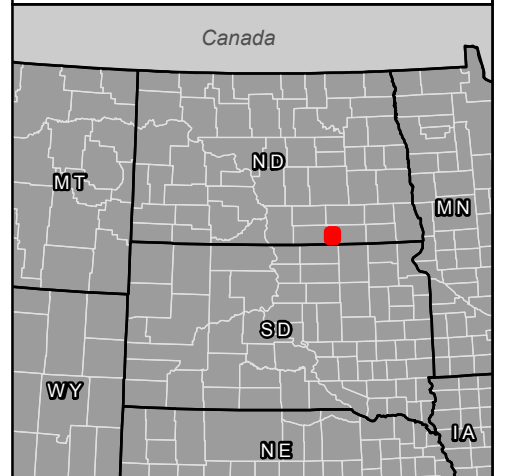


Dakota Skipper Habitat Evaluation
Updated August 2017

DICKEY COUNTY, ND

- | | | |
|---|--|---|
|  | Proposed Project Boundary (01-03-2017) | Butterfly Habitat 2014 |
|  | Proposed Turbines (07-14-2017) |  Excellent/Likely |
|  | 2015 Survey Area |  Good/Possible |

Reference Map



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APPENDIX A. SITE PHOTOS

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Photo 1. Facing West. View shows a heavily grazed hillside typical of this parcel.



Photo 2. Facing South. In lower areas of this parcel, western snowberry was dense, indicating a history of heavy grazing.



Photo 3. Facing Northwest. View shows Community 1, a porcupine grass/little bluestem hillside with purple coneflower (seed heads visible in this photo).



Photo 4. Facing West. View of the brome dominated flat located just west of Community 1. This was not suitable habitat due to the dominance of smooth brome.



Photo 5. Facing Northwest. View of Community 2, a little bluestem dominated hillside.



Photo 6. Facing Northwest. View shows a little bluestem hillside that was not potential habitat. Forbs were absent, as most of the hill was either little bluestem or dominated by smooth brome. Leafy spurge was also observed in this community.



Photo 7. Facing Southwest. View shows a typical smooth brome dominated hillside. Many hillsides in this parcel were dominated by smooth brome, with some native species contributing less than 10% overall cover.



Photo 8. Facing Northeast. View shows Community 3, a little bluestem hillside with good forb diversity. Some purple coneflower seed heads are visible in this photo.



Photo 9. Facing East. Community 4 was almost identical to Community 3, with an abundance of little bluestem and good diversity of native forbs. Note the purple coneflower seed heads in this photo.



Photo 10. Facing Northwest. View shows a dense brome flat, a dominant species throughout this parcel. Note the lack of forbs and other native grasses.



Photo 11. Facing Northeast. This small hillside of little bluestem, Community 5, was surrounded by smooth brome, yet still had a good forb abundance and diversity.



Photo 12. Facing West. Community 6 was an extensive little bluestem-dominated hillside with good forb diversity and low abundance of non-native species.



Photo 13. Facing Southeast. Community 7 was mostly dominated by porcupine grass, with some little bluestem scattered throughout this area. Forb diversity was good on this hillside.



Photo 14. Facing East. Community 8 was very similar to Community 7, separated by a woody swale.



Photo 15. Facing West. Community 9 was on a relatively steep hillside dominated by little bluestem and porcupine grass.



Photo 16. Facing East. This slight rise was dominated by little bluestem, but had almost no native forbs due to the dense grass. Area was also invaded by smooth brome.



Photo 17. Facing East. Community 10 was a little bluestem hillside with good forb diversity and low invasion from non-native species. Smooth brome was abundant on the edges of this community.



Photo 18. Facing Northeast. View shows Community 11 on a west-facing hillside. Purple coneflower was present in this little bluestem hillside, but not visible in this photo.



Photo 19. Facing North. View shows Community 12, a little bluestem hillside with good abundance of purple coneflower (seed heads visible in this photo).



Photo 20. Facing Southeast. View shows Community 13, a little bluestem hillside with excellent forb diversity, especially purple coneflower. Note the numerous purple coneflower seed heads in this photo.



Photo 21. Facing West. View shows a brome-dominated hillside, which was not considered potential habitat.



Photo 22. Facing South. View shows a brome-dominated hillside, which was not considered potential habitat.



Photo 23. Facing North. This view shows the broader landscape, which was mostly dominated by smooth brome.



Photo 24. Facing Southeast. View of Community 14, a porcupine grass hillside that had good forb diversity (note purple coneflower seed heads in this photo) and little invasion from smooth brome.



Photo 25. Facing East/Southeast. View of Community 15, which was present near an existing road. Smooth brome was present in this community (and visible in this photo), but forb diversity was good and little bluestem was abundant.



Photo 26. Facing South. Community 16, a little bluestem hillside with good forb diversity.



Photo 27. Facing South. This smooth brome-dominated hillside had few native forbs, and was not considered potential habitat.



Photo 28. Facing South. View of Community 17, a steep little bluestem hillside dropping off to a drainage to the west (trees in the background are part of this drainage).



Photo 29. Facing West. View of Community 18, which included this little bluestem hilltop. Big bluestem, located in the foreground of this photo, was present on lower slopes.



Photo 30. Facing South/Southeast. Another view of Community 18 on the steep little bluestem hillside adjacent to the drainage.



Photo 31. Facing West. View of the end of Community 18, which transitioned to a steep hillside dominated by sweet clover, smooth brome, and porcupine grass.



Photo 32. Facing East. View of Community 19, a little bluestem hillside on gentle slopes leading to a drainage.



Photo 33. Facing North. Community 20 was on a hillside with good forb diversity and high abundance of little bluestem.



Photo 34. Facing East. This area was dominated by smooth brome, was some little bluestem. Almost no native forbs were present. This area was not potential habitat.



Photo 35. Facing West. View shows the typical composition of this parcel, which was moderately grazed grassland dominated by smooth brome.



Photo 36. Facing West. View shows the typical composition of this parcel, which was moderately grazed grassland dominated by smooth brome. The yellow flowers in this photo are sweet clover, an abundant species throughout this area.



Photo 37. Facing West/Southwest. View of Community 21, a little bluestem hillside overlooking a lake. Sweet clover, visible in this photo, was relatively common in this community.



Photo 38. Facing South. View of Community 22, a little bluestem hillside overlooking a lake. Sweet clover, visible in this photo, was relatively common in this community.



Photo 39. Facing Northwest. Community 23 was a little bluestem hillside overlooking a wetland area. Forb diversity was good and smooth brome was uncommon.



Photo 40. Facing Northeast. Community 24 was a porcupine grass-dominated hillside that had high diversity and abundance of native forb species. Note the numerous purple coneflower seed heads in this photo.



Photo 41. Facing South. Community 25 was similar to Community 24, but had more little bluestem on upper slopes.



Photo 42. Facing West. This hillside was dominated by smooth brome and had a high abundance of leafy spurge, which is not suitable habitat.



Photo 43. Facing West. Although forb diversity was good on this hillside, the dominant grass was smooth brome with a minor cover (less than 10%) of porcupine grass.



Photo 44. Facing East. View of the central portion of this tract, a gentle depression dominated by smooth brome.

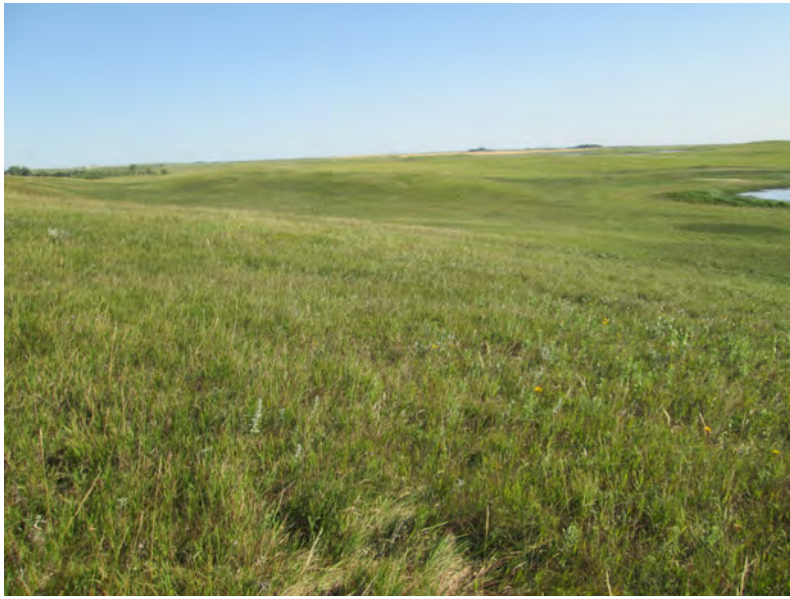


Photo 45. Facing North. View of hillsides surrounding the central portion of this tract, which were dominated by smooth brome with minor inclusions of porcupine grass.



Photo 46. Facing South. View of hillsides surrounding the central portion of this tract, which were dominated by smooth brome with minor inclusions of porcupine grass.



Photo 47. Facing Northeast. View of the flat portion of this tract, which was moderately to heavily grazed and dominated by smooth brome and western snowberry.



Photo 48. Facing South. View of row crops, present in the southern portion of this tract.



Photo 49. Facing West. This hillside had good forb diversity, but no bunchgrasses were present; smooth brome was the dominant grass species in this area.



Photo 50. Facing East/Northeast. View shows several low hills, which were dominated by smooth brome.



Photo 51. Facing Southwest. This hillside had good forb diversity, but no bunchgrasses were present; smooth brome was the dominant grass species in this area.



Photo 52. Facing Northwest. View of Community 26, a porcupine grass-dominated hillside with good forb diversity. Invasion from smooth brome was minimal in this community.



Photo 53. Facing West. General observation point in this tract. These hillsides were dominated by smooth brome and appeared moderately grazed.



Photo 54. Facing Northeast. General observation point in this tract. These hillsides were dominated by smooth brome and appeared moderately grazed.

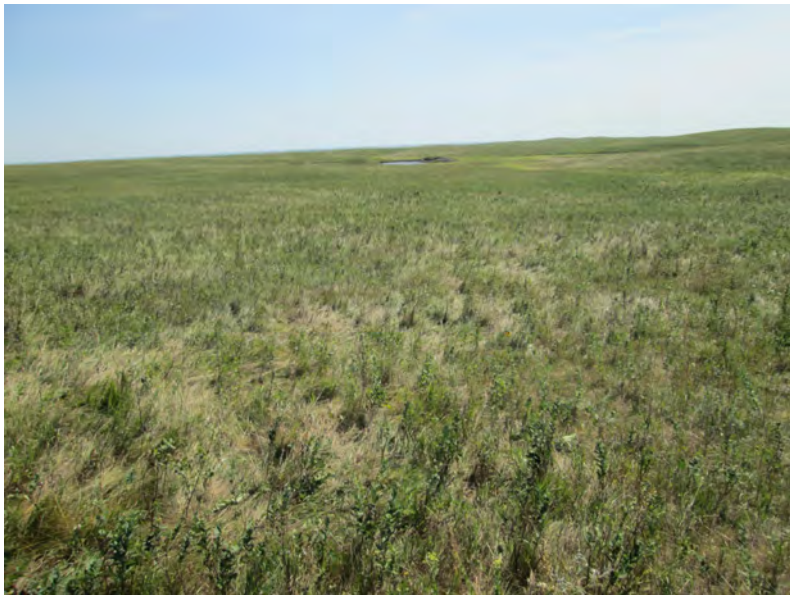


Photo 55. Facing East. View shows the typical grassland quality in this tract: heavily grazed smooth brome grassland with a high abundance of western snowberry.



Photo 56. Facing North. Another view of this tract. Note the dense smooth brome on the hillside, transitioning to dense western snowberry lower in the landscape.



Photo 57. Facing Northwest. View shows how western snowberry was even prevalent hilltops.



Photo 58. Facing North. General observation point in this tract. Note gentle hillsides and flat topography.



Photo 59. Facing East. General observation point in this tract. Note gentle hillsides and flat topography.

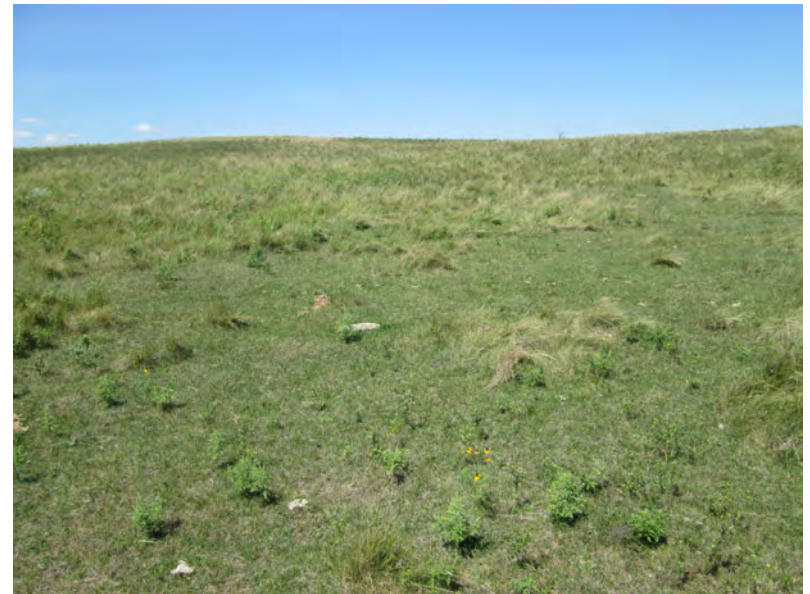


Photo 60. Facing North. View of the grassland quality in this tract. Note the heavy grazing and low abundance of native forb species. Smooth brome was prevalent in this tract.



Photo 61. Facing West. View of a little bluestem hillside near the northern edge of this tract. Native forb abundance was low and grazing appeared moderate to heavy.

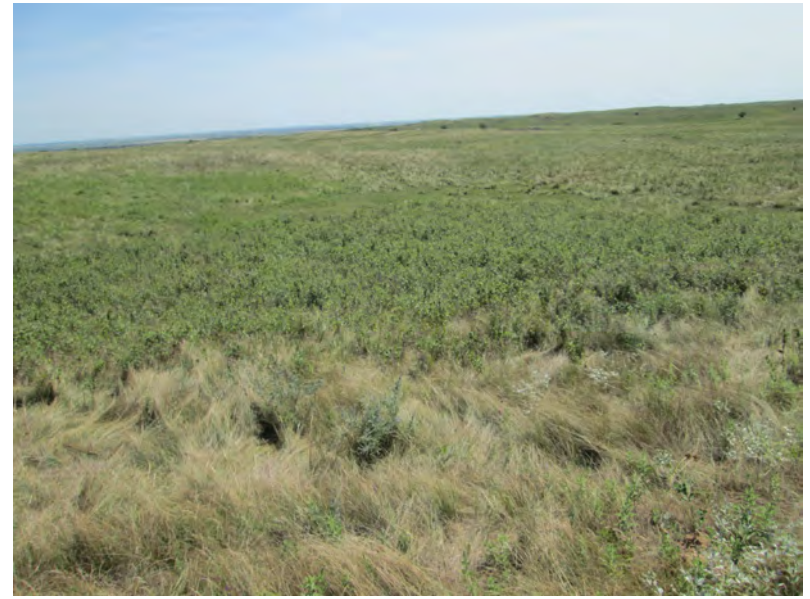


Photo 62. Facing Southeast. General observation point in this tract showing dense western snowberry.



Photo 63. Facing Northwest. Typical view in the eastern portion of this tract showing dense sweet clover.



Photo 64. Facing North/Northeast. View of the eastern portion of this tract showing evidence of early season haying.



Photo 65. Facing Northwest. View of Community 27, a little bluestem hillside with good native forb diversity. Some sweet clover was present in this community.



Photo 66. Facing South. View south through the remainder of this tract. Note the dense little bluestem in this community, with western snowberry and smooth brome to the south.



Photo 67. Facing Northeast. View of another little bluestem hillside in this tract. It did not appear to be potential habitat due to the prevalence of smooth brome and sweet clover.

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APPENDIX B. DATA SHEETS

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