

**NATIVE PRAIRIE SURVEY
WILTON IV WIND ENERGY CENTER
BURLEIGH COUNTY
NORTH DAKOTA**



Prepared for



Prepared by



TETRA TECH

September 2014

Executive Summary

Wilton Wind IV, LLC (Wilton IV) proposes to develop the Wilton IV Wind Energy Center, a 99.8 megawatt (MW) wind energy facility in Burleigh County, North Dakota (Wilton IV or Project). The Project is located on approximately 1,519 acres of private and state land in Canfield, Cromwell, Ecklund, Ghylin, Richmond, Rock Hill, and Trygg townships in Burleigh County, North Dakota (Figure 1). Although there are no federal or state regulations explicitly protecting native prairie, the North Dakota Game and Fish Department (NDGFD) and the U.S. Fish and Wildlife Service (USFWS) have highlighted the significance of native prairie in this region with respect to development in this region and have recommended avoiding areas of native prairie to the extent possible. Wilton IV is committed to environmental due diligence and contracted Tetra Tech, Inc. (Tetra Tech) to conduct a survey for native prairie.

Biologists conducted field surveys from June 24 through June 28, 2014, and September 3 through 6, 2014. Surveys were only conducted within the construction easement for the Project at the time of surveys; this included a corridor around the Project components in the site plans dated May 12, 2014, and August 20, 2014, respectively, for the June and September field survey efforts. The survey corridor presented in this report is based on the site plan dated August 20, 2014. Approximately 71 acres of the survey corridor in Ghylin Township was originally surveyed in 2011 for this Project between June 29 and August 8, 2011. The results of the 2011 surveys have been incorporated into this Wilton IV survey report. Additionally, Tetra Tech conducted a desktop review and determined that approximately 173 acres within the survey corridor had been recently plowed based on USDA (2014) Geographic Information System (GIS) data, and thus could not be native prairie; these areas, therefore, were not surveyed during the biologists' field visit. An additional 8 acres were identified as potential native prairie based on desktop review, but were not field verified. The 1,519-acre survey corridor discussed here includes the 1,267 acres surveyed in 2014, the 173 acres excluded from field surveys based on desktop review, the 8 acres of potential native prairie that were not field verified, and the 71 acres surveyed in 2011 that fell within the current survey corridor.

Based on field surveys and desktop review, the biologists classified 706 acres (46 percent of the survey corridor) as native prairie (i.e., native grassland) and 114 acres (7 percent of the survey corridor) as tame grassland (Figures 2.1 and 2.2). The remaining acreage consists primarily of agricultural croplands with a few residential homesteads and farmyards. Native prairie was distributed throughout the survey corridor (Figures 2.1 and 2.2).

The proposed turbine layout dated July 28, 2014 consists of 58 proposed wind turbines, and 8 additional alternate turbines, for a total of 66 turbines. Based on the turbine array dated July 28, 2014, 31 planned turbines and 7 alternate turbine locations would be placed within native prairie.

TABLE OF CONTENTS

Executive Summary 1
1. Introduction 1
2. Methods 2
3. Results 3
4. Discussion 4
5. References 5

TABLES

Table 1. Plant species observed in native prairie within the Wilton IV Wind Energy Center..... 8
Table 2. Plant species observed in tame grassland within the Wilton IV Wind Energy Center... 9

FIGURES

Figure 1. Project Location10
Figures 2.1 and 2.2. Native Prairie Survey Results11

APPENDICES

Appendix A. Turbines located within native prairie and tame grassland at the Wilton IV Wind Energy Center.....13
Appendix B. Site photographs.....14

1. Introduction

Wilton Wind IV, LLC (Wilton IV) proposes to develop the Wilton IV Wind Energy Center, a 99.8 megawatt (MW) wind energy facility in Burleigh County, North Dakota (Project). The Project is located on approximately 1,519 acres of private and state land in Canfield, Cromwell, Ecklund, Ghylin, Richmond, Rock Hill, and Trygg townships in Burleigh County, North Dakota (Figure 1). The Project encompasses land that consists primarily of agricultural crops and grasslands classified as tame grassland or native prairie. Although there are no federal or state regulations explicitly protecting native prairie, the North Dakota Game and Fish Department (NDGFD) and the U.S. Fish and Wildlife Service (USFWS) have highlighted the significance of native prairie in this region with respect to development in this region and have recommended avoiding areas of native prairie to the extent possible. In their letters, the USFWS has indicated native prairie is a habitat type of high value and recommended avoiding this habitat type in North Dakota.

The Project is located in the Missouri Coteau region of the Northwestern Glaciated Plains (Bryce et al. 1998). The Northwestern Glaciated Plains ecoregion marks the westernmost extent of continental glaciation and is characterized by significant surface irregularity and high concentrations of wetlands. The wetlands of the Missouri Coteau and the neighboring prairie pothole region are the major waterfowl production areas in North America. Land use on the Coteau is a mixture of tilled agriculture in flatter areas and grazing lands on steeper slopes. Native prairie, characterized by dominant species such as western wheatgrass (*Agropyron smithii*), big bluestem (*Andropogon gerardii*), needle-and-thread grass (*Stipa comata*), and green needlegrass (*Stipa viridula*), remains on unbroken areas.

Native prairie is untilled grassland dominated by non-introduced species, or previously tilled grassland that has reverted back to native vegetation (Appendix B: Photos 1-5). In contrast, tame grassland (e.g., pasturelands) is comprised primarily of non-native species. Native prairie further differs from tame grassland in that native prairie is found primarily on unbroken soil whereas tame grassland occurs on tilled soils that have been planted. Native prairie is found throughout North Dakota; however, since settlement began in the 1800s, North Dakota has lost approximately 80 percent of its native prairie, with most remaining native prairie being found in the arid western portions of the state (North Dakota Parks and Recreation Department undated).

Native prairie may be utilized by people in several ways. Most native prairie in private holdings is used for cattle ranching and is managed as rangeland. On rangeland, the soil is not tilled and fire is often used to suppress the growth of woody species (Hagen et al. 2005); other forms of management (e.g., seeding, fertilizing) are less common. Native prairie may also be placed in conservation easements or held privately or publicly as grassland preserves or wildlife refuges. Preserves and refuges can be difficult to visually distinguish from rangeland because the same types of management (i.e., fire and grazing) are often applied.

Native prairie serves as a vital ecological resource by improving water quality, providing erosion control, and supporting a diverse population of plants and animals; however, due to the fertile soil and predominantly flat topography of native prairie, many areas of native prairie have been converted to agricultural lands. The widespread loss of native prairie makes it an ecosystem of conservation concern and one of the most endangered ecosystems in North America (Samson et al. 2004). Additional factors that have altered the ecology of prairie ecosystems include colonization of non-native plant species, loss of native grazers (e.g., bison), altered fire regime, and fragmentation in the form of urban development. The lack of fire coupled with overgrazing can reduce the value of native prairie to wildlife because these factors may result in the

conversion of prairie to shrubland or woodland, which may not be utilized by grassland species (Grant et al. 2004, Reinking 2006).

Native prairie serves as vital habitat for the Dakota skipper (*Hesperia dacotae*), a species of butterfly that is currently proposed for listing under the Endangered Species Act (ESA; USFWS 2013a). The USFWS proposed to designate critical habitat for the Dakota skipper on October 24, 2013 (USFWS 2013b). The closest proposed designated critical habitat to the Project is approximately 32 miles to the northeast (USFWS 2013b). The FWS proposed listing the Dakota skipper because, although its historic range once consisted of vast, unfragmented native prairie in north-central U.S. and south-central Canada, its current range is now limited to scattered remnants of high quality native prairie in Minnesota, North Dakota, South Dakota, and Saskatchewan and Manitoba, Canada (USFWS 2013a). The Dakota skipper population has declined due to sensitivity to disturbances, such as grazing and agriculture.

One additional concern about the conversion of native prairie is the potential impact on breeding migratory waterfowl. Native prairie provides suitable stopover habitat during migration and upland nesting cover for such waterfowl species as northern pintail (*Anas acuta*), blue-winged teal (*Anas discors*), and mallard (*Anas platyrhynchos*). The prairie region of the northern Great Plains is one of the most important areas for duck reproduction in North America (Samson et al. 1998, Jones-Farrand et al. 2007). The region produces, on average, 50 percent of the primary species of game ducks on the continent (Smith 1995). Twelve of the 34 species of North American ducks are common breeders in the region (Samson et al. 1998, Jones-Farrand et al. 2007). For seven species — mallard, gadwall (*Anas strepera*), blue-winged teal, northern shoveler (*Anas clypeata*), northern pintail, redhead (*Aythya americana*), and canvasback (*Aythya valisineria*) — the prairie region accounts for more than 60 percent of the breeding population (Smith 1995). The region is also a major migration corridor during fall and spring for other ducks, geese, shorebirds and other waterbirds (Skagen and Knopf 1994, Samson et al. 1998, Jones-Farrand et al. 2007). Although construction of a wind energy facility differs from wholesale conversion of grassland to agricultural croplands, disturbances of native prairie, particularly native prairie that surrounds permanent or semi-permanent wetlands (prairie potholes), have the potential to affect these important breeding and migratory stopover areas.

Wilton IV is committed to environmental due diligence and contracted Tetra Tech, Inc. (Tetra Tech) to conduct a native prairie survey for the Project.

2. Methods

Biologists conducted field surveys from June 24 through June 28, 2014, and September 3 through 6, 2014. Surveys were only conducted within the construction easement for the Project at the time of surveys; this included a corridor around the Project components in the site plans dated May 12, 2014 and August 20, 2014, respectively, for the June and September field survey efforts. The survey corridor presented in this report is based on the site plan dated August 20, 2014. Approximately 71 acres of the survey corridor in Ghylin Township was originally surveyed in 2011 for this Project between June 29 and August 8, 2011. The results of the 2011 surveys have been incorporated into this Wilton IV survey report. Additionally, Tetra Tech conducted a desktop review and determined that approximately 173 acres within the survey corridor had been recently plowed based on USDA (2014) GIS data, and thus could not be native prairie; these areas, therefore, were not surveyed during the biologists' field visits. An additional 8 acres were identified as potential native prairie based on desktop review, but were not field verified. The 1,519-acre survey corridor discussed here includes the 1,267 acres surveyed in 2014, the 173 acres excluded from field surveys based on desktop review, the 8 acres of potential native

prairie that were not field verified, and the 71 acres surveyed in 2011 that fell within the current survey corridor.

In order to systematically identify areas of native prairie, the field biologists visually assessed the survey corridor from the road by making roadside stops, and conducted walking surveys within the habitat to delineate and describe all grassland habitat. In many areas, one square-mile sections of land were bordered by county roads or section-line two-track trails, which made the habitat easy to evaluate. Roadside stops were made when needed (e.g., change in habitat, change in land use, or limited view), which was generally once each quarter-mile. Whenever possible due to access, walking surveys were done within representative areas of each grassland parcel. Additionally, the biologists walked to higher vantage points where needed to assess breaks in the landscape and potential changes in land use/land cover. Large contiguous tracts of grassland that could not be identified from roads were accessed on foot, resulting in almost complete coverage of the survey corridor.

When grassland was encountered during field surveys, the field biologists determined if the grassland was native prairie or tame grassland. Native prairie was defined as that which had never been tilled ("broken") or planted to crops or introduced plants. Tame grassland was defined as grassland created by planting native or non-native plant species (other than cropland or hay). The field biologists determined grassland type based on several visual cues including the following: dominant visible plant species, particularly the proportion of native to non-native dominant species in core areas away from fence lines; frequency of typical native prairie species that are not as common or not present at all in tilled and seeded pastureland compared to native prairie; topography (feasibility of being tilled); presence of piles of rocks (which indicate clearing of rock from an area in preparation for cultivation); and vegetation obviously growing in rows (indicating prior tilling and seeding).

The biologists also noted any obvious uses of the grassland parcel and the predominant type of grassland community (herbaceous-perennial; herbaceous-annual; woody encroached). Areas of presumably unbroken soil that retained native prairie plants were classified as native prairie, and may have included rangelands, conservation easements, or other types of reserves. Areas that appeared to have been tilled and were comprised of mostly non-native species were classified as tame grassland. Two common land use practices sometimes made these distinctions difficult in the field. Overseeding involves directly seeding introduced plants to native prairie sod (without completely breaking/tilling the soil); parcels that appeared to have been overseeded were considered native prairie. Haying native prairie or tame grassland is also common; hayland that was dominated by grasses was considered tame grassland or native prairie as appropriate, whereas hayland obviously planted to legumes such as alfalfa (*Medicago sativa*) or sweetclover (*Melilotus* sp.) were not considered grassland.

The field biologists recorded grazing intensity by estimating the percentage of vegetation grazed in broad classes: 0-25 percent (light), 25-50 percent (moderate), 50-75 percent (heavy), and 75-100 percent (overgrazed). The habitat types were then delineated by the field biologist on aerial photographs of each section of land; the locations of grassland types were digitized from the aerial photographs using ArcGIS 10.2.1.

3. Results

Overall, 706 acres (46 percent of the survey corridor) were classified as native prairie (i.e., native grassland), and 114 acres (7 percent of the survey corridor) were classified as tame

grassland (Figures 2.1 and 2.2). Native prairie was distributed throughout the survey corridor (Figures 2.1 and 2.2).

A total of 12 grass, 5 tree and shrub, and 42 forb species were identified in patches of native prairie within the survey corridor (Table 1). Two grass, no tree and shrub, and 7 forb species were identified in tame grassland within the survey corridor (Table 2). None of the plant species detected within the survey corridor are listed as federally endangered or threatened.

The North Dakota Department of Agriculture (NDDA) defines two categories of invasive species: 1) “noxious weeds,” any plants that have been designated as injurious to public health, livestock, land or other property, and 2) “invasive species,” species that are non-native and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (NDDA 2014). One species listed as a North Dakota State Noxious Weed was found within the survey corridor: Canada thistle (*Cirsium arvense*; NDDA 2014). Thirty-seven species listed as North Dakota State Invasive Species for Burleigh County were found within the survey corridor (EDDMapS 2014; Tables 1 and 2).

The proposed turbine layout dated July 28, 2014 consists of 58¹ proposed and 8 alternate wind turbine locations, for a total of 66 turbines. Based on the turbine array dated July 28, 2014, 31 turbines and 7 alternate turbine locations would be located within native prairie, and 7 turbines (including 1 alternate turbine) would be located within tame grassland. Turbines found in native and tame grasslands are listed in Appendix A.

4. Discussion

Native Prairie is an ecosystem of conservation concern (Samson et al. 2004) and the NDGFD and the USFWS have recommended avoiding areas of native prairie to the extent possible. Native prairie comprises 46 percent of the survey corridor, and under the current configuration, 53 percent of the 58 planned turbines (31 turbines) would be located within native prairie. The USFWS has recommended that:

High-value wildlife habitat types in North Dakota include native prairie, wetlands, wooded draws and riparian forests. We recommend that construction of wind towers and appurtenant facilities in these habitat types be avoided whenever possible.

Additionally the NDGFD has recommended that:

Work within native prairie be avoided to the extent possible. This could include micro-siting turbines onto adjacent previously disturbed land, locating access roads on existing section line trails rather than across undisturbed native prairie, etc.

Maintaining unfragmented areas of native prairie in the survey corridor may be of greatest benefit to wildlife in general. Raptors, such as short-eared owl (*Asio flammeus*) and ferruginous hawk (*Buteo regalis*), benefit from large areas of prairie for nesting (Blair and Schitoskey 1982, Holt and Leasure 1993), as do waterfowl (Klett et al. 1988). Large expanses of native prairie provide suitable nesting habitat for songbirds, and lower rates of brood parasitism by brown-headed cowbirds have been observed within larger tracts of prairie (Shaffer et al. 2003, Davis et al. 2006). Although some mammal species such as deer thrive in altered landscapes, others, such as swift fox, may require areas of unfragmented native prairie (Kamler et al. 2003). Areas

¹ Includes 53 GE 1.715 MW xle and 5 GE 1.79 MW xle turbines.

of native prairie that also contain permanent or semi-permanent wetlands (prairie potholes) or riverine drainages could provide important breeding and stopover habitat for various waterfowl and shorebird species. Native prairie also serves as vital habitat for the Dakota skipper (USFWS 2013a).

One noxious weed was located within the survey corridor, including in native prairie and/or tame grassland. North Dakota law (NDCC § 63-01.1-01; NDCC 2003) requires North Dakota landowners and other persons in charge of or in possession of land to eradicate or control the spread of noxious weeds. County and city weed boards enforce the existing statute through inspections, issuance of notice to control and follow-up re-inspections. If unhandled by the landowner or other persons in charge of or in possession of infested land, the weed boards have the authority to control weeds on the land in question and charge the landowner the cost of control through levying additional real estate taxes upon the landowner the following year (North Dakota Weed Control Association 2014). Depending upon their management goals, the landowners are responsible for invasive species management. Construction activities within the survey corridor could spread noxious weeds into areas currently not occupied; therefore, coordination with local agencies is recommended in order to develop best management practices aimed at preventing the spread of noxious weeds and invasive species.

5. References

- Blair, C.L., and F. Schitoskey Jr. 1982. Breeding biology and diet of the Ferruginous Hawk in South Dakota. *Wilson Bulletin* 94:46-54.
- Bryce, S., J.M. Omernik, D.E. Pater, M. Ulmer, J. Schaar, J. Freeouf, R. Johnson, P. Kuck, and S.H. Azevedo. 1998. Ecoregions of North Dakota and South Dakota. Jamestown, ND: Northern Prairie Wildlife Research Center. Available online at: <http://www.npwr.usgs.gov/resource/habitat/ndsdeco/index.htm>. (Version 30NOV1998).
- Davis, S.K., R.M. Brigham, T.L. Shaffer, and P.C. James. 2006. Mixed-grass passerines exhibit weak and variable responses to patch size. *Auk* 123:807-821.
- EDDMapS. 2014. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Available online at <http://www.eddmaps.org/>; last accessed July 29, 2014.
- Grant, T.A., E. Madden, and G.B. Berkey. 2004. Tree and shrub invasion in northern mixed-grass prairie: Implications for breeding grassland birds. *Wilson Bulletin* 32:807-818.
- Hagen, S.K., P.T. Isakson, and S.R. Dyke. 2005. North Dakota Comprehensive Wildlife Conservation Strategy. North Dakota Game and Fish Department. Bismarck, ND. <http://www.gf.nd.gov/conservation/cwcs.html>.
- Holt, D.W., and S.M. Leasure. 1993. Short-eared Owl (*Asio flammeus*). In *The Birds of North America*, No. 62 (A. Poole and F. Gill, editors). The Birds of North America, Inc., Philadelphia, PA
- Jones-Farrand, D.T., D.H. Johnson, L.W. Burger, Jr., and M.R. Ryan. 2007. Grassland Establishment for Wildlife Conservation. Pages 25-43 in *Fish and Wildlife Response to Farmland Conservation Practices*. Technical Review 07-1.

- Kamler, J.F., W.B. Ballard, E.B. Fish, P.R. Lemons, K. Mote, and C.C. Perchellet. 2003. Habitat use, home ranges, and survival of swift foxes in a fragmented landscape: conservation implications. *Journal of Mammalogy* 84:989-995.
- Klett, A.T., T.L. Shaffer, and D.H. Johnson. 1988. Duck nest success in the prairie pothole region. *Journal of Wildlife Management* 52:431-440.
- North Dakota Department of Agriculture (NDDA). 2014. Noxious Weeds. Available at <http://www.nd.gov/ndda/weed>. Accessed July 29, 2014.
- North Dakota Century Code (NDCC). 2003. *Noxious weed control*. State of North Dakota. Available online <http://www.legis.nd.gov/cencode/t04-1c47.pdf>. Accessed July 29, 2014.
- North Dakota Parks and Recreation Department. No Date. North Dakota prairie: our natural heritage. North Dakota Parks and Recreation Department, U.S. Department of the Interior, U.S. Fish and Wildlife Service. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/habitat/heritage/index.htm> (Version 05MAY99). Accessed July 29, 2014.
- North Dakota Weed Control Association. 2014. North Dakota Noxious Weed Law enforcement procedures. Available online at <http://ndweeds.homestead.com/>. Accessed July 29, 2014.
- Reinking, D.L. 2006. Fire in the tallgrass prairie – Balance of burning for the birds. *Birding* Jan/Feb: 33-38.
- Samson, F.B., F.L. Knopf, and W.R. Ostlie. 2004. Great Plains ecosystems: Past, present and future. *Wildlife Society Bulletin* 32:6-15.
- Samson, F.B., F.L. Knopf, and W.R. Ostlie. 1998. Regional trends of biological resources--grasslands. Pages 437-472 in M. J. Mac, P. A. Opler, C. E. Puckett Haecker, and P. D. Doran, editors. *Status and trends of the nation's biological resources*. Volume 2. U.S. Department of the Interior, Geological Survey, Reston, Virginia.
- Shaffer, J.A., C.M. Goldade, M.F. Dinkins, D.H. Johnson, L.D. Igl, and B.R. Euliss. 2003. Brown-headed Cowbirds in grasslands: Their habitats, hosts, and response to management. *Prairie Naturalist* 35:145-186.
- Skagen, S.K., and F.L. Knopf. 1994. Migrating shorebirds and habitat dynamics at a prairie wetland complex. *Wilson Bulletin* 106:91-105.
- Smith, G.W. 1995. A critical review of aerial and ground surveys of breeding waterfowl in North America. National Biological Service Biological Science Report 5.
- USDA (US Department of Agriculture). 2014. National Agricultural Statistics Service Cropland Data Layer for 2005-2013. Available at <http://nassgeodata.gmu.edu/CropScape/> Accessed June 2014.
- FWS (US Fish and Wildlife Service). 2013a. Threatened Status for Dakota Skipper and Endangered Status for Poweshiek Skipperling; Proposed Rule. *Federal Register* 78(206): 63573-63625

FWS. 2013b. Designation of Critical Habitat for Dakota Skipper and Poweshiek Skipperling; Proposed Rule. Federal Register 78(206): 63625-63745.

Tetra Tech personnel who prepared/reviewed report:

Angela Lortie	June 24-28, 2014
Kathy Bellrichard	September 3-6, 2014
Field Support	Date
Amy Bensted	July 29, 2014, September 26, 2014
Report Author	Date
Anne-Marie Griger, AICP	August 1, 2014, September 26, 2014
Project Manager	Date
Karl Kosciuch, Ph.D.	July 30, 2014
Technical Review	Date
Kristina Dick	July 29, 2014, September 26, 2014
GIS Technician	Date

Table 1. Plant species observed in native prairie within the Wilton IV Wind Energy Center.

Forbs			
Scientific name	Common name	Scientific name	Common name
<i>Achillea millefolium</i> †	common yarrow†	<i>Gaura coccinea</i> †	scarlet beeblossom†
<i>Agropyron cristatum</i> †	crested wheatgrass†	<i>Gaura</i> spp.	beeblossom
<i>Ambrosia artemisiifolia</i> †	annual ragweed†	<i>Geum triflorum</i>	old man's whiskers
<i>Amorpha canescens</i> †	pursh leadplant†	<i>Glycyrrhiza lepidota</i> †	American licorice†
<i>Anemone canadensis</i>	Canadian anemone	<i>Liatris punctata</i> †	blazing star†
<i>Antennaria neglecta</i> †	field pussytoes†	<i>Medicago sativa</i> †	alfalfa†
<i>Artemisia frigida</i> †	prairie sagewort†	<i>Melilotus officinalis</i> †	sweetclover†
<i>Atriplex patula</i> †	spear saltbush†	<i>Oligoneuron rigidum</i> †	Stiff goldenrod†
<i>Asclepias ovalifolia</i>	oval-leaf milkweed	<i>Oxytropis lamberti</i> †	purple locoweed†
<i>Astragalus</i> spp.	milkvetch	<i>Penstemon</i> spp.	beardlongue
<i>Carex</i> spp.	sedge	<i>Potentilla</i> spp. †	cinquefoil†
<i>Cerastium</i> spp.	mouse-ear chickweed	<i>Psoralea argophylla</i>	silverleaf Indian breadroot
<i>Cirsium arvense</i> †*	Canada thistle†*	<i>Rumex</i> spp. †	dock†
<i>Dalea purpurea</i>	purple prairie clover	<i>Solidago</i> spp. †	goldenrod†
<i>Descurainia</i> spp.	tansymustard	<i>Sphaeralcea coccinea</i> †	scarlet globemallow†
<i>Echinacea</i> spp. †	purple coneflower†	<i>Sphaeralcea</i> sp.	globemallow
<i>Elaeagnus commutata</i>	silverberry	<i>Tragopogon dubius</i> †	yellow salsify†
<i>Erigeron annuus</i> †	daisy fleabane†	<i>Trifolium repens</i> †	white clover†
<i>Erigeron</i> spp.	fleabane	<i>Vicia americana</i>	American vetch
<i>Galium</i> spp.	bedstraw	<i>Vicia</i> spp.	vetch
<i>Gaillardia aristata</i>	blanketflower	<i>Zigadenus elegans</i> †	mountain deathcamas†
Grasses			
Scientific name	Common name	Scientific name	Common name
<i>Agrostis</i> spp.	bentgrass	<i>Schizachyrium scoparium</i> †	little bluestem†
<i>Bromus inermis</i> †	smooth brome†	<i>Stipa (Hesperostipa) comata</i> †	needle-and-thread grass†
<i>Festuca arundinacea</i> †	tall fescue †	<i>Stipa (Hesperostipa) coronata</i>	giant ricegrass
<i>Hordeum jubatum</i> †	foxtail barley†	<i>Stipa (Hesperostipa) spartea</i> †	porcupine grass†
<i>Koeleria macrantha</i>	prairie Junegrass	<i>Stipa (Hesperostipa) viridula</i>	green needlegrass
<i>Poa pratensis</i> †	Kentucky bluegrass†	<i>Stipa (Hesperostipa) spp.</i>	N/A
Trees and Shrubs			
Scientific name	Common name	Scientific name	Common name
<i>Artemisia ludoviciana</i> †	White sagebrush†	<i>Symphoricarpos occidentalis</i> †	western snowberry†
<i>Juniperus horizontalis</i>	creeping juniper	<i>Rosa carolina</i>	Carolina rose
<i>Symphoricarpos albus</i> †	common snowberry†		

- † Indicates species considered invasive in Burleigh County, North Dakota (EDDMapS 2014).

- * Indicates species found on the North Dakota's noxious and troublesome weed list (NDDA 2014).

- Nomenclature follows Great Plains Flora Association. 1986. Flora of the Great Plains. University Press of Kansas.

Table 2. Plant species observed in tame grassland within the Wilton IV Wind Energy Center.

Forbs			
Scientific name	Common name	Scientific name	Common name
<i>Achillea millefolium</i> †	common yarrow†	<i>Melilotus officinalis</i> †	sweetclover†
<i>Artemisia frigida</i> †	prairie sagewort†	<i>Psoralea argophylla</i>	silverleaf Indian breadroot
<i>Medicago lupulina</i> †	black medick†	<i>Vicia</i> spp.	vetch
<i>Medicago sativa</i> †	alfalfa†		
Grasses			
Scientific name	Common name	Scientific name	Common name
<i>Bromus inermis</i> †	smooth brome†	<i>Poa pratensis</i>	Kentucky bluegrass

- † Indicates species considered invasive in Burleigh County, North Dakota (EDDMapS 2014).

- No species found are on the North Dakota's noxious and troublesome weed list (NDDA 2014). Nomenclature follows Great

- Plains Flora Association. 1986. Flora of the Great Plains. University Press of Kansas.

Figure 1

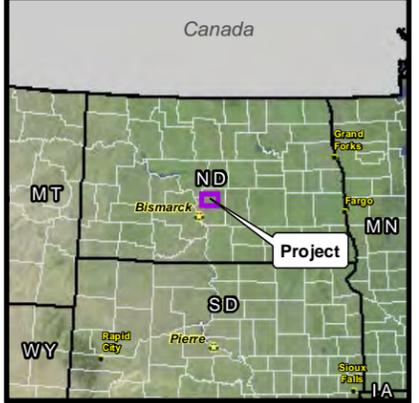
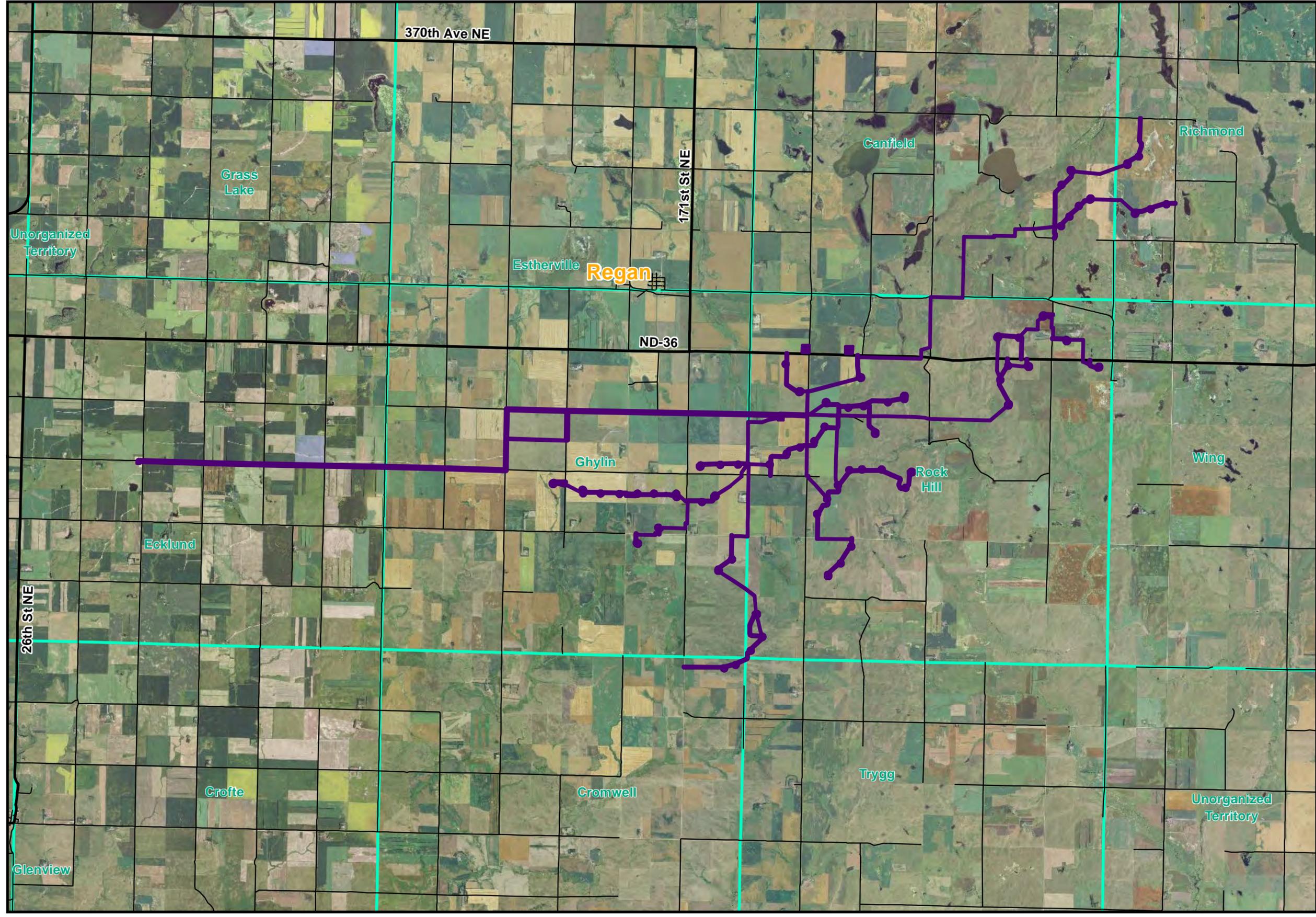
Wilton IV Wind Energy Center



Project Location

Burleigh County, ND
September 2014

-  Survey Corridor
-  Civil Township
-  City/Town
-  Local Road



P:\GIS_PROJECTS\NextEra\Wilton_IV\MapDocs\Native_Prairie\2014\NPS_Report\NEER_WiltonIV_Figure1_ProjectOverview_111171_20140930.mxd - Last Saved 9/23/2014

Figure 2.1

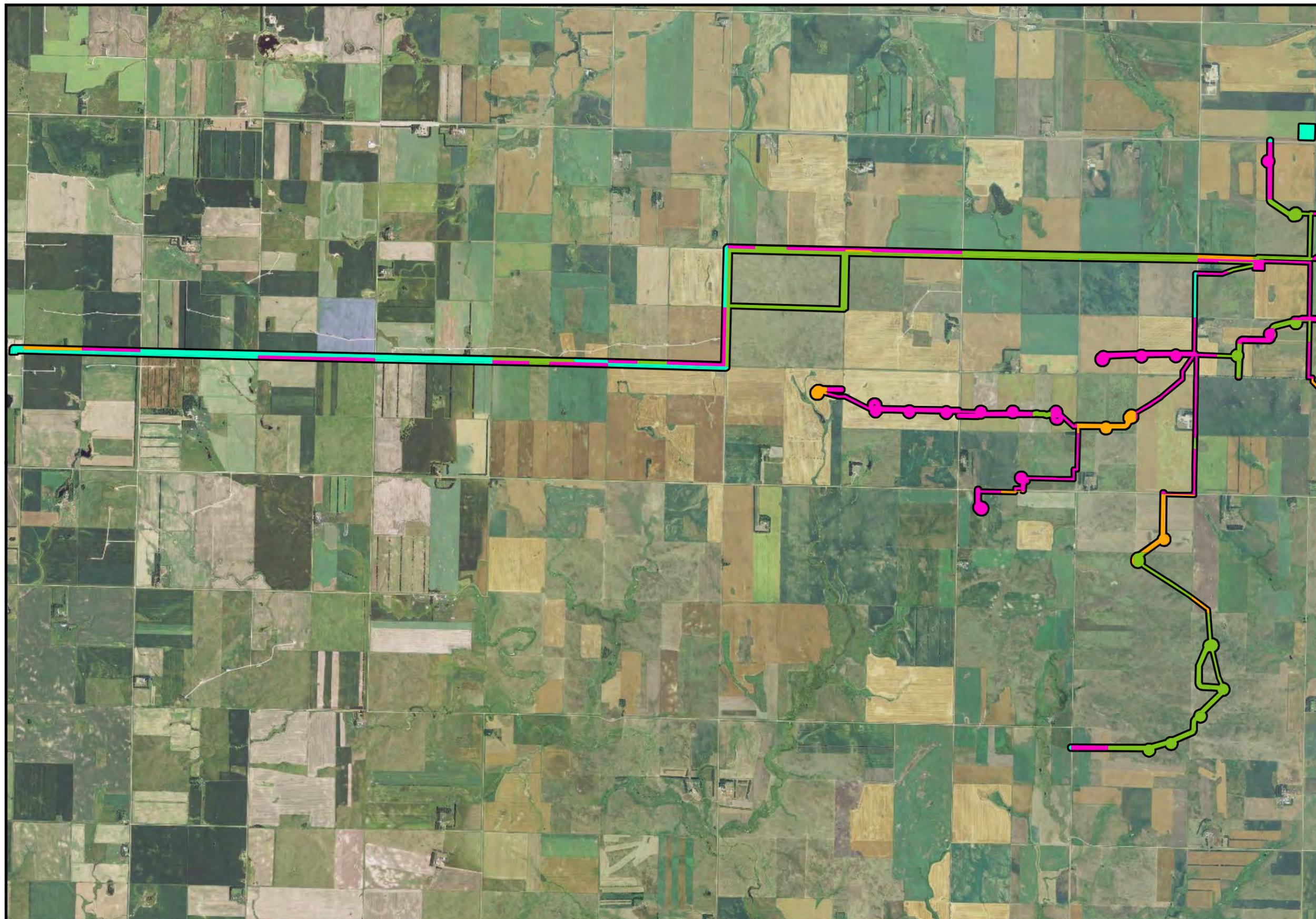
Wilton IV Wind Energy Center



Native Prairie Survey Results

Burleigh County, ND
September 2014

-  Survey Corridor
- Wilton IV Field Survey Data**
-  Native Grassland
-  Tame Grassland
-  Hay or Other Cropland
-  Other
-  Not native prairie based on desktop review
-  Potential native prairie based on desktop review



1:52,000 WGS84 UTM 14

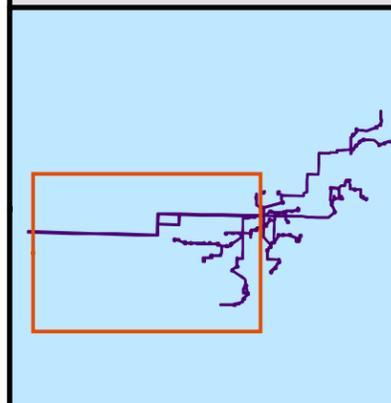


Figure 2.2

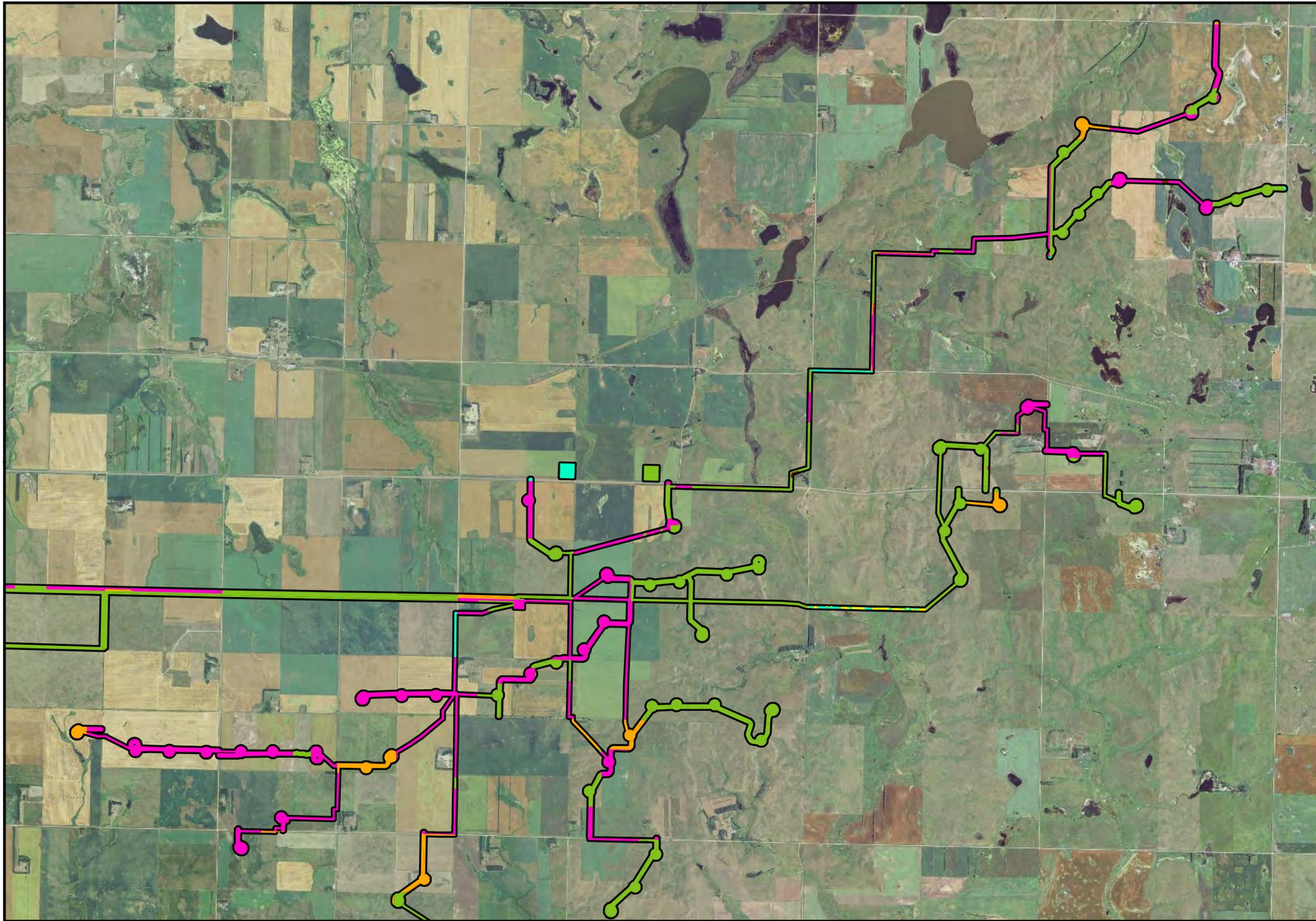
Wilton IV Wind Energy Center



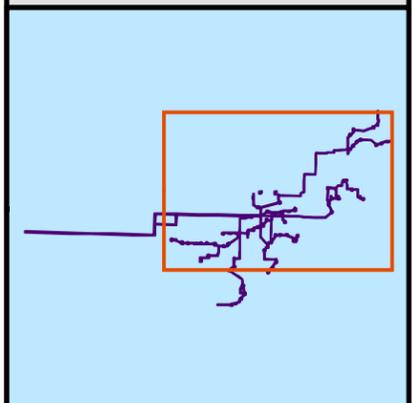
Native Prairie Survey Results

Burleigh County, ND
September 2014

-  Survey Corridor
- Wilton IV Field Survey Data**
-  Native Grassland
-  Tame Grassland
-  Hay or Other Cropland
-  Other
-  Not native prairie based on desktop review
-  Potential native prairie based on desktop review



1:52,000 WGS84 UTM 14



Appendix A. Turbines located within native prairie and tame grassland at the Wilton IV Wind Energy Center.

Table A-1: Turbines on Native Grassland		
Turbine ID	Easting	Northing
16	387147	5219099
18	387952	5219548
21	388696	5216175
22	389032	5216477
23	389316	5216924
24	388405	5217786
27	389265	5218949
28	389600	5218968
29	390122	5218967
3	385786	5216316
30	390761	5218483
31	390894	5218884
33	387925	5221023
35	389236	5220605
36	389542	5221416
37	389645	5220645
38	389955	5219949
39	390289	5220749
40	390727	5220834
41	393503	5220698
42	393274	5221341
44	393221	5222494
45	393769	5222459
48	395876	5221668
49	394892	5225417
50	395114	5225672
51	395364	5225953
53	394906	5226514
55	396656	5227082
56	396960	5227265
58	397693	5225999
Alt2	393485	5221717
Alt3	397271	5225869
Alt4	386770	5215127
Alt5	385938	5213698
Alt6	386242	5213788
Alt7	386643	5214163
Alt8	386954	5214529

Table A-2: Turbines on Tame Grassland		
Turbine ID	Easting	Northing
4	386144	5216582
11	385348	5218107
12	385673	5218250
26	388961	5218552
Alt1	381403	5218612
43	394007	5221710
54	395175	5226878

Appendix B. Site photographs



Photo 1. Native Prairie, view west.

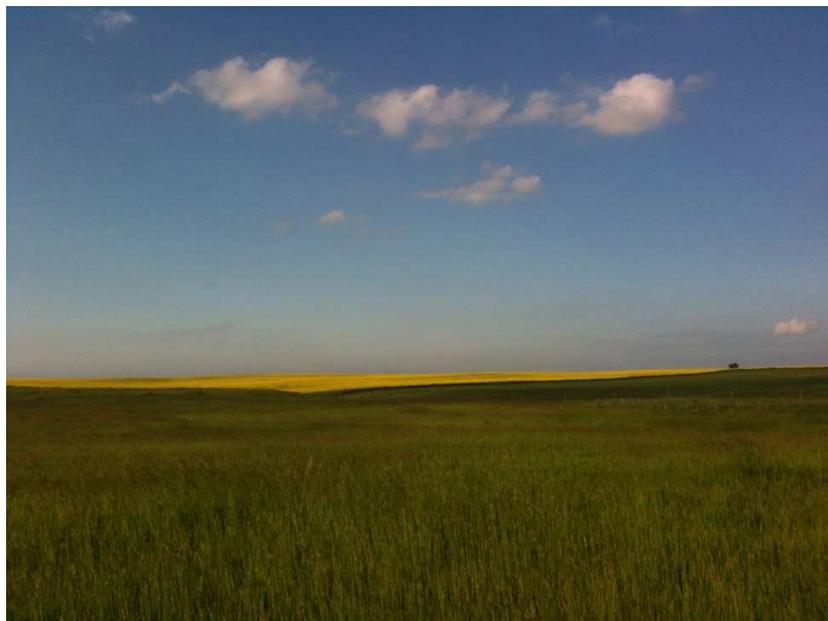


Photo 2. Native Prairie, view northeast, crop in background.



Photo 3. Native Prairie in foreground, crops in background.



Photo 4. Typical Native Prairie, view north.



Photo 5. Native Prairie, view east.