APPENDIX C - PHOTOGRAPH LOG

Photograph C-1: View of Sample Plot (SP)-001 in emergent (PEM) wetland (W)-001, facing east.

Photograph C-2: View of SP-002, an upland sample plot adjacent to W-001, facing north.

Photograph C-3: View of SP-003 in forested (PFO) W-002, facing east.

Photograph C-4: View of SP-004, an upland sample plot adjacent to W-002, facing west.

Photograph C-5: View of SP-005 in PEM W-003, facing south.

Photograph C-6: View of SP-006, an upland sample plot adjacent to W-003, facing south.

Photograph C-7: View of SP-007 in PEM W-004, facing east.

Photograph C-8: View of SP-008, an upland sample plot adjacent to W-004, facing east.

Photograph C-9: View of SP-009 in PEM W-005, facing east.

Photograph C-10: View of SP-010, an upland sample plot adjacent to W-005, facing south.

Photograph C-11: View of upland SP-011, facing south.

Photograph C-12: View of PEM W-016, facing west.

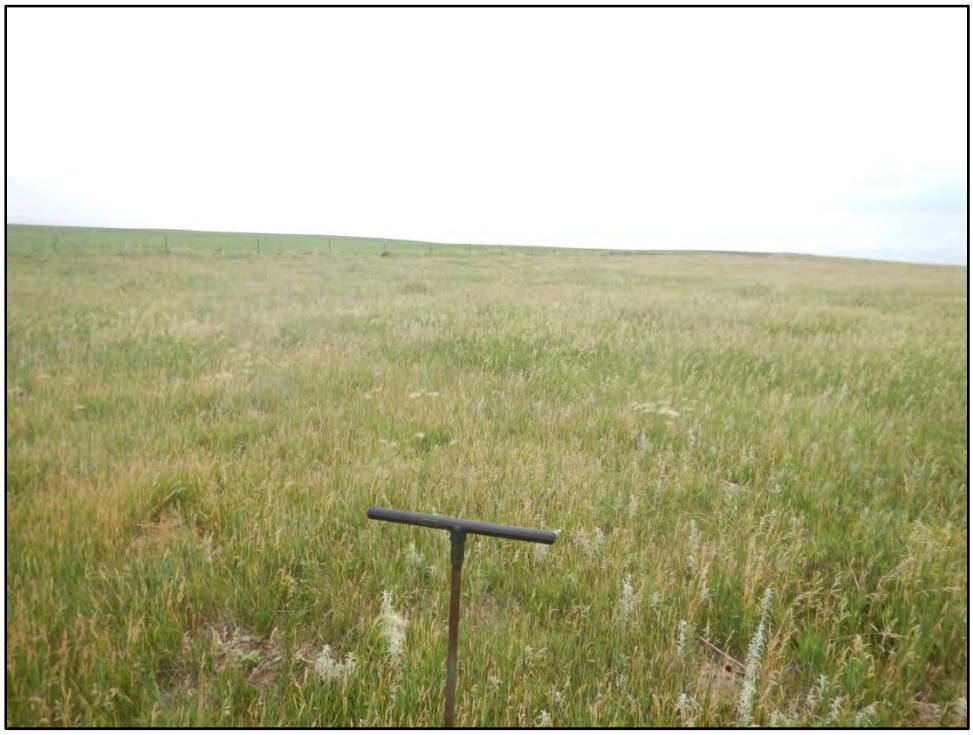
Photograph C-13: View of upland SP-501, facing south.

Photograph C-14: View of upland SP-502, facing north.

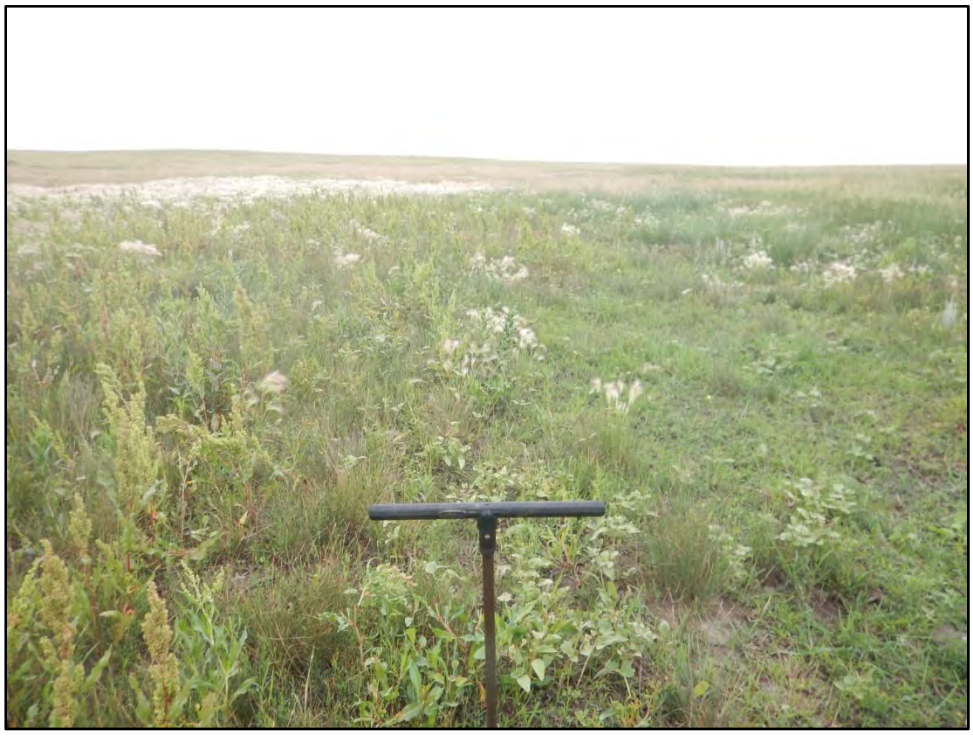
Photograph C-15: View of SP-503 in PEM W-501, facing north.

Photograph C-16: View of SP-504, an upland sample plot adjacent to W-501, facing east.

Photograph C-17: View of upland SP-505, facing west.

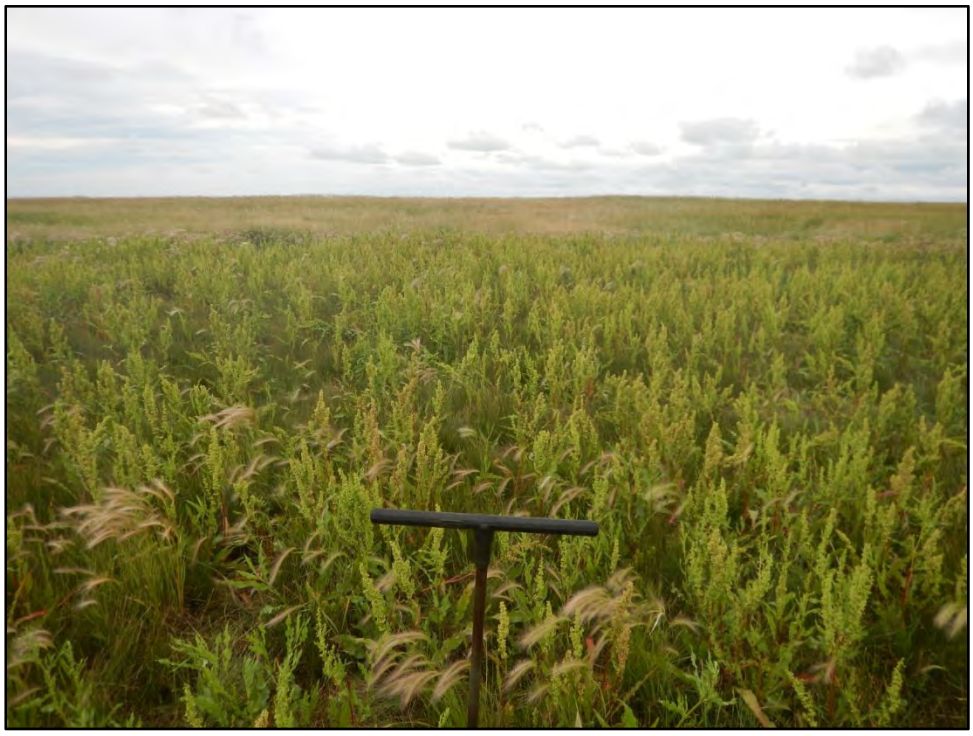


Photograph C-18: View of upland SP-515, facing south.



Photograph C-19: View of SP-516 in PEM W-507, facing north.

Photograph C-20: View of SP-517, an upland sample plot adjacent to W-507 and W-508, facing north.



Photograph C-21: View of SP-518 in PEM W-508, facing north.

Photograph C-22: View of upland SP-519, facing west.

Photograph C-23: View of SP-522 in PEM W-510, facing east.

Photograph C-24: View of SP-532 in PEM W-515, facing north.

Photograph C-25: View of palustrine unconsolidated bottom (PUB) W-516, facing north.

Photograph C-26: View of SP-533 in PEM W-517, facing south.

Photograph C-27: View of SP-534, an upland sample plot adjacent to W-517, facing west.

Photograph C-28: View of upland SP-535, facing north.

Photograph C-29: View of SP-536 in PEM W-518, facing west.

Photograph C-30: View of SP-537, an upland sample plot adjacent to W-518, facing east.

Photograph C-31: View of SP-538 in PEM W-520, facing west.

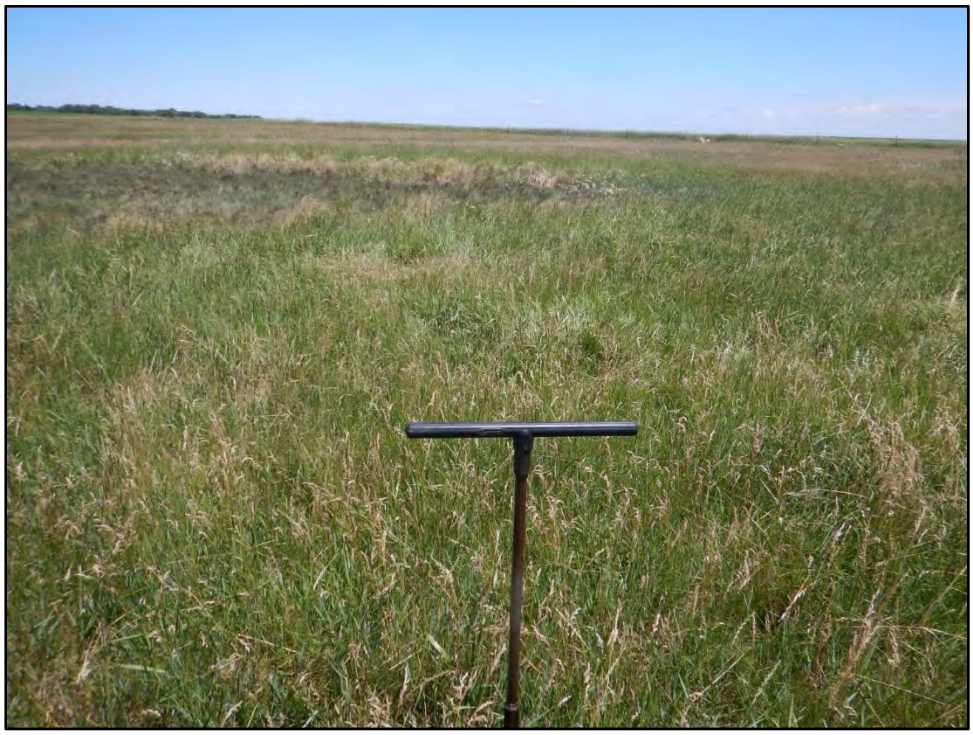
Photograph C-32: View of SP-539, an upland sample plot adjacent to W-520, facing west.

Photograph C-33: View of SP-540 in PEM W-521, facing west.

Photograph C-34: View of SP-541, an upland sample plot adjacent to W-521, facing west.

Photograph C-35: View of PUB W-522.

Photograph C-36: View of SP-542 in PEM W-523, facing east.



Photograph C-37: View of SP-543, an upland plot adjacent to W-523, facing east.

Photograph C-38: View of SP-544 in PEM W-524, facing south.

Photograph C-39: View of SP-545, an upland sample plot adjacent to W-524, facing south.

Photograph C-40: View of SP-548 in PEM W-526, facing east.

Photograph C-41: View of SP-549, an upland sample plot adjacent to W-526, facing east.

Photograph C-42: View of SP-550 in PEM W-527, facing north.

Photograph C-43: View of SP-551, an upland sample plot adjacent to W-527, facing north.

Photograph C-44: View of upland SP-552, facing north.

Photograph C-45: View of SP-561 in PEM W-533, facing south.

Photograph C-46: View of SP-562, an upland sample plot adjacent to W-533, facing south.

Photograph C-47: View of SP-570 in PEM W-537, facing north.

Photograph C-48: View of SP-571, an upland sample plot adjacent to W-537, facing south.

Photograph C-49: View of SP-574 in PEM W-539, facing north.

Photograph C-50: View of SP-575, an upland plot adjacent to W-539, facing north.

Photograph C-51: View of SP-576 in PEM W-540, facing east.

Photograph C-52: View of SP-577, an upland sample plot adjacent to W-540, facing east.

Photograph C-53: View of SP-588 in PEM W-546, facing west.

Photograph C-54: View of SP-589, an upland plot adjacent to W-546, facing west.

Photograph C-55: View of SP-590 in PEM W-547, facing south.

Photograph C-56: View of SP-591, an upland plot adjacent to W-547, facing south.

Photograph C-57: View of SP-592 in PEM W-548, facing east.

Photograph C-58: View of SP-593, an upland sample plot adjacent to W-548, facing east.

Photograph C-59: View of SP-596 in PEM W-550, facing east.

Photograph C-60: View of SP-597, an upland sample plot adjacent to W-550, facing east.

Photograph C-61: View of upland SP-600, facing north.

Photograph C-62: View of SP-602 in PEM W-552, facing west.

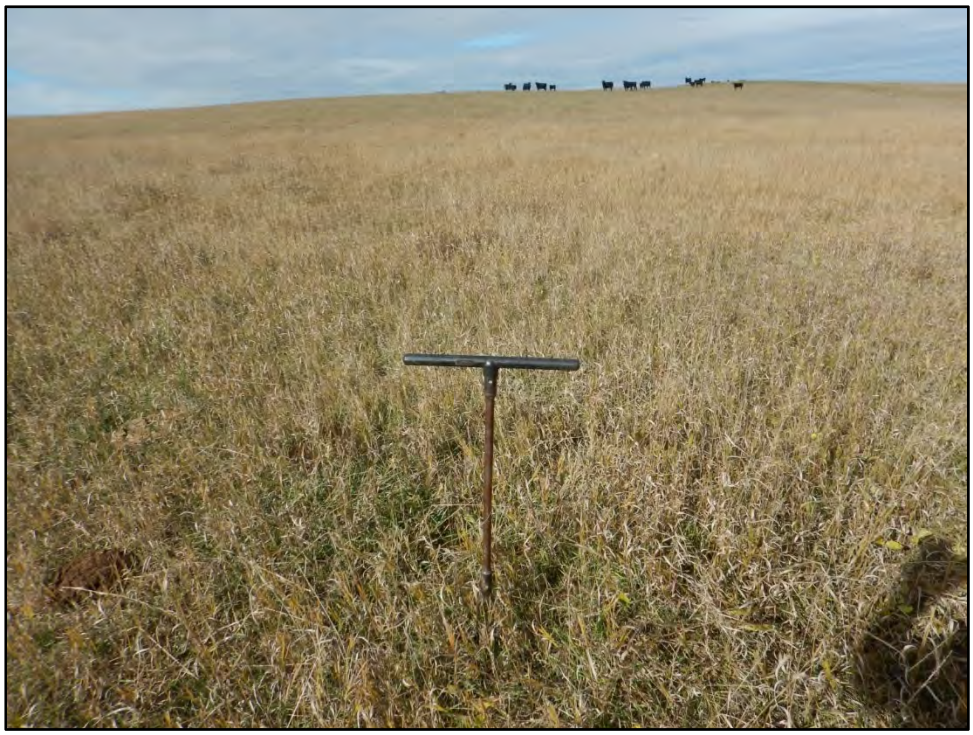
Photograph C-63: View of SP-603, an upland sample plot adjacent to W-552, facing east.

Photograph C-64: View of SP-606 in PEM W-554, facing south.

Photograph C-65: View of SP-607, an upland sample plot adjacent to W-554, facing south.

Photograph C-66: View of SP-608 in PEM W-555, facing north.

Photograph C-67: View of SP-609, an upland sample plot adjacent to W-555, facing north.



Photograph C-68: View of upland SP-612, facing north.

Photograph C-69: View of upland SP-615, facing south.

Photograph C-70: View of SP-616 in PEM W-558, facing north.

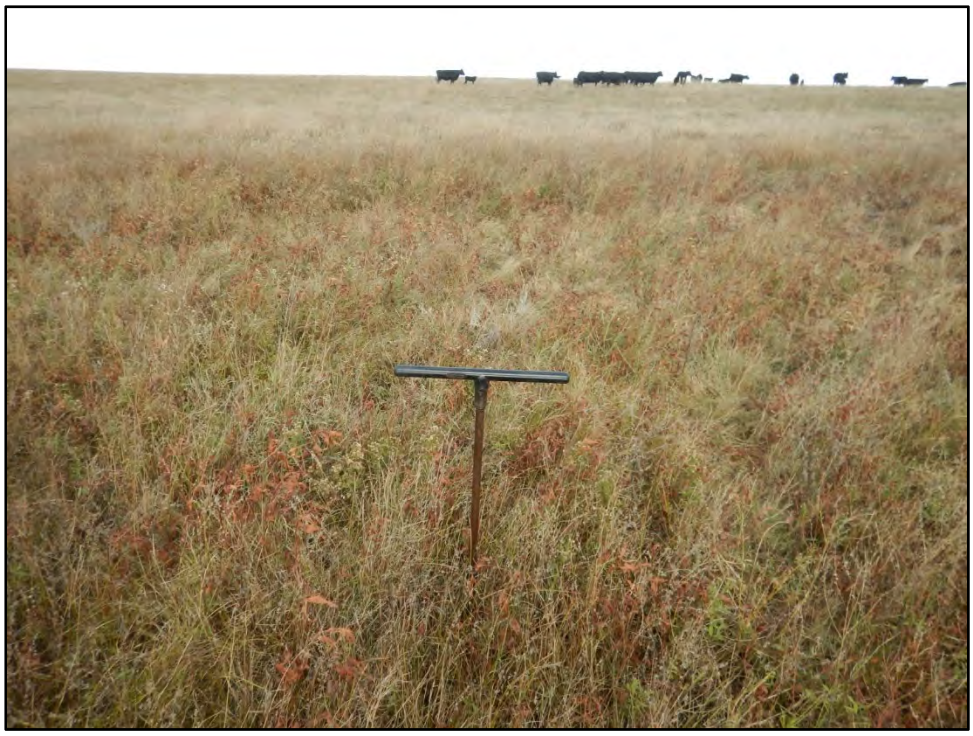
Photograph C-71: View of SP-617, an upland plot adjacent to W-558, facing north.

Photograph C-72: View of SP-618 in PEM W-559, facing north.

Photograph C-73: View of SP-619, an upland sample plot adjacent to W-559, facing north.

Photograph C-74: View of SP-620 in PEM W-560, facing north.

Photograph C-75: View of SP-621, an upland sample plot adjacent to W-560, facing north.



Photograph C-76: View of SP-622 in PEM W-561, facing north.

Photograph C-77: View of SP-623, an upland sample plot adjacent to W-561, facing north.

Photograph C-78: View of SP-624 in PEM W-562, facing north.

Photograph C-79: View of SP-625, an upland sample plot adjacent to W-562, facing north.

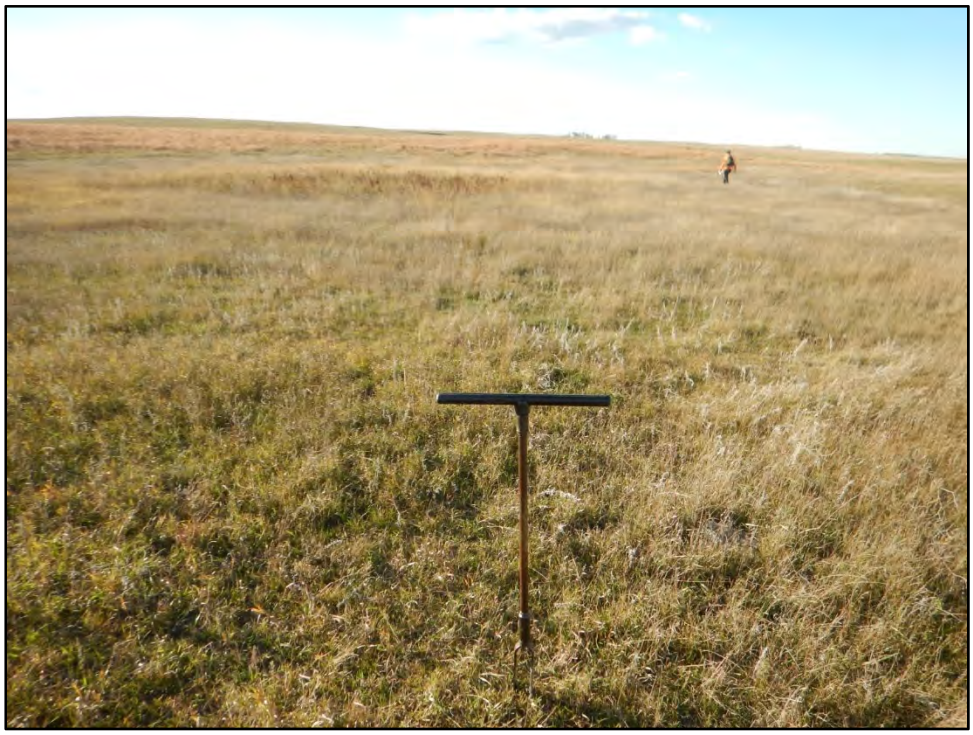
Photograph C-80: View of SP-626 in PEM W-563, facing west.

Photograph C-81: View of SP-627, an upland sample plot adjacent to W-563, facing west.

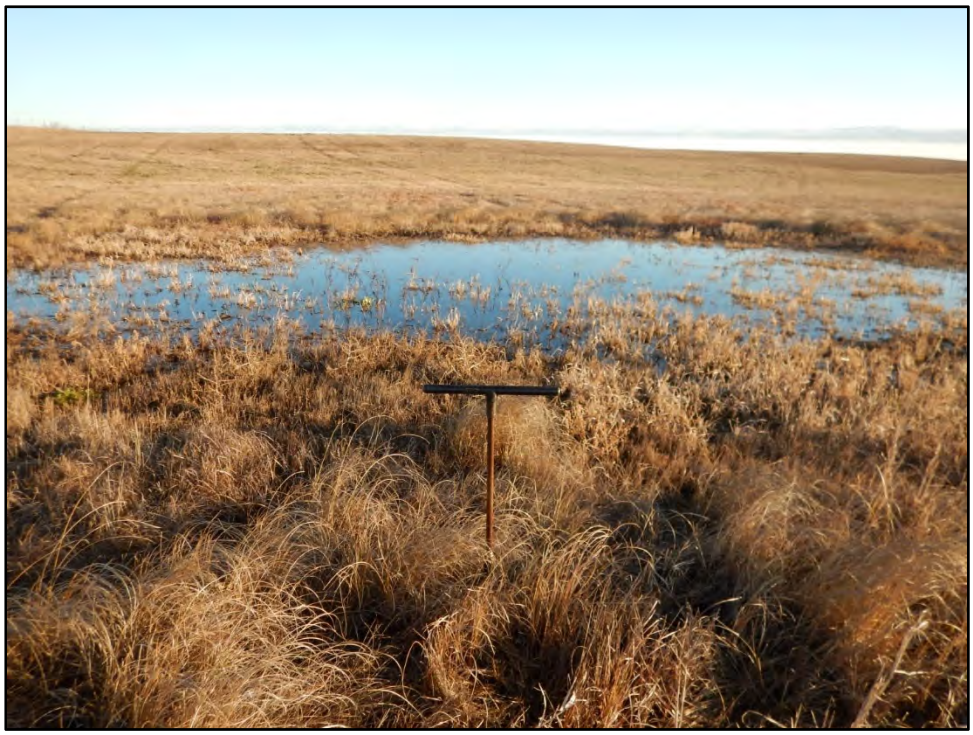
Photograph C-82: View of SP-630 in PFO W-564, facing east.

Photograph C-83: View of SP-631, an upland sample plot adjacent to W-564, facing east.

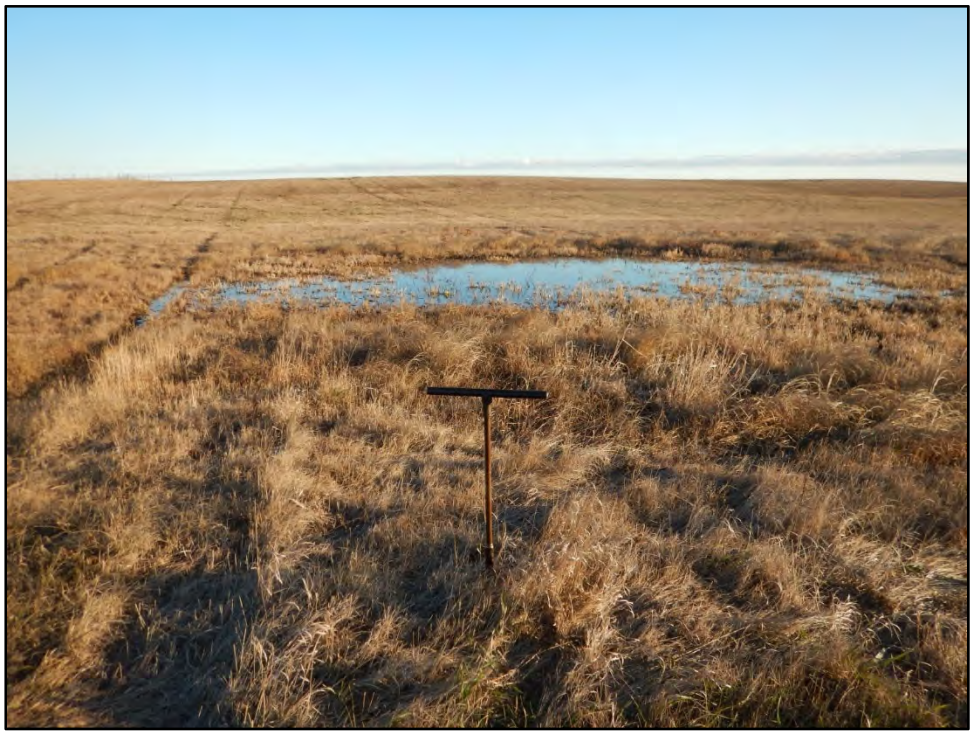
Photograph C-84: View of SP-634 in PEM W-566, facing west.



Photograph C-85: View of SP-635, an upland plot adjacent to W-566, facing west.



Photograph C-86: View of SP-636 in PEM W-567, facing north.



Photograph C-87: View of SP-637, an upland sample plot adjacent to W-567, facing north.

Photograph C-88: View of SP-638 in PEM W-568, facing north.

Photograph C-89: View of SP-639, an upland sample plot adjacent to W-568, facing north.

Photograph C-90: View of SP-640 in PEM W-569, facing south.

Photograph C-91: View of SP-641, an upland sample plot adjacent to W-569, facing south.

Photograph C-92: View of SP-642 in PEM W-570, facing south.

Photograph C-93: View of SP-643, an upland plot adjacent to W-570, facing south.

Photograph C-94: View of SP-646 in PEM W-573, facing south.

Photograph C-95: View of SP-647, an upland sample plot adjacent to W-573, facing south.

Photograph C-96: View of PUB W-575, facing east.

Photograph C-97: View of SP-658 in PEM W-579, facing west.

Photograph C-98: View of SP-659, an upland sample plot adjacent to W-579, facing west.

Photograph C-99: View of SP-660 in PEM W-580, facing west.

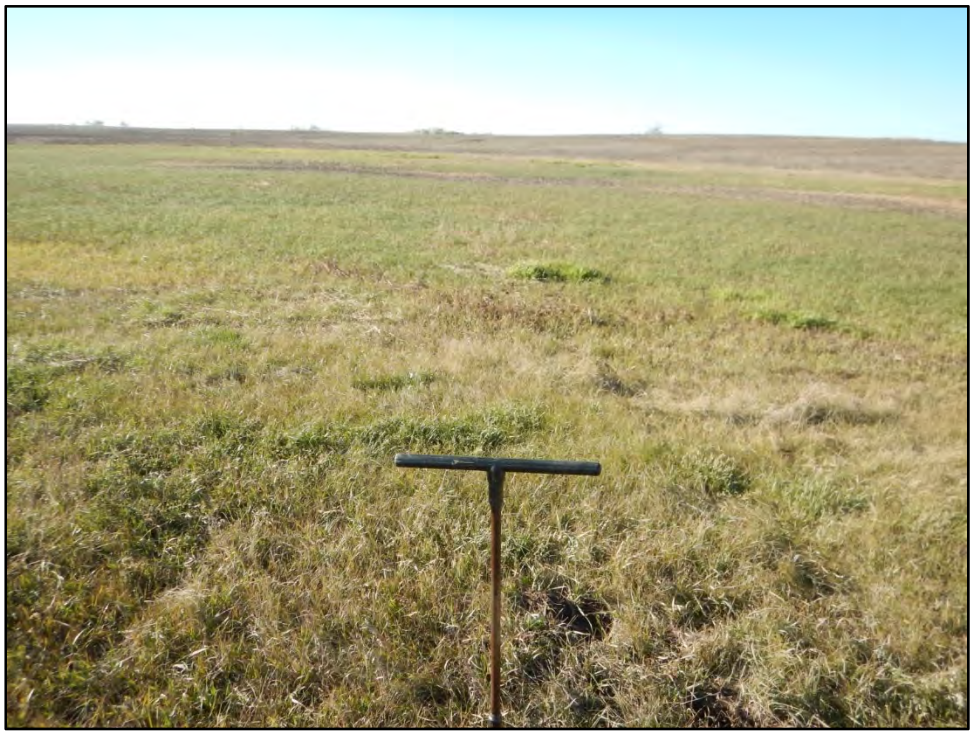
Photograph C-100: View of SP-661, an upland sample plot adjacent to W-580, facing west.

Photograph C-101: View of SP-662 in PEM W-581, facing west.

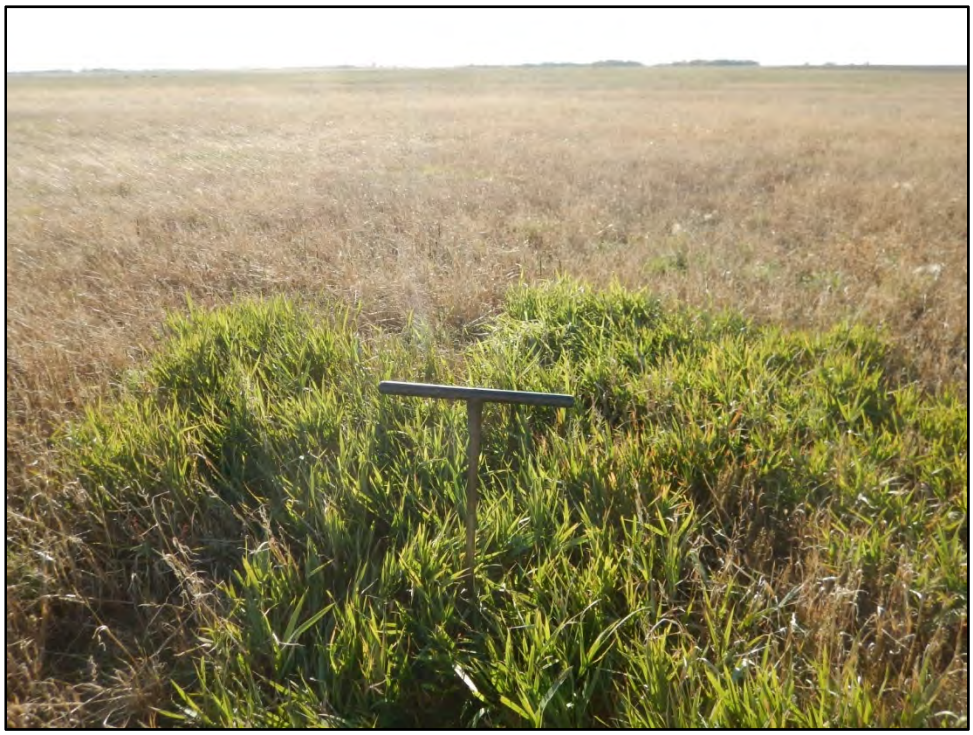
Photograph C-102: View of SP-663, an upland sample plot adjacent to W-581, facing west.

Photograph C-103: View of upland SP-664, facing west.

Photograph C-104: View of SP-665 in PEM W-583, facing north.



Photograph C-105: View of SP-666, an upland sample plot adjacent to W-583, facing north.



Photograph C-106: View of SP-667 in PEM W-584, facing west.

Photograph C-107: View of SP-668, an upland sample plot adjacent to W-584, facing west.

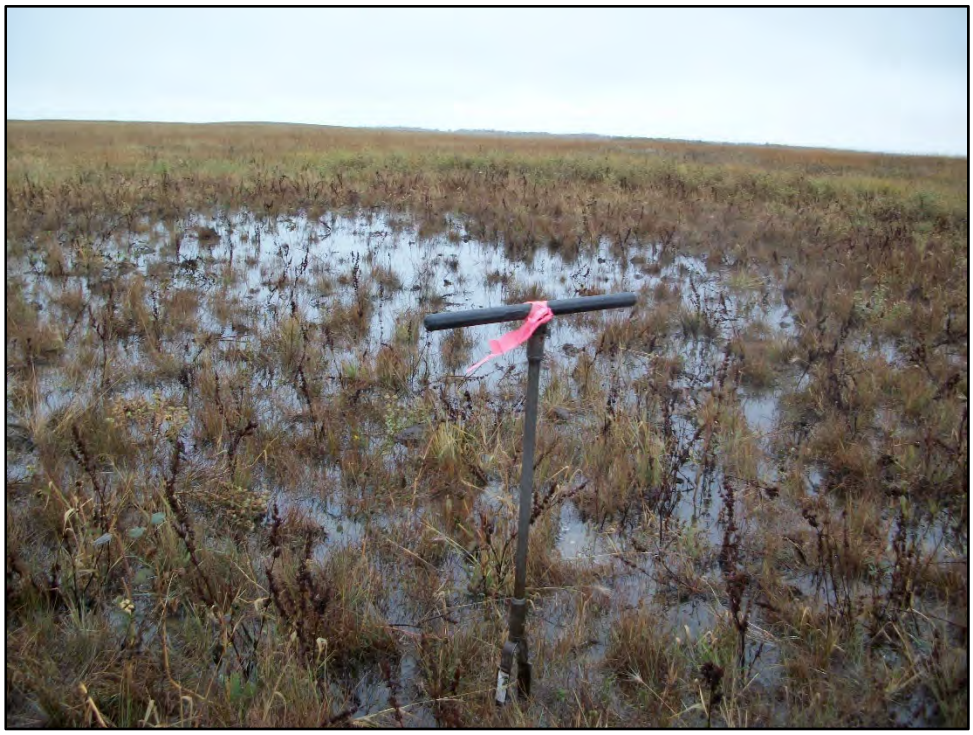
Photograph C-108: View of upland SP-669, facing north.

Photograph C-109: View of PEM W-585, facing west.

Photograph C-110: View of PEM W-586, facing south.

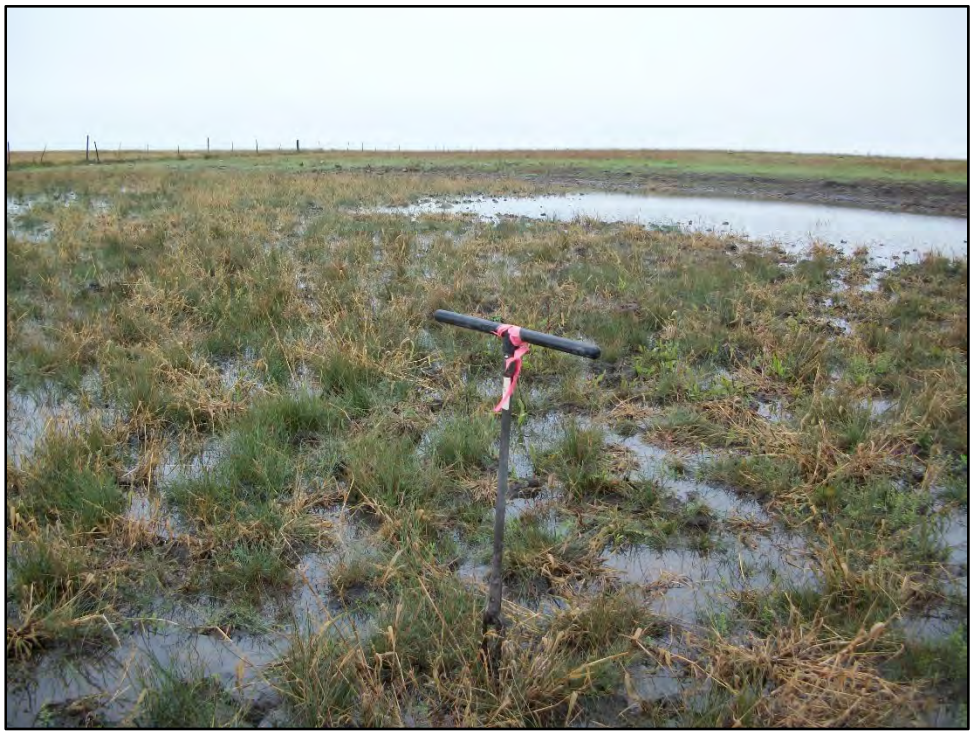
Photograph C-111: View of PEM W-587, facing south.

Photograph C-112: View of PUB W-589, facing north.



Photograph C-113: View of SP-701 in PEM W-701, facing north.

Photograph C-114: View of SP-702, an upland plot adjacent to W-701, facing northwest.

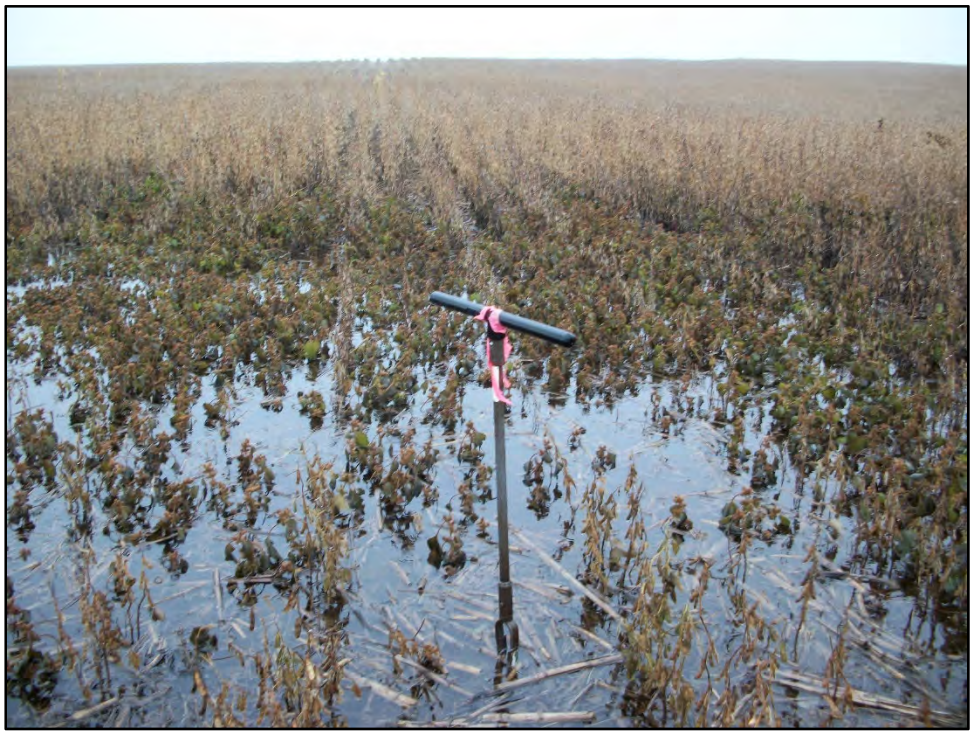


Photograph C-115: View of SP-703 in PEM W-702, facing northwest.

Photograph C-116: View of SP-704, an upland plot adjacent to W-702, facing northwest.

Photograph C-117: View of upland SP-705, facing north.

Photograph C-118: View of upland SP-706, facing southeast.



Photograph C-119: View of SP-707 in PEM W-703, facing east.

Photograph C-120: View of SP-708, an upland plot adjacent to W-703, facing west.

Photograph C-121: View of PUB W-705, facing northeast.

Photograph C-122: View of SP-709 in PEM W-707, facing south.

Photograph C-123: View of SP-710, an upland plot adjacent to W-707, facing southeast.

Photograph C-124: View of SP-711 in PEM W-708, facing north.

Photograph C-125: View of SP-712, an upland plot adjacent to W-708, facing north.

Photograph C-126: View of PUB W-709, facing northeast.

Photograph C-127: View of SP-713 in PEM W-710, facing south.

Photograph C-128: View of SP-714, an upland plot adjacent to W-710, facing northwest.

Photograph C-129: View of SP-715 in PEM W-711, facing southwest.

Photograph C-130: View of SP-716, an upland plot adjacent to W-711, facing west.

Photograph C-131: View of SP-717 in PEM W-712, facing east.

Photograph C-132: View of SP-718, an upland plot adjacent to W-712, facing northeast.

Photograph C-133: View of SP-719 in PEM W-713, facing northeast.

Photograph C-134: View of SP-720, an upland plot adjacent to W-713, facing north.

Photograph C-135: View of ephemeral stream (S)-001, facing upstream.

Photograph C-136: View of ephemeral S-002, facing upstream.

Photograph C-137: View of intermittent S-003, facing downstream.

Photograph C-138: View of intermittent S-004, facing upstream.

Photograph C-139: View of ephemeral S-501, facing upstream.

Photograph C-140: View of ephemeral S-502, facing downstream.

Photograph C-141: View of ephemeral S-504, facing downstream.

Photograph C-142: View of ephemeral S-506, facing downstream.

Photograph C-143: View of ephemeral S-508, facing downstream.

Photograph C-144: View of ephemeral S-510, facing upstream.

Photograph C-145: View of ephemeral S-513, facing upstream.

Photograph C-146: View of ephemeral S-514, facing across.

Photograph C-147: View of ephemeral S-516, facing upstream.

Photograph C-148: View of ephemeral S-517, facing upstream.

Photograph C-149: View of ephemeral S-518, facing downstream.

Photograph C-150: View of ephemeral S-519, facing upstream.

Photograph C-151: View of ephemeral S-521, facing downstream.

Photograph C-152: View of ephemeral S-522, facing downstream.

Photograph C-153: View of intermittent S-523, facing downstream.

Photograph C-154: View of ephemeral S-526, facing downstream.

Photograph C-155: View of ephemeral S-701, facing downstream.

Photograph C-156: View of ephemeral S-702, facing downstream.

Photograph C-157: View of ephemeral S-703, facing upstream.

Photograph C-158: View of ephemeral S-704, facing downstream.

Photograph C-159: View of ephemeral S-705, facing downstream.

Photograph C-160: View of ephemeral S-706, facing upstream.

Photograph C-161: View of ephemeral S-707, facing downstream.

Photograph C-162: View of ephemeral S-708, facing downstream.

Photograph C-163: View of Photo Point (PP)-512 in Project Area representative upland swale, facing north.

Photograph C-164: View of PP-514 in Project Area representative upland swale, facing west.

Photograph C-165: View of PP-526 in Project Area representative upland area that has hydric soil or NWI data, facing north.

Photograph C-166: View of PP-529 in Project Area representative upland area that has hydric soil or NWI data, facing west.

Photograph C-167: View of PP-530 in Project Area representative upland area that has hydric soil or NWI data, facing west.

Photograph C-168: View of PP-565 in Project Area representative upland swale, facing east.

Photograph C-169: View of PP-605 in Project Area representative upland swale, facing west.

Photograph C-170: View of PP-632 in Project Area representative roadside drainage, facing south.

Photograph C-171: View of PP-694 in Project Area representative roadside drainage, facing south.

Photograph C-172: View of PP-696 in Project Area representative roadside drainage, facing south.

Photograph C-173: View of PP-724 in Project Area representative upland area with a spoil pile adjacent to an excavated pond, facing east.

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APPENDIX C – HAND COUNTY DEVELOPMENT AGREEMENT

DEVELOPMENT AGREEMENT

THIS DEVELOPMENT AGREEMENT ("Agreement") is made as of the 4th day of December, 2018 ("Effective Date") by and between Sweetland Wind Farm, LLC, a Delaware limited liability company ("Developer") and Hand County, South Dakota ("County"). In this Agreement, Developer and the County may be individually referred to as a "Party" and collectively, as the "Parties."

RECITALS

A. Developer plans to develop, construct, and operate the up to 200 megawatt ("MW") Sweetland Wind Farm to be located in Hulbert, Pearl, and Rose Hill Townships in Hand County, South Dakota (the "Project").

B. Pursuant to the Hand County Zoning Ordinance, dated February 2009 ("Zoning Ordinance"), the Project is proposed to be located in the County's Agricultural District (*see* Zoning Ordinance, Art. 3, Sec. 301) and is a "utility use," which is a permitted use in the Agricultural District (*see* Zoning Ordinance, Art. 5, Sec. 503.52).

C. The Parties agree that it is in the best interest of each to memorialize the rights, obligations, and responsibilities of the Parties with respect to development of the Project.

NOW, THEREFORE, in consideration of the recitals (which are incorporated into the Agreement by this reference) and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

AGREEMENT

1. Effective Date and Termination

1.1. Effective Date. This agreement shall become effective on the Effective Date.

1.2. Termination. This Agreement may be terminated by mutual written agreement of the Parties. If the Agreement is terminated, Developer shall comply with all provisions of this Agreement that apply to any work already performed on the Project.

2. Vesting

This Agreement vests the Project to applicable existing County ordinances and regulations for the development, construction, ownership, and operation of the Project effective as the Effective Date of this Agreement to the extent such ordinances and regulations are not superseded or preempted by federal or state law or permit.

3. Development Standards

3.1. Wind Turbine Setback Commitments. Developer agrees that the Project wind turbines shall comply with the following setbacks:

Setback Type	Distance
Project wind turbines from currently occupied residence, unless waived in writing by the owner of the occupied residence	1,320 feet
Project wind turbines from maintained County roadway, unless waived in writing by the County	1.1 times wind turbine tip height
Project wind turbines from maintained township roadway, unless waived in writing by the applicable township	1.1 times wind turbine tip height
Project wind turbines from existing overhead distribution and transmission lines, unless waived in writing by the infrastructure owner	1.1 times wind turbine tip height
Pursuant to SDCL 43-13-24, Project wind turbines from property lines, unless the Developer has a written agreement with the adjacent landowner allowing the placement of the tower closer to the property line, in which case, the tower may be placed closer to the property line shared with that adjacent land owner.	500 feet or 1.1 times the height of the wind turbine tower, whichever is greater

3.2. Project Noise. Developer agrees to site Project wind turbines such that sound levels resulting from Project wind turbines will not exceed 50 dBA at the currently occupied residences of participating landowners and 45 dBA at the currently occupied residences of non-participating landowners unless waived in writing by the owner of the occupied residence.

3.3. Shadow Flicker. Developer agrees to site Project wind turbines so as to limit shadow flicker resulting from Project wind turbines at currently occupied residences to 30 hours per year or less, unless waived in writing by the owner of the occupied residence.

3.4. Wind Turbine Lighting. Developer agrees to light Project wind turbines according to applicable Federal Aviation Administration (FAA) requirements. Developer further agrees to comply with any South Dakota Public Utilities Commission energy facility permit conditions placed on the Project requiring the utilization of an Aircraft Detection Lighting System (ADLS), if applicable and if permitted by the FAA.

3.5. Compliance with Applicable Laws. The Developer shall comply with all applicable federal and state laws and regulations governing the development,

construction, and operations of the Project. Further, Developer shall develop, construct and operate the Project in a professional and workman like manner in accordance with standard industry practices.

4. **Amendments and Revisions.** This Agreement may be amended by mutual agreement of the Parties only if the amendment is in writing and signed by an authorized representative of each Party.

5. **Assignments.** Developer may, within the terms of this Development Agreement, assign this Agreement to a successor or assign with the written approval of the County Board; provided, however, that approval is not required for assignment to an affiliate of Developer or assignment for collateral purposes to a financing party. When required, approval shall not be unreasonably withheld or delayed. The assignees shall then assume all responsibilities and duties pursuant to this Agreement.

6. **General Provisions.**

6.1. Binding Effect. This Agreement shall be binding upon, and inure to the benefit of, the Developer and County and their respective heirs, successors (by merger, consolidation or otherwise) and assigns, devisees, administrators, representatives, lessees and all other persons or entities acquiring all or any portion of the Project or any interest therein, whether by sale, operation of law, devise, or in any manner whatsoever.

6.2. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of South Dakota. For the purposes of resolving any dispute with respect to this Agreement, each Party agrees that the venue for any legal action shall be in Hand County, South Dakota.

6.3. Severability. If any provisions of this Agreement are determined to be unenforceable, invalid or excessive by a court of competent jurisdiction, this Agreement can thereafter be modified to implement the intent of the Developer and County to the maximum extent allowable under law, and the remainder of this Agreement shall remain unaffected and in full force and effect.

6.4. Authority. The Parties each represent and warrant that it has the respective power and authority and is duly authorized to enter into this Agreement on the terms and conditions herein stated and to execute, deliver and perform its obligations under this Agreement. Developer shall provide the County a list of officers authorized to act for the Developer.

6.5. No Third-Party Beneficiary. This Agreement is made and entered into for the sole protection and benefit of the Developer and the County and their successors and assigns. No other person shall have any right of action based upon any provision of this Agreement.

6.6. Duty to Act Reasonably and in Good Faith. Unless otherwise expressly provided, the Parties shall act reasonably in giving consent, approval, or taking any other

action under this Agreement. The Parties agree that each of them shall at all times act in good faith in order to carry out the terms of this Agreement, and each of them covenants that it will not at any time voluntarily engage in any actions which frustrate the purpose and intent of the Parties to develop the Project in conformity with the terms and conditions specified in this Agreement. The Parties understand and agree that the process described in this Agreement depends upon timely and open communication and cooperation between the Parties. The Parties agree to use best efforts to communicate regarding issues, changes, or problems that arise in the performance of the rights, duties and obligations hereunder as early as possible in the process, and not wait for explicit due dates or deadlines. Each Party agrees to work cooperatively and in good faith toward resolution of any such issues.

6.7. Road Haul Agreement. The Parties acknowledge and agree that, prior to the commencement of Project construction, a separate agreement or agreements will be negotiated between the County, the Developer, and Hulbert, Pearl, and Rose Hill Townships, as needed, with respect to the Developer's use of County and Hulbert, Pearl, and Rose Hill Townships roads and rights-of-way during construction of the Project.

7. Notices.

7.1. Written Notice. Either Party may give notice to the other at the address for that Party set forth below. Notices may be given by U.S. certified mail, personal delivery or professional messenger.

7.2. Addresses. Notices shall be given to the Parties at their addresses set forth below.

Hand County	Auditor- Hand County, SD 415 W. 1st Avenue, #202 Miller, SD 57362
cc:	State's Attorney- Hand County, SD 214 North Broadway Avenue Miller, SD 57362
Developer	Matt Heck - Sweetland Wind Farm, LLC Director of Development Scout Clean Energy 4865 Sterling Drive, Suite 200 Boulder, CO 80301 E-mail: mheck@scoutcleanenergy.com
cc:	Mollie M. Smith - Sweetland Wind Farm, LLC Attorney Fredrikson & Byron, P.A.

	200 South Sixth Street Minneapolis, Minnesota 55402 E-mail: msmith@fredlaw.com

7.3. When Notice Effective. Unless otherwise provided in this Agreement, notice by U.S. certified mail, personal delivery, or professional messenger shall be effective upon receipt. Any Party at any time by notice to the other Party may designate a different address or person to which such notice or communication shall be given.

8. Default.

8.1. Remedies. Any failure by a Party to perform a material obligation hereunder which is not remedied within forty-five (45) days after receipt by the defaulting Party of written notice of such failure shall be deemed a default under this Agreement and in such case, the non-defaulting Party shall be entitled to pursue any remedies available at law or in equity, including terminating this Agreement and collecting reasonable attorneys' fees from the defaulting Party. Notwithstanding the foregoing, so long as the defaulting Party has initiated and is diligently working to cure, the defaulting Party's cure period shall extent for a time period reasonably sufficient for the default to be remedied.

9. Entire Agreement. This Agreement, together with all exhibits hereto, constitutes the entire agreement between the Parties with respect to the subject matter of this Agreement. Agreement is specifically intended to supersede all prior agreements whether written or oral.

[Signatures follow on the next page.]

This agreement pertains only to the current project. No further expansion is allowed.

IN TESTIMONY WHEREOF, the Parties hereto have caused this Agreement to be executed by their respective duly authorized officers as of the Effective Date.

SWEETLAND WIND FARM, LLC

By: _____
Its: Manager

HAND COUNTY

By: _____
Its: Chairman

ATTEST

And: Sandra Selting
Hand County Auditor

APPENDIX D – SOUND STUDY

SOUND LEVEL ASSESSMENT REPORT

Sweetland Wind Project
Hand County, South Dakota

Prepared for:

Scout Clean Energy
4865 Sterling Drive, Suite 200
Boulder, CO 80301

Prepared by:

Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

March 5, 2019

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1.0 EXECUTIVE SUMMARY

The Sweetland Wind Farm, LLC (the Project) is a proposed wind power electric generation facility expected to consist of up to 71 wind turbines in Hand County, South Dakota. The Project is being developed by Scout Clean Energy, LLC (SCE). Epsilon Associates, Inc. (Epsilon) has been retained by SCE to conduct a sound level modeling study for the Project. This report presents results of the study.

A sound level modeling analysis was conservatively conducted for 86 turbines, including 71 proposed wind turbine locations and 15 alternate locations and a collector substation. All wind turbines for this Project are proposed to be General Electric (GE) 2.82-127 units.[1] The purpose of this assessment is to predict worst-case sound levels generated by the facility in Hand County when the wind turbines are operational and to compare the modeling results to applicable limits. Sound levels from the Project are limited by agreement to 50 dBA at participating occupied residences and 45 dBA at non-participating occupied residences in Hand County.

Using the Project specific data provided by SCE, the L_{eq} sound levels modeled at participating occupied receptors are at or below 50 dBA and sound levels modeled at non-participating occupied receptors are at or below 43 dBA. Therefore, the Project meets the requirements with respect to sound in the Hand County Development Agreement dated December 4, 2018 (Development Agreement).

[1] Two of which will be GE 2.82-127 Low Noise Trailing Edge (LNTE) units.

2.0 INTRODUCTION

The Project is located in Hand County, South Dakota, consisting of 71 GE wind turbines and a collector substation.[2] A total of 15 alternate wind turbine locations are also proposed for the Project. The wind turbines will be GE 2.82-127 units with a rotor diameter of 127 meters.[3] A total of 64 primary and 9 alternate wind turbines are proposed to have a hub height of 114 meters and a total of 7 primary and 6 alternate wind turbines are proposed to have a hub height of 89 meters. Figure 2-1 shows the locations of the 71 proposed and 15 alternate wind turbines, the substation, and the Project boundary over aerial imagery in Hand County.

A detailed discussion of sound from wind turbines is presented in a white paper prepared by the Renewable Energy Research Laboratory.[4] A few points are repeated herein. Wind turbine noise can originate from two different sources; mechanical sound from the interaction of turbine components and aerodynamic sound produced by the flow of air over the rotor blades. Prior to the 1990's, both sources were significant contributors to wind turbine noise. However, recent advances in wind turbine design have greatly reduced the contribution of mechanical noise. Aerodynamic noise has also been reduced in modern wind turbines due to slower rotational speeds and changes in materials of construction. Aerodynamic noise, in general, is broadband (has contributions from a wide range of frequencies). It originates from encounters of the wind turbine blades with localized airflow inhomogeneities and wakes from other turbine blades and from airflow across the surface of the blades, particularly the front and trailing edges. Aerodynamic sound generally increases with increasing wind speed up to a certain point, then typically remains constant, even with higher wind speeds. However, sound levels in general also increase with increasing wind speed with or without the presence of wind turbines.

This report presents the results of a sound level modeling analysis for the Project. The wind turbines were modeled with the Cadna/A software package using sound data from GE technical documents.

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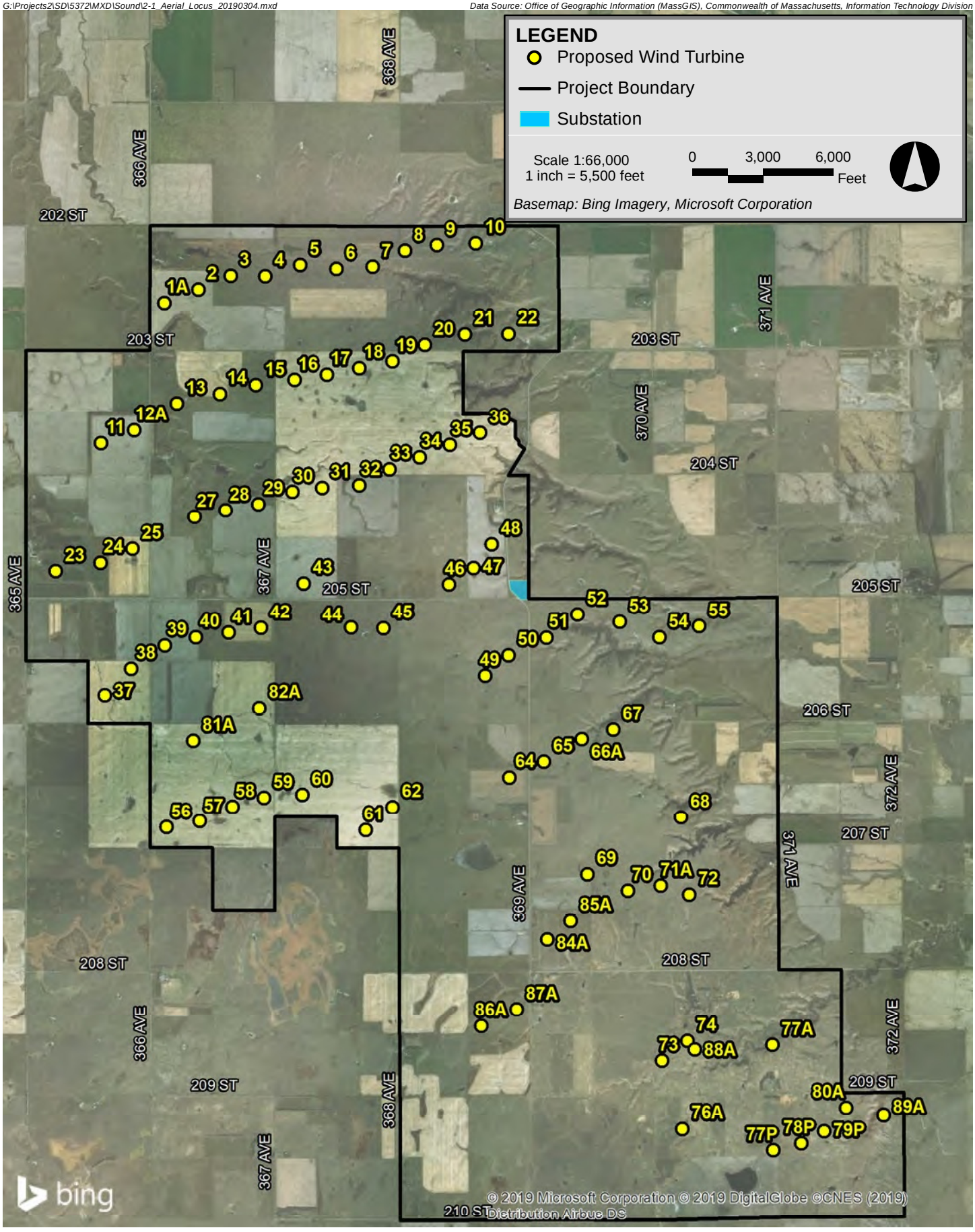
[2] The Project will also have a switchyard. The switchyard is not expected to have any significant sources of sound.

[3] Two of which will be GE 2.82-127 Low Noise Trailing Edge (LNTE) units.

[4] Renewable Energy Research Laboratory, Department of Mechanical and Industrial Engineering, University of Massachusetts at Amherst, Wind Turbine Acoustic Noise, June 2002, amended January 2006.



Sweetland Wind **Hand County, South Dakota**

Epsilon Associates Inc.

Figure 2-1
Aerial Locus Map

3.0 SOUND TERMINOLOGY

There are several ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level measurement terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a 3-decibel increase (53 dB), which is equal to doubling in sound energy but not equal to a doubling in decibel quantity (100 dB). Thus, every 3-dB change in sound level represents a doubling or halving of sound energy. Relative to this characteristic, a change in sound levels of less than 3 dB is imperceptible to the human ear.

Another mathematical property of decibels is that if one source of noise is at least 10 dB louder than another source, then the total sound level is simply the sound level of the higher-level source. For example, a sound source at 60 dB plus another sound source at 47 dB is equal to 60 dB.

A sound level meter (SLM) that is used to measure sound is a standardized instrument.[5] It contains "weighting networks" (e.g., A-, C-, Z-weightings) to adjust the frequency response of the instrument. Frequencies, reported in Hertz (Hz), are detailed characterizations of sounds, often addressed in musical terms as "pitch" or "tone". The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies. The A-weighting network is the accepted scale used for community sound level measurements; therefore, sounds are frequently reported as detected with a sound level meter using this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. These sound levels are reported in decibels designated as "dBA". Sound pressure levels for some common indoor and outdoor environments are shown in Figure 3-1.

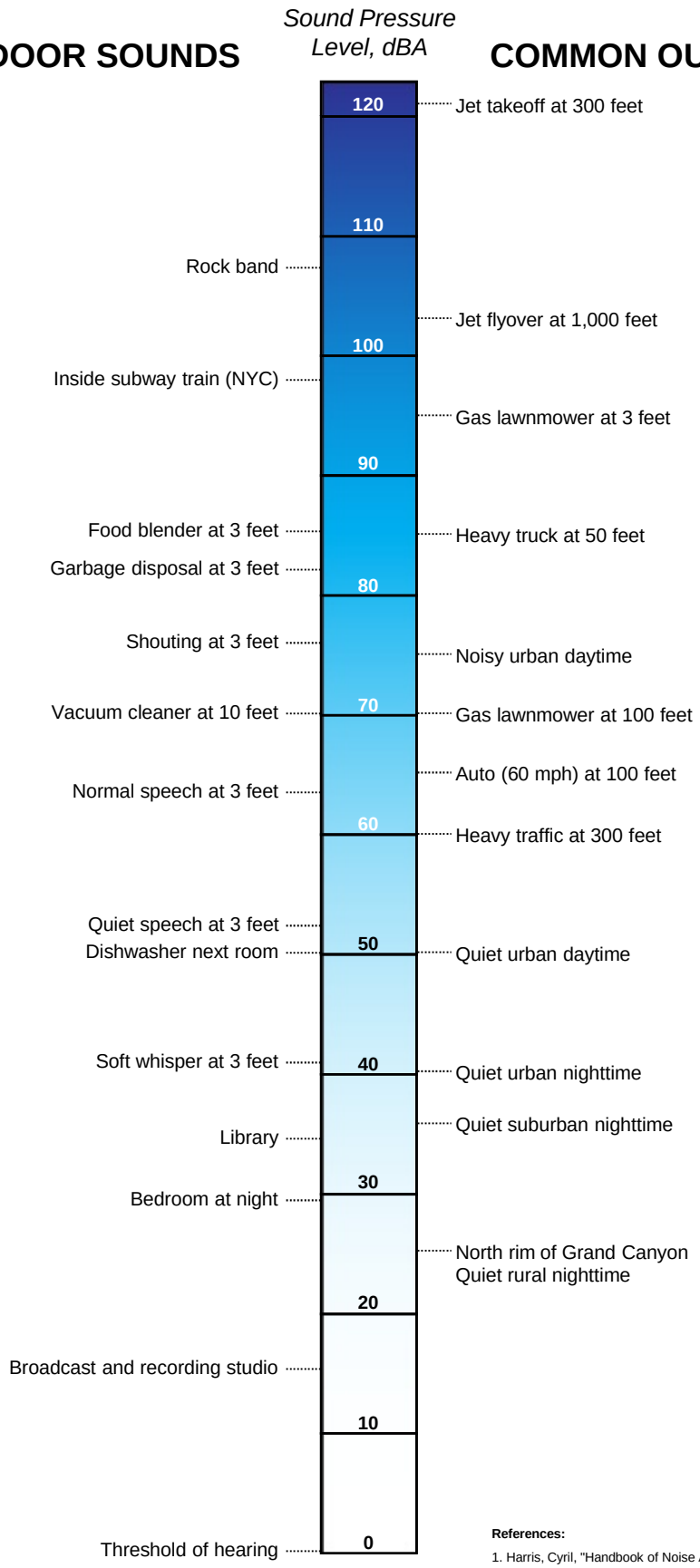
Because the sounds in the environment vary with time, many different sound metrics may be used to quantify them. There are two typical methods used for describing variable sounds. These are exceedance levels and equivalent levels, both of which are derived from a large number of moment-to-moment A-weighted sound pressure level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where "n" is a value (typically an integer between 1 and 99) in terms of percentage. Equivalent levels are

[5] *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983 (R2006), published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

designated L_{eq} and quantify a hypothetical steady sound that would have the same energy as the actual fluctuating sound observed. Two sound level metrics that are commonly reported in community noise monitoring and/or utilized in this report are described below.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during a measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.

- L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.,* the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is commonly A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with time-averaged mean square sound pressure values, the L_{eq} is mostly determined by occasional loud noises.



References:

1. Harris, Cyril, "Handbook of Noise Acoustical Measurements and Noise Control", p 1-10., 1998
2. "Controlling Noise", USAF, AFMC, AFDTC, Elgin AFB, Fact Sheet, August 1996
3. California Dept. of Trans., "Technical Noise Supplement", Oct, 1998

Epsilon ASSOCIATES INC.

Figure 3-1

Common Sound Levels in the Environment

4.0 NOISE REGULATIONS

4.1 Federal Regulations

There are no federal noise regulations applicable to this Project.

4.2 South Dakota State Regulations

There are no state noise regulations applicable to this Project.

4.3 Hand County Regulations

Hand County currently has no zoning ordinance containing language regulating sound levels from wind energy projects. However, Hand County has a Development Agreement with Scout Clean Energy for this Project. The proposed Sweetland Wind Project is therefore subject to the following sound level requirements per the agreement:

> *Developer agrees to site Project wind turbines such that sound levels resulting from Project wind turbines will not exceed 50 dBA at the currently occupied residences of participating landowners and 45 dBA at the currently occupied residences of non-participating landowners, unless waived in writing by the owner of the occupied residence.*

Participating receptors (occupied residences) have been evaluated in this analysis against the 50 dBA limit and non-participating receptors have been evaluated against the 45 dBA limit.

5.0 FUTURE CONDITIONS

5.1 Equipment and Operating Conditions

The sound level analysis conservatively includes 86 wind turbines, although only up to 71 turbines will be constructed (15 locations are alternate locations). Global coordinates for the 86 wind turbines are provided in Appendix A. All wind turbines are GE 2.82-127 units with a rotor diameter of 127 meters. A total of 64 primary and 9 alternate wind turbines are proposed to have a hub height of 114 meters and a total of 7 primary and 6 alternate wind turbines are proposed to have a hub height of 89 meters. The hub height of each wind turbine in the layout is included in Appendix A. A technical report from GE[6] was provided by SCE which documented the expected sound power levels associated with the GE 2.82-127 wind turbine. According to this technical document, which included broadband and octave-band A-weighted sound power levels for various wind speeds, the maximum sound power level for the GE 2.82-127 of 110.0 dBA occurs at hub height wind speeds of 10 m/s (and above). These sound power levels are defined as "calculated apparent" by the turbine manufacturer and therefore do not include any uncertainty factor.

In order to meet the limits in the Development Agreement, select wind turbines will be required to have Low Noise Trailing Edge (LNTE) blades which produce lower sound levels compared to the standard blade counterparts. A technical report from GE[7] was provided by SCE which documented the expected sound power levels associated with the GE 2.82-127 LNTE wind turbine. According to this technical document, which included broadband and octave-band A-weighted sound power levels for various wind speeds, the maximum sound power level for the GE 2.82-127 LNTE of 108.5 dBA occurs at hub height wind speeds of 10 m/s (and above). These sound power levels are also defined as "calculated apparent" by the wind turbine manufacturer and therefore do not include any uncertainty factor. Two wind turbines are required to be LNTE units and these wind turbines are identified in Appendix A.

In addition to the wind turbines, there will be a collector substation associated with the Project. The substation is proposed to be located southeast of wind turbine #48 as shown in Figure 5-1. Two 110 megavolt-ampere (MVA) transformers are proposed for the substation. Epsilon has estimated octave-band sound power levels using the MVA rating provided by SCE and techniques in the Electric Power Plant Environmental Noise Guide (Edison Electric Institute), Table 4.5 Sound Power Levels of Transformers. Table 5-1 below summarizes the sound power level data used in the modeling per transformer.

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[6] General Electric Company, Technical Documentation Wind Turbine Generator Systems 2.x-127 – 60 Hz Product Acoustic Specifications, 2018.

[7] General Electric Company, Technical Documentation Wind Turbine Generator Systems 2.x-127 with LNTE – 60 Hz Product Acoustic Specifications, 2018.

Table 5-1 Modeled Substation Transformer Sound Power Levels

		Sound Power Levels per Octave-Band Center Frequency [Hz]								
Maximum Rating	Broadband dBA	31.5 dB	63 dB	125 dB	250 dB	500 dB	1k dB	2k dB	4k dB	8k dB
110 MVA	99	96	102	104	99	99	93	88	83	76

5.2 Modeling Methodology

The noise impacts associated with the proposed wind turbines were predicted using the Cadna/A noise calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). The benefits of this software are a more refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections, drop-off with distance, and atmospheric absorption. The Cadna/A software allows for octave band calculation of sound from multiple sources as well as computation of diffraction.

Inputs and significant parameters employed in the model are described below:

- *Project Layout:* A project layout dated February 6, 2019 was provided by SCE. The 71 proposed wind turbines and 15 alternates were input into the model. The substation location was provided by SCE on January 2, 2019. Specific locations of the transformers were not provided, so Epsilon conservatively modeled them on the north side of the substation area closest to the nearest modeling receptor. The proposed wind turbines, substation, and transformers are shown in Figure 5-1.

- *Parcel Participation:* A dataset containing property parcels in the proximity of the Project was provided by SCE on January 7, 2019. Parcels identified as Wind Energy Lease and Easement Agreement ('Controlled Land') and Good Neighbor Agreement ('GNA') within the dataset have been considered participating parcels. Participating parcels within the Project boundary are indicated on Figure 5-1.[8] Parcels containing wind turbines that were not identified as 'Controlled Land' or 'GNA' have been given "pending participation" status and are indicated as such on the figure. All other parcels are considered non-participating properties.

- *Modeling Locations:* A modeling receptor dataset was provided by SCE for occupied residences in Hand County within ~4 miles of any proposed wind turbine on January

[8] Participating parcels that extend beyond the Project boundary have been excluded from figures.

2, 2019. A total of 41 receptors from this dataset were input into the Cadna/A model.[9] These were all modeled as discrete points at a height of 1.5 meters above ground level to mimic the ears of a typical standing person. These locations are shown in Figure 5-1. Participation status for each of the 41 modeling receptors was assigned based on the parcel data previously described. The receptors are indicated as either participating, pending participation, or non-participating on Figure 5-1.

- *Terrain Elevation:* Elevation contours for the modeling domain were directly imported into Cadna/A which allowed for consideration of terrain shielding where appropriate. The terrain height contour elevations for the modeling domain were generated from elevation information derived from the National Elevation Dataset (NED) developed by the U.S. Geological Survey.

- *Source Sound Levels:* Octave-band sound power levels for the GE 2.82-127 and GE 2.82-127 LNTE wind turbines from the provided technical reports were input to the model. These sound levels represent "worst-case" operational sound level emissions. The substation transformer sound power levels as presented in Table 5-1 were input to the model.

- *Uncertainty factor:* Typically, uncertainty factors provided by manufacturers for wind turbine sound power levels are 2 decibels or less. For this analysis an uncertainty factor of 2.0 dBA was assumed and added to the sound power level for the modeled wind turbines.

- *Ground Attenuation:* Spectral ground absorption was calculated using a G-factor of 0.5 which corresponds to "mixed ground" consisting of both hard and porous ground cover.

The highest wind turbine sound power level for each wind turbine type including uncertainty was input into Cadna/A to model wind turbine generated sound pressure levels during conditions when worst-case sound power levels are expected. Sound pressure levels due to operation of all 86 wind turbines and the substation transformers were conservatively modeled at 41 receptors in Hand County. In addition to modeling at discrete points, sound levels were also modeled throughout a large grid of receptor points, each spaced 20 meters apart to allow for the generation of sound level isolines.

[9] The original dataset contained 42 receptors; however, it was later determined that one of the receptors was not an occupied residence, as confirmed by the Hand County Tax Assessor on February 1, 2019. This receptor was excluded from the model.

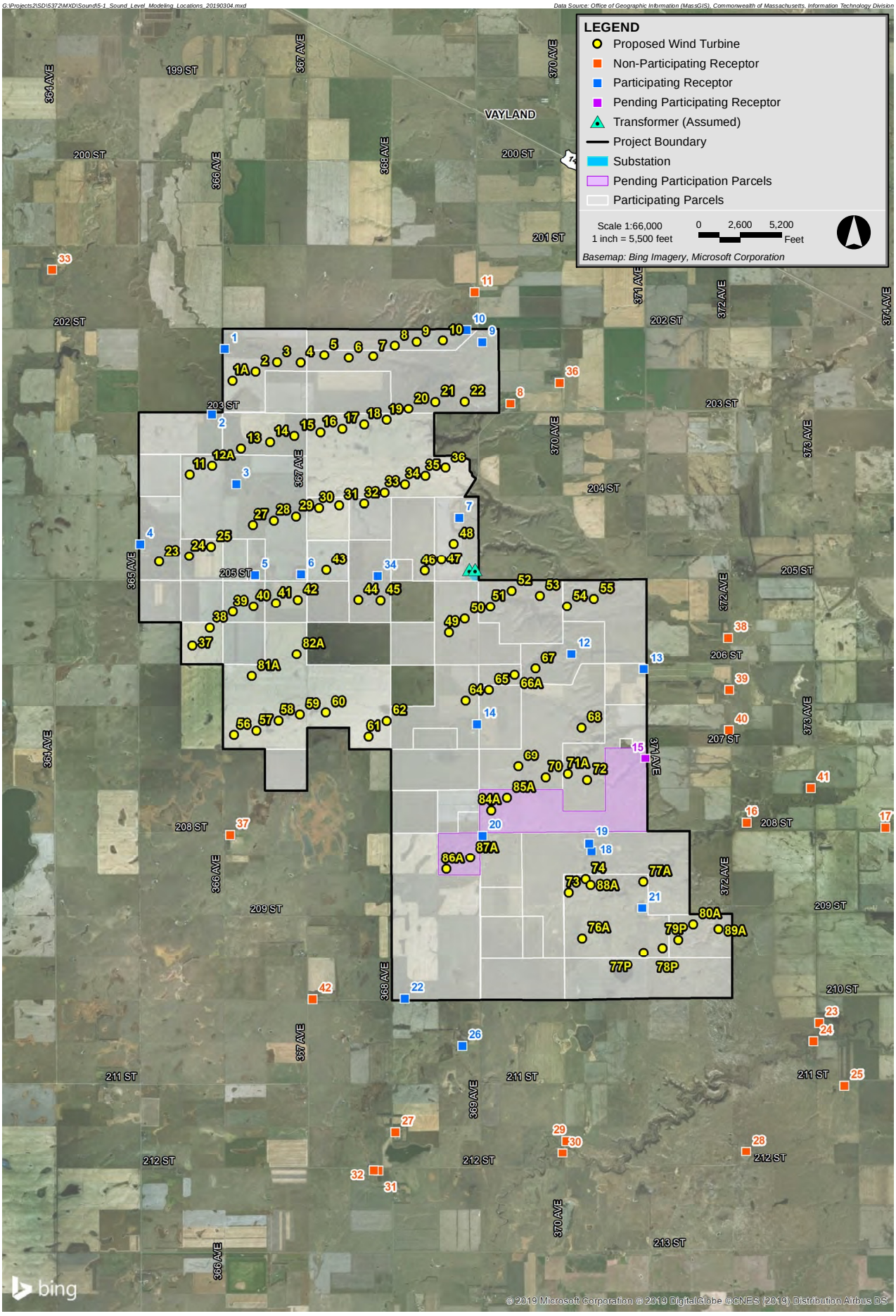
Several modeling assumptions inherent in the ISO 9613-2 calculation methodology, or selected as conditional inputs by Epsilon, were implemented in the Cadna/A model to ensure conservative results (i.e., higher sound levels), and are described below:

- All modeled sources were assumed to be operating simultaneously and at the design wind speed corresponding to the greatest sound level impacts.
- As per ISO 9613-2, the model assumed favorable conditions for sound propagation, corresponding to a moderate, well-developed ground-based temperature inversion, as might occur on a calm, clear night or equivalently downwind propagation.
- Meteorological conditions assumed in the model (temperature = 10°C & relative humidity = 70%) were selected to minimize atmospheric attenuation in the 500 Hz and 1 kHz octave bands where the human ear is most sensitive.
- No additional attenuation due to tree shielding, air turbulence, or wind shadow effects was considered in the model.

5.3 Sound Level Results

Table B-1 in Appendix B shows the predicted "Project-Only" broadband (dBA) L_{eq} sound levels under conditions specified in the previous section for the 41 receptors in Hand County. A brief description of each receptor is provided in the table for identification. The sound levels range from 35 to 50 dBA at participating receptors and from 27 to 43 dBA at non-participating receptors.

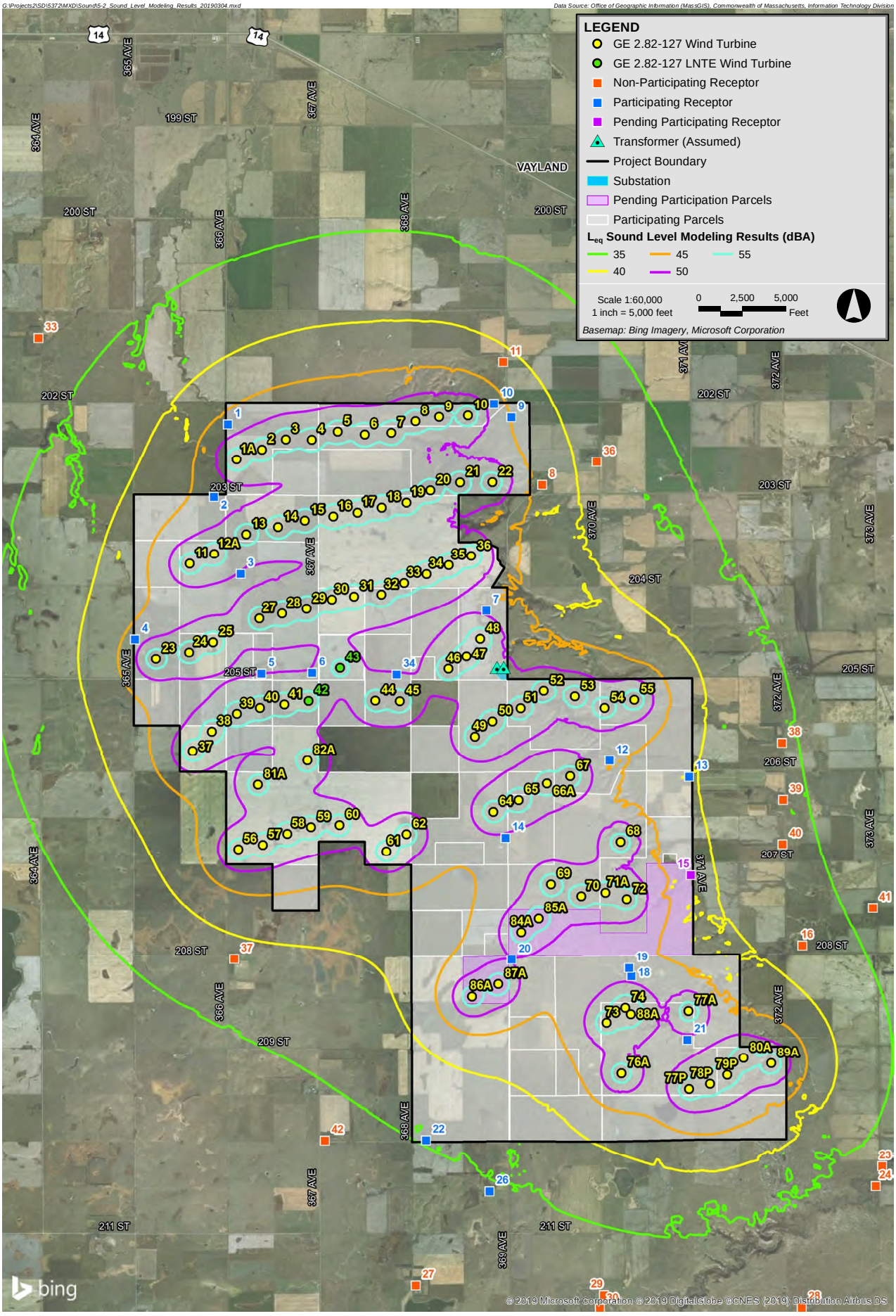
In addition to the 41 receptor points, L_{eq} sound level isolines generated from the modeling grid are presented in Figure 5-2. Wind turbines with LNTE blades are identified in the figure.



Sweetland Wind **Hand County, South Dakota**

Epsilon Associates, Inc.

Figure 5-1
Sound Level Modeling Locations



Sweetland Wind **Hand County, South Dakota**

Epsilon Associates, Inc.

Figure 5-2

L_{eq} Sound Level Modeling Results

6.0 CONSTRUCTION NOISE

The majority of the construction activity related to the Sweetland Wind Project will occur around each of the wind turbine sites. By its very nature, construction activity moves around the site. Full construction activity will generally occur at one wind turbine site at a time, although there will be some overlap at adjacent sites for maximum efficiency. There are generally three phases of construction at a wind energy project – excavation, foundations, and turbine erection. Table 6-1 presents the equipment sound levels for the louder pieces of construction equipment expected to be used at this site along with their phase of construction. Reference sound source information in Table 6-1 was obtained from either Epsilon field measurements or the FHWA's Roadway Construction Noise Model database.

Construction of the Project is expected to take multiple months. Construction of a single wind turbine from excavation to foundation pouring to turbine erection is roughly a three-week process. However, work will not proceed in that order for each wind turbine to be erected. For example, depending on weather all foundations might be poured before any turbine erection work begins. Excavation work is expected to occur from sunrise to the sunset. Concrete foundation work and turbine erection work could extend into the overnight hours depending on the weather and timing of a concrete pour which must be continuous. Excavation work will typically be daytime only.

Table 6-1 Sound Levels for Construction Noise Sources

Phase	Equipment	Sound Level at 50 feet (dBA)
Excavation	Grader	85
Excavation	Bulldozer	82
Excavation	Front-end loader	79
Excavation	Backhoe	78
Excavation	Dump truck	76
Excavation	Roller	80
Excavation	Excavator	81
Excavation	Rock drill	89
Foundation	Concrete mixer truck	79
Foundation	Concrete pump truck	81
Foundation	Concrete batch plant	83
Turbine erection	Large crane #1	81
Turbine erection	Large crane #2	81
Turbine erection	Component delivery truck	84
Turbine erection	Air compressor	78

7.0 EVALUATION OF SOUND LEVELS

7.1 Modeled Sound Levels

All modeled sound levels, as output from Cadna/A and presented in Appendix B, are A-weighted equivalent sound levels (L_{eq}, dBA). These levels may be used in evaluating measured sound pressure levels over typical averaging durations, (i.e., ten (10) minutes or one (1) hour).

7.2 Evaluation

The Project is subject to the requirements contained in the Development Agreement. The sound level limits in this agreement are 50 dBA at participating occupied residences and 45 dBA at non-participating occupied residences. The predicted worst-case L_{eq} sound levels from the Sweetland Wind Project are at or below the 50 dBA limit at all modeled participating receptors and below the 45 dBA limit at all modeled non-participating receptors.

A review of Table B-1 in Appendix B shows the highest L_{eq} sound level for a non-participating receptor to be 43 dBA. Therefore, the Project meets the requirements with respect to sound in the Developer Agreement.

8.0 CONCLUSIONS

A comprehensive sound level analysis was conducted for the proposed Sweetland Wind Project within Hand County, South Dakota. A total of 71 wind turbines are proposed to be built for this Project. Sound levels resulting from the operation of 71 wind turbines and 15 alternates were calculated at 41 receptor points (occupied residences), and isolines were generated from a grid encompassing the area surrounding the wind turbines using the proposed layout. The L_{eq} sound levels modeled at participating occupied receptors were at or below 50 dBA and sound levels modeled at non-participating occupied receptors were at or below 43 dBA. All L_{eq} sound levels meet the respective limits of 50 dBA and 45 dBA. Therefore, the Project meets the requirements with respect to sound in the Development Agreement.

Appendix A
Wind Turbine Coordinates

Table A-1: Wind Turbine Coordinates (Layout 190206)

Wind Turbine ID	Wind Turbine Type	Hub Height (m)	Coordinates NAD83 UTM Zone 14N (meters)	
			X (Easting)	Y (Northing)
1A	GE 2.82-127	89	511012.21	4921687.08
2	GE 2.82-127	114	511453.33	4921859.46
3	GE 2.82-127	114	511870.19	4922038.85
4	GE 2.82-127	114	512321.24	4922032.65
5	GE 2.82-127	114	512774.51	4922174.47
6	GE 2.82-127	114	513244.56	4922123.89
7	GE 2.82-127	114	513710.73	4922151.63
8	GE 2.82-127	114	514128.93	4922358.66
9	GE 2.82-127	114	514543.93	4922430.56
10	GE 2.82-127	114	515045.88	4922458.48
11	GE 2.82-127	114	510193.66	4919873.20
12A	GE 2.82-127	89	510620.94	4920044.27
13	GE 2.82-127	114	511176.44	4920385.98
14	GE 2.82-127	114	511733.46	4920510.93
15	GE 2.82-127	114	512198.31	4920625.64
16	GE 2.82-127	114	512699.15	4920693.91
17	GE 2.82-127	114	513119.71	4920762.30
18	GE 2.82-127	114	513540.47	4920848.10
19	GE 2.82-127	114	513970.65	4920934.88
20	GE 2.82-127	114	514387.31	4921145.50
21	GE 2.82-127	114	514905.57	4921284.73
22	GE 2.82-127	114	515470.08	4921288.61
23	GE 2.82-127	114	509603.78	4918211.78
24	GE 2.82-127	114	510183.19	4918322.66
25	GE 2.82-127	114	510600.13	4918502.72
27	GE 2.82-127	114	511405.11	4918917.06
28	GE 2.82-127	114	511804.96	4919001.75
29	GE 2.82-127	114	512229.95	4919082.95
30	GE 2.82-127	114	512672.33	4919240.36
31	GE 2.82-127	114	513058.38	4919293.06
32	GE 2.82-127	114	513537.27	4919326.90
33	GE 2.82-127	114	513931.55	4919533.22
34	GE 2.82-127	114	514321.46	4919691.24
35	GE 2.82-127	114	514711.34	4919849.29
36	GE 2.82-127	114	515101.21	4920007.25
37	GE 2.82-127	114	510243.63	4916605.53
38	GE 2.82-127	114	510579.50	4916943.29
39	GE 2.82-127	89	511017.08	4917250.36
40	GE 2.82-127	114	511418.75	4917354.69
41	GE 2.82-127	114	511845.57	4917412.66
42	GE 2.82-127 LNTE	89	512265.78	4917475.42
43	GE 2.82-127 LNTE	114	512815.20	4918054.27
44	GE 2.82-127	114	513429.64	4917481.64
45	GE 2.82-127	89	513853.67	4917471.46
46	GE 2.82-127	89	514702.38	4918039.82
47	GE 2.82-127	114	515021.66	4918255.13
48	GE 2.82-127	89	515255.92	4918559.94
49	GE 2.82-127	114	515168.17	4916854.45

Table A-1: Wind Turbine Coordinates (Layout 190206)

Wind Turbine ID	Wind Turbine Type	Hub Height (m)	Coordinates NAD83 UTM Zone 14N (meters)	
			X (Easting)	Y (Northing)
50	GE 2.82-127	114	515469.25	4917120.17
51	GE 2.82-127	114	515962.07	4917348.53
52	GE 2.82-127	114	516365.98	4917651.25
53	GE 2.82-127	114	516911.45	4917557.34
54	GE 2.82-127	114	517426.35	4917351.11
55	GE 2.82-127	114	517943.89	4917497.10
56	GE 2.82-127	114	511042.17	4914893.71
57	GE 2.82-127	114	511469.67	4914971.97
58	GE 2.82-127	114	511894.42	4915162.79
59	GE 2.82-127	114	512305.67	4915277.95
60	GE 2.82-127	114	512803.14	4915317.02
61	GE 2.82-127	114	513621.17	4914858.56
62	GE 2.82-127	114	513970.70	4915157.35
64	GE 2.82-127	114	515484.40	4915543.47
65	GE 2.82-127	89	515930.55	4915748.62
66A	GE 2.82-127	89	516423.31	4916038.94
67	GE 2.82-127	114	516827.22	4916161.87
68	GE 2.82-127	114	517706.12	4915026.43
69	GE 2.82-127	114	516494.56	4914281.40
70	GE 2.82-127	114	517021.22	4914069.27
71A	GE 2.82-127	114	517443.63	4914133.45
72	GE 2.82-127	114	517815.36	4914019.51
73	GE 2.82-127	114	517461.35	4911864.45
74	GE 2.82-127	89	517789.29	4912125.25
76A	GE 2.82-127	114	517721.01	4910983.29
77A	GE 2.82-127	114	518892.06	4912070.45
77P	GE 2.82-127	114	518901.20	4910709.17
78P	GE 2.82-127	114	519264.70	4910797.24
79P	GE 2.82-127	114	519563.99	4910955.49
80A	GE 2.82-127	89	519848.54	4911253.43
81A	GE 2.82-127	114	511384.00	4916015.74
82A	GE 2.82-127	89	512244.18	4916438.26
84A	GE 2.82-127	114	515973.83	4913442.12
85A	GE 2.82-127	114	516278.60	4913679.95
86A	GE 2.82-127	114	515116.95	4912318.92
87A	GE 2.82-127	89	515575.65	4912534.49
88A	GE 2.82-127	114	517882.92	4912011.96
89A	GE 2.82-127	114	520332.80	4911161.95

Appendix B
Predicted Sound Levels at Occupied Residences

Table B-1: Modeled Sound Pressure Levels at Occupied Residences

Receptor ID	Description	Coordinates UTM NAD83 Zone 14N		Participation Status	Source Only Broadband L_{eq} Sound Level (dBA)
		X (m)	Y (m)		
1	Dale& Leanna Resel	510861.20	4922299.80	Participating	47
2	Dale& Leanna Resel	510617.45	4921033.54	Participating	47
3	John& Kimberly Fanning	511084.98	4919693.62	Participating	50
4	Jeremy& Marci Stevens	509240.44	4918553.74	Participating	47
5	James& Renae Aalbers	511442.82	4917952.72	Participating	50
6	Eric Fanning	512329.39	4917967.20	Participating	50
7	Jason D Resel	515363.03	4919055.61	Participating	49
8	Lyle& Rebecca Resel	516342.30	4921246.06	Non-Participating	43
9	James Major	515803.65	4922429.04	Participating	45
10	36891 St	515499.23	4922661.77	Participating	47
11	Steve Runge	515658.09	4923385.39	Non-Participating	42
12	Craig& Cheryl Van Asperen	517511.88	4916440.42	Participating	46
13	Cole Mehling	518901.01	4916154.62	Participating	41
14	Karen& Clinton Haigh	515701.85	4915097.07	Participating	49
15	Gilbert& Stephanie Rodgers	518930.64	4914440.16	Pending Participation	41
16	Reynolds Family Farms LLC	520879.37	4913213.26	Non-Participating	38
17	L Brewer 37386	523539.62	4913117.77	Non-Participating	32
18	Jay Anderberg	517896.23	4912672.02	Participating	49
19	Jay Anderberg cabin	517856.16	4912818.41	Participating	47
20	Jeremy& Marci Stevens	515809.40	4912961.25	Participating	50
21	Wayne& Joan Horsley Residence	518872.55	4911572.32	Participating	49
22	Travis Letsche	514315.01	4909824.50	Participating	35
23	Robert Duxbury	522266.31	4909368.02	Non-Participating	33
24	Paul Duxbury	522159.03	4909019.95	Non-Participating	33
25	Dean Duxbury	522748.18	4908152.95	Non-Participating	30
26	Leon& Lori Boomsma	515422.97	4908930.39	Participating	35
27	Scot Parmely	514136.35	4907279.00	Non-Participating	31
28	Non-valuated property	520868.09	4906901.58	Non-Participating	31
29	Non-valuated property	517417.40	4907112.62	Non-Participating	27
30	M Anson	517347.17	4906873.43	Non-Participating	32
31	Joe Jensen	513813.93	4906527.92	Non-Participating	30
32	Howard Jensen	513722.68	4906535.03	Non-Participating	30
33	Kevin& Marcie Bertsch	507556.69	4923810.27	Non-Participating	33
34	Dale G Christiansen	513798.02	4917935.51	Participating	50
36	Larry& Deanne Rowen	517289.54	4921647.66	Non-Participating	39
37	Robert& Patricia Moriarty	510971.00	4912975.40	Non-Participating	38
38	Jerrit Mehling	520521.55	4916748.02	Non-Participating	36
39	Deborah A Mehling Rev Trust	520543.07	4915750.09	Non-Participating	36
40	Gregory Roy Mehling	520533.48	4914986.86	Non-Participating	36
41	Kenneth& Dieanne Wedge	522108.26	4913867.58	Non-Participating	34
42	Daniel W Jensen	512549.23	4909816.85	Non-Participating	33

APPENDIX E – NATIVE GRASSLANDS HABITAT REPORT

Sweetland Wind Farm

2018 Grassland Habitat Assessment

Prepared For:

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February 22, 2019

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BACKGROUND

Sweetland Wind Farm, LLC (Sweetland) is proposing to develop the Sweetland Wind Energy Project (Project) in Hand County, South Dakota (Figure 1). As currently proposed, the Project would have a generation capacity of approximately 200 megawatts (MW), consisting of up to 71 GE 2.8/1272 wind turbines encompassing approximately 23,642 acres. The location of the Project in Hand County was selected in consultation with the U.S. Fish and Wildlife Service (FWS) and South Dakota Game, Fish, and Parks (GFP) and Scout Clean Energy (Scout). The location of the Project minimizes impacts to FWS Grassland Conservation Easements.

INTRODUCTION

The predominant land use within the Project is dryland farming and rangeland. As part of the wildlife/biological baseline studies of the Project, grasslands were evaluated at the request of Sweetland to assess grassland quality within the Project area. The objective was to provide an assessment of the quality of all Project grasslands based primarily on the presence and abundance of native tallgrass prairie species and introduced species, and based secondarily on grazing pressure, woody plant invasion, and land management (e.g., haying, dryland farming) and their ability to provide quality wildlife habitat (including grassland breeding avian species).

METHODS

To determine the location of potentially undisturbed grasslands (i.e., grasslands that have not previously been tilled) in the Project, the *Quantifying Undisturbed (Native) Lands in Eastern South Dakota: 2013*[1] digital data layer (Bauman et al. 2016) was plotted on maps of the study area (Figure 2).

[1] http://openprairie.sdstate.edu/data_land-easternSD/1/

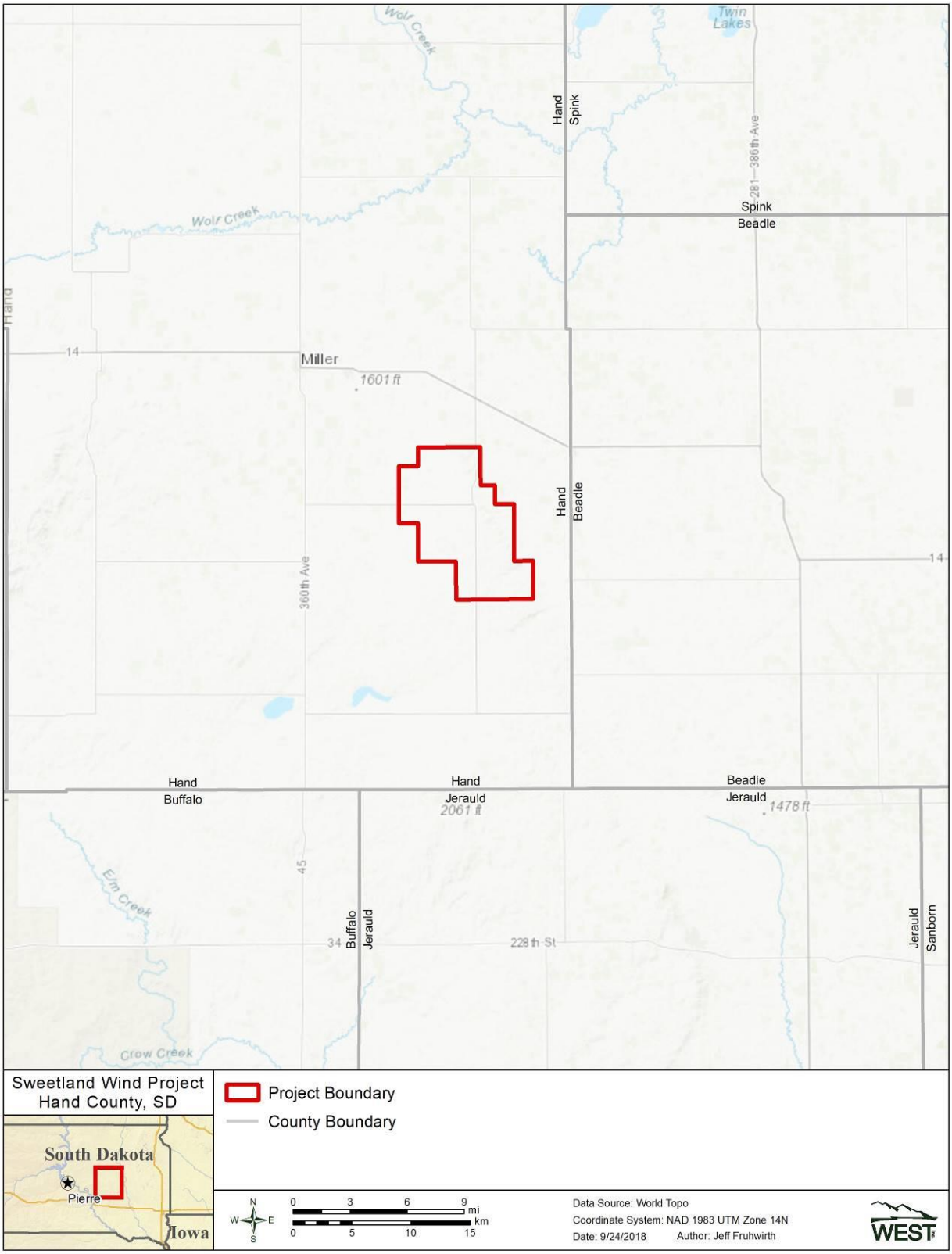

Figure 1. General location of the Sweetland Wind Energy Project, Hand County, South Dakota.

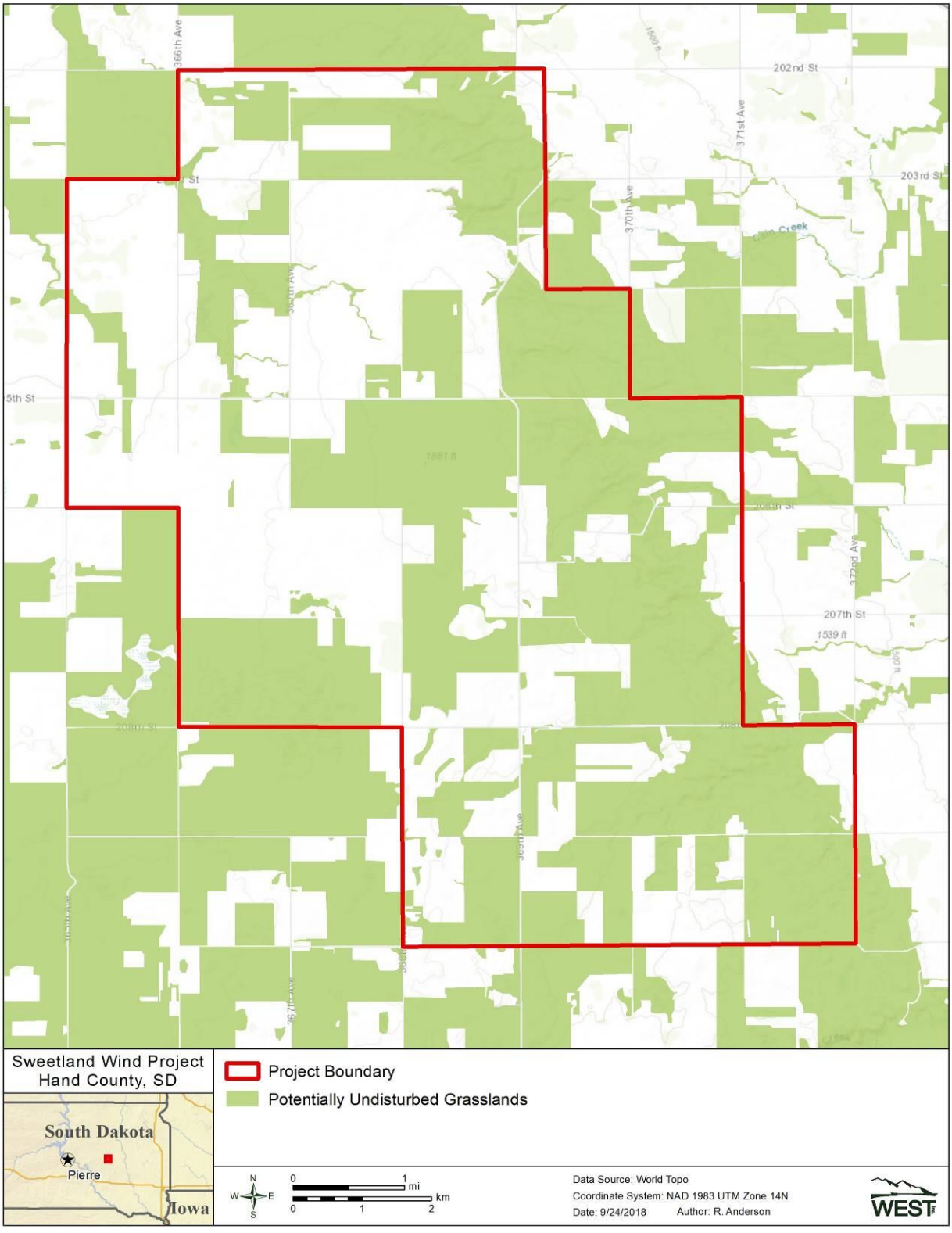

Figure 2. Potentially undisturbed grassland tracts within the Sweetland Wind Energy Project, Hand County, South Dakota (Bauman et al. 2016).

Prior to conducting grassland assessments, each square mile section, with some being expanded to accommodate for an updated project area, within the Project area was assigned a unique identifier (e.g., 1, 2, 3, etc.). While on-site, each section was visited and a subsequent unique identifier was assigned to each individual tract of grassland evaluated (e.g., 1A, 1B, B1, etc.). All grasslands were evaluated, including those not classified as undisturbed by Bauman et al. (2016). Bauman et al. (2016) defines undisturbed as never having been cultivated or mechanically disrupted for agriculture or other uses. Grassland tracts within each section were selected for separate evaluation based on differences in several characteristics such as topography, amount of grazing, plant species composition, adjacent land cover types, etc. Several tracts were separated from adjacent tracts of grassland only by fences, but were treated as separate tracts due to differences in grazing pressure, species composition, differences in the signature on aerial photos, or other factors. A total of 105 tracts of grassland habitat were assessed. The grassland evaluation was conducted on July 17-21, 2018, August 18-19, 2018, September 1, 2018, and September 14, 2018.

Where access had been granted, the evaluator traversed through the grassland tract on foot to obtain relevant information for conducting the assessment. Where no access had been granted, the evaluator recorded information and scored the grassland from public roads, with the aid of binoculars. Similar to those grasslands that were traversed, characteristics such as topography, amount of grazing, plant species composition, and adjacent land cover types were taken into account during the visual assessments, to the extent possible. No evaluations were conducted for grassland tracts that could not be viewed from public roads or areas where access had not been obtained. Based on this combined approach two tracts were not evaluated due to land access restrictions or no visibility from public roads. Whether or not the grassland tract may have been previously disturbed was recorded based on several factors, including topography, presence of wetlands and drainages, and presence of large rocks or rock piles within the grassland.

For each tract the following characteristics were described on a datasheet to help assess the quality of the grasslands: grass height; appearance with respect to grazing, burning, haying, and residual litter; and degree of woody invasion (shrubs and trees). All grass species observed in each tract were recorded and classified as native or introduced. A list of forb species also was recorded, along with notes on relative abundance of native grasses, introduced grasses, and forbs. A list of plant species identified during the survey is provided in Appendix A. Any other pertinent comments also were recorded. Data sheets were completed for each tract (Appendix B) and a photograph was taken to depict characteristics of each tract (Appendix C). Based on this information, each grassland tract was assigned a qualitative value from 1 to 5 that represents the quality of the grassland being evaluated compared to the optimal grassland type for the geographical area in question, with a score of 1 representing optimal conditions. The qualitative thresholds for ratings were: Excellent = 1; Above Average = 2; Average = 3; Fair = 4, and Poor = 5.

The following definitions were used to rate grasslands in the project area based on descriptions of habitat the U.S. Fish and Wildlife Service (USFWS) *Guidance for Interagency Cooperation*

under Section 7(a)(2) of the Endangered Species Act for the Dakota Skipper, Dakota Skipper Critical Habitat, and Poweshiek Skipperling Critical Habitat (USFWS 2016). These definitions are useful for evaluating the quality of grassland habitat, even in areas outside the range of these species, such as is the case for the Project, since the species in question are prairie-obligates dependent on grasslands containing native grass and forb species.

Excellent (1) – Dominated entirely by native tallgrass species such as big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*) or sideoats grama (*Bouteloua curtipendula*), with numerous native forbs such as purple coneflower (*Echinacea purpurea*), prairie clover (*Dalea* spp.), blanket flower (*Gaillardia* sp.), and leadplant (*Amorpha canescens*). No significant invasion by woody species, not cut for hay and no to moderate grazing by livestock.

Above Average (2) – Native grasses and forbs as described above are common, but introduced grasses and forbs are also prevalent. No significant invasion by woody species, not cut for hay and no to moderate grazing by livestock.

Average (3) – Some native grasses and forbs are present, but not common, and tract is dominated by introduced grasses. Minor to no invasion by woody species, not cut for hay and no to moderate grazing by livestock.

Fair (4) – No native grasses present. Dominated entirely by introduced grasses, although native forbs may be present. Woody species invasion may occur in portions. Not cut for hay and no to moderate grazing by livestock.

Poor (5) – Grasslands classified as poor included all those classified as hayfields as well as any grassland severely overgrazed by livestock. These grasslands were also completely dominated by introduced grasses with few native forbs present. Hayfields were classified as Poor because they have little value to wildlife once they have been cut, although their value would increase if haying were not conducted in any given year.

RESULTS

A map showing locations of grasslands evaluated during the study along with their classification is provided in Figure 3. No evaluations were done for grassland tracts where access had not been obtained, and were not visible from public roads (i.e. Figure 3 – unscored areas, 1.3% of total area scored, Table 1). No Excellent (1) level grasslands were located in the Project area. The vast majority (61 of 105; 49.9%; Table 1) of the grassland tracts evaluated were rated Fair (4), of which two were scored from public roads: 5B, and 15F. These tracts had no native grasses identified and almost all were dominated entirely by smooth brome (*Bromus inermis*), although a few were dominated by mixtures of crested wheatgrass (*Agropyron cristatum*) and smooth brome. Other introduced grasses occurring in these tracts included Kentucky bluegrass (*Poa pratensis*) and fescue (*Festuca* spp.). Some native forbs were present, but not common.

These tracts were not hayed and also were typically either not grazed or grazed lightly to moderately. A few of these tracts appeared to have previously been disturbed (i.e., previously tilled) and currently enrolled in the Conservation Reserve Program (CRP), but most appeared to have never been disturbed. Only three parcels in the Project area had big bluestem observations, with two of those parcels being apparent CRP tracts; the third tract with big bluestem was one Above Average (2) tract located along steep slopes. In all three of these cases only a few individual big bluestem plants were observed and the dominant species were introduced species such as smooth brome. Minor invasion by woody plants, especially western snowberry (*Symphoricarpus occidentalis*) has occurred in some of the tracts.

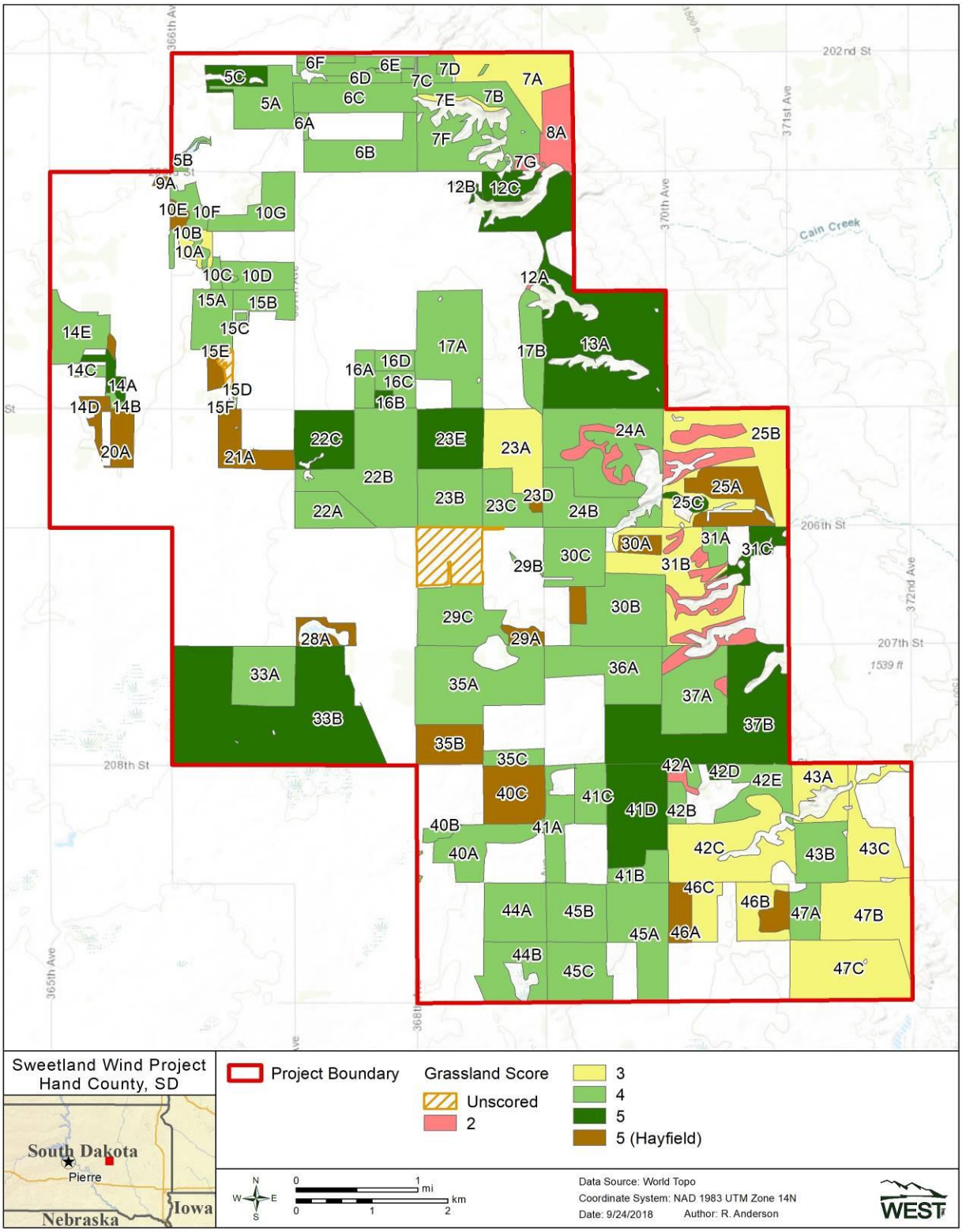

Figure 3. Locations of evaluated grasslands and their quality classification for the Sweetland Wind Energy Project, Hand County, South Dakota. White areas on map represent non-grassland habitat types.

Twenty-nine grasslands (28.4%; Table 1) were rated Poor (5), 10 of which were evaluated and scored from public roads: 5C, 12C, 13A, 22C, 23E, 25C, 31C, 33B, 37B, 40C. Thirteen of these were hayfields that had recently been cut at the time of the site visit. No native grasses were observed and all were dominated by smooth brome.

Thirteen grasslands (17.1%; Table 1) were rated Average (3), two of which were evaluated and scored from public roads: 43C and 47C. All of these grasslands had native grasses present, but the native grasses were not prevalent and the tracts were dominated by smooth brome. Some native forbs were present, but not common. These tracts were not hayed and also were typically either not grazed or grazed lightly to moderately. Minor invasion by woody plants, especially western snowberry has occurred in some.

Eight grasslands (3.3%; Table 1) were either entirely or partially rated Above Average (2). These included two entire but relatively small grassland tracts and portions of six additional tracts. All of these grasslands occurred on slopes leading up from ravines, and only occurred in the relatively hilly portion of the Project area. In those cases where only portions of the grassland were rated Above Average, the remainder of the grassland that occurred in the valley bottom or on flatter terrain away from ravines was rated Poor in four cases and Average in two cases. Grasslands rated as Above Average had substantial components of native grasses, especially sideoats grama, along with minor amounts of other native grasses such as green needlegrass (*Nassella viridula*), needle-and-thread (*Heterostipa comata*) or blue grama (*Bouteloua gracilis*). Native forbs were conspicuous and included purple coneflower, prairie coneflower (*Ratibida columnifera*), leadplant, daisy fleabane (*Erigeron annuus*), and purple and white prairie clover. Although native grasses were abundant, introduced grasses were also prevalent, which prevented any of these sites from receiving an Excellent classification. A photograph depicting a typical example of an Above Average Grassland is provided in Figure 4.

Table 1. Proportion of grasslands within each ranking for the Sweetland Wind Energy Project, Hand County, South Dakota

Ranking[a]	Percentage
1	0.0%
2	3.3%
3	17.1%
4	49.9%
5	28.4%
Unscored	1.3%

[a]Rankings: 1 = Excellent; 2 = Above Average; 3 = Average; 4 = Fair; 5 = Poor, Unscored

Figure 4. Slopes in Project area rated as Above Average due to prevalence of native grasses and forbs. Sideoats grama is prevalent here, but note that smooth brome is still a common component of these sites.

DISCUSSION

Native tall and mixed-grass prairies once covered a majority of the central and eastern Great Plains region of the United States, but less than 4% of the original tallgrass prairie remains. Smooth brome is an introduced cool-season perennial, sod-forming grass that invades both native cool- and warm-season grasslands throughout North America (Sundall et al. 2015). Smooth brome has been largely ignored as an invasive species due to its economic value as a forage plant through both livestock grazing and hay production (Dillemuth 2012). All grasslands evaluated in the Sweetland Project area had substantial components of smooth brome. The only sites found in the Project area not dominated by smooth brome and with relatively abundant native grasses and forbs all occurred on steeper slopes above ravines. These sites typically have shallow soils and do not maintain as much moisture as deeper soils in areas of relatively flat topography. Smooth brome is most commonly found in areas with abundant soil moisture and is mostly associated with wetter soils or low-lying areas (Sundall et al. 2015, Thompson and Salesman 2011); therefore it likely does not compete well with native grasses on these slopes.

From an ecological perspective, grasslands in the Project area dominated by smooth brome (i.e., Average, Fair, and Poor) do provide some wildlife habitat, but they are abundant throughout the region. The Above Average grasslands also provide wildlife habitat and have native species more commonly present although not dominant; these grasslands only occur in smaller isolated areas on the steeper slopes in the Project.

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Appendix A. Plant Species Observed During the Grassland Assessment at the Sweetland Wind Energy Project in 2018

Appendix A. Plant species observed during the grassland assessment at Sweetland Wind Resource Area.

Common Name	Scientific name
Native Grasses	
big bluestem	*Andropogon gerardi*
blue grama	*Bouteloua gracilis*
foxtail barley	*Hordeum jubatum*
green needlegrass	*Nassella viridula*
needle-and-thread	*Heterostipa comata*
prairie cordgrass	*Spartina pectinata*
porcupine grass	*Hesperostipa spartea*
prairie junegrass	*Koeleria macrantha*
prairie sandreed	*Calamovilfa longifolia*
prairie threeawn	*Aristida oligantha*
sideoats grama	*Bouteloua curtipendula*
tall dropseed	*Sporobolus compositus*
Introduced Grasses	
barnyard grass	*Echinochlosa crus-gali*
crested weatgrass	*Agropyron cristatum*
fescue	*Festuca* sp.
intermediate wheatgrass	*Thinopyrum intermedium*
Japanese brome	*Bromus japonicas*
Kentucky bluegrass	*Poa pratensis*
setaria	*Setaria* sp.
smooth broome	*Bromus inermis*
reed canarygrass	*Phalaris arundinacea*
tall wheatgrass	*Thinopyrum ponticum*
timothy	*Phleum pratense*
Forbs	
absinth wormwood	*Artemisia absinthium*
alfalfa	*Medicago sativa*
beeblossom	*Gaura coccinea*
bindweed	*Convolvulus arvensis*
buffalo bur	*Solanum rostratum*
Canada thistle	*Cirsium arvense*
cinquefoil	*Potentilla* sp.
common mullein	*Verbascum thapsis*
common salsify	*Tragopogon dubius*
common sunflower	*Helianthus annuus*
common yarrow	*Achillea millefolium*
curlycup gumweed	*Grindelia squarrosa*
curly dock	*Rumes crispus*
daisy fleabane	*Erigeron annuus*
dandelion	*Taraxacum officinale*
fringed sage	*Artemisia frigida*
goldenrod	*Solidago* sp.
horsemint	*Monarda* sp.
horseweed	*Erigeron canadensis*
kochia	*Bassia scoparia*
leadplant	*Amorpha canescens*
leafy spurge	*Euphorbia esula*
Maximilian sunflower	*Helianthus maximilina*
musk thistle	*Carduus nutans*
pennycress	*Thlaspi arvense*
poison ivy	*Toxicodendron* sp.

Appendix A. Plant species observed during the grassland assessment at Sweetland Wind Resource Area.

Common Name	Scientific name
prairie coneflower	*Ratibida columnifera*
prickly lettuce	*Lactuca serriola*
purple coneflower	*Echinacea purpurea*
purple prairie clover	*Dalea purpurea*
western ragweed	*Ambrosia psilostachya*
rose	*Rosa* sp.
rush skeletonweed	*Chondrilla juncea*
scarlet globemallow	*Sphaeralcea coccinea*
showy milkweed	*Asclepias speciose*
silverleaf scurfpea	*Pediomelum argophyllum*
smartweed	*Polygonum* sp.
smooth camas	*Zygadenus elegans*
wavyleaf thistle	*Cirsium undulatum*
white clover	*Trifolium repens*
white prairie clover	*Dalea candida*
white sage	*Artemisia ludoviciana*
white sweetclover	*Melilotus alba*
wild licorice	*Glycyrrhiza lepidota*
wooly verbena	*Verbena stricta*
yellow sweetclover	*Melilotus officinalis*
Shrubs and Trees	
eastern red cedar	*Juniperus virginiana*
Russian olive	*Eleagnus angustifolia*
western snowberry	*Symphoricarpos occidentalis*

Appendix B. Data Form For the Grassland Assessment at the Sweetland Wind Energy Project in 2018

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 & 8-18-18 **Observer**: Greg Johnson & Alex Fryman **Grassland Polygon ID**: 5A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Fescue
	Kentucky bluegrass

Comments: smooth brome is dominant

Forb Species Present:

Bindweed		
White sage		
Silverleaf scurfpea		
Western ragweed		
Common salsify		
Prairie coneflower		
White clover		
Alfalfa		
beeblossom		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 8-14-2018 **Observer**: Alex Fryman **Grassland Polygon ID**: 5B (Viewed from public road)

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Fescue

Comments: smooth brome is dominant

Forb Species Present:

Prairie coneflower		
White clover		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 8-14-2018 **Observer**: Alex Fryman **Grassland Polygon ID**: 5C (Viewed from public road/granted access, portion of land within land access but no access from south due to fencing)

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: smooth brome is dominant

Forb Species Present:

Comments:

Grass height: NA

Grazing: NA **Burning:** NA **Haying:** NA

Residual litter: NA

Shrub or tree encroachment: No

Species:

Comments:
Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Green needlegrass	Smooth brome
Blue grama	Fescue
	Kentucky bluegrass
	Setaria

Comments: smooth brome is dominant

Forb Species Present:

Bindweed		
Kochia		
Silverleaf scurfpea		
Prairie coneflower		
Western ragweed		
Absinth wormwood		
Pennycress		
White sage		
Showy milkweed		
Common yarrow		

Comments:

Grass height: ankle

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: some native grasses but dominated by smooth brome and heavily grazed

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6B
Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Fescue
	Kentucky bluegrass
	Setaria

Comments: smooth brome is dominant

Forb Species Present:

Bindweed		
Kochia		
Silverleaf scurfpea		

Comments: very few forbs

Grass height: knee

Grazing: none currently **Burning:** No **Haying:** No

Residual litter: 0.5“

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6C

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
Porcupine grass	Smooth brome
	Kentucky bluegrass

Comments: porcupine grass is rare; smooth brome is dominant

Forb Species Present:

White sage		
Silverleaf scurfpea		
Purple coneflower		
Rose		
Leadplant		
Green sagewort		
Daisy fleabane		
Prairie coneflower		
Common yarrow		

Comments: few forbs

Grass height: waist

Grazing: No **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: almost all smooth brome; appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6D

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: porcupine grass is rare; smooth brome is dominant

Forb Species Present:

alfalfa		

Comments: only forb is alfalfa

Grass height: waist

Grazing: No **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; almost all smooth brome - appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6E

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
Big bluestem	Smooth brome

Comments: big bluestem is very rare; smooth brome is dominant

Forb Species Present:

Alfalfa		
Bindweed		
Wavyleaf thistle		

Comments: very few forbs

Grass height: waist

Grazing: No **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: only a few individual big bluestem; dominated almost entirely by smooth brome - appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 6F

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
Big bluestem	Smooth brome
	Intermediate wheatgrass

Comments: big bluestem is very rare; smooth brome is dominant

Forb Species Present:

Alfalfa		
Canada thistle		
Common salsify		

Comments: very few forbs

Grass height: waist

Grazing: No **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: only a few big bluestem plants; dominated entirely by smooth brome - appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Needle-and-thread	

Comments:

Forb Species Present:

alfalfa		
Rose		
Silverleaf scurfpea		
Purple coneflower		
Prairie coneflower		
Wavyleaf thistle		
Leadplant		
Rusk skeletonweed		
Bindweed		

Comments: forbs are abundant

Grass height: ankle to knee

Grazing: None at present **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 3
Comments: dominated by smooth brome but native grasses are present and forbs are abundant

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
	Kentucky bluegrass

Comments: needle-and-thread is rare

Forb Species Present:

Horseweed		
Silverleaf scurfpea		
Western ragweed		
Rush skeletonweed		
White sage		
Prairie coneflower		
Purple prairie clover		
Common mullein		

Comments: few forbs

Grass height: ankle to knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: very few native grasses; dominated by smooth brome and very few forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7C

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Bindweed		
alfalfa		

Comments: few forbs except alfalfa

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome - appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7D

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Tall wheatgrass

Comments:

Forb Species Present:

Bindweed		
alfalfa		

Comments: few forbs except alfalfa

Grass height: knee – waist

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses; dominated by smooth brome and tall wheatgrass - appears to be a CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7E

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
Prairie junegrass	Kentucky bluegrass
	Japanese brome

Comments:

Forb Species Present:

Silverleaf scurfpea	Horseweed	
Western ragweed	Wooly verbena	
Prairie coneflower	White prairie clover	
Purple prairie clover		
Common mullein		
Common salsify		
Daisy fleabane		
Leadplant		
White sage		
Common sunflower		

Comments: forbs are abundant and diverse

Grass height: ankle – knee

Grazing: light - moderate **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: yes

Species: western snowberry

Comments: numerous rather dense snowberry patches throughout

Ranking 1 (excellent) – 5 (poor): 3

Comments: native grasses conspicuous and lots of forbs, but smooth brome is predominant

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7F

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Prairie threeawn	Smooth brome
	Kentucky bluegrass

Comments: threeawn is rare

Forb Species Present:

Common salsify	horsemint	
horseweed		
Green sagewort		
Prairie coneflower		
White sage		
Wooly verbena		
Silverleaf scurfpea		
Rush skeletonweed		
Purple prairie clover		
Daisy fleabane		

Comments: forbs are prevalent

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: yes

Species: western snowberry

Comments: in places there are dense snowberry patches

Ranking 1 (excellent) – 5 (poor): 4

Comments: few native grasses; dominated almost entirely by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 7G

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Blue grama	Smooth brome
Green needlegrass	Kentucky bluegrass
Prairie threeawn	Japanese brome
Sideoats grama	
Tall dropseed	

Comments: dominated by native grasses; smooth brome is rare

Forb Species Present:

Daisy fleabane	Purple prairie clover	
Wavyleaf thistle	Green sagewort	
Prairie coneflower	Wooly verbena	
Purple coneflower	White clover	
Common yarrow	Western ragweed	
Rush skeletonweed	Leadplant	
Common mullein	White sage	
Silverleaf scurfpea	Smooth camas	
Horseweed		
alfalfa		

Comments: forbs are prevalent

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments: a few snowberry in places

Ranking 1 (excellent) – 5 (poor): 2

Comments: dominated by native grasses with lots of forbs; very little smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 8A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Blue grama	Smooth brome
Sideoats grama	Kentucky bluegrass

Comments: dominated by native grasses

Forb Species Present:

Silverleaf scurfpea		
Prairie coneflower		
Horseweed		
Wooly verbena		
Purple coneflower		
Leadplant		
Wavyleaf thistle		
Common mullein		
Scarlet globemallow		
Smooth camas		

Comments: forbs are prevalent

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments: a few snowberry in places

Ranking 1 (excellent) – 5 (poor): 2

Comments: dominated by native grasses with lots of forbs; very little smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 9A (No Photo)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: alfalfa is only forb

Grass height: NA

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: NA

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Blue grama	Smooth brome
Sideoats grama	Kentucky bluegrass
	Crested wheatgrass
	Setaria

Comments: dominated by smooth brome

Forb Species Present:

White sage		
Silverleaf scurfpea		
Prairie coneflower		
Showy milkweed		
Buffalo bur		
Bindweed		
Yellow sweetclover		

Comments: forbs are prevalent

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 3

Comments: native grasses are present but dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Prairie cordgrass	Smooth brome
Sideoats grama	Setaria
Green needlegrass	

Comments: dominated by smooth brome

Forb Species Present:

Common mullein		
silverleaf scurfpea		
Goldenrod		
White sage		
Prairie coneflower		

Comments: few forbs

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: native grasses are present but dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Prairie cordgrass	Smooth brome
	Kentucky bluegrass

Comments: dominated by smooth brome

Forb Species Present:

Bindweed		
Alfalfa		
Wild licorice		

Comments: few forbs other than alfalfa

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: dominated by smooth brome with few native forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10D

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: dominated by smooth brome

Forb Species Present:

White sage		
Rose		
Purple coneflower		

Comments: few forbs present

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: no

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: dominated by smooth brome with few forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10E

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: dominated by smooth brome; hard to identify plants

Forb Species Present:

White sage		
Rose		
Purple coneflower		

Comments: few forbs present

Grass height: 3” (recently cut)

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: no

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: dominated by smooth brome and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 & 9-1-18 **Observer**: Greg Johnson & Alex Fryman **Grassland Polygon ID**: 10F

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: dominated by smooth brome

Forb Species Present:

White sage		
Rose		

Comments: very few forbs present

Grass height: knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: yes

Species: Russian olive

Comments: numerous Russian olive trees in grassland; a few snowberry also present

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome and very few forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 10G

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments: dominated by smooth brome

Forb Species Present:

White sage		
Common yarrow		
Showy milkweed		

Comments: very few forbs present

Grass height: ankle – knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome and very few forbs – may be CRP

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-17-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 12A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Needle-and-thread	

Comments: native grasses limited to steep slopes; otherwise dominated by smooth brome

Forb Species Present:

Alfalfa		
Horseweed		
White sage		
Green sagewort		
Purple prairie clover		
Daisy fleabane		
Western ragweed		

Comments:

Grass height: ankle – knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 2 on steep slopes only; 4 elsewhere
Comments: native grasses and forbs limited to steep slopes above ravines but this is a small area; remainder of site dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 12B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments: native grasses limited to steep slopes; otherwise dominated by smooth brome

Forb Species Present:

Goldenrod		
Blazing star		
Curlycup gumweed		
Alfalfa		
Rose		
Common Sunflower		
Bindweed		

Comments:

Grass height: ankle – knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 12C (Viewed from public road)

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: native grasses limited to steep slopes; otherwise dominated by smooth brome

Forb Species Present:

Goldenrod		
Blazing star		
Curlycup gumweed		
Alfalfa		
Rose		
Common Sunflower		
Bindweed		

Comments:

Grass height: ankle – knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 13A (Viewed from public road)

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky Bluegrass

Forb Species Present:

Goldenrod		
Blazing star		
Curlycup gumweed		
Alfalfa		
Rose		
Common Sunflower		
Bindweed		

Comments:

Grass height: ankle-knee

Grazing: Light **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:
Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 14A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: grasses hard to identify due to extreme grazing

Forb Species Present:

Dandelion		
Bindweed		
white clover		
Buffalo bur		

Comments:

Grass height: 1”

Grazing: overgrazed **Burning:** No **Haying:** No

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses and extremely overgrazed; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 14B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Reed canarygrass

Comments: reed canarygrass limited to drainages

Forb Species Present:

Bindweed		
Silverleaf scurfpea		
Yellow sweetclover		
alfalfa		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-3”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and dominated entirely by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 14C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Crested wheatgrass
	Smooth brome

Comments: dominated by crested wheatgrass

Forb Species Present:

Bindweed		
horseweed		

Comments: few forbs present

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and dominated by crested wheatgrass

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 14D

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Kentucky bluegrass
	Smooth brome

Comments:

Forb Species Present:

Alfalfa		
Pennycress		
Kochia		
bindweed		

Comments: no native forbs

Grass height: 2”

Grazing: none **Burning:** No **Haying:** Yes

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses or forbs; dominated by introduced grasses and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 & 8-19-18 **Observer**: Greg Johnson & Alex Fryman **Grassland Polygon ID**: 14E

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Intermediate wheatgrass
	Kentucky bluegrass

Comments:

Forb Species Present:

Bindweed		
Yellow sweetclover		
Common yarrow		
Kochia		
Western ragweed		
Common sunflower		

Comments: lots of yellow sweetclover in places

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome and weedy

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 15A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Blue grama	Smooth brome
Sideoats grama	Crested wheatgrass
Porcupine grass	Kentucky bluegrass
	fescue

Comments: grammas confined to steep slopes and are not common; dominated by smooth brome

Forb Species Present:

White sage		
Silverleaf scurfpea		
Purple coneflower		
Green sagewort		
Goldenrod		
Prairie coneflower		
Wavyleaf thistle		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 3
Comments: native grasses and forbs are present, but are not common and confined to slopes; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 15B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Blue grama	Smooth brome
	Crested wheatgrass
	Intermediate wheatgrass

Comments: blue gramma is rare

Forb Species Present:

Alfalfa		
Common sunflower		
Bindweed		
White sage		
Silverleaf scurfpea		
Purple coneflower		
kochia		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: blue gramma is rare and site is dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 15C

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Crested wheatgrass

Comments:

Forb Species Present:

alfalfa		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses and only forb is alfalfa; dominated by smooth brome – may be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 & 9-1-18 **Observer**: Greg Johnson & Alex Fryman **Grassland Polygon ID**: 15D

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: hardly any forbs

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and only forb is alfalfa; dominated by smooth brome – may be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 15E (No Photo)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: alfalfa is only forb

Grass height: NA

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: NA

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 15F (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Goldenrod		
Curlycup gumweed		
Alfalfa		
Common sunflower		
Bindweed		
White sage		

Comments:

Grass height: ankle - knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 16A

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		
bindweed		

Comments: hardly any forbs except alfalfa

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses and primary forb is alfalfa; dominated by smooth brome – may be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 16B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

bindweed		

Comments:

Grass height: ankle

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments: no native grasses and hardly any forbs; dominated by smooth brome and overgrazed

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 16C

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Intermediate wheatgrass

Comments:

Forb Species Present:

bindweed		

Comments:

Grass height: ankle-knee

Grazing: none now but old cowpies present **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and hardly any forbs; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 16D

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Intermediate wheatgrass

Comments:

Forb Species Present:

bindweed		
alfalfa		

Comments: very few forbs

Grass height: knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 17A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

White sage		
Prairie coneflower		
Common yarrow		
Bindweed		
Silverleaf scurfpea		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 17B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Alfalfa		
bindweed		

Comments: very few forbs

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 20A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Alfalfa		
bindweed		
Dandelion		
Canada thistle		

Comments:

Grass height: 3”

Grazing: none **Burning:** No **Haying:** Yes

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; dominated by smooth brome and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 21A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Alfalfa		
bindweed		
Silverleaf scurfpea		

Comments: very few forbs

Grass height: 3” to thigh where not cut

Grazing: none **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few trees are present

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; dominated by smooth brome and approximately 75% cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 22A

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

White sage		
Common salsify		
Silverleaf scurfpea		

Comments: very few forbs

Grass height: knee-thigh

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome – appears to be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-18-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 22B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Green needlegrass	Smooth brome
	Kentucky bluegrass

Comments: green needlegrass is rare

Forb Species Present:

White sage		
Silverleaf scurfpea		

Comments: very few forbs

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 22C (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Goldenrod		
Blazing star		
Alfalfa		
Common sunflower		
Bindweed		
White sage		

Comments:

Grass height: ankle - knee

Grazing: No **Burning:** No **Haying:** Possible but not recent

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 23A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Porcupine grass	Smooth brome
Blue grama	Kentucky bluegrass
	timothy

Comments: native grasses are rare

Forb Species Present:

White sage	Prickly lettuce	
Silverleaf scurfpea	Green sagewort	
Goldenrod	Curly dock	
Rose	Common yarrow	
Purple coneflower		
Western ragweed		
Prairie coneflower		
Wavyleaf thistle		
Leadplant		
bindweed		

Comments:

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 3
Comments: native grasses are present but not common and native forbs are prevalent; however still dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 23B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Bindweed		
Leafy spurge		
White sage		
Silverleaf scurfpea		
Prairie coneflower		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses and dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 23C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Green needlegrass	Smooth brome

Comments: green needlegrass is rare

Forb Species Present:

White sage		
Silverleaf scurfpea		
Goldenrod		
Prairie coneflower		
Common yarrow		
Horseweed		
cinquefoil		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: native grasses are rare and site is dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 23D (No photo)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: alfalfa is only forb

Grass height: NA

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: NA

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryamn **Grassland Polygon ID**: 23E (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Goldenrod		
Curlycup gumweed		
Alfalfa		
Common sunflower		
Bindweed		
White sage		
Blazing star		

Comments:

Grass height: ankle - knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 24A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

white sage	Green sagewort	
Absinth wormwood	Western ragweed	
Common yarrow		
Leadplant		
Purple coneflower		
Purple prairie clover		
Prairie coneflower		
White prairie clover		
Goldenrod		
Daisy fleabane		

Comments: lots of forbs with good diversity on slopes

Grass height: knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: Yes, in places

Species: western snowberry

Comments: several dense patches of snowberry present, a few eastern red cedar also present

Ranking 1 (excellent) – 5 (poor): 2 on slopes; 4 elsewhere
Comments: sideoats gramma and native forbs limited to steep slopes above ravines; remainder of site is dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 24B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Porcupine grass	Kentucky bluegrass

Comments:

Forb Species Present:

white sage		
Silverleaf scurfpea		
Alfalfa		
Western ragweed		
Leadplant		
Bindweed		
prairie coneflower		
Yellow sweetclover		

Comments: few forbs present

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4
Comments: sideoats gramma is very rare and only occurs on slopes; site is dominated by smooth brome with few forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 25A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: alfalfa is only forb

Grass height: ankle – knee

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments: dominated entirely by smooth brome – aerial photo shows entire area has been hayed in past but only a portion has been hayed yet this year.

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 25B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome

Comments: sideoats gramma occurs throughout, but at much higher density on slopes

Forb Species Present:

alfalfa	Prairie coneflower	
Rose	Wavyleaf thistle	
Silverleaf scurfpea	Smooth camas	
White sage		
Purple coneflower		
Leadplant		
Western ragweed		
Rush skeletonweed		
White prairie clover		
White sage		

Comments: forbs common and diverse, especially on slopes

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry and eastern red cedar present

Ranking 1 (excellent) – 5 (poor): 2 on slopes; 3 elsewhere
Comments: sideoats gramma occurs throughout, but has highest density on steep slopes. Remainder of site is dominated by brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryamn **Grassland Polygon ID**: 25C (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Goldenrod		

Comments: alfalfa is only forb

Grass height: ankle - knee

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 28A (No Photo)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments: alfalfa is only forb

Grass height: NA

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: NA

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 29A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		

Comments: only forb is alfalfa

Grass height: 3”

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: hayfield dominated by smooth brome and alfalfa

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 29B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		
Bindweed		
Showy milkweed		

Comments: very few forbs

Grass height: knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated entirely by smooth brome; may be a hayfield

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 29C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Canada thistle		
Showy milkweed		
White sage		
Bindweed		
Goldenrod		
Silverleaf scurfpea		

Comments:

Grass height: ankle – knee

Grazing: None **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated entirely by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 30A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments:

Grass height: 2”

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; dominated by smooth brome and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 30B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		
Goldenrod		
Curly dock		
Leadplant		
Silverleaf scurfpea		
White sage		
Rose		
Purple coneflower		

Comments:

Grass height: knee

Grazing: light **Burning:** No **Haying:** Yes

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 30C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		
Silverleaf scurfpea		
White sage		
Absinth wormwood		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** Yes

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 31A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		
bindweed		
White sage		

Comments: alfalfa is primary forb

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses; dominated by smooth brome – aerial photo shows this area has been cut for hay in past

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 31B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Big bluestem	Kentucky bluegrass

Comments: big bluestem very rare; sideoats gramma mostly confined to steep slopes

Forb Species Present:

White sage	Common mullein	
Purple coneflower	Rush skeletonweed	
Maximillian sunflower		
Fringed sage		
Green sagewort		
Western ragweed		
White prairie clover		
Silverleaf scurfpea		
Yellow sweetclover		
leadplant		

Comments:

Grass height: knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments: a few small patches of snowberry on slopes

Ranking 1 (excellent) – 5 (poor): 2 (slopes); 3 (elsewhere)
Comments: native grasses and forbs confined primarily to steep slopes; smooth brome dominates elsewhere

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Greg Fryman **Grassland Polygon ID**: 31C (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Comments:

Grass height: ankle - knee

Grazing: No **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 & 8-19-18 **Observer**: Greg Johnson & Alex Fryman **Grassland Polygon ID**: 33A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Common yarrow		
Canada thistle		
Leafy spurge		
Bindweed		
White sage		
rose		

Comments: few forbs present

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome with few forbs

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 33B (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Alfalfa		
Common sunflower		
Bindweed		

Comments:

Grass height: ankle - knee

Grazing: moderate **Burning:** No **Haying:** Possible but not recent

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 35A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Silverleaf scurfpea		
White sage		
Leadplant		
Alfalfa		
Western ragweed		
Wavyleaf thistle		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 35B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments:

Grass height: 3” – knee

Grazing: none **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 5
Comments: no native grasses; dominated by smooth brome. Aerial photo shows entire tract has previously been hayed; only half has been hayed this year

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 35C

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		
Showy milkweed		
Bindweed		
White sage		
White sweetclover		
Prairie coneflower		
Goldenrod		
White prairie clover		

Comments:

Grass height: ankle – knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1-2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome – may be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 36A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Silverleaf scurfpea		
Leadplant		
White sage		
Wavyleaf thistle		
Alfalfa		
Purple coneflower		
Curly dock		
Goldenrod		
Prickly lettuce		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-19-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 37A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Prairie cordgrass	
Prairie junegrass	
Porcupine grass	

Comments: native grasses confined to slopes except prairie cordgrass which is confined to draws

Forb Species Present:

White sage		
Silverleaf scurfpea		
Green sagewort		
White prairie clover		
Purple coneflower		

Comments:

Grass height: knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry and eastern red cedar is all

Ranking 1 (excellent) – 5 (poor): 2 (steep slopes); 4 (elsewhere)

Comments: native grasses confined to steep slopes; remainder dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 37B (Viewed from public road))

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Goldenrod		
Curlycup gumweed		
Alfalfa		
Rose		
Common Sunflower		
Bindweed		
White sage		

Comments:

Grass height: ankle - knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 40A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass
	Setaria

Comments:

Forb Species Present:

Canada thistle		
Prairie coneflower		
White sage		
Alfalfa		
Curlycup gumweed		

Comments:

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 40B

Disturbed or Undisturbed: Disturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Barnyard grass

Comments:

Forb Species Present:

Common sunflower		
Bindweed		
Alfalfa		
Showy milkweed		

Comments: few forbs present

Grass height: knee – waist

Grazing: none **Burning:** No **Haying:** No

Residual litter: 2”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome – may be CRP field

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 40C (Viewed from public road)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Comments:

Grass height: NA

Grazing: light **Burning:** No **Haying:** yes - recently

Residual litter: 1-2''

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 41A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

White sage		
Western ragweed		
bindweed		

Comments: few forbs present

Grass height: ankle – knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few deciduous trees is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome – used as a horse pasture

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 41B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Canada thistle		
Wild licorice		
Alfalfa		
Bindweed		
Common yarrow		
White sage		

Comments:

Grass height: ankle – knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 41C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

Silverleaf scurfpea		
White sage		
Western ragweed		
bindweed		
common sunflower		

Comments:

Grass height: knee

Grazing: none **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 41D

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

alfalfa		

Comments:

Grass height: 3”

Grazing: no **Burning:** No **Haying:** Yes

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; dominated by smooth brome and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 42A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Sideoats grama	Smooth brome
Needle-and-thread	Kentucky bluegrass

Comments: native grasses limited to steep slopes

Forb Species Present:

White sage	Wooly vervain	
Bindweed	Maximillian sunflower	
Leadplant	Poison ivy	
Goldenrod	rose	
Silverleaf scurfpea	Curly dock	
Rush skeletonweed		
Western ragweed		
Wavyleaf thistle		
Purple coneflower		
Prairie coneflower		

Comments: quality forbs (coneflowers) on steep slopes only

Grass height: ankle

Grazing: moderate-heavy **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry on slopes only

Ranking 1 (excellent) – 5 (poor): slopes (2); 4 (elsewhere)
Comments: native grasses and forbs limited to steep slopes, although smooth brome is also common on slopes; remainder of area dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 42B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments: native grasses limited to steep slopes

Forb Species Present:

alfalfa		
bindweed		
Showy milkweed		
smartweed		

Comments: few forbs except for alfalfa

Grass height: knee

Grazing: No **Burning:** No **Haying:** Yes (portions only)

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: No native grasses; dominated by smooth brome. Portions have been cut for hay.

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 42C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
sideoats grama	Smooth brome
Prairie sandreed	Kentucky bluegrass
Blue grama	
Needle-and-thread	

Comments: sideoats gramma is limited to steep slopes; the other native grasses are rare

Forb Species Present:

White sage	Prairie coneflower	
Silverleaf scurfpea	Purple prairie clover	
Common mullein	Horsemint	
Goldenrod	Rush skeletonweed	
Wooly verbena		
Musk thistle		
Green sagewort		
Western ragweed		
Cinquefoil		
Wild licorice		

Comments: coneflower and prairie clover limited to steep slopes

Grass height: knee – thigh

Grazing: light **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: Yes (places)

Species: western snowberry

Comments: several dense stands of snowberry present as are a few eastern red cedar

Ranking 1 (excellent) – 5 (poor): 3
Comments: a few smaller areas have native grasses, but overall this tract is dominated by smooth brome, even on steeper slopes

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 42D

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Green sagewort		
White sage		
Goldenrod		
Bindweed		
Purple prairie clover		
Curlycup gumweed		
Prairie coneflower		
Curly dock		
Common sunflower		

Comments:

Grass height: ankle-knee

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; a small pasture dominated by smooth brome and very weedy

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 42E

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
sideoats grama	Smooth brome
Blue grama	Kentucky bluegrass

Comments: native grasses rare and confined to slopes (sideoats gramma) and hilltops (blue gramma)

Forb Species Present:

Western ragweed	Alfalfa	
Prairie coneflower	Silverleaf scurfpea	
Wavyleaf thistle		
Showy milkweed		
Common sunflower		
Rush skeletonweed		
Green sagewort		
Wooly verbena		
Bindweed		
White sage		

Comments: ragweed is very abundant

Grass height: ankle-knee
Grazing: heavy **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 4
Comments: native grasses are present but not common; if this pasture was not heavily grazed it would have rated as a “3”

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 43A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
sideoats grama	Smooth brome
Prairie sandreed	Kentucky bluegrass
Needle-and-thread	fescue

Comments: sideoats gramma confined to slopes; the other native grasses are rare

Forb Species Present:

Wooly verbena	Daisy fleabane	
Green sagewort	Canada thistle	
White sage		
Silverleaf scurfpea		
Prairie coneflower		
Western ragweed		
Wavyleaf thistle		
Rush skeletonweed		
Purple prairie clover		
Smooth camas		

Comments:

Grass height: ankle-knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: Yes (places)

Species: western snowberry

Comments: several dense patches of snowberry and a few eastern red cedar present

Ranking 1 (excellent) – 5 (poor): 3

Comments: native grasses are present but not common; dominated by introduced grasses

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 43B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass
	fescue
	Crested wheatgrass

Comments:

Forb Species Present:

White sage		
Common yarrow		
Western ragweed		
Wooly verbena		
Wavyleaf thistle		
Silverleaf scurfpea		
Green sagewort		
Bindweed		
Prairie coneflower		
Rush skeletonweed		

Comments:

Grass height: ankle-thigh

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5-1”

Shrub or tree encroachment: Yes (places)

Species: western snowberry

Comments: a few dense patches of snowberry present

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses present; crested wheatgrass dominates

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 43C (Viewed from public road)

Disturbed or Undisturbed: NA

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
Prairie threeawn	Kentucky bluegrass

Comments:

Forb Species Present:

Wooly verbena		
Purple coneflower		
Bindweed		
Blazing star		
goldenrod		
Snowberry		
White sweetclover		
Curlycup gumweed		
Common milkweed		
White sage		

Comments: alfalfa is only forb

Grass height: ankle - knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1-2''

Shrub or tree encroachment: Yes

Species: Snowberry

Comments:

Ranking 1 (excellent) – 5 (poor): 3
Comments:

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-21-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 44A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass
	Crested wheatgrass

Comments:

Forb Species Present:

Bindweed		
White sage		
Alfalfa		
Silverleaf scurfpea		
wavyleaf thistle		

Comments:

Grass height: ankle-knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-21-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 44B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome

Comments:

Forb Species Present:

Silverleaf scurfpea		
White sage		
Rose		
bindweed		

Comments:

Grass height: ankle-knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few small trees is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 45A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Foxtail barley	Smooth brome
	Kentucky bluegrass

Comments: foxtail barley in low areas only

Forb Species Present:

Common yarrow		
Canada thistle		
Alfalfa		
Horseweed		
Western ragweed		
Bindweed		
White sage		
Wild licorice		
Wavyleaf thistle		

Comments:

Grass height: knee

Grazing: light **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments: a few small trees is all

Ranking 1 (excellent) – 5 (poor): 4

Comments: no quality native grasses; dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 45B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass
	Setaria

Comments:

Forb Species Present:

Yellow sweetclover		
Alfalfa		
Horseweed		
bindweed		

Comments:

Grass height: knee – thigh

Grazing: none **Burning:** No **Haying:** No

Residual litter: 1”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4
Comments: no native grasses; dominated by smooth brome – aerial photo shows tract has previously been cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 45C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
	Kentucky bluegrass

Comments: needle-and-thread is rare

Forb Species Present:

Canada thistle		
White sage		
Rush skeletonweed		
Wavyleaf thistle		
Silverleaf scurfpea		
Western ragweed		

Comments:

Grass height: 3” – ankle

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: none

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 4

Comments: very few native grasses; dominated by smooth brome and heavily grazed

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 46A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

alfalfa		

Comments:

Grass height: 3”

Grazing: No **Burning:** No **Haying:** Yes

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments:

Ranking 1 (excellent) – 5 (poor): 5

Comments: no native grasses; dominated by smooth brome and cut for hay

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 46B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Green needlegrass	Smooth brome
Sideoats grama	Kentucky bluegrass
Blue grama	
Prairie cordgrass	

Comments: native grasses are all rare; sideoats gramma confined to slopes

Forb Species Present:

White sage	Poison ivy	
Silverleaf scurfpea	Horsemint	
Bindweed	Purple coneflower	
Leadplant	Wooly verbena	
Rush skeletonweed		
Rose		
Prairie coneflower		
Wavyleaf thistle		
Canada thistle		
Yellow sweetclover		

Comments:

Grass height: ankle-knee

Grazing: moderate-heavy **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry is all

Ranking 1 (excellent) – 5 (poor): 3

Comments: native grasses present but rare; mostly dominated by smooth brome

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 46C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Green needlegrass	Smooth brome
Sideoats grama	Kentucky bluegrass

Comments: native grasses are present but confined primarily to steep slopes

Forb Species Present:

White sage	Wavyleaf thistle	
Prairie coneflower	Silverleaf scurfpea	
Bindweed		
Western ragweed		
Leadplant		
Goldenrod		
Purple prairie clover		
Purple coneflower		
Maximillian sunflower		
Smooth camas		

Comments:

Grass height: ankle-knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry and scattered trees in draws

Ranking 1 (excellent) – 5 (poor): 3
Comments: native grasses present but occur primarily on slopes; however, even on slopes smooth brome predominates

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 47A

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
	Smooth brome
	Kentucky bluegrass

Comments:

Forb Species Present:

White sage		
Silverleaf scurfpea		
Yellow sweetclover		
Alfalfa		
Rush skeletonweed		
Bindweed		
Kochia		
Common sunflower		

Comments:

Grass height: ankle

Grazing: heavy **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: No

Species:

Comments: a few snowberry and scattered trees in draws

Ranking 1 (excellent) – 5 (poor): 4

Comments: no native grasses; dominated by smooth brome with large weedy patches present

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 7-20-18 **Observer**: Greg Johnson **Grassland Polygon ID**: 47B

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
Prairie threeawn	Kentucky bluegrass
	Crested wheatgrass

Comments: needle-and-thread is rare

Forb Species Present:

White sage		
Silverleaf scurfpea		
Prairie coneflower		
Goldenrod		
Wavyleaf thistle		
Purple coneflower		
Western ragweed		
Purple prairie clover		
Green sagewort		
rose		

Comments:

Grass height: knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: Yes (places)

Species: western snowberry

Comments: some dense patches of snowberry in places

Ranking 1 (excellent) – 5 (poor): 3
Comments: native grasses and forbs present but rare; less smooth brome than most areas but crested wheatgrass is common

SWEETLAND GRASSLAND QUALITY ASSESSMENT

Date: 9-14-18 **Observer**: Alex Fryman **Grassland Polygon ID**: 47C

Disturbed or Undisturbed: Undisturbed

Grass Species:

Native	**Introduced**
Needle-and-thread	Smooth brome
Prairie threeawn	Kentucky bluegrass
	Crested wheatgrass

Comments: needle-and-thread is rare

Forb Species Present:

Wooly verbena		
Silverleaf scurfpea		
Prairie coneflower		
Goldenrod		
Wavyleaf thistle		
Purple coneflower		
Western ragweed		

Comments:

Grass height: knee

Grazing: moderate **Burning:** No **Haying:** No

Residual litter: 0.5”

Shrub or tree encroachment: Yes

Species: snowberry

Comments:

Ranking 1 (excellent) – 5 (poor): 3
Comments:

Appendix C. Photographs of Grassland Tracts Evaluated During the Grassland Assessment at the Sweetland Wind Energy Project in 2018

Appendix C. Photo of tract 5A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C. Photo of tract 5B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C. Photo of tract 5C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 6F during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7F during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 7G during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 8A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

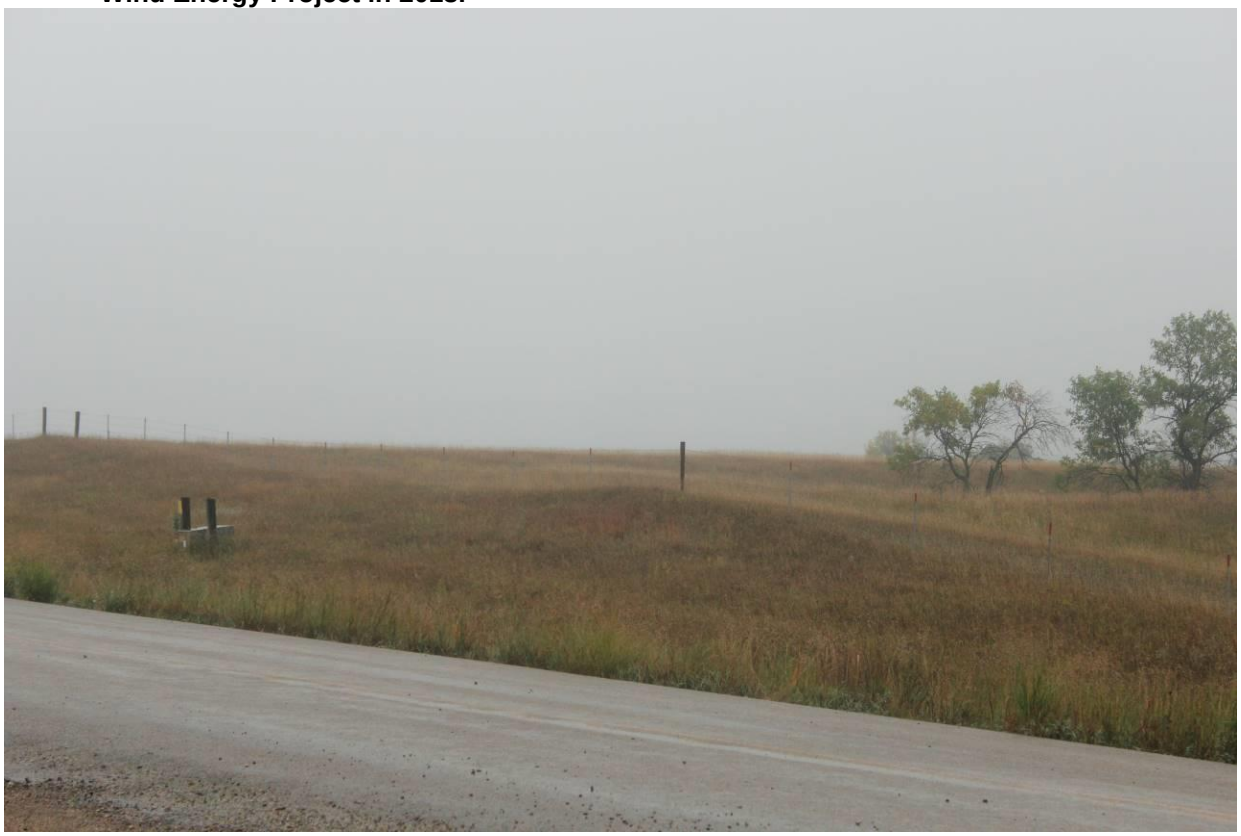
Appendix C (continued). Photo of tract 10F during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 10G during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 12A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 12B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 12C during the grassland assessment at the Sweetland Wind Energy Project in 2018.



Appendix C (continued). Photo of tract 13A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 14A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 14B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 14C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 14D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 14E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 15A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 15B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 15C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 15D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

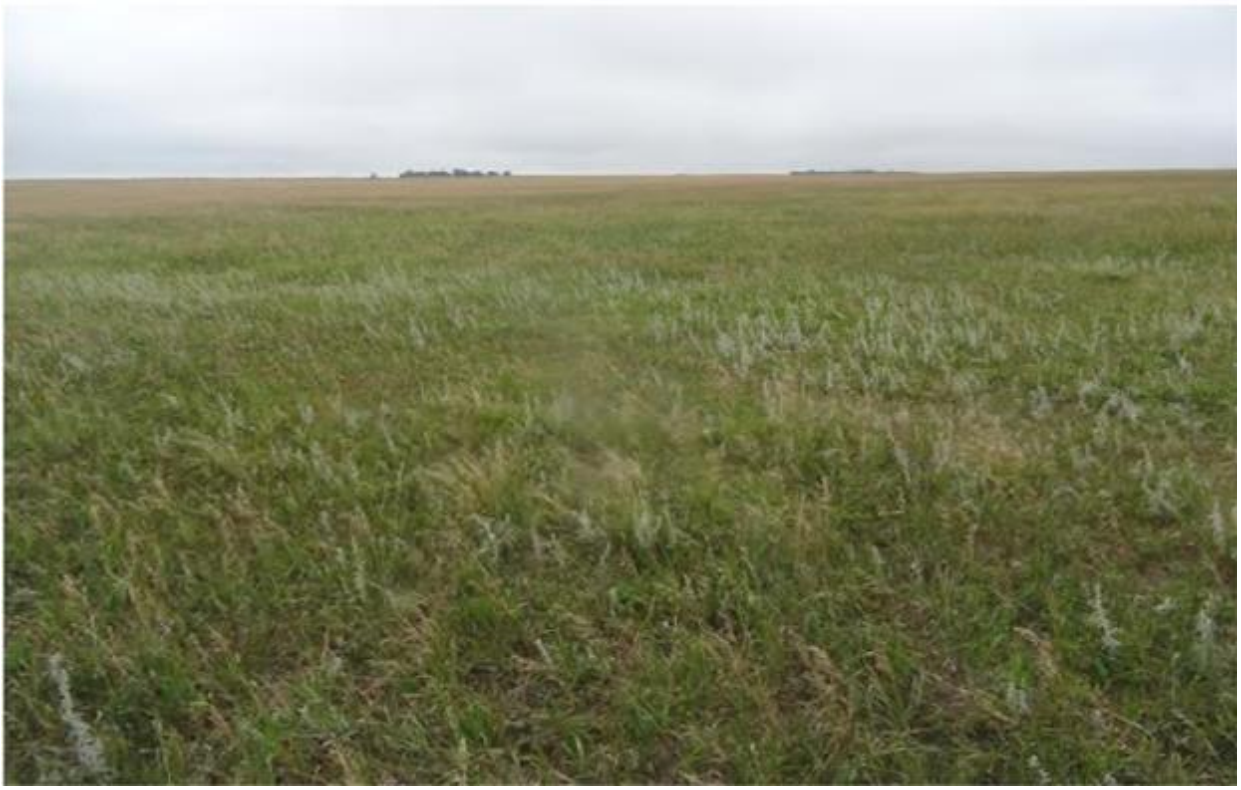
Appendix C (continued). Photo of tract 15F during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 16A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 16B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 16C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 16D during the grassland assessment at the Sweetland Wind Energy Project in 2018.



Appendix C (continued). Photo of tract 17A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 17B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 20A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 21A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 22A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 22B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 22C during the grassland assessment at the Sweetland Wind Energy Project in 2018

Appendix C (continued). Photo of tract 23A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 23B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 23C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 23E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 24A during the grassland assessment at the Sweetland

Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 24B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 25A during the grassland assessment at the Sweetland

Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 25B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 25C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 29A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 29B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 29C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 30A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 30B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 30C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 31A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 31B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 31C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 33A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 33B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 35A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 35B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 35C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 36A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 37A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 37B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 40A during the grassland assessment at the Sweetland

Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 40B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 40C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 41A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 41B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 41C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 41D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 42A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 42B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 42C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 42D during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 42E during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 43A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 43B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 43C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 44A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 44B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 45A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 45B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 45C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 46A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 46B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 46C during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 47A during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 47B during the grassland assessment at the Sweetland Wind Energy Project in 2018.

Appendix C (continued). Photo of tract 47C during the grassland assessment at the Sweetland Wind Energy Project in 2018.