Grassland Assessment for the Proposed Bowman Wind Project Bowman County, North Dakota

Final Report

May/October 2020 and March 2021

Prepared for:

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

Bowman Wind, LLC (Bowman Wind") is proposing the development of the Bowman Wind Project (Project) located in Bowman County, North Dakota (Figure 1). To support the development of the Project and inform siting within the proposed development areas, Bowman Wind contracted Western EcoSystems Technology, Inc. to complete a grassland assessment. The objective of this effort was to map grassland parcels near planned turbine locations (74 primary and 11 alternate turbines) and to ascertain and delineate areas of unbroken native prairie and previously broken grasslands.

PROJECT AREA

The proposed Project encompasses 42,120 acres (ac; 17,045 hectares [ha]) in the Missouri Plateau Level IV Ecoregion within the Northwestern Great Plains Level III Ecoregion of North Dakota (US Environmental Protection Agency 2017). The Missouri Plateau ecoregion was largely unaffected by glaciation, retaining its original soils and complex stream drainage patterns that now support a mosaic of spring wheat (*Triticum* spp.), alfalfa (*Medicago sativa*), and grazing lands.

According to the National Land Cover Database (NLCD 2016), the dominant land cover type in the Project is shrub/scrub (43.1%), followed by herbaceous/grassland (31.9%), and cultivated crops (20.3%; Figure 2, Table 1). The remaining land cover types account for less than 5.0% of the Project, individually (Figure 2, Table 1).

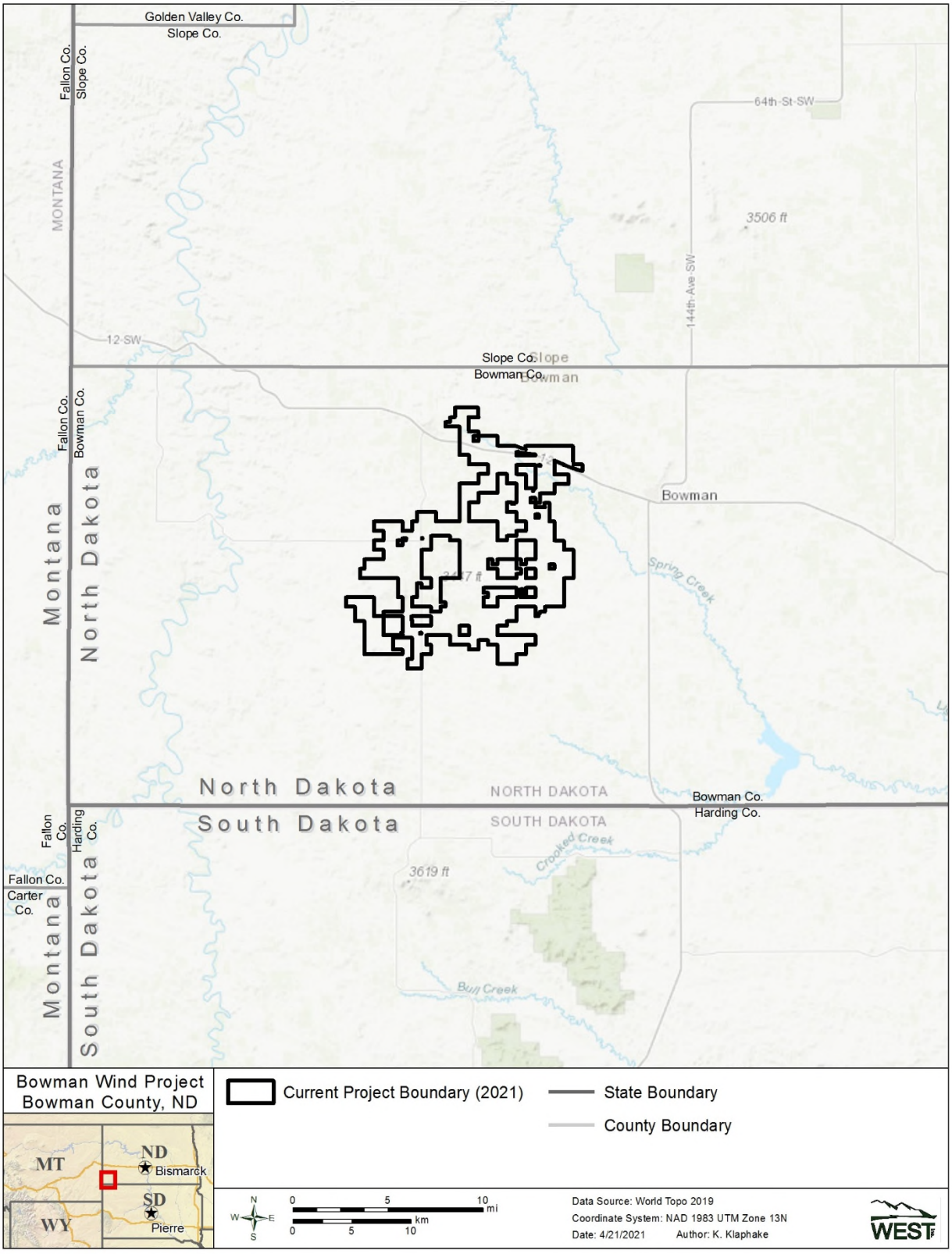

Figure 1. Location of the proposed Bowman Wind Project, Bowman County, North Dakota.

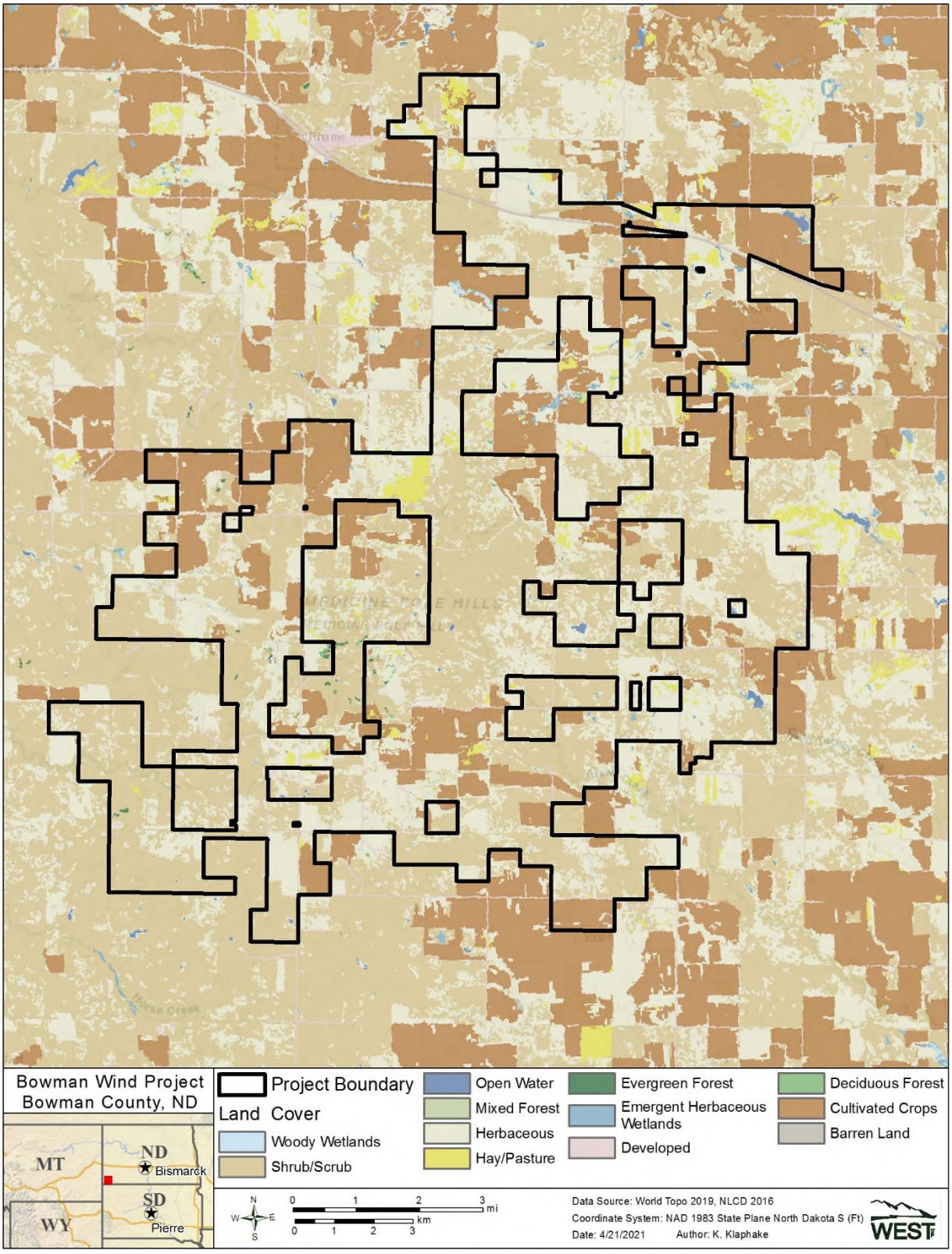

Figure 2. Land cover types at the proposed Bowman Wind Project, Bowman County, North Dakota.

Table 1. Land cover types, area, and percent (%) composition within the proposed Bowman Wind Project, Bowman County, North Dakota.

Land Cover Type	Area (acres)	% Composition
Shrub/Scrub	0	43.1
Herbaceous/Grassland		31.9
Cultivated Crops		20.3
Developed		2.1
Hay/Pasture		2.0
Emergent Herbaceous Wetlands		0.2
Open Water		0.2
Woody Wetlands		0.1
Evergreen Forest		<0.1
Deciduous Forest		<0.1
Mixed Forest		<0.1
Barren Land		<0.1
Total[1]	**42,120**	**100**

Source: National Land Cover Data (NLCD) 2016 using NAD83 State Plane North Dakota S (ft).

[1.] Sums of values may not add precisely to total value shown, due to rounding.

METHODS

Desktop Review

Prior to the field visits in May and October 2020, a desktop review of existing grassland habitat within a 400-meter (1,315 foot) buffer of each of the 85 proposed turbines' locations ("Assessment Areas" [8,561 ac (3,465 ha)]; Figure 3) within the Project was conducted. Based on a recent change to the turbine layout, an additional desktop review was completed in March 2021 to account of 11 primary turbines that moved more than 100 m from the original survey location. The desktop review included a review of current (US Department of Agriculture [USDA] National Agriculture Imagery Program 2019) and historic aerial photography (1957-1962; USDA 2017), existing land cover types data (NLCD 2016, USDA National Agricultural Statistics Service 2019), 2018 grassland assessment (SWCA Environmental Consultants 2018), landowner input, and North Dakota Game and Fish Department's (NDGFD) Native Habitat layer (NDGFD 2016). This desktop review was completed using ESRI Software (ArcGIS 10.7) and resulted in a digital data layer of land cover type polygons representing grassland or other (i.e., non-grass areas such as cultivated cropland, roads, barren areas, development, wetlands, etc.).

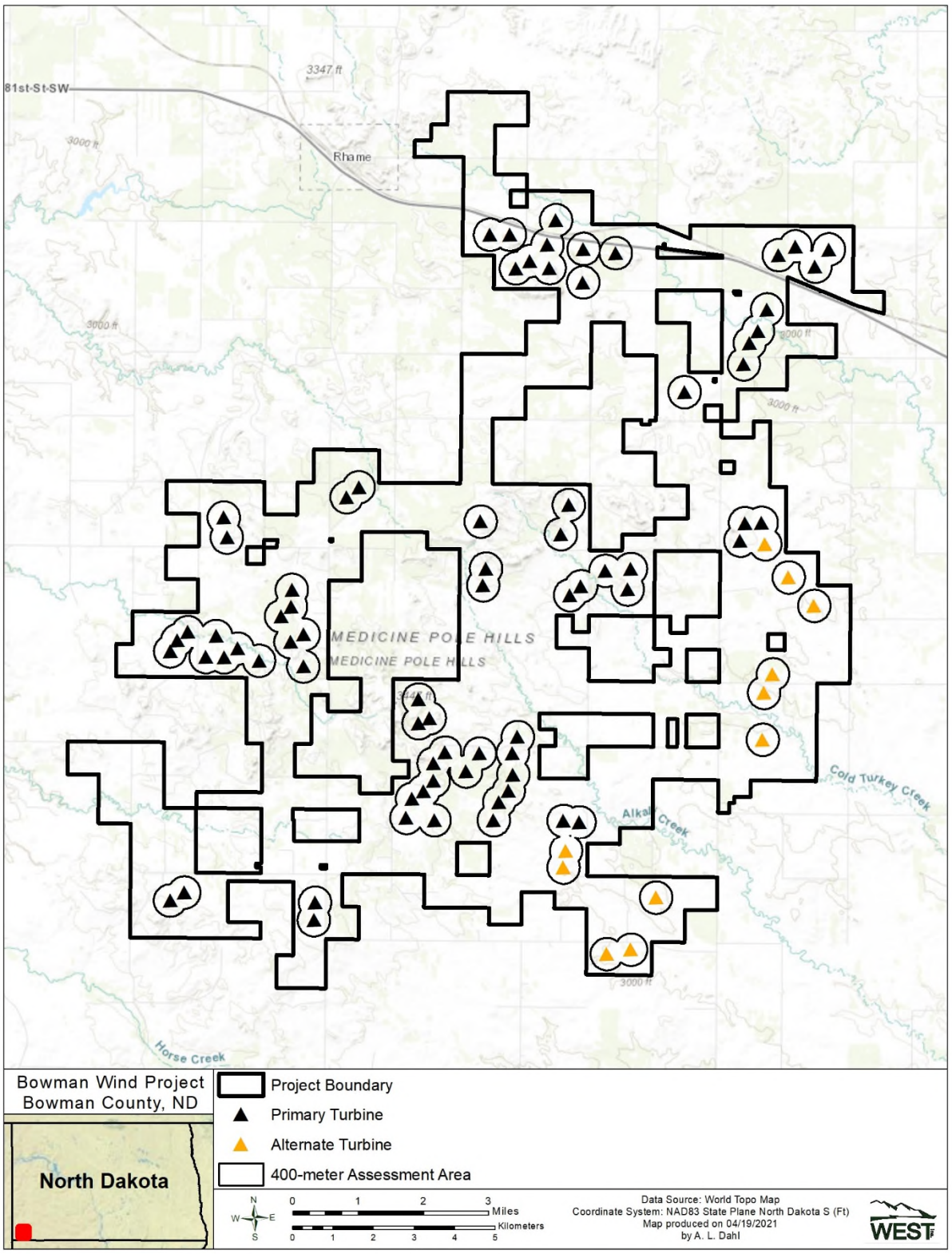

Figure 3. Location of the grassland Assessment Areas (i.e., proposed turbine location and 400-meter [1,312 foot] buffer of turbine) at the proposed Bowman Wind Project, Bowman County, North Dakota.

Field Surveys

Field surveys were completed on May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020 to assess, confirm, and delineate grassland polygon boundaries and sod type within the Assessment Areas. Grasslands within the Assessment Areas were visually assessed from public roads and on foot where access was permitted. Sod types were classified as "Non-native, Broken Grassland" and "Native, Unbroken Grassland". A native, unbroken prairie grassland was defined as grassland in its original or natural state showing no evidence of soil disturbance, with native plant species present (i.e., green needle grass [*Nassella viridula*], needle-and-thread [*Hesperostipa comata*], sideoats grama [*Bouteloua curtipendula*], bluestem species [*Andropogon* spp.], western wheatgrass [*Pascopyrum smithii*], etc.). Non-native, broken grasslands were identified based on features such as rock piles; presence, amount, and apparent height of trees and shrubs; field edge changes; straight line features indicating plowing, discing, harvesting, or planting; and any other features indicating human disturbance. Field data forms were completed and photographs were taken to document the grasslands surveyed.

Post-Survey Processing

Upon completion of field surveys, grassland polygon boundaries, sod type, and land cover types were updated accordingly in the digital data layer created during the desktop review, using the field survey data and information provided by private landowners regarding the historical grassland status.

Quality Assurance and Quality Control

Quality assurance and quality control measures were implemented at all stages of the assessment, including desktop review, field surveys, post-survey processing, and report writing. All field data forms were inspected for completeness, accuracy, legibility, and entered into a Microsoft® Access database. Any anomalous records from the database were compared to the raw data forms and any errors detected were corrected. Errors, omissions, or problems were traced back to the raw data forms and rectified. All data forms and electronic data files were retained for reference.

RESULTS

Based on the desktop review and field survey, 51.7% (4,427 ac [1,792 ha]) of the 8,561ac (3,465 ha) Assessment Areas were classified as potential grassland. Unbroken native prairie accounted for 27.6% (2,365 [957 ha]) of the Assessment Areas and previously broken grassland accounted for 24.0% (2,058 ac [833 ha]; Figure 4). A small percentage (0.04%; 3.3 ac [1.3 ha]) of grasslands identified during the desktop review were not included in the field survey due to access limitations and time constraints (Figure 4). Attribute data associated with the field-verified grassland data is presented in Table 2.

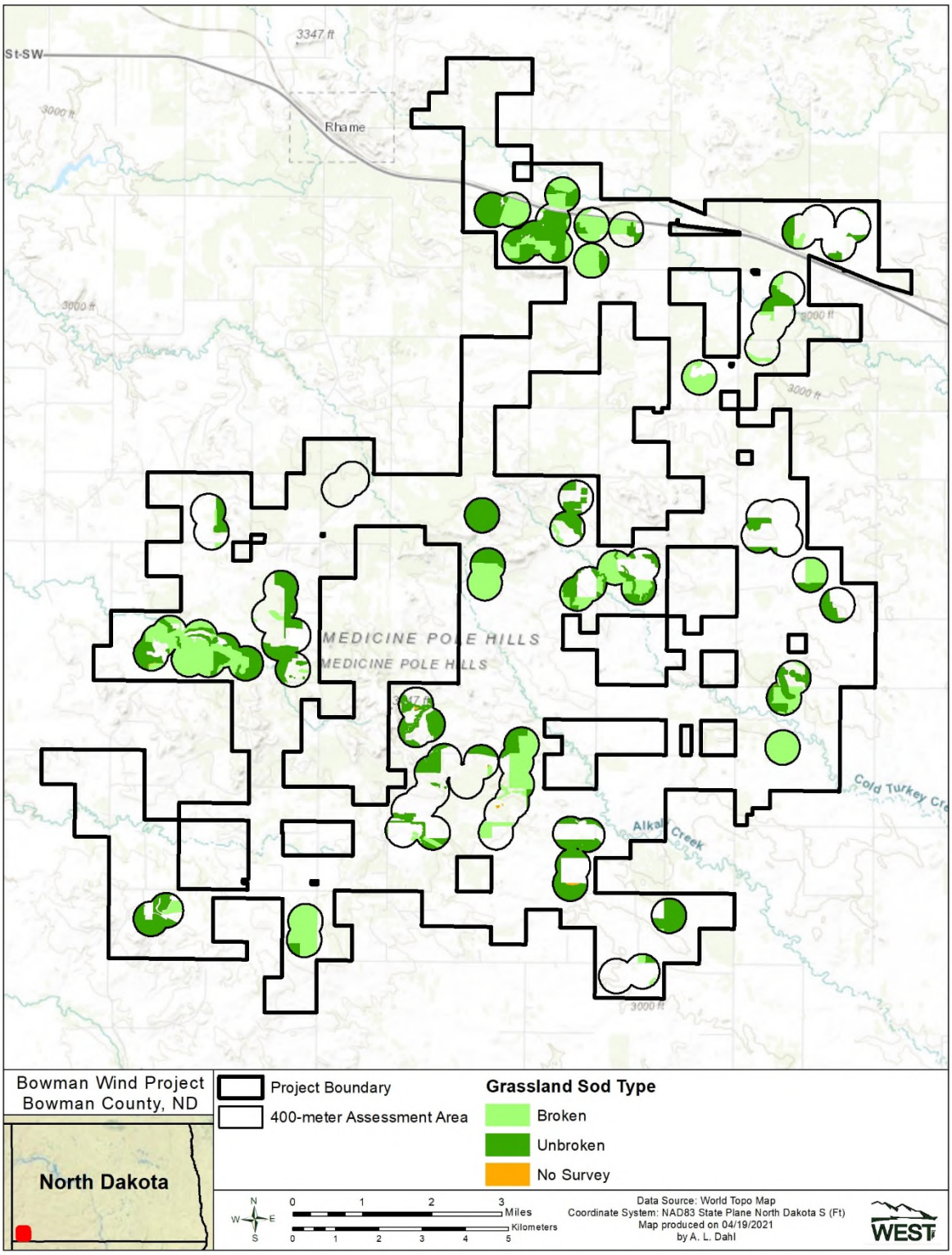

Figure 4. Sod types assessed based on the desktop review and grassland field surveys completed May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020 for the Assessment Areas (i.e., proposed turbine location and 400-meter [1,312-foot] buffer of turbine) at the proposed Bowman Wind Project, Bowman County, North Dakota.

Table 2. Attributes and definitions for the grassland survey shapefile based on the desktop review and field surveys completed May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020 for the Assessment Areas (i.e., proposed turbine location and 400-meter buffer of turbine) at the proposed Bowman Wind Project, Bowman County, North Dakota.

Attribute	Definition
Final_LC	Final land cover type classification
GrasStatus	Sod type based on desktop review and field surveys (i.e., unbroken or previously broken grassland)

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Appendix A. Representative Photographs of Native, Unbroken Grassland and Non-Native, Broken Grassland Assessed in the field on May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020, within the Proposed Bowman Wind Project, Bowman County, North Dakota

Photo A. Native, unbroken grassland within the proposed Bowman Wind Project, Bowman County, North Dakota, May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020.

Photo B. Non-native, broken grassland within the proposed Bowman Wind Project, Bowman County, North Dakota, May 20 – 21, 2020, May 27, 2020, and October 13 – 15, 2020.