APPENDIX G – WHOOPING CRANE HABITAT REVIEW

Sweetland Wind Project
Whooping Crane Stopover Habitat Assessment

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This document or presentation includes Whooping Crane migration use data from the Central Flyway stretching from Canada to Texas, collected, managed and owned by the U.S. Fish and Wildlife Service. Data were provided to "Western Ecosystems Technology, Inc." as a courtesy for their use. The U.S. Fish and Wildlife Service has not directed, reviewed, or endorsed any aspect of the use of these data. Any and all data analyses, interpretations, and conclusions from these data are solely those of "Western Ecosystems Technology, Inc."

INTRODUCTION

Scout Clean Energy is proposing construction of the Sweetland Wind Project (Sweetland) in Hand County, SD (Figure 1). Federally-listed endangered whooping cranes migrate through the U.S. along an approximately 200-mile wide corridor between breeding grounds in Canada and wintering grounds in Texas along the Gulf of Mexico (Canadian Wildlife Service [CWS] and U.S. Fish and Wildlife Service [USFWS] 2007). Sweetland is located in the distance bands where 75% of migratory whooping crane observations have occurred, based on confirmed sightings (Pearse et al. 2018; Figure 1). Potential stop-over habitat for whooping cranes was evaluated using a model developed by The Watershed Institute, Inc. (TWI 2012). This model has been recommended by the U.S. Fish and Wildlife Service (USFWS) Kansas Ecological Services Field Office and was also discussed with USFWS South Dakota Ecological Services Field Office personnel during an in-person meeting in August 2017. This report describes results of the desktop evaluation of potential whooping crane stopover habitat using the TWI model for the Sweetland project area plus a 10-mile buffer, and results are evaluated along with other available data (i.e. whooping crane observations and USGS Site Use Intensity data) on whooping crane stop-over site use.

TWI WHOOPING CRANE HABITAT ASSESSMENT

The TWI habitat assessment model is a quantitative and easily-replicated desktop approach to evaluating the quantity, quality, and locations of potential whooping crane stopover habitat in a given area. It is based on available data on water regime, water depth, visibility obstructions, wetland size, disturbance, and proximity to feeding areas, which are all factors that have been shown to affect how whooping cranes choose stopover habitat. The initial goal of the TWI model was to provide electric utilities with a tool for making power line-marking decisions, but the USFWS stated in a personal communication (D. Mulhern, USFWS [retired], November 19, 2012) that it should be applicable to wind power development areas for the identification of potential whooping crane stop-over habitat as well.

The TWI model is based on National Wetlands Inventory (NWI) wetlands data (USFWS 2016). It should be noted that wetland features identified in the NWI dataset may not meet all of the criteria defined by the U.S. Army Corps of Engineers for jurisdictional wetlands. NWI features were selected that intersected a 10-mile buffer of the Sweetland project area. Wetland features were then screened for unsuitability based on size, construction, and proximity to human disturbance and visual obstructions. U.S. National Agriculture Imagery Program (NAIP) aerial imagery from 2015 was used to evaluate the presence of human development and visual obstructions such as wooded areas. Spatial datasets for roads, highways, and railroads were available from the US Census Bureau (USCB), TIGER data (USCB 2018). Bridges, and electric transmission lines were digitized by WEST from available topographic and aerial imagery.

Screening and scoring of wetlands occurred in a step-wise fashion. Wetlands were first screened based on wetland type; wetlands described as forested, scrub-shrub, or excavated

were removed from the dataset. The second screening step removed wetlands with calculated total acreage of 0.25 acre or less. The third screening step was to designate buffers around human developments/sources of disturbance and screen the wetlands or portions of wetlands within those disturbance buffers. Table 1 lists human disturbance types included and the disturbance buffers used (based on the TWI model).

Table 1. Disturbance types and buffer distances used to screen wetlands, based on TWI 2012.

Disturbance Type	Disturbance Buffer (m)*	Comments
Paved Roads	400	Non-State Trunk Road Inventory (NSTRI)
Gravel Roads	200	Non-State Trunk Road Inventory (NSTRI)
Dwellings and Developments	200	South Dakota GIS; only occupied structures were selected
Railroads	400	Spatial data not publicly available. Digitized from USGS 1:24,000 topographic map.
Power Lines	200	Spatial data not publicly available. Digitized from USGS 1:24,000 topographic map.
Bridges	400	Spatial data not publicly available. Digitized from NAIP 2015 aerial imagery.

* Width of the buffer applied to each side of a linear feature, or radius applied to a point feature

Following the TWI model, wetlands were assigned scores based on five attributes that contribute to high-quality stop-over habitat for whooping cranes, including water regime, distance to crop fields for feeding, wetland size, whether the wetland is natural or man-made, and if the wetland is part of a wetland mosaic (Table 2). The scores for the five attributes were summed. Resulting scores were compared to the scores calculated by TWI for Quivira National Wildlife Refuge (NWR), which is a traditional stop-over site for whooping cranes in Kansas. Based on the average score for Quivira wetlands, scores of 12 or higher were considered by TWI to be potentially suitable habitat.

Aside from a few traditional stop-over sites such as Quivira NWR and Cheyenne Bottoms in Kansas, whooping crane stop-over sites are highly variable from year to year. If a wetland feature is scored by the TWI as potentially suitable (12 or higher), that does not necessarily mean that a whooping crane will ever visit that site; however, if a whooping crane is migrating through the area and conditions (stormy or foggy weather, inclement winds, sunset) cause the bird to look for a place to stop, whooping cranes may be more likely to choose a feature that possesses the characteristics scored highly by the TWI model, compared to lower scoring features.

Table 2. Wetland scoring system used by the TWI model (TWI 2012).

Score Type	Attributes	Score Value
Water Regime	Permanent (H)[1]	5
	Intermittently Exposed (G)[1]	4
	Semi-Permanent (F)[1]	3
	Seasonally Flooded (C)[1]	2
	Intermittently/Temporarily Flooded (J/A)[1]	1
Distance to Food	Within/adjacent to cropland[2]	5
	<0.5 km from cropland[2]	4
	0.51 – 1.0 km from cropland[2]	3
	1.1 – 1.5 km from cropland[2]	2
	>1.5 km from cropland[2]	1
Wetland Size	>7 acres	5
	5 - 6.9 acres	4
	3 – 4.9 acres	3
	1 – 2.9 acres	2
	<1 acre	1
Natural Wetland	Natural[3]	2
	Created[3]	0
Wetland Mosaic	Yes[4]	3
	No[4]	0

[1] – Codes in parenthesis are codes from the Wetlands and Deepwater Habitats Classification system (Cowardin et al. 1979) used by the NWI system

[2] – Cropland areas from National Land Cover Database (NLCD; USGS 2014) and include the "cultivated crops" category.

[3] – Based on NWI wetland codes indicating the wetland was diked or impounded.

[4] – A wetland was considered part of a mosaic if it was within ¼ mile of four or more other wetlands and with no visual obstructions such as wooded areas or buildings between the wetlands. Visual obstructions were assessed based on NAIP (2016) aerial imagery.

RESULTS

TWI Whooping Crane Habitat Assessment

For the Sweetland project area and a surrounding 10-mile buffer combined, 9,454 NWI features initially were identified and scored and of these, 1,459 received scores of 12 or higher. Within the Sweetland project area, there were 527 features that were scored, with scores ranging from 3 to 18 (Figures 2 and 3). Of these 527 within the Sweetland project area, 74 scored 12 or higher. The features that scored 12 or higher within the Sweetland project area are generally located along the western and south-western edge of the project boundary (Figure 3).

Within a 10-mile buffer of the Sweetland project area and excluding the area within the Project area, 8,927 wetland features were scored by the TWI model. There were 1,385 high-scoring (12+) features present throughout the 10-mile buffer area and included emergent wetlands,

ponds, lakes and rivers (Figure 5). High-scoring features of note included Spring Lake in the southwest, and Jones Lake in the northwest (Figure 5).

When comparing the TWI model results between the Sweetland project area and the 10-mile buffer area, the areas are similar in that features scoring between seven through 10 were most common (Figures 2 and 4). The largest high-scoring features in terms of acreage, and the areas with the most densely occurring high-scoring features were outside of the Sweetland project area to the east, west, and northeast. The widespread availability of suitable stopover habitat indicates that if cranes are displaced from suitable habitat by development within the Sweetland project area, they are likely to find similar habitat nearby.

Whooping Crane Observations

Through spring 2017, three whooping crane observations were confirmed within the 10 mi buffer (16 km) of the Sweetland project area (CWCTP 2016; Figure 6). The CWCTP emphasizes that the whooping crane observation data are incidental sightings and not accurate documentations of absence in areas where no observations are recorded, nor are observation locations representative of all sites used by cranes since only the location of the first observation is logged in the database.

To date, no whooping cranes have been observed during fixed-point avian use surveys that have been occurring at the Project since May 2017.

USGS Site Use Intensity Data

The U.S. Geological Survey (USGS) evaluated spatial intensity of use by 58 whooping cranes fitted with platform transmitting terminals (PTT; Pearse et al. 2015). Stopover sites used during spring and fall migration were monitored over five years. Based on stopover site use density and duration, 20-square-kilometer grid cells were categorized as unoccupied, low use, core intensity, or extended-use core intensity. The resulting data were meant to help identify areas that may be important for migrating whooping cranes. Overlaying the USGS site use intensity data with the Sweetland project area indicates that the majority of the area is located in core use intensity, the second highest of the four categories identified by Pearse et al. (2015; Figure 7). Higher intensity (extended use core intensity) cells do occur to the south, east, and northwest (Figure 7).

Summary

The assessment indicates that there is potentially suitable stopover habitat for whooping cranes in the project area, and there is the potential for whooping cranes to use or fly through the area during the life of the project. This finding is based on the following:

- Located within the corridor
- Suitable habitat within the project area
- Documented sightings in the area within the last decade
- Presence of core use intensity area

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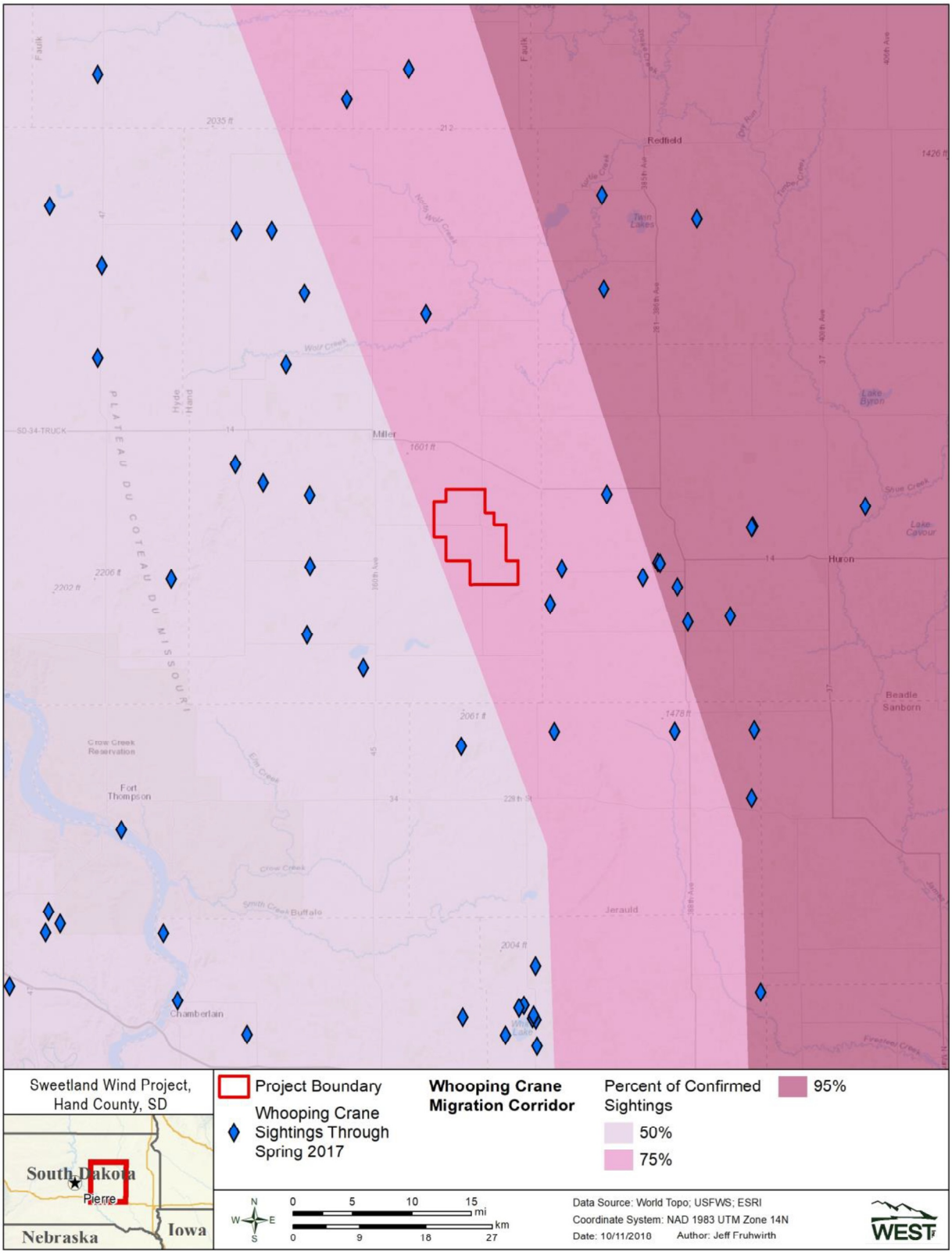

Figure 1. Sweetland Wind Project evaluated for whooping crane stopover habitat.

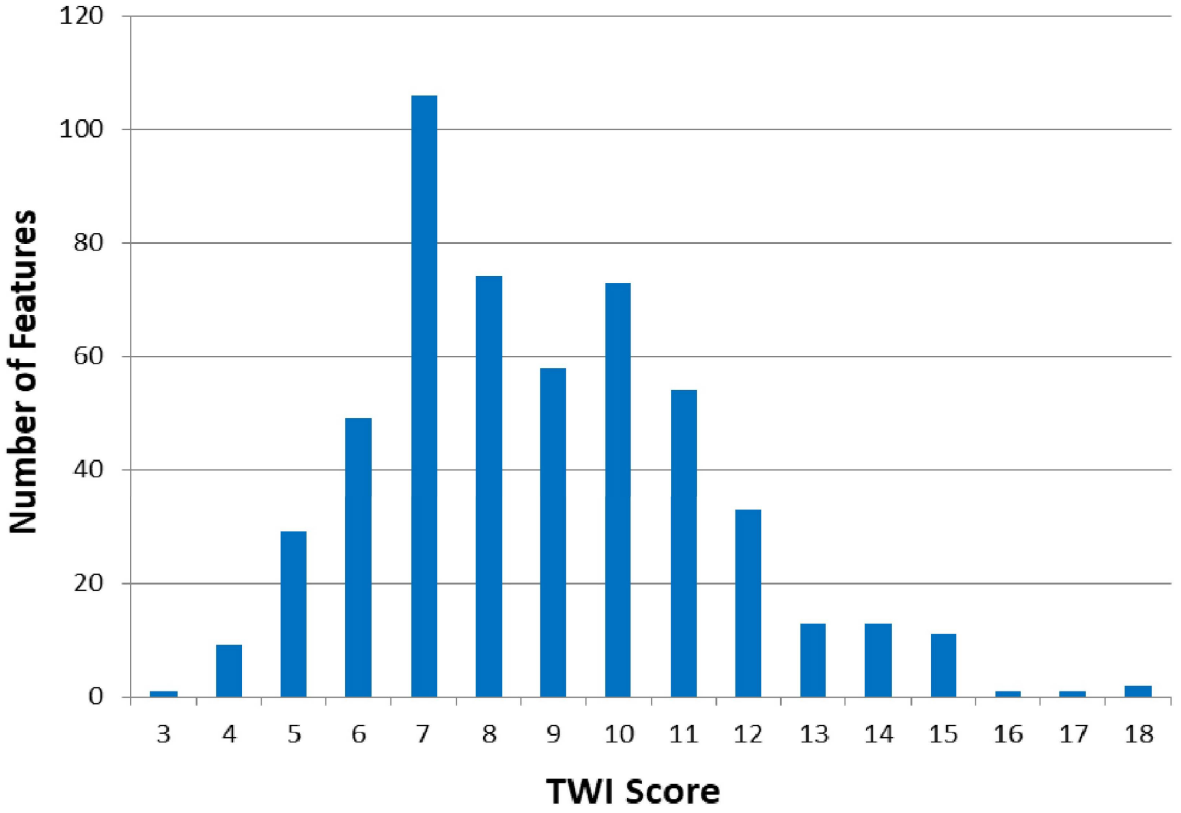

Figure 2. TWI scores for NWI wetland features within the Sweetland Wind Project.

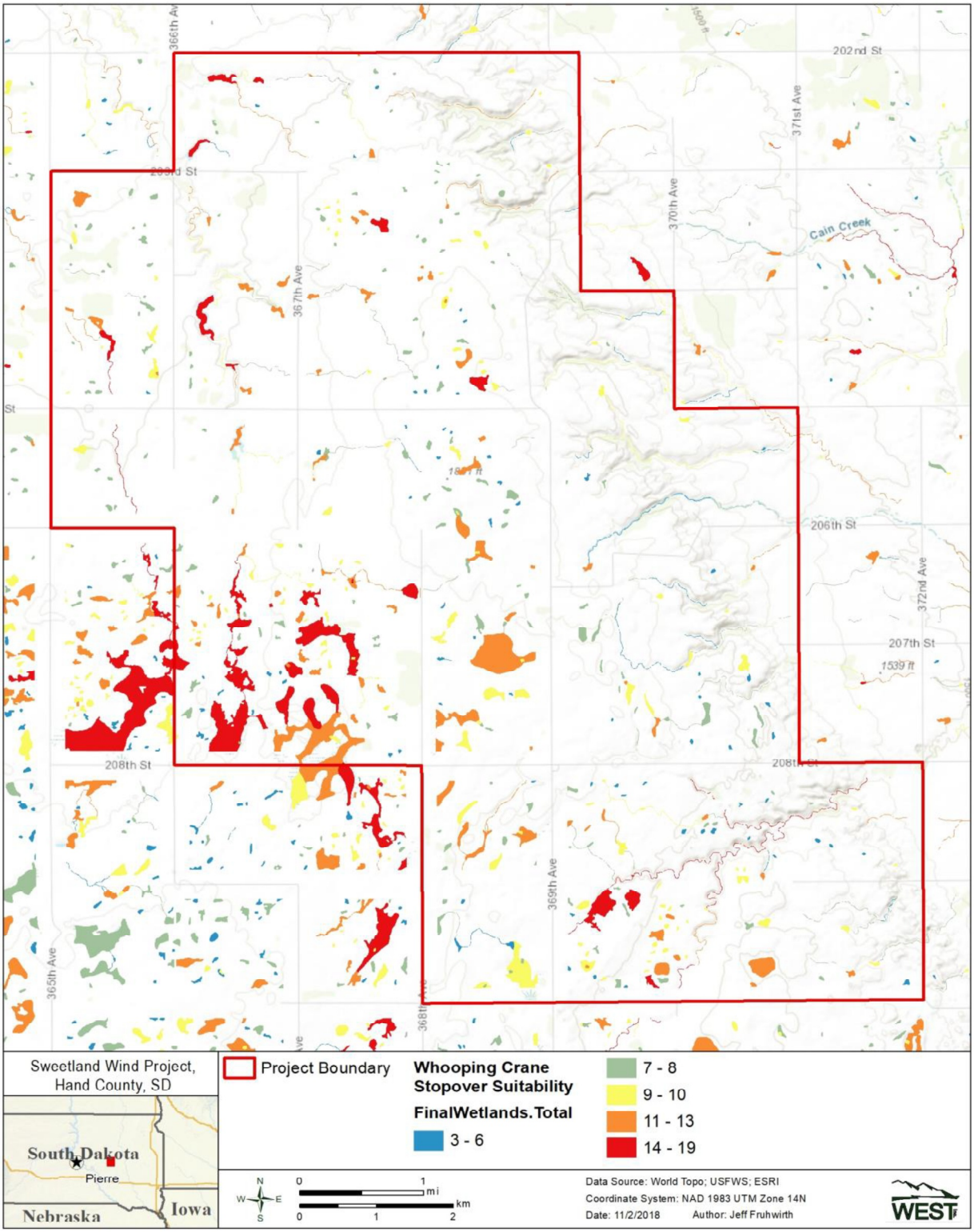

Figure 3. Wetland scores for the Sweetland Wind Project using the TWI model.

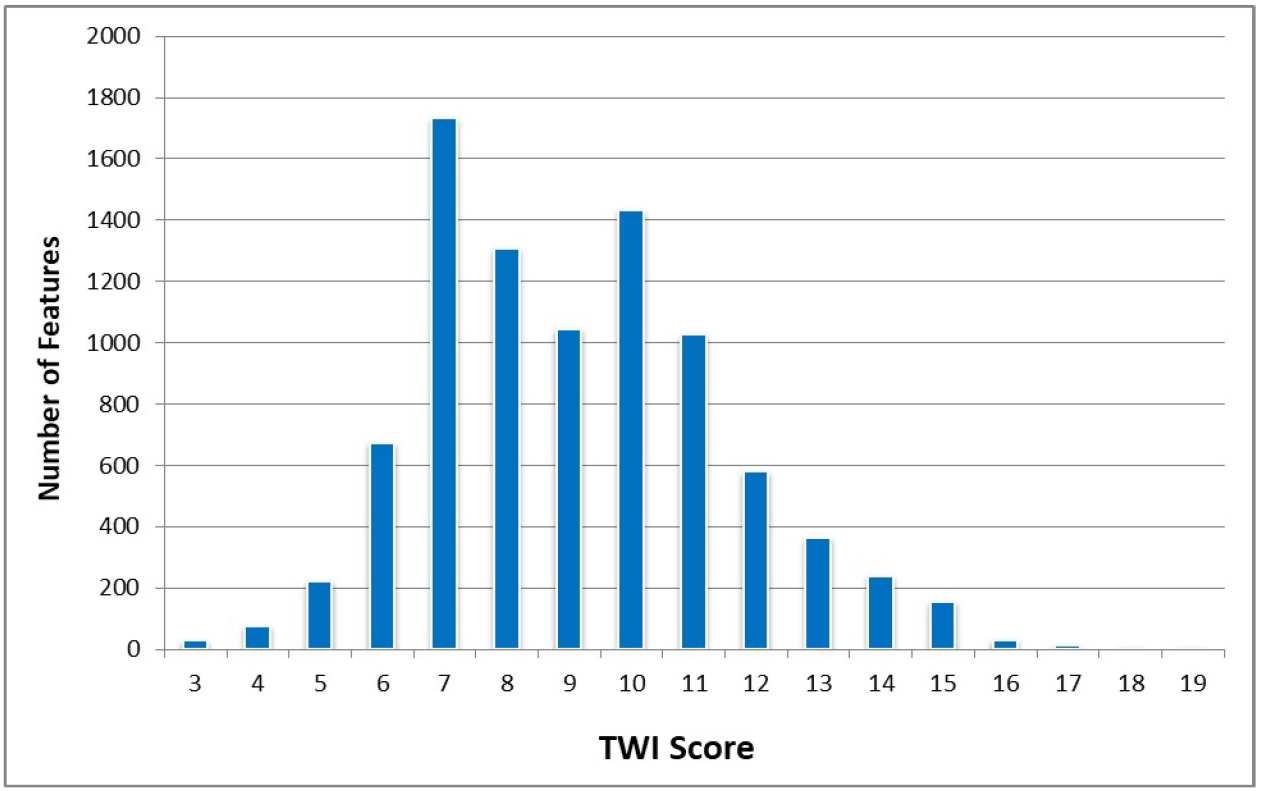

Figure 4. TWI scores for wetlands in the 10-mile buffer but excluding land within the Sweetland Wind Project boundary.

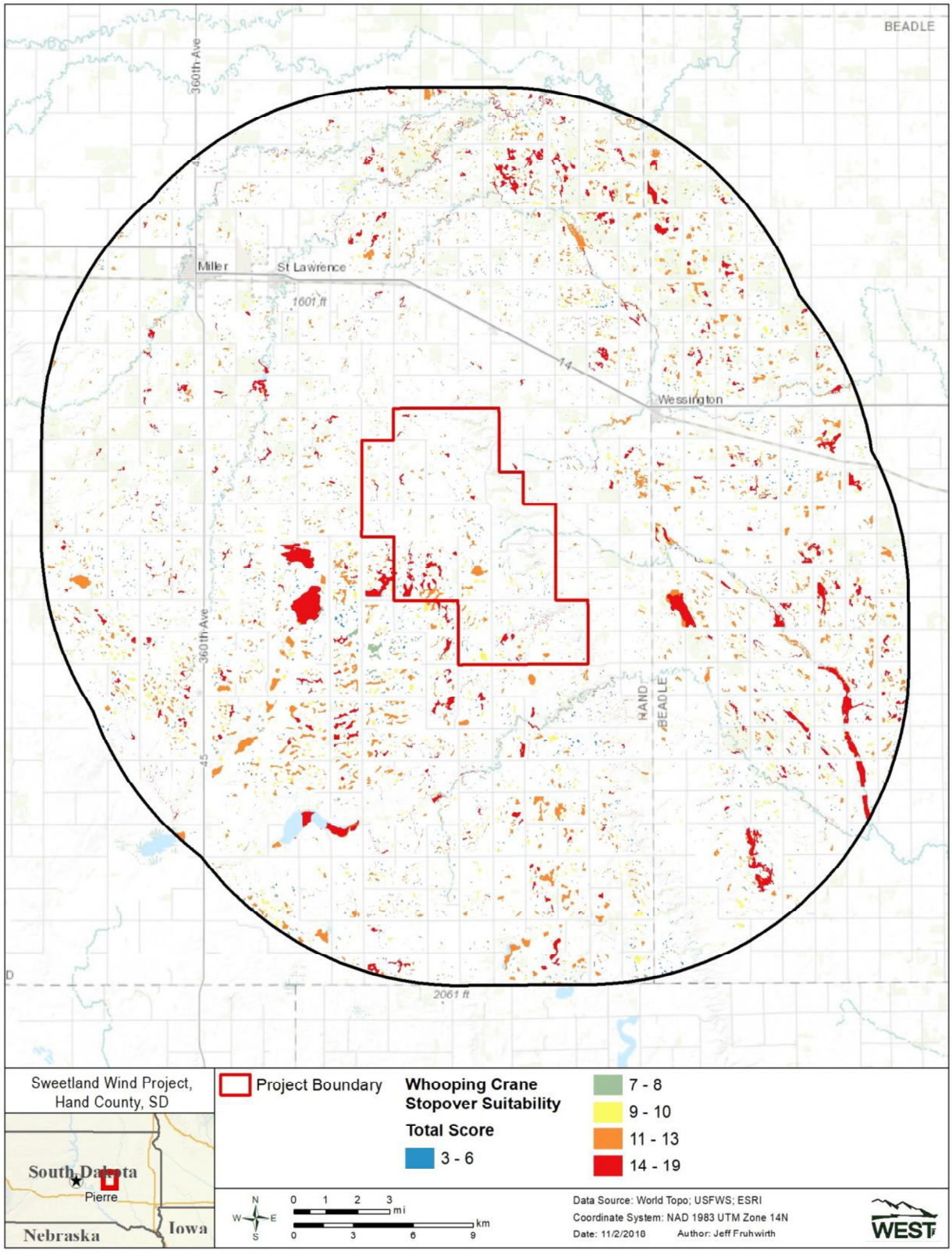

Figure 5. Map of wetlands scored using the TWI model for the Sweetland Wind Project and 10-mile buffer.

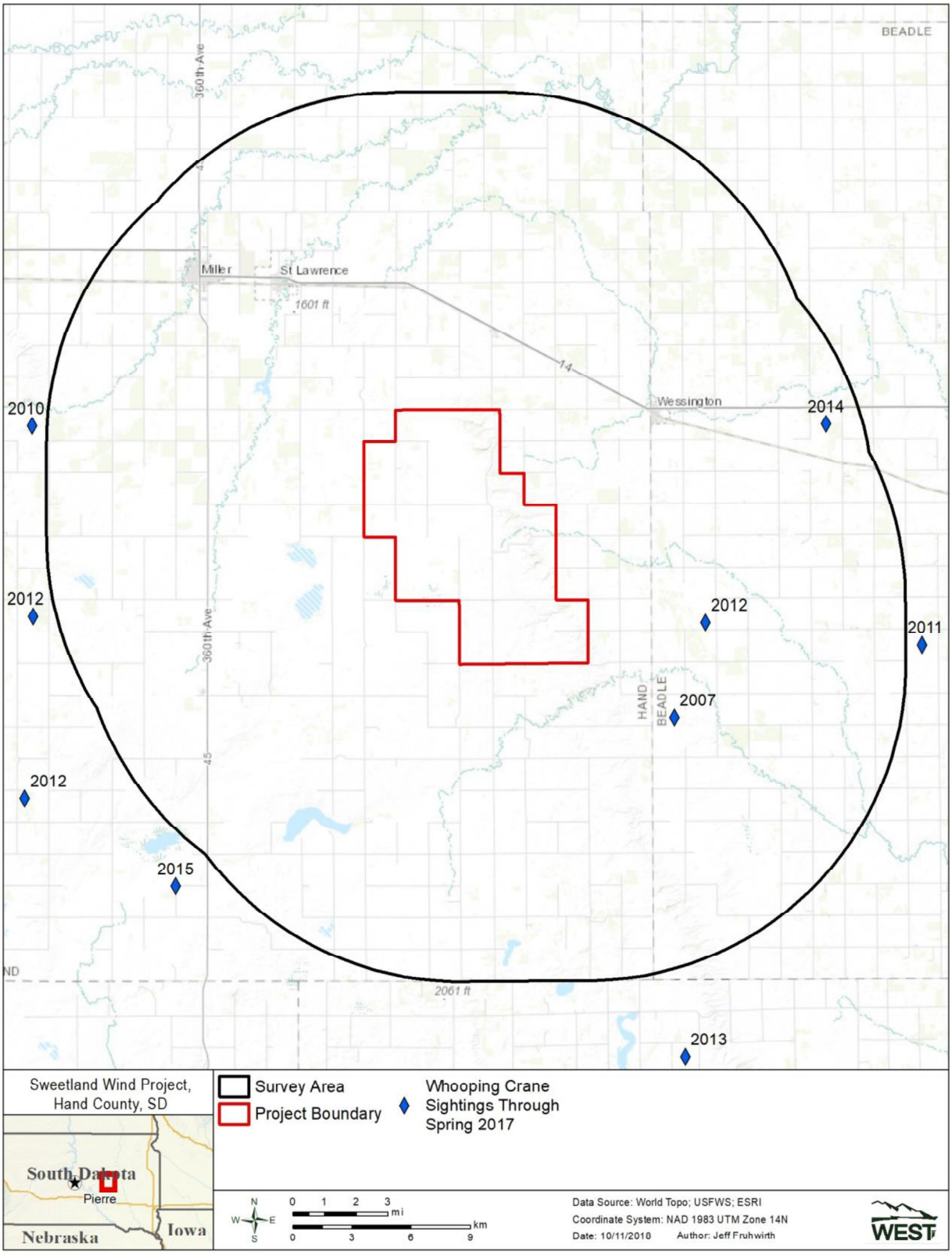

Figure 6. Whooping crane observations through spring 2017 Data from the USFWS Nebraska Ecological Services Field Office.

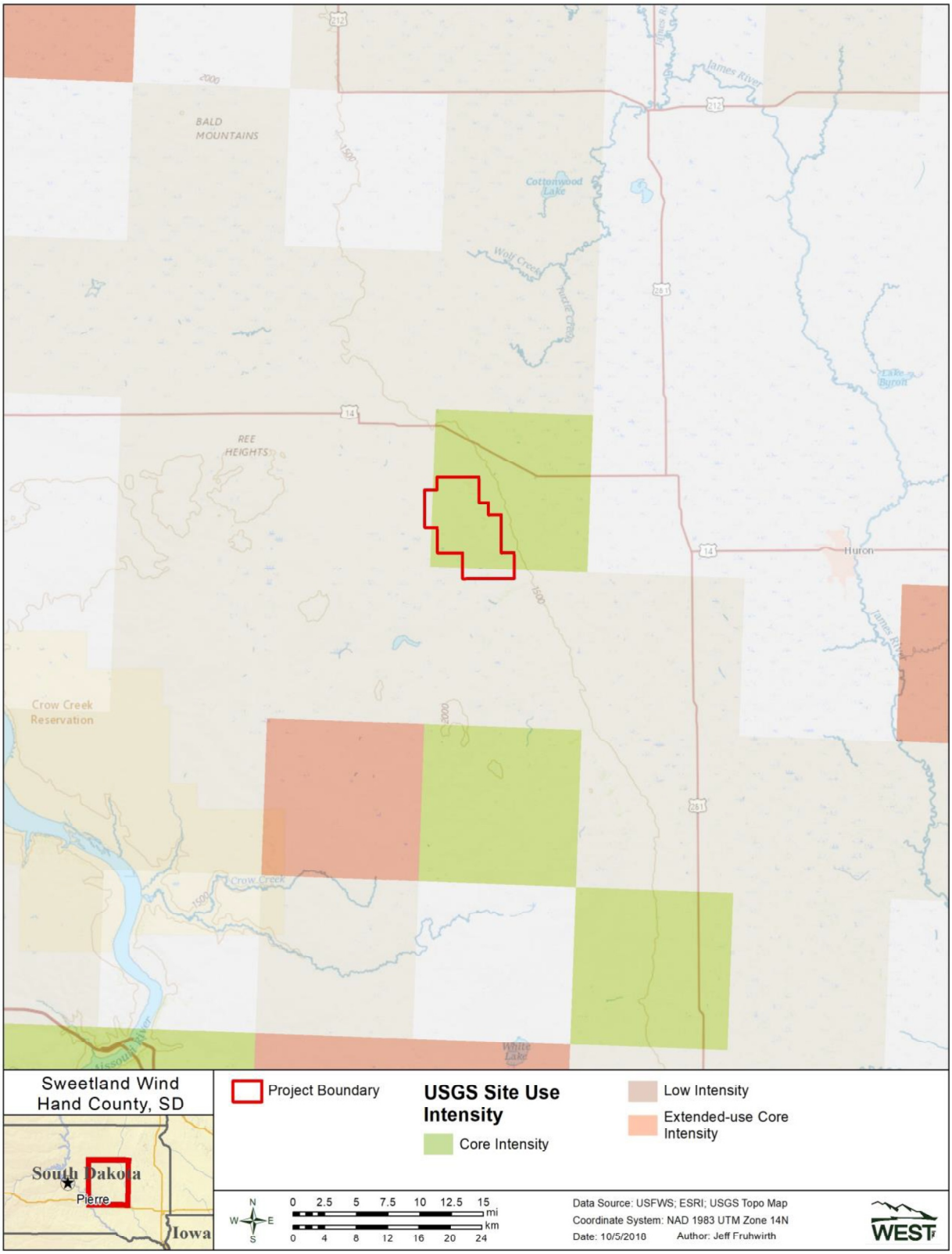

Figure 7. USGS site use intensity data for the vicinity of Sweetland Wind Project (USGS 2015).