

Figure 1.5. Spring 2019 eagle nest survey results for the Big Bend Wind Project in Cottonwood and Watonwan counties, Minnesota.

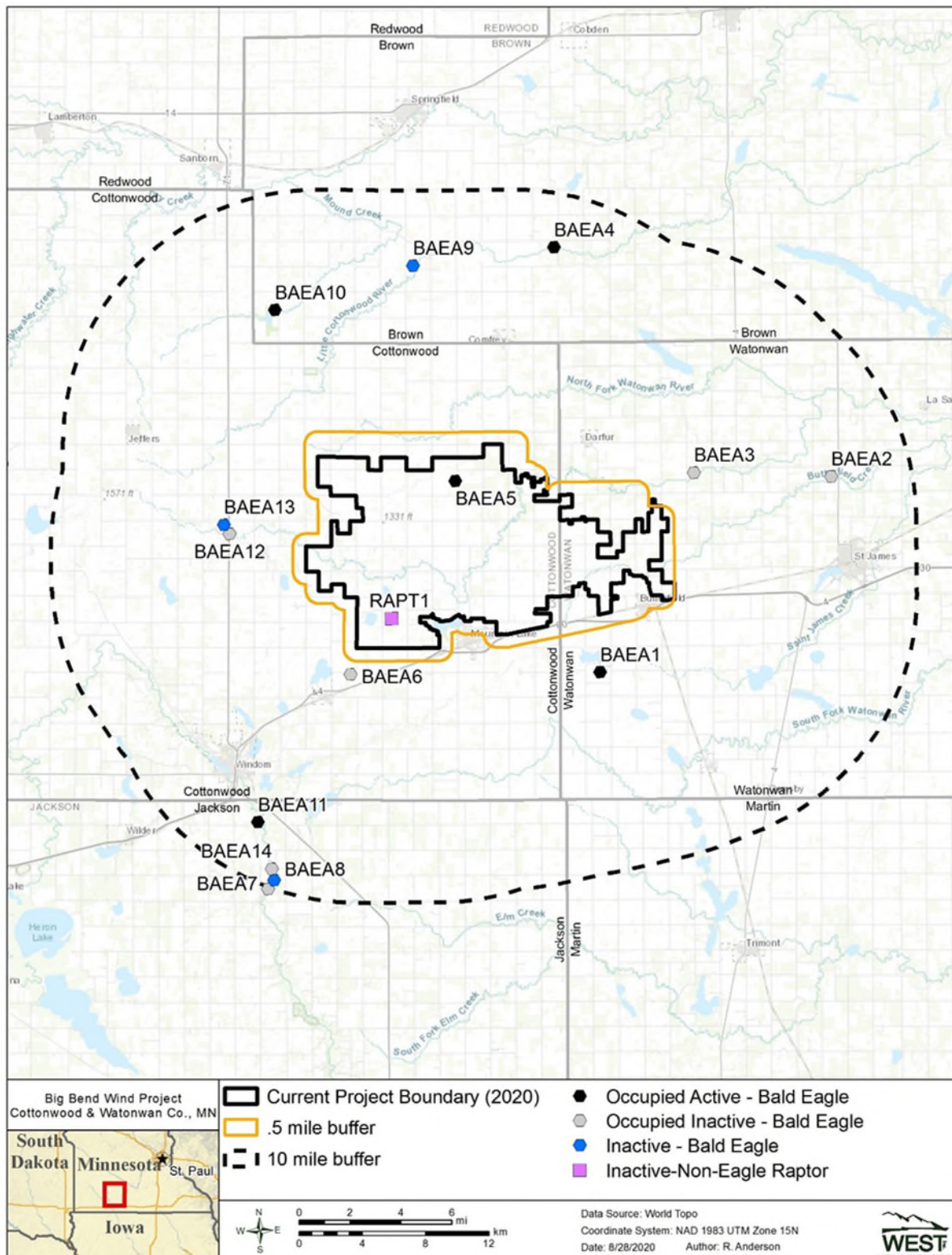


Figure 1.6. Spring 2020 raptor nest survey results for the Big Bend Wind Project in Cottonwood and Watonwan counties, Minnesota

Eagle Nest Monitoring 2020

Eagle nest monitoring was completed by WEST from March 26, 2020 to August 1, 2020, at one known active bald eagle nest within the northern portion of the current project boundary. The objective of the eagle nest monitoring survey was to document how the eagles approached and left the nest location and how they used the area within 1.0 mile (mi) of the nest to inform infrastructure siting and assess potential risk to eagles (Foo and Bailey 2020). Bald eagle observations, behaviors, and flightpaths were recorded regardless of the distance from the observer. Each week, one-hour surveys were conducted at four survey points¹; survey points were located on public roads and ranged in distance from 0.1 to 1.0 mi from the nest (**Figure 2.7**).

A total of 76 hours of nest monitoring were conducted and a total of 102 bald eagle observations were recorded. Relative to concentrations of flight paths observed within 1.0 mi of the nest, very high concentrations of eagle flights were observed within 100 m of the nest, with other areas of medium- and high-concentrations of flights along the tributary of the North Fork Watonwan River approximately 0.4-0.5 mi northwest of the nest (**Figure 2.7**). The farthest flight path observed at the nest extended approximately 2.0 mi from the nest. Aside from perching near the nest, eagle perch locations were primarily located northwest of the nest. One eaglet fledged from the nest in late June; therefore, the nest was successful in 2020.

¹ Points 1 and 2 were replaced with points 5 and 6 in April 2020 to increase the surveyor's viewshed of the area surrounding the nest after leaf out.

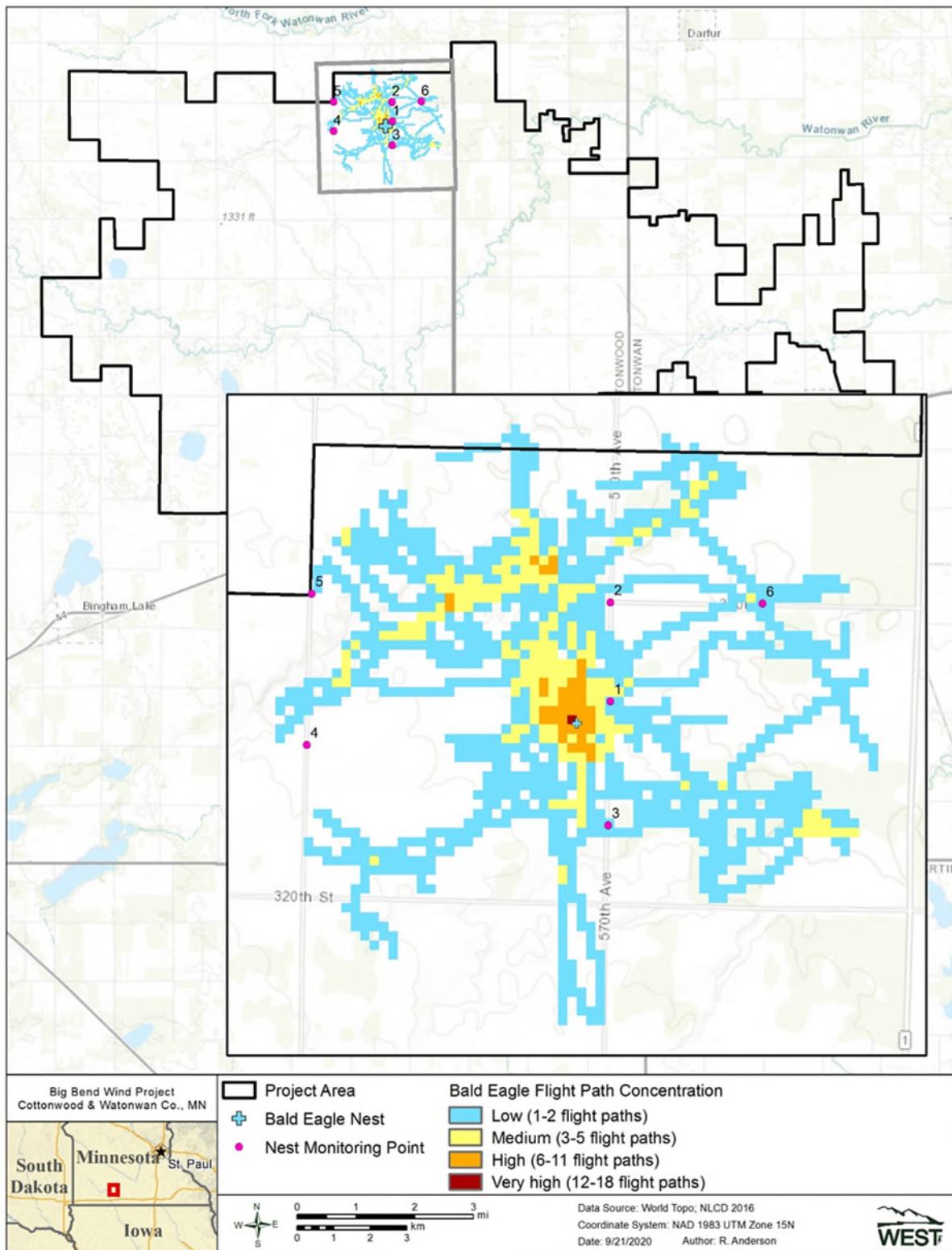


Figure 1.7. Bald eagle activity concentrations during eagle nest monitoring for the Big Bend Wind Project in Cottonwood and Watonwan counties, Minnesota, from March 26 to August 1, 2020.

Wetland Avian Use 2020

WEST completed avian wetland use surveys for previously unsurveyed portions of the current Project boundary between March 26 and May 30, 2020, to determine the bird species associated with the wetlands and waterbodies in and around the area and to approximate overall wetland and waterbody use during the spring migration and early nesting period. Study design followed MNDNR-approved Biological Study Plan (LeBeau 2018), the 2018 wetland avian use surveys, and the MNDNR *Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems in Minnesota* (Mixon et al. 2014).

Surveys were completed three times at three survey points established near waterbodies and larger wetlands within the portion of the current Project area that expanded into Watonwan County (**Figure 2.8**). Surveys were scheduled to occur so that at least one survey was completed during ice out and peak waterfowl migration. Surveys were completed for 60 min between dawn and 10:00 am or within three hours prior to sunset at each point within an 800-m radius circular plot. All species of large birds were recorded, but emphasis was placed on recording wetland/waterbody-dependent species, federal and state-listed species, and species of concern. This section will be updated upon completion of the survey report.

A total of 20 species (849 observations) were recorded over 9 hours of avian wetland use surveys. Waterfowl had higher mean use than any other bird type (82.11 observations/800-m plot/60-min survey), followed by shorebirds (7.00), gulls (3.56), and waterbirds (1.33; Foo and LeBeau 2020). Waterfowl accounted for 87.0% of all observations; the majority of use was attributed to Canada goose (*Branta canadensis*; 60.2% of all observations), mallard (*Anas platyrhynchos*; 8.2%), and unidentified ducks (8.1%). Northern harrier was the only diurnal raptor species observed during surveys (n=2, 0.2% of all observations). Waterfowl were observed during 100% of surveys; shorebirds were observed during 88.9% of surveys, and waterbirds were observed during 44.4% of surveys.

No federally or state-listed threatened or endangered species or eagles were observed during avian wetland use surveys for previously unsurveyed portions of the Project (Foo and LeBeau 2020). Migrating waterfowl were observed at each survey point; however, the highest waterfowl use was observed at Point 88 (195.00 observations/800-m plot/60-min survey), primarily due to several large flocks of migrating Canada goose.

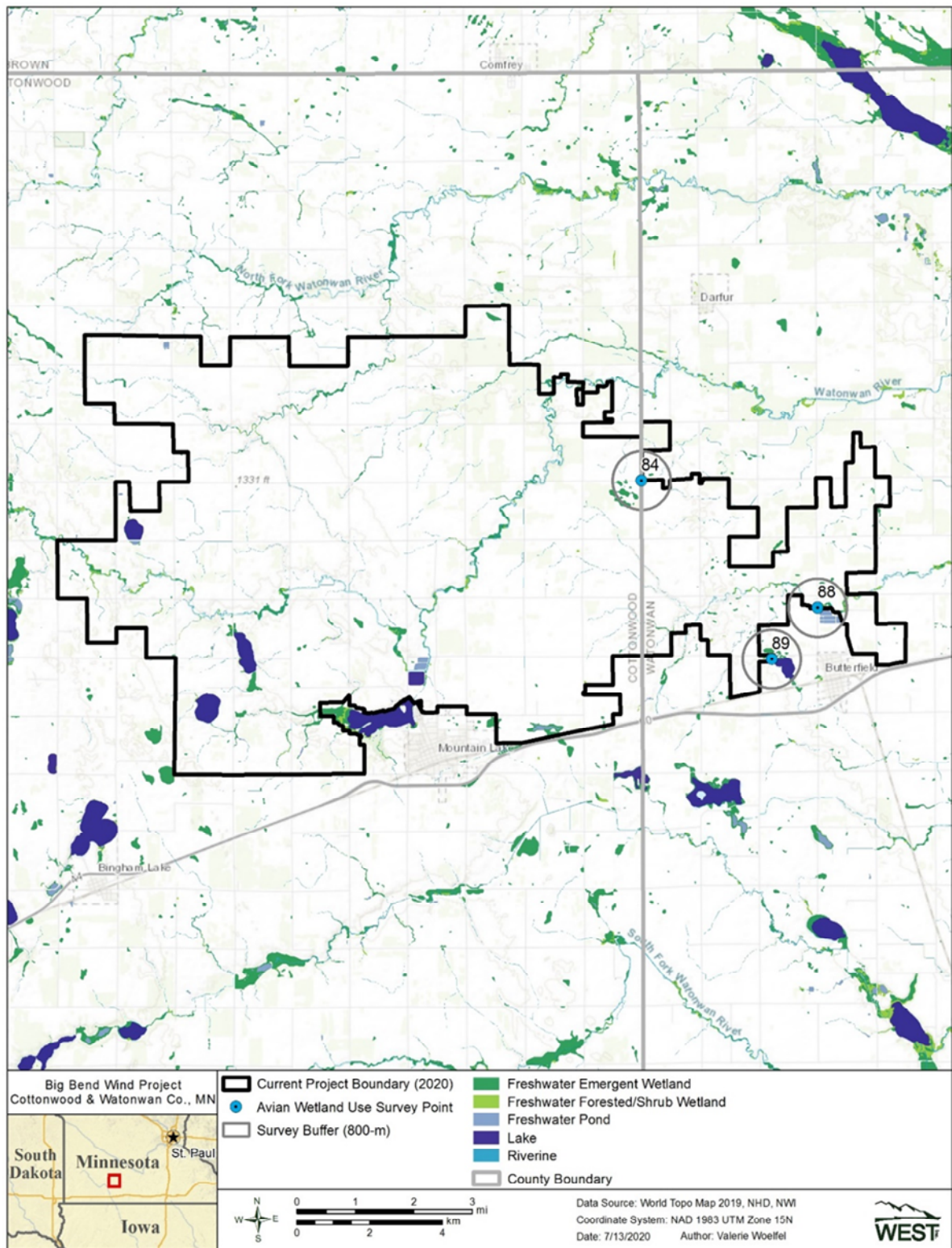


Figure 2.8. Avian wetland use survey points and plots at the Big Bend Wind Project in Cottonwood and Watonwan counties, Minnesota from March 26, 2020 – May 30, 2020 (US Geological Survey National Hydrography Dataset 2017 and US Fish and Wildlife Service National Wetland Inventory 2017).

Native Prairie Habitat Assessment 2020

The purpose of the native prairie assessment was to identify areas of potential native prairie grasslands within the current Project area to inform Project design, as well as to inform the Native Prairie Protection Plan if any Project-related impacts are proposed within those parcels. As defined in the Minnesota Statutes (Section 84.02, Subd. 5, 2019a), “native prairie” means “land that has never been plowed where native prairie vegetation originating from the site currently predominates or, if disturbed, is predominantly covered with native prairie vegetation that originated from the site.”

The preliminary assessment consisted of a desktop assessment and field visit conducted along public rights-of-way. The desktop assessment included a review of recent aerial photographs and other publicly available land cover databases including the MBS sites and MNDNR Native Prairie dataset. During the field visit, a qualified ecologist confirmed the locations of native prairie identified during the desktop assessment, to the extent possible from the roadsides, and looked for additional areas of potential native prairie (Markhart and Foo 2020). The ecologist also refined the boundaries of potential prairie areas identified during the desktop assessment, if necessary. The field study was completed on June 9 and June 10, 2020.

The preliminary desktop assessment identified 1,106 ac of potential native prairie. The field assessment eliminated approximately 640 ac of this due to the presence of non-native cool season grasslands, riparian areas, and evident disturbance (e.g., tree plantings, row crops, etc.) and verified 20 ac as untilled native prairie. The remaining 446 ac were considered potentially untilled native prairie and will be further assessed once Project design is finalized to confirm whether or not they constitute native prairie.

Avian Use Surveys 2020-2021

Additional avian use studies were conducted at eight survey points in Watonwan County from March 27, 2020 through February 18, 2021; points were sited using a Previous Project Boundary that was reduced slightly with the Current Project Boundary (**Figure 2.9**). The objective of the study was to evaluate species composition and seasonal and spatial use of the previously unsurveyed portion of the Project area by birds, with a particular focus on eagles and species of concern. The study methods are consistent with other avian use surveys conducted at the Project and with recommendations outlined in the USFWS 2012 *WEG*, Appendix C(1)(a) of the USFWS 2013 *ECPG*, and the USFWS 2016 *Final Eagle Rule*.

Twenty-eight large bird species and 52 small bird species were recorded during Year 3 of avian use surveys. The most commonly observed large birds were Canada goose (74.9%), killdeer (*Charadrius vociferous*, 4%), and ring-necked pheasant (*Phasianus colchicus*, 3.8%). Five diurnal raptor species were observed during surveys. Red-tailed hawk was the most commonly observed diurnal raptor (0.3% of large bird observations and 40% of diurnal raptor observations) during large bird surveys.

No federally or state-listed threatened or endangered species were observed during surveys. One state-endangered species, loggerhead shrike, was observed incidentally at Point 84 on March

30, 2020. After the observation, WEST conducted a survey for loggerhead shrike habitat. Suitable habitat was found approximately two miles north of Point 84; no suitable habitat was found within the Project. Ten bald eagle observations in 10 groups were observed during surveys; 18 additional bald eagle observations were recorded incidentally. A total of 19 bald eagle risk minutes were recorded during surveys. Bald eagle risk observations occurred in spring, fall, and winter. No golden eagles were observed. In addition to bald eagle, two species of particular concern for Watonwan County were observed during surveys: bobolink (*Dolichonyx oryzivorus*) and red-headed woodpecker (*Melanerpes erythrocephalus*, USFWS 2021).

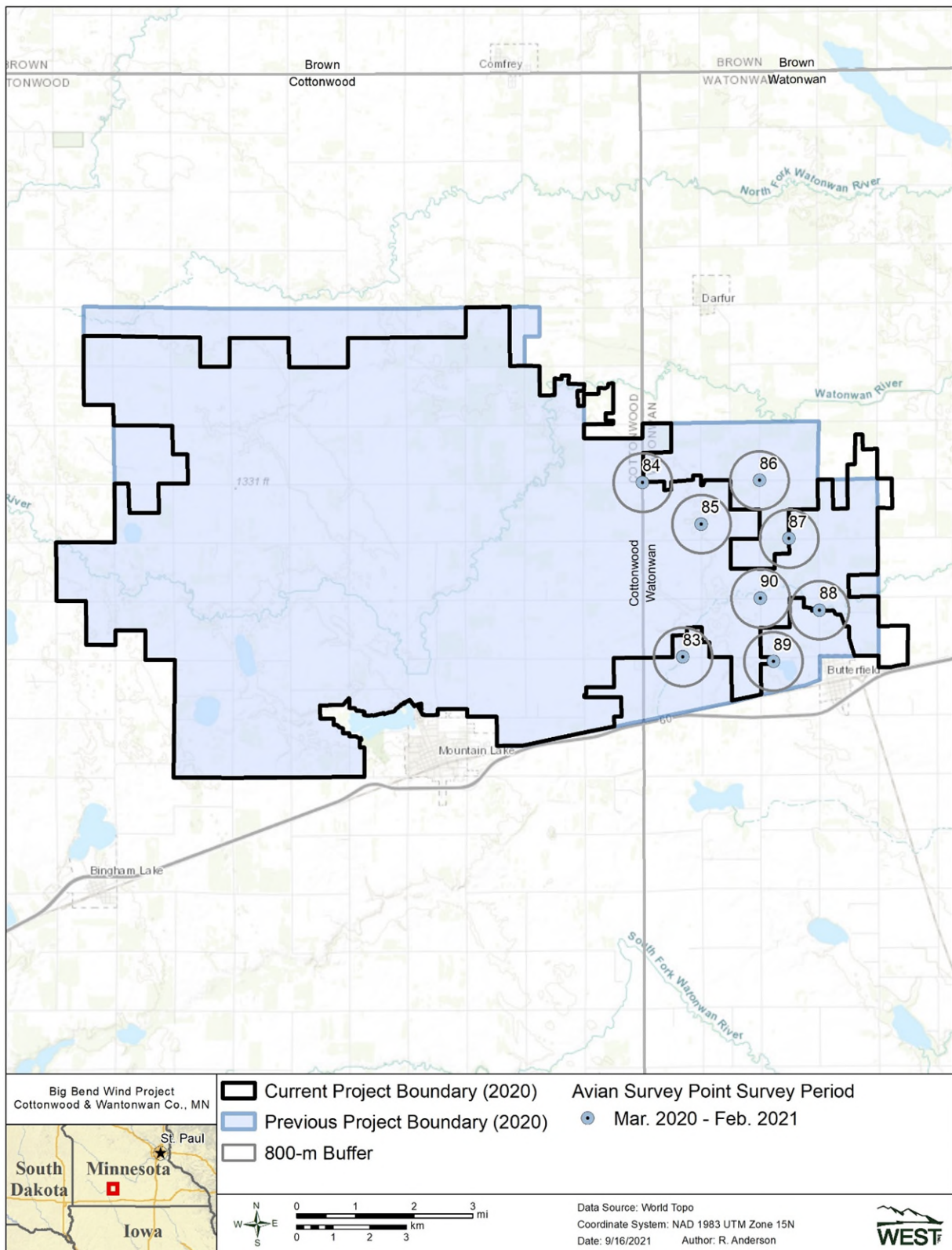


Figure 2.9. Avian use survey points and plots at the Big Bend Wind Project in Cottonwood and Watonwan counties, Minnesota from March 2020 – February 2021.

Acoustic Bat Survey

WEST completed a bat acoustic survey from April 20 to October 15, 2018 (Solick et al. 2019). The objective of the survey was to determine bat activity and species composition, and to assess the possible risk to bats by comparing bat activity within the 2018 Project boundary to activity at nearby operating wind projects (Elm Creek 1 and Elm Creek 2 Wind Energy Facilities) during summer maternity and fall migration seasons.

Acoustic surveys were conducted at two met tower stations in cropland habitat that was representative of potential turbine locations (i.e., 'representative' stations), and at three stations in habitat attractive to bats (i.e., 'bat feature' stations) within the 2018 Project boundary (**Figure 2.10**). At the turbine representative stations, microphones for Wildlife Acoustics SM3 detectors were paired at each met tower, with one placed near the ground at 5 ft and one elevated to 148 ft above ground level. The bat feature stations were placed in riparian forest habitat atop a 5 ft PVC pole.

Bat activity was monitored for a total of 1,004 detector nights. Detectors and microphones were operating for 88.9% of the sampling period. Of the total bat passes recorded, 78.8% were classified as low frequency (LF; e.g., big brown bats [*Eptesicus fuscus*], hoary bats [*Lasiurus cinereus*], and silver-haired bats [*Lasionycteris noctivagans*]), and 21.1% of bat passes were classified as high frequency (HF; e.g., tri-colored bats [*Perimyotis subflavus*], eastern red bats [*Lasiurus borealis*], and *Myotis* species). This proportion was similar among bat feature stations (77.4% LF, 22.5% HF) and among ground representative stations (83.2% LF; 16.8% HF).

The automated identification program Kaleidoscope 4.2.0 (KPro; Wildlife Acoustics, Concord, Massachusetts) identified calls for seven species that potentially occur in the assessment area. Big brown bats and hoary bats were the primary species recorded, present on 65% and 60% of detector nights, respectively. Eastern red bats were the third most frequently identified species (49% of detector nights), followed by silver-haired bats (43%). *Myotis* species (NLEB and little brown bats [*Myotis lucifugus*]) and tri-colored bats were detected on 25% and 11% of detector nights, respectively. KPro classified eight calls as potential NLEB calls; however, after qualitative review, none were confirmed to display characteristics indicative of typical NLEB call structures.

Overall bat activity at representative stations was approximately two times greater during the summer (14.61 ± 1.48 bat passes per detector night) than in the fall (6.78 ± 1.34 bat passes per detector night). Activity at representative stations was lowest during the spring (1.80 ± 0.70); however, data was only collected at one met tower during the spring due to a weather delay in the installation of the BB5 met tower. Bat activity averaged 13.38 bat passes per detector-night during the fall migration period. Weekly bat activity was relatively low at the start of the study period and increased from mid-July through the end of August, peaking from August 11 to August 17 (42.92 bat passes per detector night). Weekly bat activity decreased through September and was relatively low through the end of the study period.

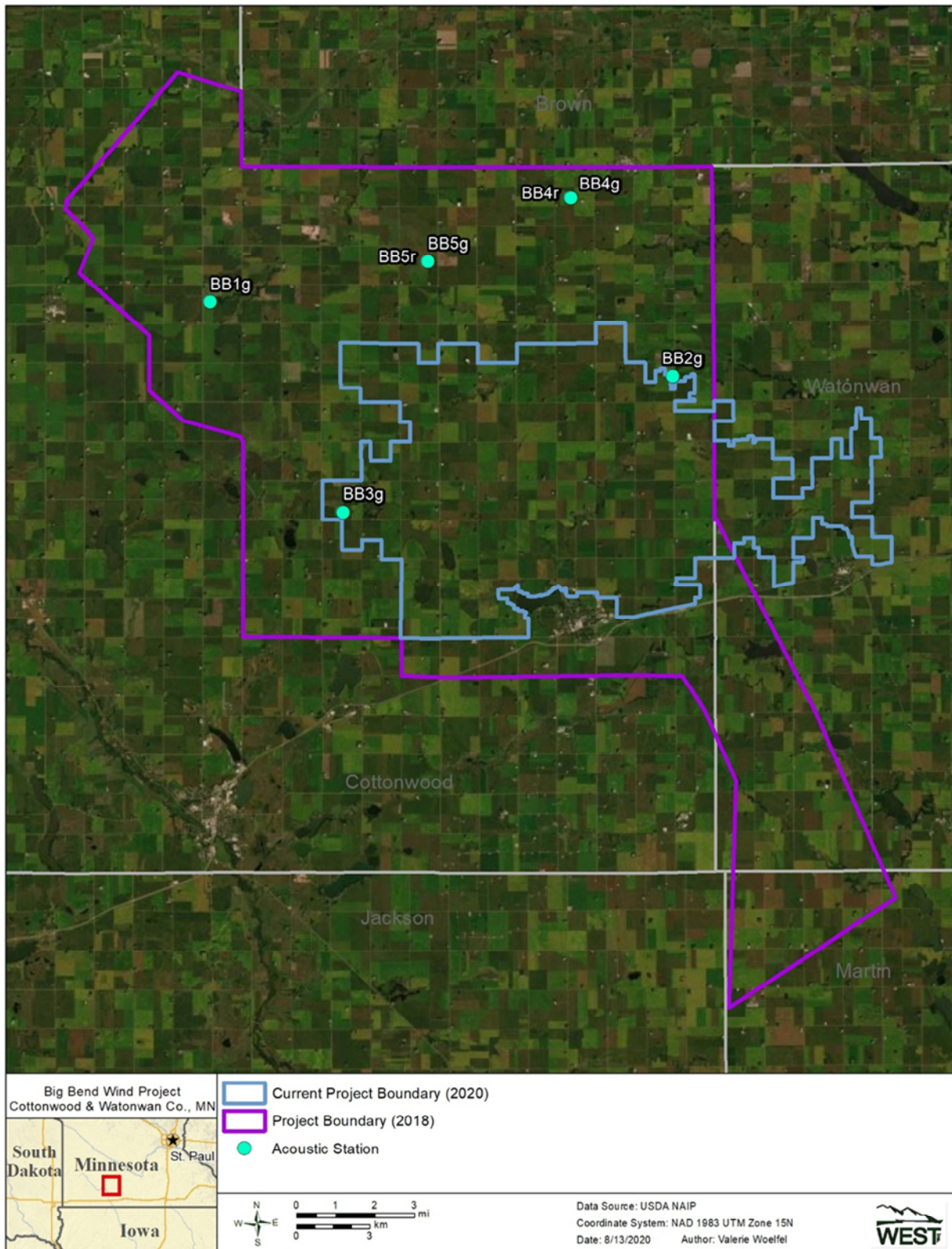


Figure 1.10. Location of bat detector stations during 2018 bat acoustic monitoring at the Big Bend Wind Project, Cottonwood and Watonwan counties, Minnesota.

Bat feature stations averaged 92.38 ± 6.92 bat passes per detector night, representative ground stations averaged 12.93 ± 1.42 bat passes per detector night and representative raised stations averaged 8.40 ± 0.97 bat passes per detector night. Bat activity in the 2018 Project boundary varied among representative stations. At the paired ground and raised representative stations, bat activity was much higher at station BB5 than at station BB4 (**Figure 2.10**). Bat passes at representative ground stations outnumbered passes at raised stations at both BB4 and BB5.

Northern Long-Eared Bat Habitat Assessment

WEST completed both a desktop and ground-based habitat assessment for the federally threatened NLEB for the Project boundary in spring 2019 and spring 2020 (**Figure 2.11**). The purpose of the assessment was to identify potentially suitable summer NLEB habitat within the Project area and 1,000-foot (ft) buffer. The assessment was completed in accordance with the USFWS *Range-Wide Indiana Bat Survey Guidelines* (USFWS 2019), which also applies to NLEB.

An initial habitat desktop review of the 2020 Project area and 1,000-ft Project area buffer (Assessment Area) was completed using available Geographic Information System data. Forested areas and subsequent potential habitat were derived from a machine learning classification algorithm used to delineate mature forest patches. The results from the model were filtered and visually assessed for accuracy, whereby false positives were removed and forest boundaries were adjusted, if necessary. This information was used to identify potential areas of NLEB suitable forested habitat for subsequent ground-truthing.

A total of 756.0 ac (1.7% of the Assessment Area) of potentially suitable NLEB habitat was identified in the desktop analysis. During the site visits, the biologist determined 145.0 ac identified during the desktop analysis were not suitable NLEB habitat and identified an additional 12.6 ac of suitable habitat, for a total of 623.6 ac of suitable habitat for NLEB within the Assessment Area (**Figure 2.11**). The majority of suitable habitat consisted of forested riparian areas scattered across the Assessment Area, particularly along the Watonwan River and Butterfield Creek in the southern portion of the current Project area. Unsuitable forest patches were either ornamental or in residential areas and did not meet criteria for suitable NLEB habitat.

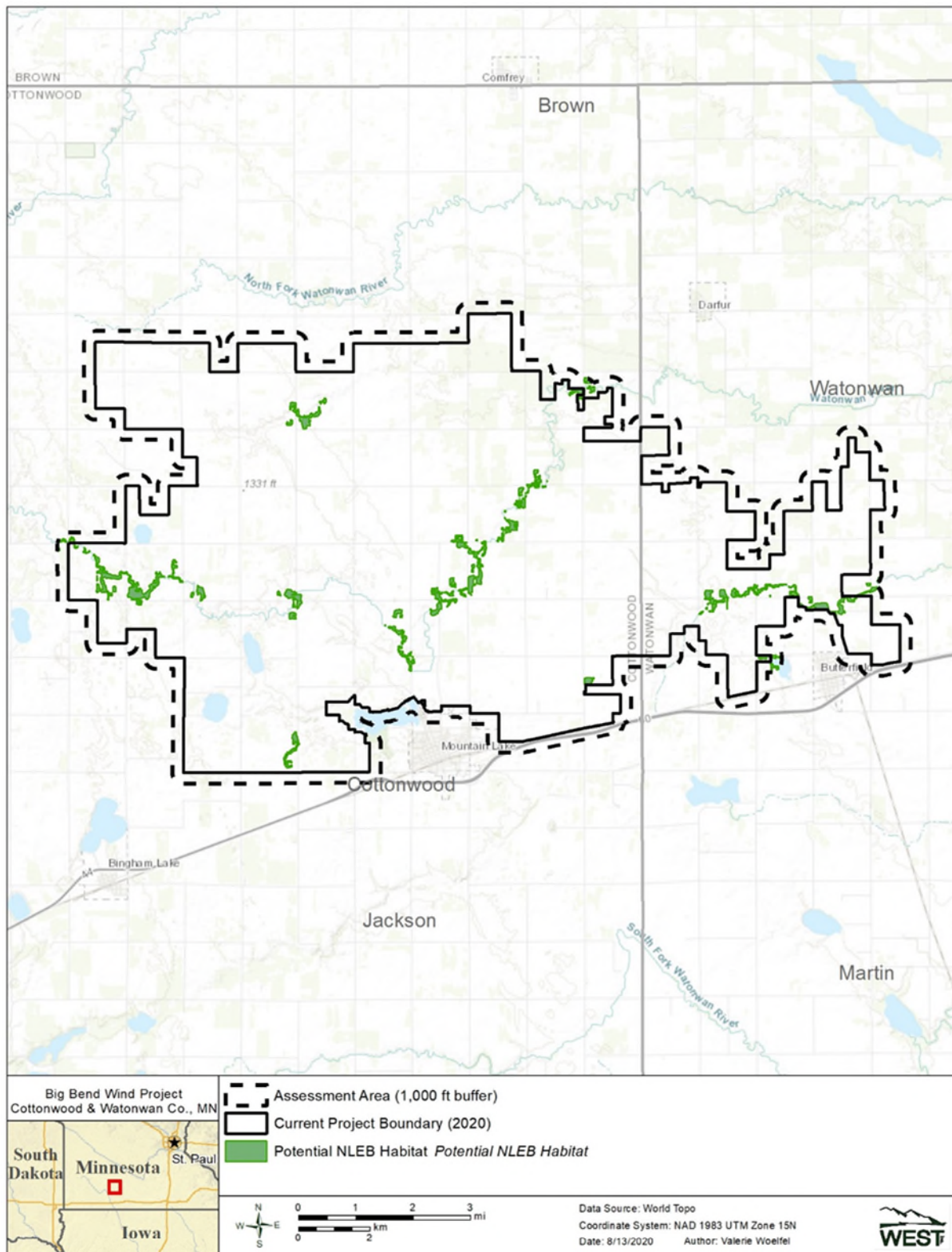


Figure 2.11. Potentially suitable habitat for federally listed NLEB at the Big Bend Wind Project, Cottonwood and Watonwan counties, Minnesota

3 DISCUSSION AND IMPACT ANALYSIS

Following the WEG tiered process, Big Bend Wind's initial screening of the broad geographic region determined areas where development may pose significant risks to species of concern and refined Project area to avoid such locations. The Tier 2 evaluation reviewed readily available desktop resources to assess potential adverse effects to wildlife and their habitats within the refined Project area. Part of that review was to determine potential occurrence of species of concern within the Project area. This review was conducted in 2017 and may not be applicable to the current boundary because of the reduction in size and changes in species status. A final review of both the IPaC and MNDNR Rare Species Guide occurred on September 13, 2021 within the current and final Project area (specific to the IPaC) and Cottonwood and Watonwan Counties (specific to the MNDNR Rare Species Guide). The IPaC search revealed that Poweshiek skipperling and Dakota skipper no longer appear as species with the potential to occur within these counties or the Project area. The number of birds of particular concern with the potential to occur was reduced to five (bald eagle, black tern, Franklin's Gull, lesser yellowlegs, and golden-winged warbler) further demonstrating Big Bend Wind's ability to follow the WEG (USFWS 2017). No changes were associated to the MNDNR Rare Species Guide.

Tier 3 studies were implemented to better understand potential adverse effects to wildlife and their habitats identified in the Tier 2 evaluation. While many of those studies were designed using various iterations of the Project boundary as it evolved, they all are applicable to understanding potential adverse effects to species that occur within the current and final Project boundary. Information from all of these studies were used to answer Tier 3 questions posed in the WEG specific to the current and final Project boundary (**Figure 3.1**).

3.1 Tier 3 Questions

Table 3.1. Predicted impacts of the Big Bend Wind Project: Responses to questions posed in Tier 3 of the Land-Based Wind Energy Guidelines (USFWS 2012).	
Question	Response
Do field studies indicate that species of concern are present on or likely to use the proposed site?	<p>Field studies indicate that species of concern are present in low numbers and certain species will likely use the Project area (Solick et al. 2019, Foo et al. 2019, Bailey et al. 2020, Foo et al. 2021).</p> <p>No federally listed species were recorded during three years of avian use surveys.</p> <p>Two state endangered species were recorded incidentally at the Project. Henslow's sparrow (<i>Ammodramus henslowii</i>) was recorded incidentally in summer during Year 1 surveys. Loggerhead shrike (<i>Lanius ludovicianus</i>) was recorded incidentally in spring during Year 3 surveys.</p> <p>Year 1, Year 2, and Year 3 of avian use surveys indicate that bald eagles (also a bird of particular concern) are present in the Project area and vicinity.</p>

Table 3.1. Predicted impacts of the Big Bend Wind Project: Responses to questions posed in Tier 3 of the Land-Based Wind Energy Guidelines (USFWS 2012).

Question	Response
	<p>Two birds of particular concern (black tern [<i>Chlidonias niger</i>] and Franklin's gull [<i>Leucophaeus pipixcan</i>] were observed in the Project area.</p> <p>The Project area is within the range of NLEB and potential NLEB habitat exists within the Project area; however, no NLEB calls were identified during acoustic monitoring (Solick et al. 2019, Hyzy et al. 2020).</p>
Do field studies indicate the potential for significant adverse impacts on affected populations of species of habitat fragmentation concern?	Field studies indicate that due to relatively limited habitat and preexisting fragmentation from intensive agricultural cropland production, the Project area is considered unlikely to create adverse effects to the bird or bat populations of habitat fragmentation concern.
What is the distribution, relative abundance, behavior, and site use of species of concern identified in Tiers 1 or 2, and to what extent do these factors expose these species to risk from the proposed wind energy project?	<p>Data indicate that development of the current Project area is unlikely to trigger substantial impacts to small or large bird populations, including listed species or birds of particular concern. The majority (96.0%) of the current Project area consists of cropland and developed areas, with little preferred habitat for species of concern. Most species observed are relatively widespread and abundant in the region, signifying a moderately low risk of adverse impacts to bird populations.</p> <p>Franklin gulls and bald eagles were the only species of concern found in relatively high numbers compared to other species of concern during Tier 3 surveys. Flocks of migrating Franklin's gulls may occur within the current Project area on occasion, but the species is not expected to occur frequently. The majority (95.1%) of Franklin's gull observations were recorded below the estimated RSH; most observations occurred in one large flock in a tilled field at Point 74 along the southwest boundary of the Project. Only two Franklin's gull fatalities have been reported in publicly available records from operating wind farms in the Midwest (Bay et al 2017, Osborn et al. 2000).</p> <p>Bald eagles were observed throughout the Project area, during all seasons and not concentrated in a particular portion of the Project area but were generally observed near rivers and lakes during both study years. One bald eagle nest was detected within the Project boundary in 2020. The majority of flights observed during the monitoring of this nest were in the immediate vicinity of the nest and 0.4-0.5 mi northwest of the nest, along a tributary of the North Fork Watonwan River.</p>

Table 3.1. Predicted impacts of the Big Bend Wind Project: Responses to questions posed in Tier 3 of the Land-Based Wind Energy Guidelines (USFWS 2012).

Question	Response
	<p>Seven bat species were identified as potentially occurring in the current Project area, including the federally threatened NLEB. No NLEB calls were qualitatively identified by a qualified bat biologist (Solick et al. 2019). It is likely that migratory tree bat species will utilize forested habitat within the Project area; however, implementing conservation measures should minimize the potential take of all bat species using these habitats.</p>
<p>What are the potential risks of adverse impacts of the proposed wind energy project to individuals and local populations of species of concern and their habitats? (In the case of rare or endangered species, what are the possible impacts to such species and their habitats?)</p>	<p>Bird and bat species are susceptible to collision impacts but these potential impacts are not expected to adversely impact populations. The Project area is located in highly fragmented landscape. Given that previous fragmentation and conversion to cropland has likely already negatively affected the bird and bat populations, the Project area is not expected to further adversely impact bird and bat populations.</p> <p>The closest operating wind-energy facilities to the Project area with public post-construction fatality data are the Elm Creek 1 and Elm Creek 2 Wind Energy Facilities, located approximately 5.0 mi and 6.2 mi from the Project area. Both projects are in cropland similar to the Project area. Bat casualty rates at Elm Creek 1 and 2 ranged from 1.49 – 2.81 bats/MW/study periods, respectively (Derby et al. 2010, 2012). Based on the proximity of these wind facilities to the Project area, it is expected that bat fatality rates observed at these facilities would be similar to fatalities observed in the Project area assuming wind turbines are sited in a similar cropland dominated habitat (Solick et al. 2019).</p> <p>With impact avoidance and minimization measures in place and the relatively low levels of use observed during surveys, the Project area is not likely to cause population-level impacts to birds, including diurnal raptors or sensitive birds, or to bats.</p>
<p>How can developers mitigate identified significant adverse impacts?</p>	<p>No mitigation is warranted because risk during construction will be minimized to the greatest extent practicable, and risk during operations to species of concern will be relatively low.</p>
<p>Are there studies that should be initiated at this stage that would be continued in post-construction?</p>	<p>No additional studies are needed.</p>

3.2 Results and Impact Analysis

3.2.1 Birds

No federally threatened or endangered bird species were observed during surveys. Two state-listed endangered species were recorded incidentally at the Project. Henslow's sparrow, a species that has often been recorded during baseline surveys at other regional wind energy facilities in southwestern Minnesota, was recorded incidentally during Year 1 avian use surveys. However, no Henslow's sparrow fatalities at wind energy facilities have been reported in publicly available data, so overall risk is anticipated to be relatively low (Foo et al. 2019). No state-listed species were recorded during Year 2 of avian use surveys. During Year 3 surveys, one loggerhead shrike was observed incidentally. One loggerhead shrike fatality has been reported at a wind energy facility in the Midwest (WEST 2021); based on minimal regional fatalities and limited use of the Project, overall risk is expected to be relatively low.

Two birds of particular concern (bald eagle, black tern) were observed in the current Project area during surveys at comparatively low levels during Year 1 and one bird of particular concern (Franklin's gull) was observed incidentally. Two birds of particular concern were recorded during Year 2 (bald eagle, Franklin's gull). One bird of particular concern was recorded during Year 3 (bald eagle). Approximately 96% of the current Project area consists of cultivated crops and developed areas, leaving limited preferred herbaceous (0.5%) and open water (0.9%) habitat available to species of concern. The majority of species of concern were recorded infrequently and in low numbers, suggesting low use of the Project area.

Bald eagles were observed using the Project area during all seasons in Year 1 of avian use surveys and in fall, winter, and spring during Year 2 and Year 3 of avian use surveys, which is typical of the region. Overall bald eagle use was not concentrated in a specific portion of the Project area, although higher use was generally associated with areas in close proximity to rivers and lakes. A bald eagle nest was discovered within the Project area during 2020 aerial nest surveys and eagle use around this nest is expected to be high if occupied in the future. The majority of flights observed during the monitoring of this nest were in the immediate vicinity of the nest and 0.4-0.5 mi northwest of the nest, along a tributary of the North Fork Watonwan River; siting of turbines near the nest may increase eagle collision risk during Project operation. Bald eagle use and proposed minimization and avoidance measures are discussed in further detail in the Eagle Management Plan (Big Bend Wind, LLC 2020).

Project survey results indicate that development of the Project area is unlikely to adversely impact small or large bird populations, including diurnal raptors or species of concern. Most species observed are prevalent and abundant, and their populations are therefore at low risk of adverse impacts from the Project. Analysis of data collected during raptor and eagle surveys suggests there is minimal potential for the Project to create instability in local or regional nesting diurnal raptor populations.

Results from Tier 1, 2, and 3 studies suggest that with the implementation of the Avoidance and Minimization Measures (AMMs; Section 4.0), the Project is not likely to create substantial risk to birds.

3.2.2 *Bats*

The current Project area is within federally threatened NLEB range; however, no known hibernacula or maternity colonies exist within the Project area, and the nearest known hibernacula is approximately 50 mi northeast. Potential NLEB habitat does exist within the Project area, and it is likely that tree-roosting migratory bat species will utilize the Project area, including NLEB and other state-listed species of concern. Although NLEB were not documented as occurring within the Project area during the acoustic bat surveys, Big Bend Wind will implement best management practices recommended by USFWS and MNDNR to minimize take for all bat species (Baerwald et al. 2008, Arnett et al. 2010, Good et al. 2011). These measures include siting turbines more than 1,000 ft (305 m) from suitable habitat, minimizing tree removal to the greatest extent possible including focusing any necessary tree removal in winter, and locking or feathering blades to manufacturer's cut in speed from one half hour before sunset to one half hour after sunrise from April 1 to October 31.

4 IMPACT AVOIDANCE AND MINIMIZATION MEASURES

This section discusses the measures that Big Bend Wind has implemented, or plans to implement, to avoid and minimize potential impacts on birds and bats. For fatality monitoring measures, please see **Section 5**. These AMMs were informed by pre-construction studies (**Section 2**) and Big Bend Wind's experience developing and operating environmentally responsible wind energy facilities. Additional measures to avoid and minimize potential impacts to eagles are described in the Eagle Management Plan (Big Bend Wind, LLC 2020).

4.1 Project Layout and Design

Big Bend Wind adopted the following industry-standard and also agency-informed best management practices (BMPs) to avoid, minimize, and reduce potential impacts to birds and bats during the planning/design stage of the Project:

- The Project area has been sited in disturbed agricultural lands away from major wildlife use and habitat areas.
- The Project has been sited to avoid all areas identified by the Minnesota Biological Survey as having moderate or high biodiversity significance.
- The Project has been sited to avoid calcareous fens and native prairies as defined by the Minnesota Statutes (Section 84.02, Subd. 5, 2019), to the extent practicable.
- Turbines will be sited more than 1,000 ft from suitable NLEB summer habitat to minimize risk to roosting bats.
- Tree clearing will be minimized by utilizing existing roads and minimizing the size of clearings needed around turbines, to the maximum extent practicable. This measure

minimizes potential disturbance to bats as well as conversion of natural areas to Project facilities (habitat loss).

- The electrical collection system will be placed underground. This measure will eliminate collision risk and electrocution hazards for birds using the Project area and allows habitat to regenerate.
- The length of the 161kV aboveground transmission line necessary to connect the Project to the regional grid will be minimized to the extent practicable.
- Permanent fencing will only be used around the substation and operations and maintenance building as necessary for security and human safety.
- Turbines will be sited as far away as practicable from any "natural" areas likely to have higher avian activity or diversity.
- Areas of disturbance have been minimized:
 - Infrastructure footprints associated with roads and other infrastructure have been minimized to the extent feasible
 - Area disturbed by pre-construction monitoring and testing activities were minimized to the extent feasible; and
 - The length and number of access roads were minimized and existing roads were used when feasible

4.2 Construction

Big Bend Wind will employ industry-standard BMPs to reduce potential impacts to birds and bats during the construction stage of the Project:

- To avoid and minimize impacts to roosting bats during the maternity season, tree removal will be minimized to the greatest extent possible, and Big Bend Wind will attempt to conduct any necessary tree removal in winter.
- Wildlife-friendly erosion measures will be used during construction to minimize entrapment and potential mortality of small animals and reptiles.
- All employees and contractors working on the site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species. Training will include:
 - Reducing the potential for vehicle collision by adhering to posted speed limits, being alert for wildlife, and using additional caution in low visibility conditions.
 - Confining construction vehicle activity to the limits of disturbance.
 - Avoiding harassing or disturbing wildlife, particularly during reproductive seasons.
 - Keeping any dogs on site on leashes to avoid the potential for unleashed dogs to harass wildlife within the Project.
 - Storing food-related trash and waste in containers and remove on a regular basis to reduce attractiveness of the Project to scavengers and their prey.

- Eliminating ponding water following construction to minimize on-site attractants to bats.
- Reviewing the Wildlife Incident Reporting System (WIRS) so that the construction team understands the procedures for recording avian and bat species found in the Project (**Section 5**).

4.3 Operations

Big Bend Wind intends to adopt the following industry-standard BMPs to reduce potential impacts to birds and bats during the operational stage of the Project:

- Lock or feather blades for all turbines up to manufacturer's cut-in speed from one-half hour before sunset to one-half hour after sunrise from April 1 to October 31 to minimize impacts to bats.
- An Aircraft Detection Lighting System (ADLS) will be utilized at the Project to reduce the frequency of blinking lights at night.
- Lighting will be minimized to the extent practicable. An ADLS will be installed, and downward projecting lights or motion sensor activated lights will be installed as practicable to minimize attractants to birds/bats.
- Lighting that does not escape the nacelle will be used, or nacelle lights will be turned off at night as practicable to minimize attractants to birds/bats.
- Minimize the number of storm water control features (sediment retention ponds) to minimize on-site attractants to bats.
- Wildlife carrion and livestock carcasses in proximity to the turbines will be reported for removal as practicable. This measure reduces the attractiveness of the Project to avian scavengers and their prey.
- All employees and contractors working on the site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species. Training will include:
 - Reducing the potential for impacts to wildlife by turning off lighting, adhering to posted speed limits, managing food-related trash and waste appropriately, etc.
 - Identification of state- and federally listed species as well as eagles so that this information can be relayed to the appropriate entity in a timely manner and operational adjustments implemented if appropriate.
 - Reviewing the WIRS so that the operations team understands the procedures for recording avian and bat species found in the Project.

5 OPERATIONAL MONITORING AND WILDLIFE INCIDENT REPORTING

5.1 Fatality Monitoring

Big Bend Wind will conduct post-construction mortality monitoring (PCM) surveys following construction to assess and monitor for potential direct impacts to birds and bats. The post-construction mortality monitoring study will address Tier 4 of the WEG and also will be consistent with the MNDNR's *Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems in Minnesota* (Mixon et al. 2014). Two years of bird and bat PCM will be conducted, the details of which will be developed through coordination with the MNDNR and Minnesota Department of Commerce (MNDOC, Energy and Environmental Review & Analysis Unit). Any eagle-specific PCM protocols will be developed through coordination with the USFWS as part of the EMP development. Searcher efficiency and carcass removal trials will be completed during each survey season to capture seasonal variations and aid in determining estimated bird and bat fatality rates for the Project.

After each year of monitoring is completed, a mortality analysis will be completed that evaluates species, number, location, and distance from the nearest turbine for each recovered bird or bat. At a minimum, the mortality analysis will consider the following:

- Number of annual mortalities per turbine and estimate of facility-wide fatality rates; and
- Comparison to existing public data on bird and bat mortality at projects with similar habitat types and study methodology.

The survey results will be provided to the USFWS, MNDOC and MNDNR no later than March 15th of the year following the surveys.

5.2 Wildlife Incident Reporting System

If injured or deceased species protected under the federal ESA or BGEPA are discovered at the Project, Big Bend Wind or its representatives will contact the USFWS-Minnesota Twin Cities Field Office (952-252-0092) within one business day, or as soon as possible thereafter in the event of unique circumstances that would prevent such immediate contact.

If species protected under the Minnesota Endangered Species Protection Act are discovered at the Project, Big Bend Wind or its representatives will contact the MNDNR within one business day, or as soon as possible thereafter in the event of unique circumstances that would prevent such immediate contact.

Big Bend Wind shall notify the Public Utilities Commission, USFWS, and the MNDNR within 24 hours of the discovery of any of the following: (a) five or more dead or injured birds or bats within a five day reporting period; (b) one or more dead or injured state threatened, endangered, or species of special concern; (c) one or more dead or injured federally listed species, including species proposed for listing; or (d) one or more dead or injured bald or golden eagle(s).

In the event that one of the four discoveries listed above should be made, Big Bend Wind will file with the Public Utilities Commission within seven days, a compliance report identifying the details of what was discovered, the turbine where the discovery was made, a detailed log of agencies and individuals contacted, and current plans being undertaken to address the issue.

6 ADAPTIVE MANAGEMENT

The WEG describes adaptive management as the process of assessing various management actions and then designing and implementing the management action that is determined to be the most appropriate for the situation. The management action is then assessed through monitoring and evaluation to determine if the desired results are being met or if adjustments to the management action are warranted.

Big Bend Wind has sited the Project and incorporated measures to avoid, minimize, and mitigate impacts to birds and bats, and to avoid and minimize take of NLEB. Post-construction monitoring results will be evaluated in coordination with the USFWS, MNDOC and MNDNR, and Big Bend Wind will work with the wildlife agencies to determine appropriate additional measures should impacts exceed anticipated levels. Otherwise, Big Bend Wind will continue operating under the existing protocols.

Big Bend Wind is committed to understanding potential impacts to birds and bats resulting from Project operations. Adaptive management will be implemented, if necessary, to further avoid, minimize, or mitigate unexpected impacts to birds or bats. The following adaptive management framework will be implemented, if appropriate, based on findings:

- Based on the results of the first year of post-construction monitoring, Big Bend Wind will confer with MNDNR and MNDOC to determine if modifications to the survey protocol should occur.
- Big Bend Wind will work with the USFWS and MNDNR to evaluate the data and determine if additional avoidance or minimization measures are necessary to reduce risk to acceptable levels.
- Should USFWS and/or MNDNR list or change the listing status of species that have potential to occur with the Project area, Big Bend Wind will evaluate the potential risk to the newly listed species posed by the Project and meet with agencies, as deemed appropriate.
- If an eagle fatality occurs, Big Bend Wind will evaluate the potential cause and determine whether further studies are warranted to reassess risk.
- Details of adaptive management measures, if deemed necessary, will be determined from the site-specific assessment and will focus on:
 - impacts that may be reasonably considered to cause significant population level impacts, and

- reducing mortality relative to what has been observed beyond anticipated levels.

Discovery of a cluster (5 or more carcasses) of bird or bat fatalities in space (i.e., at one turbine or other component of Project infrastructure) or time (i.e., found or estimated to have occurred on the same day) will trigger the following response:

- Completion of a root cause analysis and implementation of appropriate measures or consultation with the USFWS to determine next steps.

Adaptive management responses or mitigation will be commensurate with identified impacts and will be limited to activities that do not significantly affect wind energy production. Big Bend Wind may submit a new or revised BBCS or monitoring plan in the future to USFWS for review if new information suggests revisions are warranted. The adaptive management plan will apply throughout the life of the Project.

7 MITIGATION AND CONSERVATION DURING DECOMMISSIONING

In the event of decommissioning at the end of the operational life of the Project, Big Bend Wind will reclaim disturbed areas in accordance with lease requirements with landowners or as specified by applicable regulations within the Big Bend Wind-approved Decommissioning Plan. Decommissioning may include removing any and all aboveground equipment, including towers, concrete pads, anchors, guy wires, fences, fixtures, materials, buildings, structures, improvements, and personal property installed by the Project or the Project's affiliates..

The following decommissioning BMPs, as outlined in the WEG, will be implemented during the decommissioning process:

- Decommissioning methods will minimize new site disturbance and removal of native vegetation, to the greatest extent practicable.
- Foundations will be removed to a minimum of 4 ft below surrounding grade (or as specified by the landowner or otherwise required by state regulation and the approved decommissioning plan), and so that subsurface structures do not substantially disrupt ground water movements.
- If topsoil is removed during decommissioning, it will be stockpiled and reused when restoring plant communities. Once decommissioning activity is complete, topsoil will be restored to assist in establishing and maintaining pre-construction conditions to the extent possible, consistent with landowner objectives.
- Surface water flows will be restored to pre-disturbance conditions consistent with storm water management objectives and requirements. This will include removal of stream crossings, roads, and pads.
- Overhead power lines that are no longer needed will be removed.

- After decommissioning, erosion control measures will be installed in all areas of disturbance where potential for erosion exists, consistent with storm water management objectives and requirements.
- Fencing will be removed unless the landowner wishes to utilize the fence.

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