APPENDIX D
Agency Correspondence

May 24, 2013

Mr. Bob Patton
Ag Marketing and Development Division
625 Robert Street North
Saint Paul, MN 55155

RE: Odell Wind Farm and Transmission Line in Southwest Minnesota

Dear Mr. Bob Patton:

Odell Wind Farm, LLC (Odell Wind Farm), a wholly owned subsidiary of Geronimo Wind Energy, LLC, is gathering information and requesting agency comments for a proposed wind energy project and transmission line in Cottonwood, Jackson, Martin, and Watonwan Counties, Minnesota. The proposed project will be up to 200 MW.

Odell Wind Farm intends to submit a Site Permit Application for a Large Wind Energy Conversion System and a Route Permit Application for a High Voltage Transmission Line to the Minnesota Public Utilities Commission (PUC). The Odell Wind Farm will include wind turbines and associated facilities, including gravel access roads, an underground collector system, two substations, meteorological monitoring stations, an operations and maintenance facility, and a 115 kV transmission line.

Turbine locations, access roads and electrical connections have not been finalized at this time. Table 1 provides the sections of land Odell Wind Farm is evaluating for siting the wind energy project.

Table 1 –Sections within the Odell Wind Farm Project Boundary

County Name	Township Name	Township	Range	Sections
Cottonwood	Lakeside	105N	35W	22, 23, 24, 25, 26, 35, 36
Cottonwood	Mountain Lake	105N	34W	12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Jackson	Christiana	104N	35W	1, 2, 12
Jackson	Kimball	104N	34W	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 16, 17, 18, 19, 20, 21
Martin	Cedar	104N	33W	4, 5, 6, 7, 8, 9, 16, 17
Watonwan	Odin	105N	33W	7, 18

Similarly, the transmission line route is not yet finalized. Table 2 identifies the land in the transmission route evaluation area, which is the area currently being considered for the transmission route and possible alternative routes.

Table 2 –Sections Included in the Transmission Route Evaluation Area*

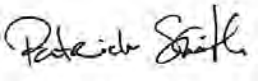
County Name	Township Name	Township	Range	Sections
Cottonwood	Mountain Lake	105N	34W	32, 33, 34, 35, 36
Jackson	Kimball	104N	34W	1, 2, 3, 4, 5
Martin	Cedar	104N	33W	4, 5, 6, 7, 8, 9, 16, 17
*The Sections in Table 2 are also included in Table 1 because the prospective transmission routes are located within the current Odell Wind Farm boundary.				

To facilitate your review, we have enclosed a map of Odell Wind Farm's location and project boundary. The transmission route evaluation area is also indicated on the map.

We welcome any comments the Ag Marketing and Development Division may have at this time or throughout the permit application process. Any comments provided will be incorporated into the PUC review process for the Odell Wind Farm.

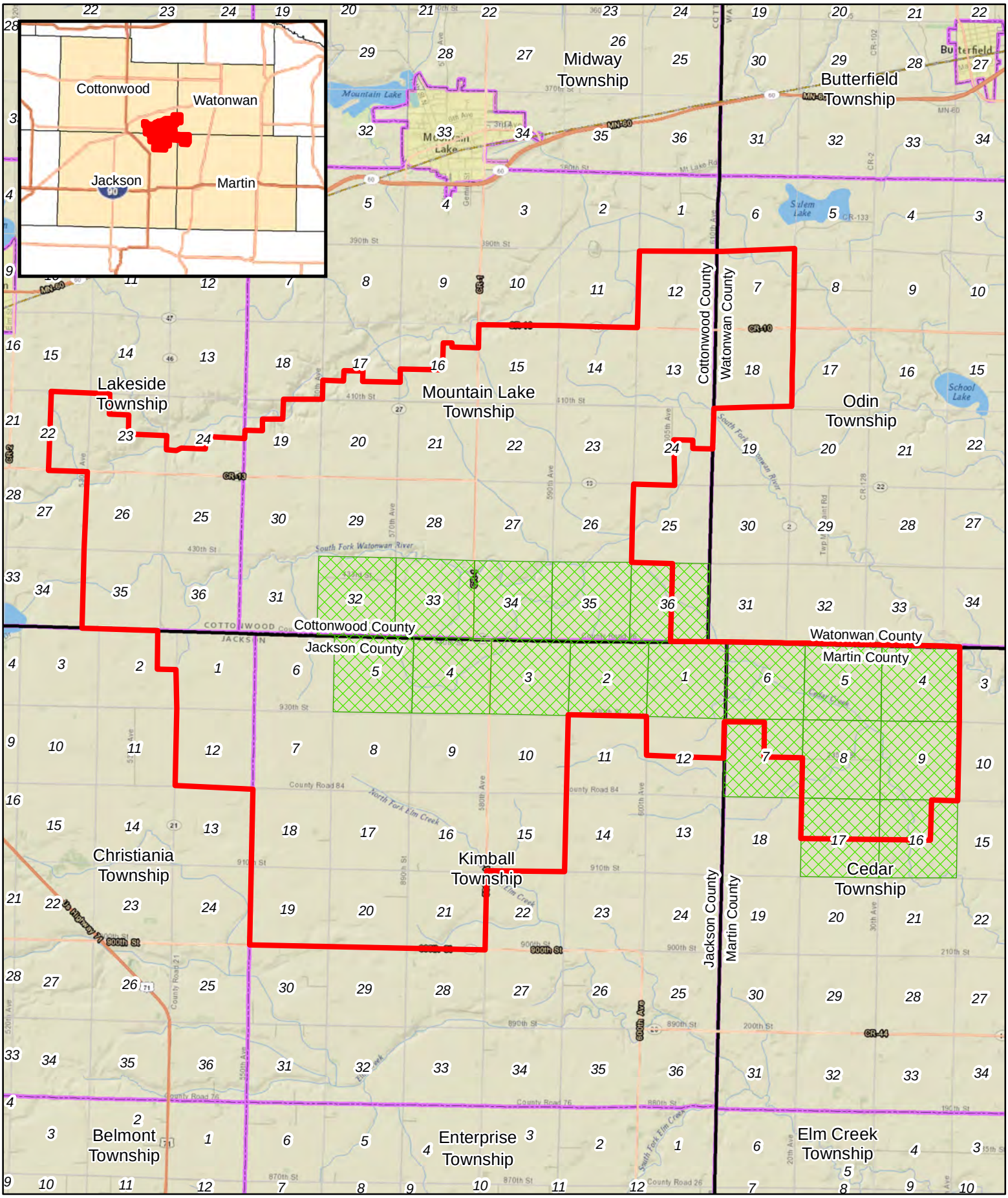
If you require further information or have questions regarding this matter, please contact me at 952-988-9000 or at Patrick@geronimoenergy.com

Sincerely,



Patrick Smith
Director of Environmental Planning

Enclosures:
Odell Wind Farm Project Location Map



Odell Footprint

Route Evaluation Area

County

County Subdivisions

GERONIMO ENERGY

0 0.75 1.5 3

Miles

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

Project Location Map

Document Path: O:\GIS\GISData\Projects\Odell Wind Farm\Projects\OD_ProjectLocationMap_05232013_CJ.mxd

cjjenson Date: 5/24/2013

Minnesota Department of Natural Resources

Division of Ecological Resources – Reg. 4
261 Hwy 15 South
New Ulm, MN 56073-8915
Phone: (507) 359-6073 Fax: (507) 359-6018 E-mail: kevin.mixon@dnr.state.mn.us

October 28, 2009

Mr. Patrick Smith
Geronimo Wind Energy
5050 Lincoln Drive
Edina, MN 55436

In re: Odell LWECS
Preliminary Review
Cottonwood County, MN

Dear Patrick:

The Minnesota Department of Natural Resources (DNR) has received information concerning the above referenced wind project located in Cottonwood County, MN. The DNR is providing the following comments as a mechanism to collaboratively work together to identify potential natural resource issues that should be considered during project development.

The Bennett and Banks Wildlife Management Areas (WMA) are immediately adjacent to the project area. Please note the new addition (yellow polygon) to the Banks WMA on the attached map. The DNR recommends that no direct impacts occur to these public recreational lands from turbine construction, transmission lines, substations, or road networks associated with the project. In addition, a buffer should be established around all WMA's that is a minimum of five times the rotor blade diameter. This buffer may be re-evaluated as the project progresses if more information on sensitive resources associated with the WMA are discovered. State Wildlife Management Area boundaries can be downloaded from the DNR Data Deli (http://deli.dnr.state.mn.us/).

Several large blocks of Conservation Reserve Program properties in the project area contain valuable wildlife habitat for grassland birds and other wildlife species. The DNR recommends these areas be avoided and an appropriate setback be established in order to reduce potential mortality and avoidance of the habitat by avian species.

The Bureau of Water and Soil Resources (BWSR) conservation easement areas prohibit construction of turbines and an appropriate setback should be established in order to reduce potential mortality and avoidance of the habitat by avian species. Conservation Reserve Enhancement Program, Reinvest in Minnesota-Wetland Reserve Program, and Permanent Wetland Preserves easements are all considered RIM Reserve easements for program policy and administration. Conservation easement information can be found at: http://www.bwsr.state.mn.us/easements/index.html under Download Our Statewide GIS (shapefile) of All RIM Easements. For additional site specific information you can contact the Soil and Water Conservation District (SWCD) for the county where the land is located. The SWCD directory can be found at: http://www.bwsr.state.mn.us/directories/SWCDs.pdf

Placing turbines, access roads, or other infrastructure in close proximity to wetlands (non-meandered, non-public water) may result in avian avoidance of the wetland and its associated habitat and may result in increased avian and bat mortality. The general DNR recommended buffer to wetlands (FWS Circular 39 Type III-VIII) and perennial streams that provide significant habitat value is 600 feet. The DNR may recommend buffers for some Type I and II wetlands that contain high habitat value based on a project-by-project basis. The DNR wetland buffer is consistent with prior DNR recommendations to counties during their development of county wind ordinances. Numerous counties have adopted the 600 foot wetland setback distance into their wind ordinance. Further coordination should occur with the DNR in situations where the project proponent feels the wetland buffer should not apply.

Minnesota Administrative Rules 7836.0500, Subpart 7, requires the applicant to analyze potential environmental impacts of the project, proposed mitigative measures, and any adverse environmental effects that cannot be avoided. Groundwater resources, surface waters, wetlands, vegetation, wildlife, rare and unique natural resources, etc. are included. In order to address the potential environmental impacts the applicant should resolve all outstanding issues with the DNR prior to applying for the Large Wind Energy Conversion System permit from the Public Utilities Commission.

Wind projects disturb soils, surface water and associated ground cover. These disturbances create openings for invasive species that quickly colonize these sites putting adjoining lands and habitat at risk. In addition, this can cause erosion and sedimentation into adjacent waters. The DNR, Soil and Water Conservation District, Minnesota Pollution Control Agency or the Department of Agriculture may recommend BMP's for different areas of the project. These BMP practices help address construction and maintenances activities to minimize impacts to soil, water and existing ground cover. The BMP's may also provide site restoration recommendations.

The DNR recommends working within the US Fish and Wildlife Service guidelines to avoid and minimize impacts to wildlife from wind development. The guidelines and additional information can be found at the following site: http://www.fws.gov/habitatconservation/Service Interim Guidelines. PDF

This review constitutes a preliminary review of the project and is not a substitute for reviewing potential turbine placement. Further review of the project should be conducted when the preliminary turbine locations are determined. The DNR will provide a second review of the project that is site specific to the proposed turbine locations, transmission lines, substations, and access roads.

The DNR looks forward to working in a positive and collaborative manner on this project to ensure that sustainable energy sources are developed while protecting Minnesota's natural resources. Please contact me directly at 507-359-6073 if you have any questions.

Very truly yours,

Kevin Mixon
Regional Environmental Assessment Ecologist
Division of Ecological Resources

Cc: Lisa Joyal, DNR
Randall Doneen, DNR
John Schladweiler, DNR
Ken Varland, DNR
Randy Markl, DNR
Lisa Gelvin-Innvaer, DNR
Bob Hobart, DNR
Rich Davis, U.S. FWS

Cottonwood County CSAH2
Cottonwood County CR46
Cottonwood County CSAH13
Cottonwood
Banks WMA
Banks WMA
Cottonwood County CSAH17

Swenson, Kristen

From: Heather L. Wayne
Sent: Monday, April 15, 2013 4:41 PM
To: kevin.mixon@state.mn.us
Cc: heather.kieweg@appliedeco.com; Patrick Smith
Subject: Minutes from 03-28-2013 Odell Meeting with Geronimo and AES
Attachments: Odell-GWE-AES-DNR-Meeting03282013-V2.docx

Hi Kevin-

Thanks again for your time and input on the Odell Project.
I've attached a draft of the meeting minutes from our discussion.

Let me know if we missed anything or if you have anything to add.

Have a good week, talk to you soon,

Heather Wayne
Associate

Direct: 952.641.4043
www.geronimoenergy.com

Meeting Minutes for March 28, 2013

10:00 AM

Attendees: Kevin Mixon, MNDNR; Heather Wayne, Geronimo Energy; Heather Kieweg, AES

1. Overview of the proposed Odell project – Heather Wayne, Geronimo
    a. LOCATION: The Odell wind farm is a development of Geronimo Energy in southwestern Minnesota (parts of Cottonwood, Jackson, Watonwan, and Martin Counties)
    b. SIZE: The project is planned as a 200 MW project. The footprint has changed and expanded over time.
    c. TIMELINE: The Odell project has been in Geronimo's development portfolio since 2007. It has been a long-term project, but is now being actively marketed. The exact timeline for development is unknown, but the project is likely to enter construction in 2014 or 2015.
2. Overview of the environmental setting and survey work – AES
    a. Environmental setting
        i. Most of the site is agricultural use/row crops
        ii. AES will be visiting the site next week to start field surveys, and will know more about the environmental setting.
        iii. Mr. Mixon identified privately-owned grassland on the northeast portion of the project as an area of interest as well as the Banks and Bennett WMAs (outside the northwest boundary).
        iv. State conservation lands (Banks WMA and Bennett WMA) are present near the northwest and west boundary of the project.
        v. The Des Moines River is to the west of the project. May provide trumpeter swan habitat.
        vi. The project area has limited wetlands.
    b. Endangered, Threatened and Special Concern Species –
        i. Sullivant's Milkweed and Phlox Moth Records nearby
            1. Reported in the grassland in northeast section of the project boundary (inside the grassland mentioned above)
        ii. Henslow's Sparrow
            1. Mr. Mixon remarked that there is a Henslow's Sparrow record (from 2007) within a half mile of the project boundary (near Bennett WMA). The Henslow's Sparrow is a Minnesota state listed endangered species.
            2. When asked about sparrow management, Mr. Mixon said more information about the project regarding sparrows would be helpful (Is there a large enough block of habitat present? Are there Henslow's Sparrows in the project area?) The NHIS database may also provide information on this species as well.
            3. Geronimo plans to conduct grassland habitat surveys as a part of their Tier II assessment, which will provide an inventory of possible sparrow habitat.

iii. Federal species – Poweshiek Skipperling, Prairie Bush Clover
    1. Both species have the potential to occur but DNR did not have any records in the project area
    2. Mr. Mixon deferred this conversation to the USFWS
iv. Bald Eagle
    1. DNR does not comprehensively track bald eagle nests at this time. The USFWS has data, but it may be incomplete.
    2. An older record of a bald eagle nest approximately four miles away from the western boundary (near the Des Moines River).
    3. AES will be surveying for stick nests this spring, starting the week of April 1, 2013.
    4. Geronimo will consult with the USFWS regarding bald eagles.
v. AES will request a NHIS review of Odell next week (week of April 1, 2013).

c. Proposed 2013 survey work (see survey protocol for more comprehensive information)
    i. Avian surveys
        1. Heather Kieweg reported that, while surveys will occur throughout the day, those near the Bennett and Banks WMAs will be focused during the morning and evening hours when waterfowl activity is expected to be greatest.
        2. Site visit – raptor nest search
        3. Flight path mapping will occur during the raptor and large bird surveys
    ii. Bat acoustic monitoring
        1. AES/Geronimo plans to have acoustic monitors out in early May at two or three meteorological tower locations.
        2. Monitors at 3 meters and 55 meters (rotor swept and ground level observations)
        3. Mr. Mixon said the earlier in May the bat monitoring starts, the better. He also mentioned that it's valuable to have someone check the data often in the first couple of weeks for technology reliability reasons.

3. Discussion
    a. Generally Mr. Mixon acknowledged that the survey work as described looked suitable.
        i. Geronimo/AES will be providing more detailed survey protocol information to DNR. DNR will plan to review the information the week of April 1, 2013.
        ii. Mr. Mixon said that he may also visit the site.
    b. He agreed with creating a survey focus around the northwest part of the project.
    c. Mr. Mixon discussed the need to work with the DNR if a public waterway needs to be crossed with a utility, or needs to be crossed temporarily. A license to cross permit or a work in water permit may be needed.
    d. Mr. Mixon said that the DNR has the lands on the edges, but overall he doesn't anticipate any major issues for the Odell project.

From:	Heather L. Wayne
To:	"kevin.mixon@state.mn.us"
Cc:	heather.kieweg@appliedeco.com; Patrick Smith
Subject:	Documents from Odell (Geronimo & AES) meeting with DNR: Email 1 of 2
Date:	Thursday, March 28, 2013 1:16:29 PM
Attachments:	Odell_SiteLocation20130328.jpg BirdPointCountDataSheet_passerine.pdf BirdPointCountDataSheet-raptor_60min.pdf Odell_Agenda_Mtg_2013_03_26.docx Odell_SiteHabitats20130325.jpg Odell_SiteLocation20130326.jpg

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Hi Kevin-

Thank you again for taking the time to talk with us about the Odell wind energy project today.

I've attached the maps and the agenda that we reviewed at the meeting.
I'm also providing additional documents regarding AES's field protocol.

I will be sending two emails to provide all of the documents (because of the large file sizes).

Have a good day,

Heather Wayne
Associate

Direct: 952.641.4043
Mobile: 612.247.7506
Main: 952.988.9000
1.855.GERONIMO
(1.855.437.6646)

www.geronimowind.com

Corporate Office:
Geronimo Wind Energy
7650 Edinborough Way, Suite 725
Edina, MN 55435

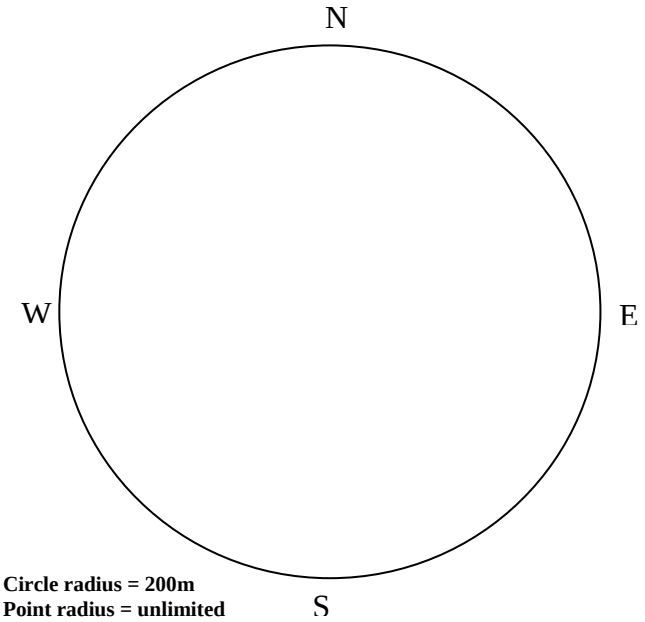
PASSERINE - Bird Point Count Data Sheet

Project Name _____ Sample Point ID # & Location (road names) _____

Date _____ Start Time (24 hr format) _____ Stop Time _____ X coordinate, Y coordinate _____

Observer _____ Wind Spd. _____ Wind Dir. _____ Sky _____ Temp _____ Dominant (>50%) AES Habitat Type _____

Other Habitats_____



Circle radius = 200m
Point radius = unlimited

Wind	**Sky**	**AES Habitat Type**
0 = none	0 = <10% clouds	Developed
1 = 1-3mph	1 = partly cloudy	Cropland
2 = 4-7 mph	2 = mostly cloudy	Barren Land
3 = 8-12 mph	3 = overcast	Grassland
4 = 13-18 mph	4 = rain	Upland Shrub-Scrub
5 = 19-24mph	5 = fog	Upland Broadleaf Forest
6 > 24 mph		Upland Coniferous Forest
Behavior		Upland Mixed Forest
H = Heard, not seen		Wetland Forested
P = Perched, on water or on ground		Wetland Shrub-Scrub
F = Flying (flapping)		Wetland Emergent
S = Soaring (updraft)		Open Water
G = Gliding		
K = Kiting		
MI = Multi-bird Interaction (describe)		
O = other (describe)		

Notes:

Alpha Code	**Behav. Code**	**Dir. from Point**	**Dist. from Point (m)**	**Flight Dir.**	**Ht. (m)**	**0-3 min**	**3-5 min**	**5-10 min**	**10-15 min**	**15+ min**	**Notes**

Alpha Code	Behav. Code	Dir. from Point	Dist. from Point (m)	Flight Dir.	Ht. (m)	0-3 min	3-5 min	5-10 min	10-15 min	15+ min	Notes

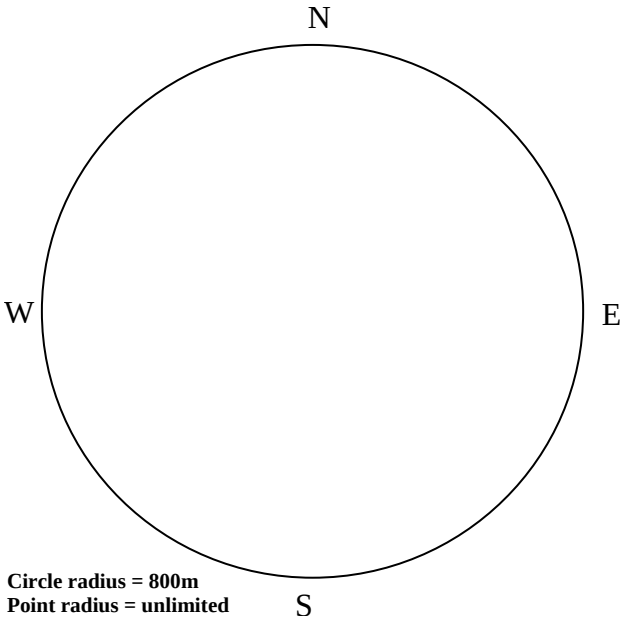
Raptor Large Bird- Bird Point Count Data Sheet

Project Name _____ Sample Point ID # & Name _____

Date _____ Start Time (24 hr format) _____ Stop Time _____ X coordinate, Y coordinate _____

Observer _____ Dominant (>50%) AES Habitat Type _____ Other Habitats _____

Time	Wind Speed	Wind Dir.	Sky	Temp.



Circle radius = 800m
Point radius = unlimited

Wind	Sky	AES Habitat Type
0 = none	0 = <10% clouds	Developed
1 = 1-3mph	1 = partly cloudy	Cropland
2 = 4-7 mph	2 = mostly cloudy	Barren Land
3 = 8-12 mph	3 = overcast	Grassland
4 = 13-18 mph	4 = rain	Upland Shrub-Scrub
5 = 19-24mph	5 = fog	Upland Broadleaf Forest
6 > 24 mph		Upland Coniferous Forest
Behavior		Upland Mixed Forest
H = Heard, not seen		Wetland Forested
P = Perched, on water or on ground		Wetland Shrub-Scrub
F = Flying (flapping)		Wetland Emergent
S = Soaring (updraft)		Open Water
G = Gliding		
K = Kiting		
MI = Multi-bird Interaction (describe)		
O = other (describe)		

Notes:

Fl #	Alpha Code	Num. Obs.	Behav. Code	Dir. from Point	Dist. from Point (m)	Flight Dir.	Flight Ht. (m)	Duration (min) in RSA (30-150m)	Start Time	Stop Time	Notes
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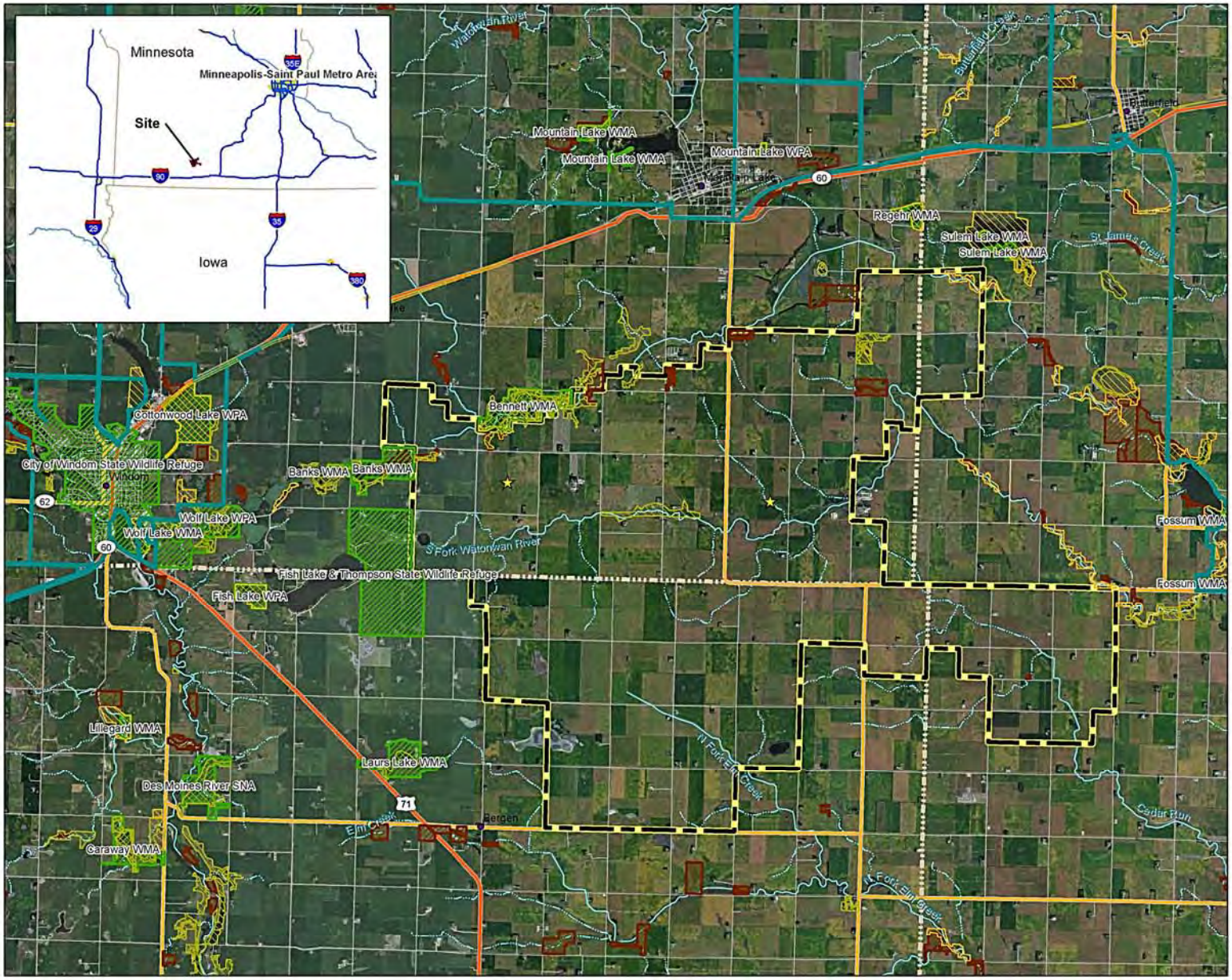

Odell
Site Location

- Site Boundary
- Met Tower Locations
- Protected Natural Areas
- RIM Easement
- Cty. Biological Survey - Native Plant Community
- Cty. Biological Survey - Sites of Biological Sig.
- Railroad Prairie
- Snowmobile Trails

Data Sources:
ESRI Street Map
Bing Aerial Base Map

AES Job Number: 12-0974
Date: 3/28/2013
File Name: Odell_SiteLocation2013328.mxd

APPLIED ECOLOGICAL SERVICES
21938 Mushtown Road
Prior Lake, MN 55372
952-447-1919
www.appliedeco.com

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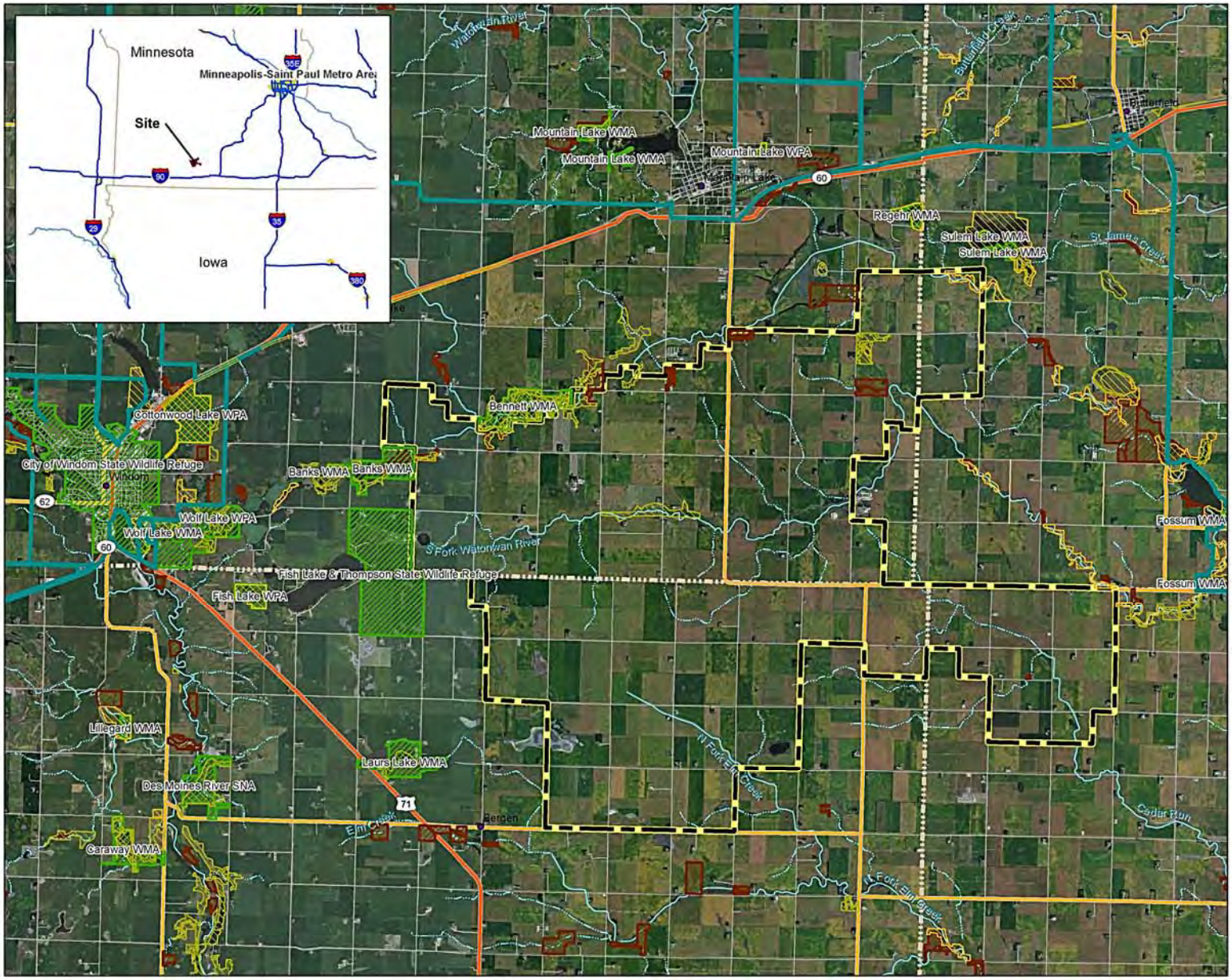
Miles

N



Odell
Site Location

- Site Boundary
- Protected Natural Areas
- RIM Easement
- Cty. Biological Survey - Native Plant Community
- Cty. Biological Survey - Sites of Biological Sig.
- Railroad Prairie
- Snowmobile Trails
- County Land

Data Sources:
ESRI Street Map
Bing Aerial Base Map

AES Job Number: 12-0974
Date: 3/26/2013
File Name: Odell_SiteLocation2013326.mxd

APPLIED ECOLOGICAL SERVICES
21938 Mushtown Road
Prior Lake, MN 55372
952-447-1919
www.appliedeco.com

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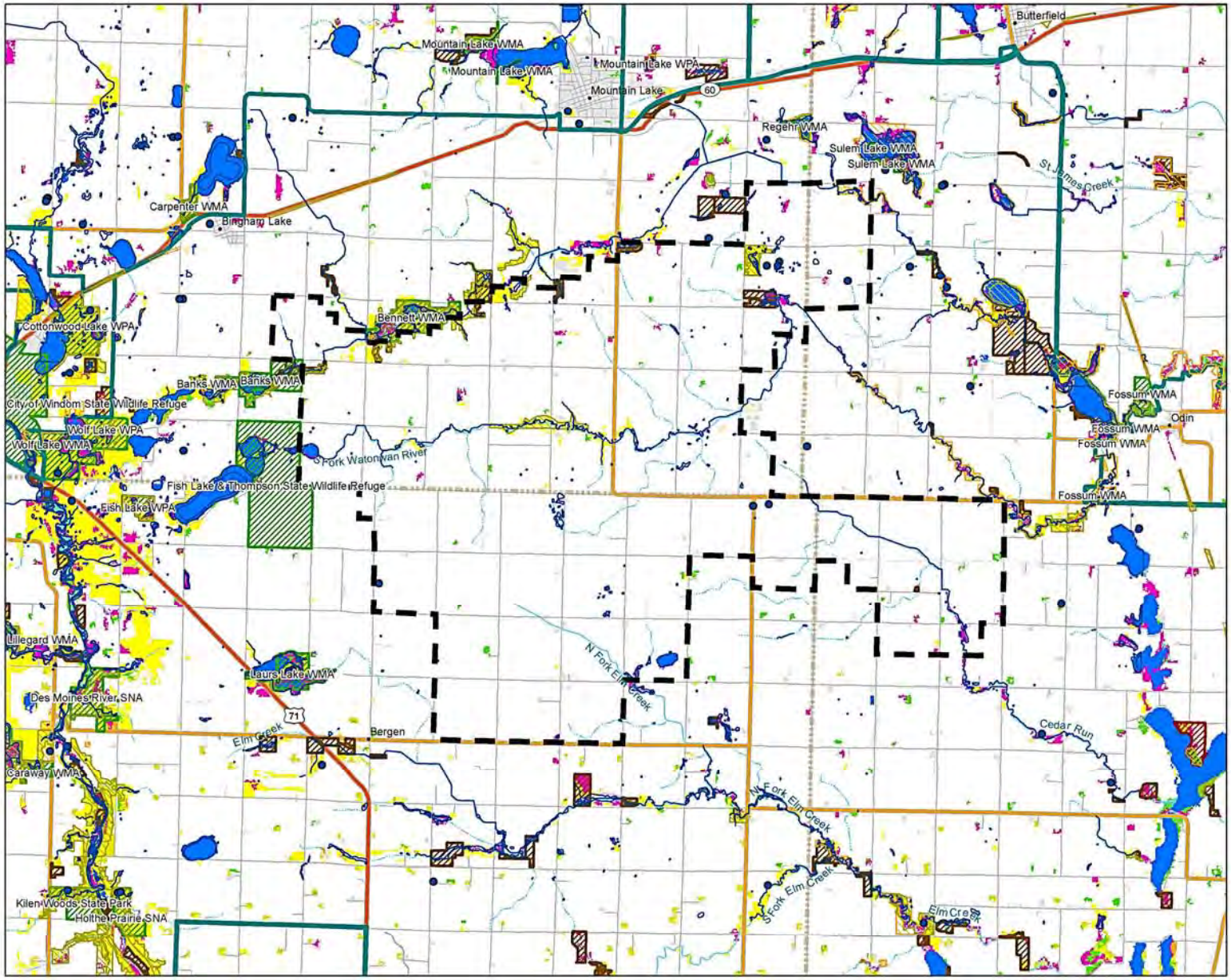

Odell Wind Farm Site Habitats

- Site Boundary
- Protected Natural Areas
- Railroad Prairie
- Cty. Biological Survey - Native Plant Community
- Cty. Biological Survey - Sites of Biological Sig.
- NWI Wetlands
- RIM Easement
- County Land
- Snowmobile Trails

Land Cover:

- Open Water
- Developed
- Barren Land
- Upland Broadleaf Forest
- Upland Coniferous Forest
- Upland Mixed Forest
- Upland Shrub-Scrub
- Grassland
- Cropland
- Forested Wetland
- Emergent Wetland

Data Sources:
ESRI Street Map
2001 National Landcover Database USDA/NRCS
MNDNR - CBS, MNDNR Ownership, NWI
AES Job Number: 12-0974
Date: 3/26/2013
File Name: Odell_SiteHabitats20130325.mxd

APPLIED ECOLOGICAL SERVICES
21938 Mushtown Road
Prior Lake, MN 55372
952-447-1919
www.appliedeco.com

0 0.375 0.75 1.5
Miles

N

From:	Heather L. Wayne
To:	"kevin.mixon@state.mn.us"
Cc:	Patrick Smith; heather.kieweg@appliedeco.com
Subject:	Documents from Odell (Geronimo & AES) meeting with DNR: Email 2 of 2
Date:	Thursday, March 28, 2013 1:16:53 PM
Attachments:	Raptor_Large_Bird_Migration_-_60min.pdf Odell_SpringPass_draftpts_20130326.jpg Odell_SpringRLB_draftpts_20130326.jpg Odell_SurveySummary_2013_03_28.docx Passerine_Migration_&_Breeding.pdf

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Hi Kevin-

Here are the rest of the documents.

I will be writing up the meeting minutes and will provide those to you for your comment.

Thank you again,

Heather

APPLIED ECOLOGICAL SERVICES

Odell – Survey Summary

March 28, 2013

Project Size: 60square miles

Proposed Avian Surveys

Survey	Approximate Dates	Number of Points	Length of Count (minutes)
Early April Raptor & Large Bird Migration Survey	April 3 – April 6	30	60
Late April Raptor & Large Bird Migration Survey	April 1 – April 30	30	60
Spring Passerine Migration Survey	May 1 – May 15	25, surveyed twice	10
Breeding Bird Survey	June 1 – June 30	25, surveyed twice	10
Fall Passerine Migration Survey	August 15 – September 15	25, surveyed twice	10
October Raptor & Large Bird Migration Survey	October 1 – October 31	30	60
November Raptor & Large Bird Migration Survey	November 1 – November 30	30	60

Proposed Bat Acoustic Monitoring

- 3 met towers at current project – 1 climbable, 1 with pulley system, one tilt-up
- Ultimately 6 full spectrum monitoring units to be deployed – 3 at 55m and 3 at 3m
- Monitoring dates early May – October 31, 2013; high elevation tilt-up monitor may be deployed later

Midwest/Corporate
P.O. Box 256, 17921 Smith Rd
Brodhead, WI 53520
(608) 897-8641

Great Lakes
120 W Main St
West Dundee, IL 60118
(847) 844-9385

Northwoods
21938 Mushtown Rd
Prior Lake, MN 55372
(952) 447-1919

Great Plains
1271 N 222 Rd
Baldwin City, KS
(785) 594-2245

Atlantic Coast
1100 E Hector St, Suite 398
Conshohocken, PA 19428
(610) 238-9088

Northeast
1899 SR414
Waterloo, NY 13165
(608) 214-2361

Field Protocol for Raptor & Large Bird Migration Point Surveys
Applied Ecological Services
March 26, 2013

Time of Day Limitations

Surveys with an emphasis on raptors and large birds should be conducted between dawn and dusk.

Weather Constraints

Surveys should be conducted during weather that promotes bird activity.

a. Soaring raptors strongly prefer clear skies and favorable winds (southerly in spring, northerly in fall).

b. Powered-flight raptors and large birds can fly in less favorable conditions, but are most active with clear skies and favorable winds.

c. Steady rain, poor visibility or steady strong winds (steady wind over 25mph) are not acceptable. Brief periods of rain, light drizzle and gusts up to 30mph are acceptable if birds remain active.

Point Count Procedure

1. When approaching a sampling point, assess whether a single AES land-cover type covers >50% of the plot. If there is no dominant habitat, move the point location into the intended dominant type for that point.
2. For unlimited radius plots used in raptor/large birds surveys, it is most important to have unobstructed views. Assess visibility and reposition point to increase visibility as necessary., while generally covering the appropriate location.
3. Arrive at point and wait 5 minutes for birds to habituate to the surveyor's presence.
4. While waiting, begin filling in the general point and weather information on the data sheet.
5. If visiting a point for the first time, take a GPS reading. For all GPS readings at sampling points in a project site, use a four letter code made of the first initials of key words (e.g., Big Muddy = BIMU) followed by a unique number for each sampling point. Number sampling points consecutively beginning at 100. On subsequent visits, do not take a GPS reading as it severely complicates data management. Write the coordinates on the data sheet and indicate the location of the point on your field map if it differs from the proposed point on the field map. Write down the nearest street location or other unique location identifier for the point.
6. On the first visit to a point identify the dominant and other significant AES habitat cover types at the site. For each, visually estimate the percent of the habitat within a 800m radius of the point, or within the observable radius if less than 800m. Estimate area visible if less than an 800m circle.
    a. The dominant habitat has >50% cover in the 800m radius area.
    b. Other significant habitats will cover >10% of the 800m radius area.

Habitat Cover Type	Description
Developed	Residential, commercial, industrial, and other developed land, including developed green space (e.g., golf-course, city park).
Cropland	Regularly cultivated land. Includes winter wheat.
Barren Land	Land with sparse to no vegetation (e.g., mines, landfills, construction sites, sparsely vegetated shores).
Grassland	Grass and herbaceous plants cover ≥90% of the ground in uplands.

Upland Shrub-Scrub	Shrubs and scrubby or mature trees cover 10-50% of the ground. Includes brushland and savanna with trees and shrubs.
Upland Broadleaf Forest	Trees cover cover ≥50% of the ground. Broadleaf deciduous trees are ≥90% of the tree cover.
Upland Coniferous Forest	Trees cover ≥50% of the ground. Coniferous (needle-leaved) trees are ≥90% of the tree cover.
Upland Mixed Forest	Trees cover ≥50% of the ground. A mixture of broadleaf and coniferous trees, with each covering <90% of the forest.
Wetland Forested	A wetland or lowland flooded area with 50-100% tree cover.
Wetland Shrub-Scrub	A wetland with 10-50% cover by shrubs, scrubby and mature trees. Includes savanna with trees and shrubs.
Wetland Emergent	A wetland with ≥90% cover of herbaceous plants.
Open Water	Water and sparse to no vegetation cover; rivers, streams, lakes, ponds.

7. On the first visit to a point sketch and label the habitat cover type in the circle on the data sheet. Note the dimensions of the habitat, including distances from the sampling point. Note significant features in the 800m radius area, such as roads, hedgerows, houses, ditches with grass cover, etc. Note limits on visibility.
    a. In the notes section add details on type of crop, percent tree cover, maturity of forest, etc.
8. For Raptor/Large Birds surveys remain at point for 60 min.
9. Use the AOU 4-digit alpha codes for species. A master alpha code list is available from AES.
10. For other data, use the codes provided on the data sheet.
11. For flight height use meters.
12. The notes column in the bird data section is for noting the identifying features of a bird for later identification or for clarification or explanation of data.
13. Map the flight path for raptors, waterfowl and SGCN species. Draw flight path on zoomed in aerial map, not on data sheet. Number flight path with pre-assigned number from datasheet.
14. If a Bald Eagle is observed – add the following information:
    a. Flight path (map on field map)
    b. Time first observed; time last observed
    c. Flight behavior and flight heights during observation period
15. Vary start location for each round of surveys to ensure each point is visited at varying times of day

Protocol for Passerine Migration & Breeding Point Surveys
Applied Ecological Services
March 13, 2012

Scheduling

Dates

Spring migration survey should occur during the peak of the long-distance passerine migration, typically May 1-15 in northern states.

Breeding bird survey should occur during the peak breeding season for birds in the northern temperate zone, typically in June.

Fall migration survey should occur during the peak of the long-distance passerine migration, typically August 21-September 15 in the northern states.

Consult local birding experts and websites to adjust timing of surveys.

Point Selection

1. Acquire recent aerial photo of the site.
2. Map habitat in the project site using AES land-cover (habitat) types:

AES Habitat Cover Type	Description
Developed	Residential, commercial, industrial, and other developed land, including developed green space (e.g., golf-course, city park).
Cropland	Regularly cultivated land. Includes winter wheat.
Barren Land	Land with sparse to no vegetation (e.g., mines, landfills, construction sites, sparsely vegetated shores).
Grassland	Grass and herbaceous plants cover ≥90% of the ground in uplands, includes pasture, hay meadow and fallow field.
Upland Shrub-Scrub	Shrubs and scrubby or mature trees cover 10-50% of the ground. Includes brushland and savanna with trees and shrubs.
Upland Broadleaf Forest	Trees cover cover ≥50% of the ground. Broadleaf deciduous trees are ≥90% of the tree cover.
Upland Coniferous Forest	Trees cover ≥50% of the ground. Coniferous (needle-leaved) trees are ≥90% of the tree cover.
Upland Mixed Forest	Trees cover ≥50% of the ground. A mixture of broadleaf and coniferous trees, with each covering <90% of the forest.
Forested Wetland	A wetland or lowland flooded area with 50-100% tree cover.
Shrub-Scrub Wetland	A wetland with 10-50% cover by shrubs, scrubby and mature trees. Includes savanna with trees and shrubs.
Emergent Wetland	A wetland with ≥90% cover of herbaceous plants.
Open Water	Water and sparse to no vegetation cover; rivers, streams, lakes, ponds.

3. Determine research questions:
    a. Characterization of habitat and bird use of project site.
    b. Identification of sensitive species habitat, bird concentration areas, etc.
    c. Identification of migratory and movement routes.

   d. Importance for birds of riparian corridors, habitat patch size, public land, wetlands, etc.
   e. Response with distance from a feature (e.g., shoreline, Important Bird Area).

4. With aerial photo and habitat map, identify potential sample points consistent with the number in the proposal budget. Points should have public road access or be on public land. A simple grid of points is not likely to address the research questions.
   a. Distribute points evenly across all habitat types.
   b. Locate sampling points in one dominant (>50% cover) habitat cover type.
   c. Represent the project site with the geographic distribution of points.
   d. Identify alternate points in field if selected points are not appropriate.
   e. Determine other point locations based on the key research questions (e.g., some studies require that points be placed inside/outside riparian zones, at varying distances from a shoreline or IBI, etc.).
   f. Separate points by a minimum of 250m for passerine point counts.

Time of Day Limitations

Spring passerine migration: Dawn to 11am or until a noticeable drop in bird activity; and 5pm to dusk

Breeding bird survey: Dawn to 10am or until a noticeable drop in bird activity; if activity remains high at 10am, continue until 11am or a noticeable drop in bird activity.

Fall passerine migration: Dawn to dusk.

Weather Constraints

Surveys should be conducted during weather that promotes bird activity.

a. Steady rain, poor visibility or steady strong winds (steady wind over 25mph) are not acceptable. Brief periods of rain, light drizzle and gusts up to 30mph are acceptable if birds remain active.

Point Count Procedure

1. When approaching a sampling point, assess whether a single AES land-cover type covers >50% of the plot. If there is no dominant habitat, move the point location into the intended dominant type for that point.
2. Arrive at point and wait 5 minutes for birds to habituate to the surveyor's presence.
3. While waiting, begin filling in the general point and weather information on the data sheet.
4. If visiting a point for the first time, take a GPS reading. For all GPS readings at sampling points in a project site, use a four letter code made of the first initials of key words (e.g., Big Muddy = BIMU) followed by a unique number for each sampling point. Number sampling points consecutively beginning at 100. On subsequent visits, do not take a GPS reading as it severely complicates data management. Write the coordinates on the data sheet and indicate the location of the point on your field map if it differs from the proposed point on the field map. Write down the nearest street location or other unique location identifier for the point.
5. On the first visit to a point identify the dominant and other significant AES habitat cover types at the site. For each, visually estimate the percent of the habitat within a 100m radius of the point, or within the observable radius if less than 100m.
   a. The dominant habitat has >50% cover in the 100m radius area.
   b. Other significant habitats will cover >10% of the 100m radius area.
6. On the first visit to a point sketch and label the habitat cover type in the circle on the data sheet. Note the dimensions of the habitat, including distances from the sampling point. Note

significant features in the 100m radius area, such as roads, hedgerows, houses, ditches with grass cover, etc.

   a. In the notes section add details on type of crop, percent tree cover, maturity of forest, etc.

7. Record all birds seen and heard at the point in 10 minutes for an unlimited distance from the point. Record one line of data for each species (individual or group at one general location). Note the number of individuals of a species for each observation . For the first 3 minutes record the number of birds observed in the 0-3 column. For the next 2 minutes record the number of birds observed in the 3-5 column. For the last 5 minutes record the number of birds in the 5-10 column. Record a number in the column, not a tally mark.
8. Use the AOU 4-digit alpha codes for species. A master alpha code list is available from AES.
9. For other data, use the codes provided on the data sheet.
10. For flight height use meters.
11. The notes column in the bird data section is for noting the identifying features of a bird for later identification or for clarification or explanation of data.
12. During the breeding season, some states (e.g., Ohio) require that a breeding confirmation level be recorded for each species observed. Use the local breeding confirmation level guidelines.