Environmental Report

Black Oak/Getty Wind Project

In the Matter of the Application of Black Oak Wind, LLC and Getty Wind Company, LLC for a Certificate of Need for an up to 82 MW Large Wind Energy Conversion System in Stearns County

PUC Docket No. IP-6853 and 6866/CN-11-471

Minnesota Department of Commerce
Energy Facilities Permitting
85 7th Place East, Suite 500
Saint Paul, MN 55101

May 2012

MINNESOTA DEPARTMENT OF COMMERCE

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Abstract

On October 11, 2011, Black Oak Wind, LLC and Getty Wind Company, LLC, jointly filed a Certificate of Need application with the Minnesota Public Utilities Commission for the Black Oak/Getty Wind Project. The Applicants are proposing to construct an up to 82 megawatt large wind energy conversion system in Stearns County.

The proposed project is a large energy facility as defined by Minn. Statute 216B.2421. Such a facility requires a certificate of need from the Commission (Minn. Statute 216B.243). As part of the application review, the Department of Commerce must prepare an environmental report for the project (Minn. Rules 7849.1200).

Department of Commerce Energy Facility Permitting staff is responsible for preparing the environmental report. This Environmental Report has been prepared as per Minnesota Rules 7849.1100-2100, and is part of the record which the Commission will consider in making a decision on a certificate of need for the project.

Information about the Commission's certificate of need process can be obtained by contacting Tricia DeBleeckere, Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, Saint Paul, MN 55101, phone: (651) 201-2255, email: tricia.debleeckere@state.mn.us.

The official record for the certificate of need for this project can be found on the eDockets system at: https://www.eDockets.state.mn.us/EFiling/search.jsp; search on the year "**11"** and number "**471**".

Information about this project can also be found on the Department's energy facilities permitting website: http://mn.gov/commerce/energyfacilities/Docket.html?Id=32459, or obtained by contacting

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Appendix A. Environmental Scoping Decision

Acronyms, Abbreviations and Definitions

ALJ	Administrative Law Judge
BMP	best management practice
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
dB	decibels
dB(A)	A-weighted sound level recorded in units of decibels
Department	Minnesota Department of Commerce
DNR	Department of Natural Resources
EFP	Department of Commerce Energy Facilities Permitting
EMF	electromagnetic field
EPA	United States Environmental Protection Agency
ERP	Department of Commerce Energy Regulatory and Planning
FAA	Federal Aviation Administration
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HVTL	high voltage transmission line
kV	kilovolt
kWh	Kilowatt hour
LIDAR	Light Detection and Ranging
LWECS	Large Wind Energy Conversion System
MISO	Midwest Independent System Operator
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	Mega Watt
NAC	noise area classification
NEV	Neutral-to-Earth Voltage
NPDES	National Pollutant Discharge Elimination System
NTIA	National Telecommunications and Information Administration
NWI	National Wetland Inventory
ppm	parts per million
SODAR	Sonic Detection and Ranging
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Corp of Engineers
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WMA	Wildlife Management Area
WPA	Waterfowl Production Area

1 Introduction

On October 11, 2011, Black Oak Wind, LLC and Getty Wind Company, LLC (collectively, Applicants), filed a Certificate of Need (CN) application with the Minnesota Public Utilities Commission (Commission) for the Black Oak/Getty Wind Project (Project). The Applicants are proposing to construct an 82 megawatt (MW) Large Wind Energy Conversion System (LWECS) in Stearns County, Minnesota.

Project Overview
Depending upon the turbine model selected and the final layout, the project would consist of between 27 and 52 wind turbines, transformers, a project substation, between six and 12 miles of turbine access roads, an operation and maintenance facility, collection lines, a 69 kV transmission line, a SODAR or LIDAR unit, and up to four permanent meteorological towers.[1]

The project area is located in Stearns County in central Minnesota about two miles southwest of the city of Sauk Centre (Map 1: Project Area). It comprises approximately 14,600 acres (22.8 square miles), most of which is agricultural land. Electricity from the project would be collected and transmitted to the project substation via 34.5 kilovolt (kV) electric lines. The project would connect to the electrical transmission grid at Xcel Energy's Black Oak Switching Station, located approximately three miles east of the Project.

As independent power producers, the Applicants plan to sell the power generated by the project to one or more utilities to satisfy the Renewable Energy Standards defined in Minnesota Statutes, Section 216B. 1691. Accordingly, alternatives examined in this Environmental Report (ER) are limited to technologies that support Minnesota's Renewable Energy Standards objective. These alternatives include: (1) a generic 82 MW wind generation project sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) the “no build” option.

Organization and Content of this Document
This Environmental Report is organized into seven sections:

Section 1: Introduction
Section 2: Regulatory Framework
Section 3: Description of the Proposed Project
Section 4: Description of Project Alternatives
Section 5: Human and Environmental Impacts
Section 6: Availability and Feasibility of Alternatives
Section 7: Permits

Sections three through six discuss the project, alternatives, associated impacts and mitigation.

Sources of Information
Information for this report is drawn from multiple sources and cited throughout. The primary source documents used are the applications submitted by Applicants to the Commission:

[1] CN Application, at p. 23, and personal communication April 23, 2012

- Application for Certificate of Need, 82 MW Black Oak/Getty Wind Project, October 11, 2011 (herein after, CN Application)[2]
- Application for Site Permit, 42 MW Black Oak Wind Farm (herein after, Black Oak Site Permit Application)[3]
- Application for a Site Permit,40 MW Getty Wind Project, (herein after, Getty Site Permit Application)[4]

Information from other reports issued by the Minnesota Environmental Quality Board, the Minnesota Department of Commerce, and other Minnesota and Federal agencies has been incorporated as applicable.

[2] Application for Certificate of Need, 82 MW Black Oak/Getty Wind Project, PUC Docket No. IP 6853 and IP6866/CN-11-471, October 11, 2011, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=viewDocument&documentId={1D26CFF3-B620-48BC-933B-9740E68AC278}&documentTitle=201110-67221-03&userType=public

[3] Application for Site Permit, Black Oak Wind Farm, PUC Docket No. IP 6853/WS-10-1240, amended January, 2011, January 14, 2011, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={2E223046-B2F2-42C7-BA67-0FB157F1FD1B}&documentTitle=20111-58574-03

[4] Application for Site Permit, 40 MW Getty Wind Project, October 11, 2011, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={37D7DE77-3FD5-4016-B9E1-5AF11DC1BCC9}&documentTitle=201110-67223-01

2 Regulatory Framework

The project is a large wind energy conversion system as defined in the Wind Siting Act (Minn. Stat. 216F). Upon completion, the project would produce up to 82 MW of power, meeting the definition of a large energy facility per Minnesota Statutes section 216B.2421.

In accordance with Minnesota Statutes section 216B.243, no large energy facility may be sited or constructed in Minnesota without issuance of a Certificate of Need (CN) by the Commission Commission. On October 11, 2011, the Applicants jointly submitted a CN application to the Commission. On December 15, 2011, the Commission issued an order accepting the application as complete and authorizing an informal review process.

The informal review process is designed to develop a record upon which a CN decision is made, including: (1) a notice and comment period, (2) analysis by Department of Commerce (Department) Energy Regulation and Planning (ERP) staff, (3) environmental review by Department Energy Facility Permitting (EFP) staff, and (4) a public hearing presided over by an administrative law judge (ALJ). Based on the ALJ's hearing report and entire record, Commission staff will make a recommendation to the Commission on issuance of the certificate of need. The Commission is the final decision-making body.

2.1 Environmental Report

Pursuant to Minnesota Rule 7849.1200, the analysis provided by EFP staff takes the form of an environmental report (ER). The ER provides an analysis of potential human and environmental impacts of the project, as well as alternatives to the project. To develop the ER, EFP staff is required to conduct at least one public meeting in the proposed project area. The purpose of the meeting is to advise the public of the project and to solicit public input into the scope of the ER. A "scope" is a determination of what needs to be assessed in the ER to fully inform decision-makers and the public about the possible impacts and potential alternatives of the project.

Based on the scoping comments received and the rules governing the scope of an ER (Minn. Rule 7849.1500), the Deputy Commissioner of the Department issued a scoping decision on February 28, 2012 (Appendix A). This environmental report has been developed in accordance with the scoping decision.

2.2 Public Participation

EFP staff held a public information and scoping meeting on January 26, 2012, in Sauk Centre, Minnesota. Approximately 30 people attended the meeting. Nine comments were received before the close of the comment period on February 15, 2012. In addition to statements of support for or opposition to the Project, concerns raised included impacts to birds and other wildlife, avian species and other wildlife, local permitting of certain facilities related to the Project, noise, visual impact and shadow flicker, property values, roads, and water contamination. No comments on alternatives to the proposed project were submitted during the comment period.

A public hearing conducted by an ALJ will be held in the project area to further develop the record for a Commission decision. This ER will be introduced into the record by EFP staff.

2.3 Permitting Authority and Additional Permits

In addition to the Certificate of Need, the proposed project requires separate site permits (Minn. Statute 216F.04) for the Black Oak Wind Farm and the Getty Wind Project. The site permits are issued by the Commission and are being considered in separate dockets (Black Oak, Docket No. IP6853/WS-10-1240 and Getty, Docket No. IP-6866/WS-11-831). A site permit authorizes the siting and construction of the project and cannot be issued before a certificate of need has been issued for the project (Minn. Statute 216B.243).

In order to better participate in the wind siting process, citizens may place their name on the project contact lists to receive future notices from the Department on hearings and availability of documents.

Citizens can sign up for the Black Oak Wind site permit project list online at:
http://mn.gov/commerce/energyfacilities/Docket.html?Id=30578

And for the Getty site permit project list online at:
http://mn.gov/commerce/energyfacilities/Docket.html?Id=32297

Citizens may also join the project mailing list by contacting EFP State Permit Manger Suzanne Steinhauer, phone: (651) 296-2888, email: suzanne.steinhauer@state.mn.us.

In addition to approvals issued by the Commission, the project will require permits and approvals from federal agencies, additional state agencies, and local governments. These permits are discussed in Section 7.

3 Description of the Proposed Project

Black Oak Wind, LLC, a wholly-owned subsidiary of Geronimo Wind Energy (GWE), is proposing to build an up to 42 MW LWECS. Getty Wind Company, LLC is a limited liability company and wholly-owned subsidiary of Getty Wind, LLC. Getty Wind, LLC was formed by 18 Minnesota residents for the purpose of developing an approximately 40 MW LWECS in Stearns County, Minnesota.

3.1 Project Description

The proposed Project is comprised of two adjacent LWECS located in Stearns County, approximately two miles southwest of Sauk Centre (Map 1):

- Black Oak Wind, LLC proposes to construct the Black Oak Wind Farm on a site comprised of approximately 7,100 acres of agricultural land in Ashley and Raymond townships.

- Getty Wind Company, LLC proposes to construct the Getty Wind Project on a site comprised of approximately 7,600 acres of agricultural land in Sauk Centre and Getty townships.

Black Oak/Getty Wind has not made a final selection of wind turbine generators at this time, and is considering three types of wind turbines sized from 1.5 to 3.0 MW. Associated Project facilities include transformers, a project substation, approximately 6.6 to 11.6 miles of gravel access roads, a wind electrical collection system, an Operations and Maintenance building, up to four permanent meteorological towers, and a Sonic Detection and Ranging (SODAR) unit or Light Detection and Ranging (LIDAR) unit, and a 69 kV transmission line. Currently Black Oak and Getty Wind each operate two temporary meteorological towers within the site.

Access roads will provide access to the wind turbines year-round. They will have a low profile design to allow easy access across them with farming equipment. The electrical collection system will consist of a group of electrical cabling (collector and feeder lines) operating at 34.5 kV. The lines will primarily be located undergrounded by trenching, plowing, or, where needed, directionally boring the cables. They may be located above ground when shallow bedrock, restrictive environmental conditions, or conflicts with underground utility infrastructure are encountered.[5]

The electricity will be delivered to the project substation, where it will be converted to 69 kV and then transported via a new 69 kV line between the project substation and Xcel Energy's Black Oak Switching Station. The new transmission line will be approximately seven to 8.5 miles long. Applicants will seek a permit from Stearns County for construction of the transmission line.

The Applicants plan to begin construction of the Project in mid-2012, with the Project operating by December, 2012.

3.2 Project Location

The proposed site is located southwest of Sauk Centre in Stearns County, Minnesota (Map 1). Table 1 identifies the townships and sections within the project boundary.

[5] Getty Site Permit Application, at p. 9

Table 1. Project Location in Stearns County

Project Phase	Township Name	Township	Range	Sections
Black Oak	Ashley	126N	35W	25- 27, 34-36
Black Oak	Raymond	125N	35W	1-3, 11-14, 23
Getty	Sauk Centre	126N	34W	29-33
Getty	Getty	125N	34W	4-9, 16-21

The Project Boundary encompasses approximately 14,700 acres, of which approximately 10,800 acres, or 73 percent of the land within the project boundary, are under site control.[6] The Project's preliminary site layouts are for up to 82 MW, based on the Repower MM100 1.8 MW turbine, the Goldwind 87/1500 1.5 MW turbine, and the Vestas V112 3.1 MW turbine. Turbine models under consideration are compared in Table 2 below.

Table 2. Turbine Types and Specifications[7]

Characteristics	REPower MM100 1.8 MW Wind Turbine	Goldwind 87/1500 1.5 MW Turbine	Vestas V112 3.1 MW Turbine
Maximum Number of Turbines	44	52	27
Installed Capacity (MW)	79.2	78	81
Hub Height	100 m (328 ft) or 80 m (262 ft)	100 m (328 ft) or 80 m (262 ft)	94 m (308 ft) or 84 m (276 ft)
Rotor Diameter	100 m (328 ft)	87 m (285 ft)	112 m (368 ft)
Total Height	150 m (492 ft) or 130 m (427 ft)	144 m (472 ft) or 129 m (423 ft)	150 m (492 ft) or 140 m (459 ft)
Cut-in Wind Speed	3.0 m/s (6.7 mph)	3.0 m/s (6.7 mph)	3.0 m/s (6.7 mph)
Rated Capacity Wind Speed	10.5 m/s (23.5 mph)	9 m/s (20.1 mph)	13 m/s (29.1 mph)
Cut-out Wind Speed	22 m/s (49.2 mph)	22 m/s (49.2 mph)	25 m/s (55.9 mph)
Rotor Area	7,854 m^2 (84,539 ft^2)	5,944 m^2 (63,987 ft^2)	9,852 m^2 (106,046 ft^2)
Rotor Speed	7.8 – 13.9 rpm	9.0-16.6 rpm	6.2 to 17.7 rpm
3 Rotor Diameters	300 m (984 ft)	261 m (855 ft)	336 m (1104 ft)
5 Rotor Diameters	500 m (1,640 ft)	435 m (1,425 ft)	560 m (1,840 ft)

[6] CN Application at p. 26, updated in personal communication 4/24/2012.
[7] Source: Getty Site Permit Application at p. 10

3.3 Project Cost and Schedule

Using the Applicants estimate of project capital cost of approximately $1,860 to $1,975 per installed kW, pending final interconnection costs,[8] the total installed capital cost for an 82 MW project is estimated to be between approximately $153 and $162 million. Applicants have estimated ongoing operations and maintenance costs and administrative costs to be approximately $0.007 to $0.009 per kWh,[9] or approximately $1.96 to 2.91 million per year, assuming an annual generation of approximately 280,145 to 323,244 MWh. Applicants anticipate that construction will begin in mid-2012, with the Project becoming operational in late 2012.

[8] CN Application, at p. 34. Estimate includes, wind turbines, associated electrical and communication systems, and roads.
[9] CN Application, at p. 35

4 Description of Project Alternatives

Minn. Rule 7849.1200 requires the Commission to consider alternatives to the proposed project. In addition to evaluating alternatives and their impacts, a no build option must also be evaluated. This section provides a discussion of alternate power sources to the Black Oak/Getty Wind project.

The alternatives considered would generate energy equivalent to that of the proposed project and provide renewable, low, or zero carbon emission energy. Typically, alternatives to the project would include generation facilities of all types, including plants that use coal, natural gas, fuel oil, or similar non-renewable fuels. Alternatives would also include constructing transmission facilities (to import energy) in lieu of generation. However, the proposed project is intended to produce renewable energy in furtherance of Minnesota's renewable energy standard. Accordingly, alternatives considered here are technologies eligible to be counted toward these objectives.[10]

Alternatives evaluated include: (1) a 82 MW LWECS sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) a "no build" alternative.

4.1 82 MW LWECS

An alternative to the proposed project, which would utilize an eligible renewable energy (wind), is a LWECS sited elsewhere in Minnesota. Such a project could, theoretically, be an 82 MW project or a combination of smaller dispersed projects. The analysis in this ER will attempt to describe differences in the impacts associated with a generic 82 MW wind project sited in Minnesota and the Black Oak/Getty Wind Project, sited in Stearns County.

4.2 38.5 MW Biomass Plant

One alternative renewable energy source to the proposed project would be a biomass plant of equivalent electricity generation as the proposed project. Biomass is any organic matter that is available on a renewable or recurring basis. It includes all plants and plant derived materials, including agricultural crops and trees, wood and wood residues, grasses, aquatic plants, animal manure, municipal residues, and other residue materials. Plants (on land or in water) use the light energy from the sun to convert water and carbon dioxide to carbohydrates, fats, and proteins along with small amounts of minerals.[11] Combustible gases from landfills or anaerobic digestion of waste material is referred to as biogas.

Solid biomass can be burned like coal to produce steam. It can also be gasified and burned like natural gas. Various forms of biomass are utilized in Minnesota. The St. Paul District Energy, a combined heat and power facility in downtown St. Paul, is fueled primarily by woody biomass and has an electric generation capacity of 25 MW. Other biomass plants in Minnesota, such as Fibrominn, utilize turkey litter or combinations of woody biomass and agricultural biomass, as with the Laurentian Energy Authority in Hibbing and Virginia.

[10] Minn. Statute 216B.1691, Subd. 1. Eligible energy technologies include technologies that generate electricity from solar, wind, hydroelectric, hydrogen, or biomass.
[11] From the Oak Ridge National Laboratory's Biomass Energy Notebook, http://cta.ornl.gov/bedb/introduction/Biomass_Overview.shtml

The biomass alternative considered in this ER would likely burn a combination of woody and agricultural biomass, such as corn stover, with natural gas as a backup fuel. A similar plant, the 38.5 MW NGPP Minnesota Biomass, LLC, electric generation facility, has undergone environmental review in Minnesota (2003) and provides data on potential impacts.[12] The Black Oak/Getty Wind project would have a capacity of 82 MW, with an estimated capacity factor of 39 to 45 percent,[13] for an effective generating capacity of approximately 32 to 37 MW. The 38.5 MW biomass alternative examined in this ER provides energy generation that is roughly equivalent to the proposed project.[14]

4.3 No Build Alternative

The no build alternative means that no wind project is constructed. The analysis for this alternative will consider the potential benefits and drawbacks of not constructing the proposed project.

[12] EQB Docket No. 03-67-EAW-NGP Biomass [hereafter Minnesota Biomass EAW]; see http://mn.gov/commerce/energyfacilities/Docket.html?Id=4452

[13] CN Application at p. 25

[14] The biomass alternative, because it has natural gas backup, is assumed for analysis purposes to have a capacity factor of 1.0. Scheduled and unscheduled maintenance would make the effective capacity factor slightly less than 1.0.

5 Human and Environmental Impacts

Construction and operation of large energy facilities can result in human and environmental impacts. Many of the impacts can be mitigated through siting and through use of best management practices. This section discusses the potential impacts of the Black Oak/Getty Wind project and project alternatives. The alternatives include: (1) a 82 MW LWECS sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) a no-build alternative. Additionally, this section provides mitigation strategies for potential impacts.

5.1 Air Quality

Electric generation facilities have the potential to emit air pollutants during construction and operation. Minnesota Rule 7849.1500 requires this ER to examine certain air quality emissions.

5.1.1 Criteria Pollutants

Minnesota Rule 7849.1500 requires this ER to examine emissions of the following pollutants: sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon dioxide (CO_2), mercury (Hg), and particulate matter (PM). These common pollutants (other than mercury) are known as criteria pollutants.[15] Each of these pollutants is known to cause environmental health impacts. Sulfur oxides (SO_x) cause acid rain and human respiratory illness.[16] Nitrous oxides (NO_x) are greenhouse gases that cause ozone and related respiratory illnesses.[17] Carbon dioxide (CO_2) is a greenhouse gas that contributes to climate change and associated impacts.[18] Mercury can cause impaired neurological development in children.[19] Inhalation of particulate matter causes and contributes to human respiratory illness.[20]

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With the exception of fugitive dust created during construction of the project, the Black Oak/Getty Wind Project will emit no criteria pollutants during operation. Impacts from construction will be minimal and localized and would include dust due to earth moving and emissions from diesel-powered construction equipment. Transmission lines, under certain conditions, produce limited amounts of ozone and nitrogen oxide emissions. Emissions of these pollutants would be minimal.

Dust and emissions associated with the construction of the project would be similar to large scale outdoor construction activities such as road work and residential areas. The project area includes multiple construction "sites" in the form of individual turbines and a network of access roads. Dust from construction traffic can be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits on site. Once project construction is completed, air and dust emissions related to vehicular traffic would be reduced. Limited emissions would be associated with routine maintenance and repairs.

[15] What Are the Six Common Air Pollutants?, http://www.epa.gov/air/urbanair/.
[16] Health and Environmental Impacts of SO_2, http://www.epa.gov/air/urbanair/so2/.
[17] Health and Environmental Impacts of NO_x, http://www.epa.gov/air/nitrogenoxides/.
[18] Climate Change 2007: Synthesis Report, Summary for Policymakers, An Assessment of the Intergovernmental Panel on Climate Change (IPCC), http://www.ipcc.ch/.
[19] Health Effects, http://www.epa.gov/mercury/effects.htm.
[20] Health and Environment, http://www.epa.gov/air/particlepollution/health.html.

Generic 82 MW LWECS

A generic 82 MW LWECS would emit no criteria pollutants during operation, and would have ancillary emissions (construction, transmission line) similar to those from the Black Oak/Getty Wind Project.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would emit criteria pollutants. Table 3 provides potential emission rates and annual emissions of criteria pollutants associated with a 38.5 MW biomass plant.[21]

Table 3. Estimated Criteria Pollutants 38.5 MW Biomass Plant

Pollutant	Emissions Rate (lbs/kWh)	Annual Emissions (tons/year)
Sulfur Dioxide (SO_2)	3.46 E-04	58.3
Nitrogen Oxides (NO_x)	1.98 E-03	333.9
Carbon Dioxide (CO_2)	0.66[22]	1.11 E05[23]
Mercury (Hg)	1.19 E-08	2.00 E-03
Particulate Matter (PM)	7.18 E-04	121.1

lbs/kWh = pounds per kilowatt-hour

Because these pollutants are diffused into the global atmosphere, regional impacts are difficult to quantify. However, impacts due to particulate matter and ground-level ozone can be localized. Particulate matter and ozone are the pollutants of most concern in Minnesota and are tracked regionally by the Minnesota Pollution Control Agency (MPCA). Because the plant would primarily utilize biomass for generation, net impacts from carbon dioxide will be minimal. Carbon dioxide released by the biomass plant would be utilized by living plants, which in time, would serve as fuel. The plant would operate as a largely closed carbon dioxide loop. However, fuels used to collect and transport biomass would likely not be carbon neutral and would create carbon dioxide emissions.

Mercury exists throughout the environment; however, the primary source of mercury in air emission is coal, i.e., the burning of coal in a coal-fired power plant. The biomass plant considered here would use biomass as a primary fuel and natural gas as a backup fuel. Thus, emissions of mercury, and related impacts, would be minimal.

Emissions of some criteria air pollutants can be mitigated through control technologies. Nitrous oxides emissions could be reduced by approximately 75 percent through use of a selective non-catalytic reduction system on the biomass boiler.[24] Particulate matter emissions could be reduced by 90 percent with add-on devices such as a multi-cyclone and dust collector.[25]

[21] Adapted from Minnesota Biomass EAW, http://mn.gov/commerce/energyfacilities/Docket.html?Id=4452.
[22] AP-42, Fifth Edition, Volume 1, Chapter 1 External Combustion Sources, Section 1.6 Wood Residue Combustion in Boilers, http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s06.pdf.
[23] Because the plant is fired with biomass (excepting natural gas backup) net carbon dioxide emissions from the plant would be minimal. Carbon dioxide released from the plant would be integrated into new biomass materials which, in time, would be harvested and used to fire the plant. There would be carbon dioxide emissions related to transport of biomass and plant operations.
[24] Minnesota Biomass EAW.
[25] Id.

In addition to the use of control equipment to mitigate pollutant impacts, a best available control technology analysis could be conducted. The analysis is a requirement of new facilities under federal new source review prevention of significant deterioration. Implementation of best available control technologies could limit emissions from the plant to less than those presented in Table 3.

No Build Alternative
Under the No-Build Alternative no project would be built and no criteria pollutants would be emitted.

5.1.2 Hazardous Air Pollutants and Volatile Organic Compounds

Electric generation facilities have the potential to emit air pollutants during construction and operation. Minnesota Rule 7849.1500 requires this ER to examine emissions of hazardous air pollutants (HAP) and volatile organic compounds (VOC). These classes of pollutants are known or suspected of causing cancer and other serious health effects.[26]

Black Oak/Getty Wind Project
The Black Oak/Getty Wind project will not emit HAPs or VOCs during operation. Petroleum-based fluids used in the operation of wind turbines such as gear box oil, hydraulic fluid, and gear grease, have a low vapor pressure and any release of VOCs will be minimal.

Generic 82 MW LWECS
A generic 82 MW LWECS would have HAP and VOC emissions similar to the Black Oak/Getty Wind Project.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would emit HAPs and VOCs. The amounts of these pollutants are based on a plant similar to the NGPP Minnesota Biomass plant. Because these pollutants are diffused into the global atmosphere, regional impacts are difficult to quantify. The only area in Minnesota with a cancer risk due to HAPs greater than 100 in a million is the Minneapolis - Saint Paul metro area.[27] The emissions from the biomass plant would be relatively small compared with other sources. Table 4 lists the potential emission rate and annual emissions of hazardous air pollutants and volatile organic compounds associated with a 38.5 MW biomass plant. [28]

Table 4. Estimated HAP and VOC Emissions 38.5 MW Biomass Plant

Pollutant	**Emission Rate** (lbs/kWh)	**Annual Emissions** (tons/year)
Hazardous Air Pollutants (HAPs)	1.80 E-04	30.4
Volatile Organic Compounds (VOCs)	5.55 E-04	93.6

lbs/kWh = pounds per kilowatt-hour

[26] About Air Toxics, http://www.epa.gov/ttn/atw/allabout.html
[27] Summary of Results for the 2002 National-Scale Assessment, http://www.epa.gov/ttn/atw/nata2002/risksum.html
[28] Adapted from Minnesota Biomass EAW, http://mn.gov/commerce/energyfacilities/Docket.html?Id=4452

It is possible to mitigate HAP and VOC emissions with control technologies. However, given the relatively small amounts of HAP and VOC emissions compared with the costs of control equipment, it is likely that control technologies would not be employed.

No Build Alternative
Under the No-Build Alternative no project would be built and no HAPs or VOCs would be emitted.

5.1.3 Ozone

Large electric power generating facilities, such as biomass facilities, have the potential to produce reactive organic gases, which can lead to ground-level ozone formation. Wind turbines do not produce ozone or ozone precursors. Minnesota Rules 7849.1500, subpart 2 requires that this ER address anticipated ozone formation. Ozone can cause human health risks and can also damage crops, trees and other vegetation.[29]

Black Oak/Getty Wind Project
The Black Oak/Getty Wind project would not produce ozone or ozone precursors. Thus, there would be no human or environmental impacts or mitigation related to ozone formation.

Generic 82 MW LWECS
A generic 82 MW LWECS would have ozone formation similar to the proposed project.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would produce ozone precursors (e.g., NO_x, VOC) that would lead to ozone formation. Impacts from ozone are localized. The State of Minnesota is designated as in attainment for ozone by the Environmental Protection Agency (EPA). Given this status, ground level ozone formation and associated impacts are anticipated to be minimal.

Ozone formation could be mitigated by mitigating ozone precursors. See discussion in Sections 51.1 and 5.1.2 regarding nitrous oxides (NO_X) and volatile organic compounds (VOC) respectively.

No Build Alternative
Under the No-Build Alternative no project would be built and no ozone would be produced.

5.2 Water Appropriations

Large electric power generating facilities may require water for operations. This section discusses potential water appropriation impacts from such facilities. Minnesota Rules 7849.1500, subpart 2 requires that this ER address anticipated water appropriations. A discussion of ground water occurs in Section 5.5.3, and surface water occurs in Section 5.5.4.

Black Oak/Getty Wind Project
The proposed project would require water appropriations for potable and sanitary water for the operations and maintenance facility. Depending upon the location of the operations and maintenance

[29] Ozone, http://www.epa.gov/Ozone/. Air Quality – Ozone, http://www.health.state.mn.us/divs/eh/air/ozone.htm

facility, water would be supplied through the existing rural water supply or a single domestic-sized well. This amount of water used would be roughly equivalent to the amount consumed by a residence or farmstead in the area, and would likely not require mitigation. Because of the minimal water appropriation, mitigation is not discussed.

Generic 82 MW LWECS
A generic 82 MW LWECS would have water appropriations similar to the Black Oak/Getty Wind Project.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would require water appropriations for energy production (process water) and sanitation. Process water could come from a well; however, a municipal water source may also be required. For some aspects of the process, such as in the cooling tower, effluent water from a wastewater treatment facility could be used. The sources of water would depend on the type and availability of water sources near the facility location.

The required quantity of water would be dependent on plant design and water quality. Functions within the plant that require water include cooling, sanitation, washing and separations. The average anticipated water use would be approximately 1275 gallons per minute. If a source of effluent wastewater were available, the appropriation of well or municipal water would be relatively lower. If the plant used only well or municipal water, the water appropriation would be higher. Based on anticipated water use, the plant would require a water appropriations permit from the MDNR[30] if using well water.

Mitigation of well water and municipal water use by the plant could be achieved through plant equipment choices and through the use of effluent water (water that has already been appropriated). If municipal water were used for the plant, modifications or an expansion of the municipal water treatment plant may be required to accommodate the increase in demand.

No Build Alternative
Under the No-Build Alternative no project would be built and no water would be appropriated.

5.3 Wastewater

Large electric generation facilities have the potential to generate significant amounts of wastewater. This section discusses potential impacts from wastewater generation. Minnesota Rules 7849.1500, subpart 2 requires that this ER address anticipated wastewater streams and discharge.

Black Oak/Getty Wind Project
The proposed project does not create wastewater during the generation of electricity. However, wastewater would be created by the operation and maintenance building. This wastewater would likely be discharged into a septic system associated with the building. The potential impacts of this wastewater and septic system are anticipated to be minimal. Mitigation of the impacts, beyond a properly functioning septic system, is not anticipated.

[30] Water Use Permits, http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

Generic 82 MW LWECS
A generic 82 MW LWECS would have wastewater impacts similar to the Black Oak/Getty Wind Project.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would have process and sanitary wastewater discharges. The amount of wastewater discharge would depend on the water sources used for the plant. If well and municipal water are used, anticipated average wastewater discharge would be approximately 1,275 million gallons per year. If effluent water is also utilized, wastewater discharge could decrease to approximately 310 million gallons per year.

Wastewater impacts could be mitigated by processing. The most likely scenario is transference of the wastewater to a municipal sewage system for treatment and release. Wastewater could be held or pre-treated at the biomass plant. Holding could reduce discharges through evaporation. However, holding introduces risks related to keeping wastewater stored away from surface and ground waters.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no water discharge.

5.4 Solid and Hazardous Wastes

Large electric generation facilities have the potential to generate solid and hazardous wastes. If not properly stored and disposed of solid and hazardous wastes can contaminate surface and ground waters. This contamination has the potential to cause human health impacts. This section discusses potential impacts from such wastes. Minnesota Rules 7849.1500, subpart 2 requires that this ER address anticipated solid and hazardous wastes generated by the proposed project.

Black Oak/Getty Wind
Construction of the project would generate solid wastes such as scrap wood, plastics, cardboard and wire.

Once the project becomes operational lubricants and fluids would be stored at the operation and maintenance building. Applicants anticipate that approximately 6.8 tons of hydraulic fluid, lubrication oil and grease would be generated annually during operation; these materials would be disposed of through a used oil recycler or off-site incinerator. Applicants estimate that approximately 2.25 tons of solid waste, such as oily and greasy rags, materials packaging, cleaning residues and fluorescent light bulbs would be generated annually and disposed of in a solid waste landfill or, for some materials designated as hazardous wastes, through a hazardous waste treatment and disposal facility.[31]

The operating entity would likely be considered as a hazardous waste generator under Minnesota Hazardous Waste Rules ((Minnesota Rules Part 7045). Hazardous waste generation would likely fall below the quantity required for a very small quantity generator license (220 pounds per month).[32]

[31] CN Application, at p. 59
[32] MPCA. *Step 1: Evaluate Waste, Determine Generator Size*, http://www.pca.state.mn.us/index.php/view-document.html?gid=4030. This publication notes that certain of the wastes generated, such as oil that will be recycled, packaging, and fluorescent light bulbs, do not count towards generator size.

Generic 82 MW LWECS
A generic 82 MW LWECS would have solid and hazardous waste impacts similar to the Black Oak/Getty Wind.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would create solid and hazardous wastes. Solid wastes would be generated during construction, e.g., scrap wood, plastics, cardboard and wire. Solid waste generated from operations would consist primarily of ash from the biomass boiler. Small amounts of hazardous wastes would be generated during operation, e.g., oils, grease, hydraulic fluids, solvents. Hazardous materials, e.g., diesel fuel, would likely be stored on site.

Ash generated by the plant would be held on-site in an ash holding facility or removed to an off-site disposal facility. Storage tanks would be registered and maintained in accordance with MPCA guidelines.

No Build Alternative
Under the No-Build Alternative no project would be built and no solid or hazardous waste would be produced.

5.5 Natural Resources

Large electric generation facilities have the potential to impact natural resources, including flora, fauna, habitat, soils and water. This section discusses potential impacts to natural resources from the operation of a generation facility in the project area.

5.5.1 Ecological Setting

The Black Oak/Getty Wind project and surrounding landscape are located at the transition between the Minnesota River Prairie Ecological Subsection of the Prairie Parkland Province and the Hardwood Hills Ecological Subsection of the Eastern Broadleaf Forest Province.[33] Historically, the predominant land cover in these sections and subsections was treeless, fire-dependent grassland and brushland types interrupted by lakes, streams, marshes, and pothole wetlands. The Hardwood Hills Subsection lies within the heart of the Mississippi flyway and harbors a large number of wetlands. Despite drainage of many of the historic wetland habitat, this part of Minnesota is also part of the prairie pothole region, which hosts the most productive breeding habitat for North American waterfowl and other waterbird species. Farmland, rivers, lakes, and wetlands of various sizes characterize the project area and glacial outwash land features and land use is predominantly agricultural.

Current land use is dominated by agricultural uses; approximately 83 percent of the project area is cropland, 16 percent grassland, with scattered wetlands, homesteads, and scattered small woodlots and fencerows.[34]

Public lands surrounding the project area provide important wildlife habitat in a landscape dominated by agricultural uses, particularly for resident and migratory birds. Wildlife management areas (WMAs)

[33] MDNR 2006. Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife, (Pp. 88-93 and 214-219)
[34] Black Oak Site Permit Application and p. 42; Getty Site Permit Application at p. 39

are part of Minnesota's outdoor recreation system and are established to protect lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses.[35] Similarly, Waterfowl Production Areas (WPAs) are acquired as public land or protected through perpetual easement, as part of the U.S. Fish and Wildlife Service's (USFWS) National Wildlife Refuge System and provide habitat for a vast variety of waterfowl, shorebirds, grassland birds, plants, insects and wildlife. [36] WPAs also provide outdoor recreational opportunities such as hunting, hiking, and wildlife watching. Of the five WMAs and 16 WPAs within 5 miles of the Project, one WPA is surrounded by the project, one WMA and one WPA are adjacent to the project. Table 5 identifies the public lands within five miles of the project.

Table 5. Public Lands within Five Miles of the Project

Name	Distance from Boundary (miles)	Area (acres)
State Wildlife Management Areas (WMAs)		
Padua WMA	Adjacent	324
Sauk River WMA	1.9	900
Spirit Marsh WMA	3.4	39
Victor Winter WMA	4.5	160
Miller WMA	4.9	39
Total		**1,462**
Federal Waterfowl Production Areas (WPAs)		
Trisko	Surrounded	397
Kenna	Adjacent	251
Whitney	2.2	346
Behnen	2.5	371
Stoney Creek	2.6	48
McCormick Lake	2.9	245
Zehrer	3.0	145
Schurman	3.0	18
Wiener	3.0	100
Gettel	3.2	116
Costello	3.3	106
Claude	3.6	62
Padua	3.8	720
Crosier	3.9	99
Ashley	4.5	876
Dickhaus	4.8	319
Total		**4,219**

[35] DNR http://www.dnr.state.mn.us/wmas/description.html
[36] U.S. Fish and Wildlife Service http://www.fws.gov/refuges/whm/wpa.html

5.5.2 Geology and Soils

Surficial geology of the project area in northwestern Stearns County consists of glacial deposits associated with the Des Moines Lobe. The Project area is covered by till deposits described chiefly as loam-textured, unsorted sediment with scattered pebbles, cobbles, and boulders. Surficial deposits range from 150 to 250 feet in thickness. Bedrock in the Project area consists of a granitoid gneiss from the Archean Eon.[37] Bedrock outcrops are found approximately one mile northwest Project area.[38]

The underlying bedrock geology of Stearns County consists primarily of metamorphic rocks; granite and gneiss that are overlain by weathered metamorphic rocks and sedimentary rocks; and shale and siltstones. While some of these formations may be visible as outcrops at various points of the county, the majority of bedrock is overlain by 50 to 150 feet of glacial outwash and till.[39]

Soils in the area belong predominantly to the Normania-Flom-Roliss (MN064) classification, which is characterized by Boroll and Aquoll soil types dominant in this area.[40] Borolls are described as cold well drained soils developed under grassland and Aquolls can be described as wet soils developed under grassland. Underlying bedrock is covered by 100 to 400 feet of glacial till; the till is a calcareous loamy sediment. Soils tend to range from loamy sands to clay loams and are moderately well-drained.[41]

Black Oak/Getty Project

Impacts to geology from the project are not anticipated. Construction of the turbines, access roads, substation, and operations and maintenance facility will increase the potential for soil erosion and compaction.

All construction projects disturbing one acre or more are required to apply for a construction stormwater permit through the MPCA. Applicants will submit a National Pollutant Discharge Elimination Systems (NPDES) permit application for construction facilities to the MPCA. The application will identify BMPs to be employed during construction of the project to prevent erosion. A Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction, and will identify BMPs such as silt fencing, management of exposed soils and revegetation plans to prevent erosion.

LWECS permits typically require topsoil to be segregated from subsoil in cultivated lands during grading and replaced during restoration unless otherwise negotiated with landowners. LWECS permits typically require permittees to minimize soil compaction during all phases of the project's life and to confine compaction to the smallest area possible. After construction Applicants will restore natural contours and loosen and seed soil to mitigate against compaction.[42]

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[37] Getty Site Permit Application at p. 37
[38] Black Oak Sit Permit Application at p. 39
[39] Stearns County. *Stearns County All Hazard Mitigation Plan, 2008* http://www.paynesvillemn.com/vertical/sites/%7B05195765-6E0A-45FD-92E2-DCFCDB1C131E%7D/uploads/Stearns_Co__HazMit_Plan_2008__2_.pdf
[40] Black Oak Site Permit Application, at p. 38
[41] Minnesota DNR, Ecological Classification System, Hardwood Hills Subsection, http://www.dnr.state.mn.us/ecs/222Ma/index.html
[42] Getty Site Permit Application at p. 65

Generic 82 MW Wind Project
Impacts to geology and soils from a generic 82 MW wind project would depend upon the specific site of the project(s). With the exception of locating a project in an area with karst topography, geologic impacts from a wind project would be expected to be minimal. Any wind project would create the potential for soil erosion and compaction; mitigation strategies would likely be similar.

38.5 MW Biomass Project
Construction of a 38.5 MW biomass project would also increase the potential for soil erosion. As a large construction project, the developer would be required to apply for an NPDES permit and develop a SWPP for both the construction and operation components of the project. Soil compaction would be less of an issue, as the project would be used as an industrial facility and not for agriculture.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to geology or soils.

5.5.3 Ground Water

The project is located within Minnesota's Central Ground Water Province. The province generally is characterized by buried sand aquifers and relatively extensive surficial sand plains as part of a thick layer of unconsolidated sediments deposited by glaciers overlying the bedrock. Groundwater in the region is supplied by unconfined and confined (buried) glacial aquifers. The glacial aquifers in the project area are generally unconfined and yield less than 100 gallons per minute (low yield). The water table is shallow with an elevation of approximately 1,340 feet above mean sea level, or 0 to 20 feet below ground surface across the site. Groundwater flows in an easterly direction. Portions of the project area are underlain by a sand and gravel aquifer, identified as Aquifer 1, ranging from 20 to 30 feet in thickness. This aquifer is used for domestic, industrial, and municipal uses.[43] Both types, confined and unconfined, can be highly susceptible to contamination depending on the confining layer which overlays the aquifer.[44] The MPCA regional ground water profile for the project area identifies sand aquifers as particularly susceptible to contamination from agricultural irrigation, septic systems, and commercial and industrial development lacking a proper sewer system.[45]

Black Oak/Getty Wind Project
Impacts to groundwater resources are not anticipated. As addressed in Section 5.2, water supply needs will be similar to those required in a residence. Applicants anticipate that, depending upon the location of the operations and maintenance facility, water requirements for the project will be met through either a well or municipal water supply.

Wind turbine locations will not impact the use of existing water wells. To comply with residential and noise setbacks turbines would be located at least 1,000 feet from homes, where most of the wells would

[43] Getty Site Permit Application at p. 37.
[44] Stearns County All Hazard Mitigation Plan, 2008, at p. 15, http://www.paynesvillemn.com/vertical/sites/%7B05195765-6E0A-45FD-92E2-DCFCDB1C131E%7D/uploads/Stearns_Co__HazMit_Plan_2008__2_.pdf
[45] MPCA, Ground Water Profile, Central Sands Region, http://www.pca.state.mn.us/index.php/view-document.html?gid=6483

be located. Measures would be taken to identify any nearby wells prior to construction of turbine foundations. Agencies such as the DNR, MPCA and Minnesota Department of Health will also be contacted as necessary to determine appropriate actions to protect local groundwater resources.

Generic 82 MW Wind Project
Impacts to groundwater from a generic wind project would be similar or higher depending on site location and geological material of the project. The potential for groundwater contamination resulting from construction may be higher in areas with karst topography.

38.5 MW Biomass Plant
As discussed in Section 5.2, a biomass plant would be expected to require approximately 1,275 gallons per minute of water for cooling, sanitation, washing and separations. A biomass plant would be expected to have similar impacts on resources as the proposed project depending on resources on and near the project site. Siting of the biomass plant utilizing construction practices that minimize impacts to surface water would likely mitigate impacts.

No Build Alternative
Under the No-Build Alternative no project would be built and no impacts to ground water.

5.5.4 Surface Waters

Potential impacts to surface waters from electric generation projects are largely related to construction activities. In the case of a biomass facility, where fuel may be stored onsite, fuel supplies need to be properly stored to prevent potential impacts to surface waters from runoff.

Black Oak/Getty Project
The project area is located in the Sauk River Watershed.[46] The project area contains a number of intermittent and perennial streams, some of which are designated waters of the United States. Getty Creek and Hoboken Creek, both tributaries to the Sauk River, Moliter Lake, and several unnamed streams are located partially or completely within the project area.

During construction of the project, there is the potential for sediment to reach surface waters due to ground disturbances from vegetation clearing, excavation, grading and construction traffic.

Because construction of the project requires disturbance of more than one of soil, Applicants will submit a NPDES permit application for construction facilities to the MPCA. The application will identify Best Management Practices to be employed during construction of the project. A SWPPP will be developed prior to construction, and will identify BMPs such as silt fencing, management of exposed soils and revegetation plans to prevent erosion.

In addition to erosion control measures, fueling and lubricating far construction equipment away from waterways would ensure that fuel and lubricants do not enter waterways.

LWECS permits issued by the Commission require permits and approvals from the DNR, USFWS, and USACE for any access roads constructed across streams or drainage ways. If access roads are

[46] Getty Site Permit Application at p. 40

constructed across streams or drainage ways, roads must be designed to ensure that runoff from the upper portions of the watershed can readily flow to the lower portions of the water shed.

Generic 82 MW Wind Project
The primary source of impacts to surface from a generic 82 MW wind project would be erosion and runoff during construction. Generally mitigation strategies would be similar to that of the Black Oak/Getty project. In areas where a surface water body is identified as impaired, the SWPPP would provide detailed mitigation on how impacts to the impaired water body would be avoided.

38.5 MW Project
Construction of a 38.5 MW project would also increase the potential for soil erosion. As such a project would require disturbance of an area larger than one acre, the developer would be required to apply for an NPDES permit and develop a SWPP for both the construction and operation components of the project. Fuelstocks stored onsite would need to be properly contained and covered to minimize the potential for runoff.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impacts to surface water.

5.5.5 Wetlands

Wetlands provide direct benefits to the environment and vary according to the type or class of wetland and the season. Wetlands serve as floodwater detentions, provide nutrient assimilation and sediment entrapment (water quality), and provide wildlife habitat. Wetlands are either protected federally under Section 404 of the Clean Water Act or by the State of Minnesota under the Wetland Conservation Act. The National Wetland Inventory (NWI) developed by the USFWS identifies wetlands based on imaging from aerial photography or digital aerial imagery. Although the NWI data has not been field verified, it provides a good start to identify potential wetland areas.

Black Oak/Getty Project
Within the project boundary approximately 7.5 percent of the area is described as an NWI wetland. Most of the wetlands within the project boundary are classified as freshwater emergent, with the majority of these classified as partially drained. Wetlands within the project area are comprised of both larger wetland complexes and scattered potholes. Table 6 identifies the National Wetland Inventory types and acreage within the project area.[47]

[47] Wetland acreage calculated using USFWS NWI data

Table 6. National Wetland Inventory Types

NWI Type		Acres
Freshwater Emergent Wetland	PEMA	17
	PEMAd	376
	PEMC	48
	PEMCd	482
	PEMCx	0
	PEMF	49
	PEMAFd	24
	Total	**1042**
Freshwater Pond/Lake	PUBF	2
	PUBFx	11
	L1UBH	23
	Total	**36**
Freshwater Forested/Shrub Wetland	PFO1C	3
	PFO1Cd	3
	PSS1C	0
	PSS1Cd	16
	Total	**22**
Total NWI Wetlands		**1100**

Construction activities within wetlands could temporarily affect the function of the wetland. If project components were to be placed within wetlands, the affected wetland would be lost or converted to another type of wetland.

Wind permits issued by the Commission prohibit placement of wind turbines or associated facilities such as roads, transformers, foundations, or underground cables within public water wetlands. Electric collector or feeder lines may cross or be placed in public waters or public waters wetlands subject to permits and approvals the DNR, the USACE, and local units of government as implementers of the Minnesota Wetland Conservation Act.

Once a final project layout is determined, Applicants will conduct a wetland delineation in areas identified for construction of turbines, roads, or other facilities associated with the Project. Depending upon the results of the delineation results, project components may be shifted to avoid delineated wetlands.

Generic 82 MW Wind Project
Because wind projects are designed to avoid wetlands to the extent possible impacts and mitigation would be expected to be similar for a generic 82 MW wind project.

38.5 MW Biomass Facility
It is likely that a biomass facility could be designed and located to avoid wetland impacts. If the project could not avoid wetlands, permits from the USACE, DNR, and the local county or implementor of WCA would be required depending upon jurisdiction.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impacts to wetlands.

5.5.6 Wildlife

Wildlife in the area consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which use the project area habitat for foraging, breeding, and/or shelter. The resident species are representative of Minnesota game and non-game fauna associated with upland grass, farmlands, and wetland and forested areas. The majority of the migratory wildlife species are birds, including waterfowl, raptors, and songbirds. Avian and bat species are particularly susceptible to impacts from wind farms due direct collision, habitat fragmentation, or displacement. Impacts to wildlife are discussed below.

Birds
The impact of wind facilities on avian species has been relatively well documented in the United States. With the exception of some wind facilities in California, raptor fatality rates are low. Songbirds, or passerines, have the highest fatality rates, although the fatality rates of all species generally range from 1-4 birds per MW per year. [48] In the Midwest, bird fatality rates at the Top of Iowa wind farm in Iowa, estimated fatality rates between 0.3 and 0.8 birds per turbine per year.[49] This estimate is similar to results from studies in other states where fatality rates ranged between < 1 to 2.83 birds per turbine per year.[50] Studies conducted in the Buffalo Ridge region of southwestern Minnesota estimated bird fatality rates between 1.0 and 4.5 birds per turbine per year.[51] Nocturnal migrants suffered relatively more fatalities; local grassland species suffered relatively less. The studies noted that birds tend to avoid turbine towers, but utilize the surrounding habitat.

In sum, studies of bird fatalities near wind farms indicate that fatalities will occur and that they will vary with bird type (e.g., raptor, passerine) and bird use (habitat). It is unclear how fatalities from wind farms will impact avian populations at a broader scale.

Bats
Bat fatality studies indicate a broad range of fatalities across the United States as a result of wind development. Fatality rates are highest for migrating-tree roosting bat species, with the majority of fatalities occurring during the late summer and early fall migration (roughly July-October). Documented bat fatalities are highest in the eastern United States, while those in the Midwest represent a wide range of fatality rates. Post-construction fatality studies completed in Iowa, Minnesota and Wisconsin

[48] National Wind Coordinating Collaborative. *Wind Turbine Interactions with Birds, Bats, and their Habitats: a Summary of Research Results and Priority Questions*. Spring 2010 http://www.nationalwind.org/publications/bbfactsheet.aspx?
[49] *Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm*, (Jain2005). http://www.batsandwind.org/pdf/Jain_2005.pdf.
[50] Id.
[51] Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-Year Study, http://mn.gov/commerce/energyfacilities/documents/AvianMonitoringBuffaloRidge.pdf [hereafter Buffalo Ridge Studies].

range from 1 to 9 bats/MW/year.[52] Bat studies conducted at the Buffalo Ridge, Minnesota, found an average of 1 to 3 bat fatalities/turbine/year. The highest bat fatalities were found at the Blue Sky Green Field wind facility in Wisconsin, where bat fatalities averaged 24 bats/MW/year.

It is presumed that projects in areas with similar habitat and cover types would have similar fatality rates, depending on migration patterns, known roosting and foraging areas, and hibernacula. However, bat migration routes and behavioral patterns are poorly understood and there is a lack of comparative studies of bat fatalities from wind facilities, making it difficult to determine fatality rates at regional levels much less at broader scales. [53]

There are seven species of bats that occur in Minnesota, all of which have the potential to occur throughout the state.[54] Two bat species are state-listed as special concern and also Species of Greatest Conservation Need (eastern pipistrelle / tricolored bat *Pipistrellus subflavus* / *Perimyotis subflavus* and northern myotis / northern long-eared bat *Myotis septentrionalis).* The northern long-eared bat is also under consideration by the by the U.S. Fish and Wildlife Service for protection under the Endangered Species Act. Two species of bats are proposed to be state-listed as special concern (little brown myotis / little brown bat *Myotis lucifugus* and big brown bat *Eptesicus fuscus).* Bats roost in trees and other structures during the day and commute to foraging sites after sunset and utilize a variety of habitats for foraging, including riparian corridors, open grasslands, and forests. [55]

The high proportion of agricultural land and low proportion of forested area within the project boundary would appear to limit habitat for tree-roosting bat species. Bat activity is greatest in late July through mid-August. Fatality rates of migrating bats (tree-roosting species) peak during late summer and early fall. [56] There is also a small spike in bat fatalities during the spring migration. The cumulative impacts to bat populations are unknown at this time.

Black Oak/Getty Wind

The project area is representative of the Hardwood Hills and Minnesota River Prairie sub-sections, with 82 percent of the land use in agriculture and 16 percent in grasslands.[57] Most of the grasslands in the project area have been plowed or cropped.

Impacts to most wildlife species is expected to be minimal. Avian and bat fatalities would occur. While the extent of such fatalities is not known, it is likely they would be within the range seen at other large wind facilities in the Midwest – 1 to 4 birds/MW/year and 1 to 8 bats/turbine/ per year. Black Oak/Getty submitted a draft Avian and Bat Protection Plan (ABPP) February 9, 2012. The ABPP includes

[52] National Wind Coordinating Collaborative. *Wind Turbine Interactions with Birds, Bats, and their Habitats: a Summary of Research Results and Priority Questions*. Spring 2010 http://www.nationalwind.org/publications/bbfactsheet.aspx?
[53] Id.
[54] DNR http://www.dnr.state.mn.us/mammals/bats.html
[55] Kunz et al. 2011. *Ecosystem Services Provided by Bats, Annals of the New York Academy of Sciences: 1223* (2011) 1–38. http://www.caves.org/WNS/WNS%20Kunz%20April%205%20%202011.pdf
[56] National Wind Coordinating Collaborative. *Wind Turbine Interactions with Birds, Bats, and their Habitats: a Summary of Research Results and Priority Questions*. Spring 2010 http://www.nationalwind.org/publications/bbfactsheet.aspx
[57] Black Oak/Getty Avian Use Assessment Report, 2011

information on formal and informal monitoring, construction and operation training, and reporting protocol.

Avian surveys were conducted in the project area in the spring of 2011. Surveys consisted of avian use/flight path surveys and point counts, which were used to document bird species and their movements within the project area. During 23 monitoring dates 116 species of birds were documented. Table 7 identifies species found during the surveys that are identified as endangered, threatened or of special concern.

Table 7. Listed Species in Project Area

Common Name	Scientific Name	Status
Trumpeter swan	*Cygnus buccinator*	State-listed Threatened
Horned Grebe	*Podiceps auritus*	State-listed Threatened
Wilson's Phalarope	*Phalaropus tricolor*	State-listed Threatened
Marbled Godwit	*Limosa fedoa*	Species of Special Concern
Forster's Tern	*Sterna forsteri*	Special Concern
American White Pelican	*Pelecanus erythrorhynchos*	Special Concern
Bald Eagle	*Haliaeetus leucocepohalus*	Special Concern

Source: Black Oak/Getty Avian Use Assessment

No federally listed bird species were observed during the avian surveys conducted in the spring of 2011. Seven of the documented bird species are identified by DNR as endangered, threatened, or special concern, and 22 species designated as Species of greatest Conservation Need.[58] Special Concern Species and Species of Greatest Conservation Need are not provided the same statutory protection as endangered or threatened species, but are protected from indiscriminate taking through the Migratory Bird Treaty Act. The spring Avian Survey identified a broad corridor of significant avian movement and concentration from the south of the project to the northeast and northwest of the project towards the Sauk River. Preliminary turbine siting within the project utilized survey results to avoid and minimize impacts to habitat and flight corridors.

Given the lack of forested habitat in the project area, it is assumed bat fatalities in the project area would be similar to those at other large wind facilities in the Midwest and that fatalities would likely be migrating bats.

Impacts to ground animals are expected to be minimal and no specific mitigation has been proposed.

Applicants propose to minimize impacts to birds and bats through siting, timing of construction, and avoidance of habitat. Siting turbines away from bird habitat (grasslands, riparian areas, and wetlands), identified flyways, and bat feeding areas (forests, riparian corridors, and wetlands) reduces impacts to avian and bat species. The project will maintain a 3 x 5 RD setback from all public lands adjacent to the project boundary. Construction timing to avoid the avian breeding season also reduces impacts to bird species.

[58] Black Oak/Getty Avian Use Assessment, 2011

Wetland and prairie delineations will be conducted prior to construction to limit the extent of construction activities if they occur near these habitats. Existing trees and shrubs will not be removed for the construction of access roads and turbines.

High wind conditions reduce bird and bat flight activity. Wind turbines require a minimum wind speed ("cut-in" speed, Table 2) for operation. Impacts to birds and bats could be mitigated by employing turbines with a relatively higher cut-in speed or by using SCADA system controls to increase cut-in speed.[59] Curtailment of turbines has been found to effectively reduce bat fatalities by as much as 80 percent.[60]

Generic 82 MW LWECS

Because impacts to wildlife would depend upon specific site characteristics, it is difficult to assess wildlife impacts for a generic 82 MW LWECS located elsewhere in Minnesota. As discussed above, impacts to birds and bats are the primary concern with wind projects. Information about local bird and bat populations within Minnesota is incomplete and sites provide habitat and foraging areas for numerous species of birds and some species of bats. However, "thunderstorm" maps showing relative density of different types of birds throughout the prairie pothole region provide some of the Black Oak/Getty project location. As shown in Map 6, compared to Prairie Pothole region in Minnesota and Iowa, the project area shows a low to moderate population density of grassland nesting birds (including Bobolink, Dickcissel, Grasshopper Sparrow, LeConte's Sparrow, Savannah Sparrow, and Sedgewren). As shown in Map 7, compared to the Litchfield Wetland Management District, the project area shows a moderate density of upland nesting duck pairs.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have likely have fewer impacts on avian and bat species than the Black Oak/Getty Wind Project. The biomass plant would be constructed on an approximately 60 acre site. This acreage would be removed from use as wildlife habitat. However, the land used for the project would likely be agricultural land; such land is relatively poorer habitat for wildlife. Impacts from operation of the plant are anticipated to be minimal. Emissions from the plant (e.g., hazardous air pollutants) could, through impacts to the environment, impact wildlife. The extent of this impact is uncertain.

No Build Alternative

Under the No-Build Alternative no project would be built and there would be no impact to wildlife.

5.5.7 Rare and Unique Natural Resources

The Minnesota County Biological Survey and the Minnesota Natural Heritage Information System provide information on federal and state listed species, Species of Greatest Conservation Need, and unique or rare habitat types in Minnesota. The Minnesota County Biological Survey systematically collects, interprets, and delivers baseline data on the distribution and ecology of rare plants, rare

[59] Arnett et al. April 2009. *Effectiveness of Changing Wind Turbine Cut-In Speeds to Reduce Bat Fatalities at Wind Facilities*, http://www.batsandwind.org/pdf/curtailment_2008_final_report.pdf.

[60] National Wind Coordinating Collaborative. *Wind Turbine Interactions with Birds, Bats, and their Habitats: a Summary of Research Results and Priority Questions*. Spring 2010 http://www.nationalwind.org/publications/bbfactsheet.aspx

animals, and native plant communities.[61] The Natural Heritage Information System database provides information on Minnesota's rare plants, animals, native plant communities, and other rare features. The Natural Heritage Information System is continually updated as new is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features.[62]

Black Oak/Getty Wind Project

Risk analyses conducted using the USFWS Land-Based Wind Energy Guidelines 2012[63], did not identify any designated critical habitat within the Project boundary. Avian surveys discovered the presence of seven species listed by the State of Minnesota as endangered, threatened or special concern during spring 2011 surveys (see Table 7 above).

There are no records of federally listed or candidate species in Stearns County.

One record of the Powesheik skipper, a state species of special concern, occurs on the Trisko WPA. Although outside the project boundary, the Trisko WPA is surrounded by the Project. No native plant communities or designated critical habitat have been recorded within the project area.[64]

The following measures would prevent potential impacts to rare and unique natural resources in the project area.

- Conduct a preconstruction inventory of existing biological resources, native prairie, and wetlands in the Project Area
- Avoid or minimize disturbance of individual wetlands or drainage systems during Project
- Maintaining setbacks from the Trisko WPA, Kenna WPA, and the Padua WMA
- Avoid placement of turbines in flyways identified during the 2011 avian survey

Generic 82 MW LWECS

A generic 82 MW LWECS sited elsewhere in Minnesota would have potentially very different unique and rare natural resources depending on location. Mitigation techniques would be site specific would likely include avoidance as the primary mitigation technique.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would likely have fewer impacts to rare and unique natural resources. By occupying a single location rather than being dispersed across thousands of acres, opportunities for conflict with rare and natural resources would be reduced. A biomass plant could also be sited to avoid unique habitats and would utilize construction practices that would avoid or minimize disturbances to wetlands or drainage systems.

[61] For more information on Minnesota County Biological Surveys, see http://www.dnr.state.mn.us/eco/mcbs/index.html
[62] For more information on the Minnesota Natural Heritage Information System Database, see http://www.dnr.state.mn.us/eco/nhnrp/nhis.html
[63] USFWS. *Land-Based Wind Energy Guidelines*, 2012. http://www.fws.gov/windenergy/docs/WEG_final.pdf
[64] Black Oak Wind Farm Site Permit Application at p. 56 and Getty Wind Farm Site Permit Application at p. 56

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to rare natural resources.

5.6 Human and Social Environment

Large energy generating facilities have the potential for effects or perceived effects on nearby residences, including impacts to human, community, and social environments. Although the population in Stearns County is increasing at a faster rate than that of Minnesota as a whole, growth in the four townships that are included in the project area is slower than the county as a whole. Table 8 summarizes the demographics in Stearns County.[65]

Table 8. Demographic Characteristics of Stearns County

Description	Stearns County	Ashley	Raymond	Sauk Centre	Getty	Minnesota
Population, 2000	133,166	244	255	966	405	4,919,492
Population, 2010	150,642	262	259	1088	376	5,303,925
Percent population change (2000-2010)	13.1	7.4	1.6	12.6	-9.6	7.8
Persons per square mile, 2010	112	6.2	7.2	25.9	10.4	62
Median Household Income ($ 2010) 2006-2010	51, 579	63,125	36,406	63,571	54,643	57,243

5.6.1 Aesthetic Impact and Visibility Impairment

The construction of large energy facilities changes the existing aesthetic environment by introducing a large new facility, or in the case of LWECS, several large towers dispersed through a project area. This section discusses visual changes and perceptions of aesthetics of the proposed project and alternatives. Shadow flicker is discussed in Section 5.6.2. Visual impairment is not identified as an impact from wind facilities, as they do not produce emissions that may limit visibility.

Black Oak/Getty Wind
The Black Oak/Getty Wind project would alter the current landscape through the introduction of large wind turbines. The large size and high-tech appearance of wind turbines causes them to stand out against the backdrop of the open, rural landscapes in which they are often sited. Additionally, due to their 400-foot height, they can be seen for long distances.

Many factors influence how a wind energy facility is perceived. Factors may include levels of visual sensitivity of individuals, viewing conditions, visual settings, and individual ideas and experiences. Distance from a turbine(s) and activities within and near the project area, landscape features such as hills and tree cover, as well an individual's personal feelings about wind energy technology can all contribute to how a wind energy facility is perceived. Black Oak/Getty Wind will be located in a predominantly rural agricultural area characterized by gently undulating topography.

[65] Compiled from U.S. Census Bureau data, Census 2000. See State and County Quick Facts for Stearns County, http://www.census.gov/.

Developing a method to assess aesthetics of wind projects is difficult. Current methods of assessing visual impacts include viewshed mapping, photographic simulations, and video animation.[66] All of these methods depend, to some extent, on assessing the current aesthetic resources of the project area, i.e., the aesthetics of the area before construction of a wind farm. Such assessments can be subjective; however, state and federal agencies often perform such assessments in the development of parks that have valuable aesthetic resources.

There are no scenic byways within or adjacent to the Project. The Lake Wobegon trail passes through the city of Sauk Centre, approximately two miles north of the project. There are five state wildlife management areas (WMAs) located within five miles of the project boundary; the Padua WMA adjacent to the project. In addition to the WMAs, there are sixteen Waterfowl Production Areas (WPAs) located within five miles of the project; the Kenna WPA is adjacent to the project and the Trisko WPA is outside of the project boundary but completely surrounded by the project. The nearest state park is Sibley State Park, located approximately 23 miles (Getty) south of the site. The Sedan Brook Prairie Scientific and Natural Area (SNA) is located approximately 7 miles southwest of the project.

Mitigation of impacts to aesthetic and visual resources is best accomplished through micrositing of wind turbines and maintaining designated setbacks from participating and non-participating landowners. In general, siting wind projects in rural areas minimizes human impacts. Aesthetic impacts to public lands can be mitigated by siting wind projects outside of these areas, and utilizing natural features such as topography and vegetation to reduce visual intrusions.

Setbacks from individual turbines, as embodied by Minnesota's general permit standards, do provide some level of mitigation for aesthetic impacts.[67] Wind turbines must be set back from non-participating properties a minimum distance of 5 rotor diameters (RD) on the prevailing wind direction and 3 RD on the non-prevailing wind direction. The potential setback distances for the Black Oak/Getty Wind are shown in Table 2. Additional setbacks may be required to meet Minnesota noise standards.[68] Finally, turbines are designed to be a uniform off-white color to blend in with the horizon and reduce visibility impacts.

The proposed project would not impact or otherwise impair visibility. Unlike other types of generation facilities that produce by-products and emissions that may diminish or reduce visibility, wind turbines do not produce emissions.

[66] Visual Considerations: Public Perceptions, Regulatory Environment and Assessment Methods in the Eastern U.S., http://www.nationalwind.org/assets/blog/Allen-NWCC_2009.pdf.
[67] Commission Order Establishing General Permit Standards, http://mn.gov/commerce/energyfacilities/documents/19302/PUC%20Order%20Standards%20and%20Setbacks.pdf
[68] Minnesota Rules Chapter 7030 at all residential receivers (homes). Residential noise standard NAC-1, L50 50 dBA during overnight hours.

Generic 82 MW LWECS
A generic 82 MW LWECS located elsewhere in Minnesota would have similar visual impacts and mitigation strategies. The number of people experiencing the visual impacts would generally tend to be lower in more sparsely populated areas of Minnesota.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would likely impact visual aesthetics in the immediate area of the facility, and in the surrounding area depending on the height of the stack plume. Shadow flicker would not be an issue due to the absence of rotating exterior parts.

A biomass plant would be industrial in nature with many buildings, conveyors, biomass piles, and a boiler stack. The building housing the boiler is likely to be at least 100 feet tall. The conveyors and biomass piles could range from 30 to 50 feet in height. Buildings, conveyors, and biomass piles would likely be lighted to allow for nighttime operation. Lighting would also be necessary for wood fuel loading/unloading points, truck scales, and vehicle parking areas.

The estimated height for the boiler stack is approximately 150 feet. Particulate matter control devices would capture most of the particulates from the boiler exhaust gas stream. Thus, the majority of the plume from the boiler stack would be water vapor. This plume may be seen during cold weather conditions, but would likely be virtually clear in warm weather. In cold weather, the plume may impair visibility. If taller than 200 feet, the boiler stack may require Federal Aviation Administration (FAA) lighting, similar to wind turbines.

Mitigation of visual impacts could be accomplished through siting of the biomass plant. The plant could be located in an industrial location allowing it to blend in with other industry and be located away from aesthetically valuable resources. However, the biomass plant would need to be located in an area where biomass is readily available in large quantities. Vegetative screening (trees, shrubs) could be used to partially block views of industrial buildings, silos, conveyors and boiler stack.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impacts to aesthetics or visibility.

5.6.2 Shadow Flicker

Wind turbines are known to create shadow flicker. Shadow flicker is the intermittent change in light intensity due to rotating wind turbine blades casting shadows on the ground. Three conditions must be present for shadow flicker to occur: the sun must be shining with no clouds to obscure it; the rotor blades must be spinning and located between the receptor and the source; the receptor must be close enough to the turbine to be able to distinguish the shadow created by the turbine. Shadow intensity, or how “light” or “dark” a shadow appears at a specific receptor (usually a home), will vary with distance from the turbine. The closer a receptor is to a turbine, the more turbine blades block out a larger portion of the sun’s rays and shadows will be wider and darker. Receptors located farther away from a turbine experience thinner and less distinct shadows since the blades block out less sunlight. Shadow flicker is reduced or eliminated when buildings, trees, blinds, or curtains are located between the turbine and receptor.

There is not a Minnesota "light standard" that addresses potential impacts of shadow flicker, i.e. there is not a descriptive or numeric standard that would categorize a certain amount of flicker as acceptable or unacceptable. No other states have adopted such a standard. However, other countries have examined the issue and have adopted standards. Standards depend on assumptions about how flicker impacts are to be calculated:

- Germany has proposed a standard such that shadow flicker does not exceed 30 hours/yr. or 30 minutes/day at a receptor.[69] It is unclear whether this is a worst-case scenario (e.g., clear skies every day) or an actual-case scenario (e.g., weather representative of the project area).[70]
- Belgium has adopted the German standard.[71]
- Denmark recommends a maximum of 10 hours/yr assuming actual weather conditions in the project area.[72]
- France has adopted no standard but requires shadow flicker modeling.[73]
- The Netherlands have adopted a yearly maximum of 5 hours and 40 minutes assuming clear skies.[74]
- The State of Victoria, Australia, has adopted a shadow flicker standard of 30 hours/yr.[75]

Black Oak/Getty Wind

Shadow flicker would occur as a result of the proposed project. Shadows would be longest during periods near sunrise or sunset and longer in the winter than the summer. Areas most likely to experience shadow flicker would occur to the west and north of turbines.[76] The number of hours per year during which shadow flicker could occur lessens as distance from the wind turbine increases, even for residences east and west of turbines. Based on preliminary site layouts for the three turbine models under consideration, Applicants anticipate an average of between three and seven hours per year and a maximum of up to 88 hours per year under a worst case scenario (full sun all the time, turbines in constant operation, wind direction always orients the rotors perpendicular to the un-receptor sightline), with an average of between one and two hours per year and a maximum of up to 29 hours per year under an expected case (taking into account for local weather conditions in the project area).[77]

Computer models can predict the amount of expected shadow flicker at locations within or near a wind farm. This information can be used to minimize shadow flicker within and adjacent to the project area. Additional mitigation measures include siting turbines to utilize vegetative screening, planting vegetative screening or installing blinds. These additional mitigation measures could be considered on a case-by-case basis.

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[69] *Spatial Planning of Wind Turbines, European Actions for Renewable Energy* (PREDAC) [hereafter Spatial Planning Report], http://www.cler.org/info/IMG/pdf/WP8_ANG_guide.pdf.
[70] Shadow Flicker Assessment – Honeywood, Final Report, p. 5, http://www.eolectric.com/assets/honeywood/pdf/en/appendix%20k.pdf.
[71] Spatial Planning Report, p. 21.
[72] Id.
[73] Id.
[74] Id.
[75] Policy and planning guidelines for development of wind energy facilities in Victoria, p. 26, http://www.sustainability.vic.gov.au/resources/documents/WindEnergyGuidelines.pdf.
[76] Black Oak Site Permit Application at p. 20
[77] Errata Filing, April 23, 2012

Generic 82 MW LWECS
Depending on surrounding landscape and topography, a generic 82 MW LWECS would have similar shadow flicker impacts and mitigation. Shadow flicker could be reduced in an area with greater variation in topography and vegetation, such as a landscape with hills and greater tree cover. Areas with fewer homes would have fewer potential receptors.

38.5 MW Biomass Plant
A biomass plant would not cause shadow flicker due to the lack of exterior moving parts that could cast alternating shadows.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no shadow flicker.

5.6.3 Project Lighting

Large electric generating facilities would generally have some type of lighting at the facility to ensure safe operation of the facility. Tall structures, such as wind turbines and emissions stacks would also require lighting to make the facility visible to airplanes.

Black Oak/Getty Wind Project
Wind turbines, per FAA requirements and because of their height, would be lighted.[78] Generally, turbines have flashing white lights during the day and red lights during the evening. Turbine lighting would be consistent with other lighted towers on the landscape, such as communication towers.

Lighting required by the FAA is similar to that for other tall structures in rural areas, and mitigation is not expected to be necessary.

Generic 82 MW LWECS
A generic 82 MW LWECS located elsewhere in Minnesota would have lighting impacts similar to the proposed project.

38.5 MW Biomass Plant
If taller than 200 feet, the boiler stack for a 38.5 MW Biomass plant would require FAA lighting similar to wind turbines.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to project lighting.

[78] FAA Advisory Circular AC 70/7460-2K, http://rgl.faa.gov/REGULATORY_AND_GUIDANCE_LIBRARY/RGADVISORYCIRCULAR.NSF/0/22990146db0931f186256c2a00721867/$FILE/ac70-7460-2K.pdf.

5.6.4 Noise

Large electric generation facilities generate noise. Potential human impacts due to noise include hearing loss, stress, annoyance, and sleep disturbance.[79] Noise can be defined as unwanted or inappropriate sound. Sound has multiple characteristics which determine whether a sound is too loud or otherwise inappropriate. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels (dB). Sounds also consists of frequencies, e.g., the high frequency (or pitch) of a whistle. Most sounds are not a single frequency but a mixture of frequencies. Finally, sounds can be constant or intermittent. The perceived loudness of a sound depends on all of these characteristics.

A sound meter is used to measure loudness. The meter sums up the sound pressure levels for all frequencies of a sound and calculates a single loudness reading. This loudness reading is reported in decibels, with a suffix indicating the type of calculation used. For example, "dB(A)" indicates a loudness reading using an A-weighted calculation (or "scale").

The State of Minnesota has promulgated noise standards designed to ensure public health and minimize citizen exposure to inappropriate sounds. The rules for permissible noise vary according to land use, i.e., according to their noise area classification (NAC). In a residential setting, for example, noise restrictions are more stringent than in an industrial setting. Rural residential homes are considered NAC 1 (residential), while agricultural land and agricultural activities are classified as NAC 3 (industrial). The rules also distinguish between nighttime and daytime noise; less noise is permitted at night. Sound levels are not to be exceeded for 10 percent and 50 percent of the time in a one-hour survey (L_{10} and L_{50}) for each noise area classification.

Table 9 lists Minnesota's Noise Standards by noise area classification.

Table 9. Minnesota Noise Standards

Noise Area Classification[80]	Daytime		Nighttime	
	L_{50}[81]	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

[79] World Health Organization. *Occupational and Community Noise* http://www.who.int/mediacentre/factsheets/fs258/en/.
[80] Minnesota Rules 7030.0050, https://www.revisor.leg.state.mn.us/rules/?id=7030.0050. The noise area classification is based on the land use activity at the location of the receiver (listener).
[81] Minnesota Rules 7030.0020, https://www.revisor.leg.state.mn.us/rules/?id=7030.0020. "L_{50}" means the sound level, expressed in dB(A), which is exceeded 50 percent of the time for a one hour survey. "L_{10}" means the sound level, expressed in dB(A), which is exceeded ten percent of the time for a one hour survey.

Black Oak/Getty Wind

The operation of wind turbines would produce noise. Turbines produce mechanical noise (noise due to the gearbox and generator in the nacelle) and aerodynamic noise (noise due to wind passing over the turbine blades).[82] Perceived sound characteristics would depend on the type/size of turbine, the speed of the turbine (if turning), and the distance of the listener from the turbine.

The primary means of mitigating sound (noise) produced by wind turbines is siting. Turbines must be sited to comply with noise standards in Minnesota Rules 7030.[83] For rural residential areas in Stearns County, this means sound levels must meet an L_{50} standard of 50 dB(A). The Applicants propose siting turbines at least 1,000 feet from residences unless other arrangements have been made with participating landowners as allowed by Stearns County. Using anticipated layouts for the three turbines under consideration, Applicants modeled anticipated noise impacts to be a maximum Leq noise level at 45 dBA, and average project-related Leq to be 33 to 33 dBA.[84] Maximum calculated noise levels for all preliminary turbine layouts are at least 5 kV below the nighttime L50 noise limit of 50 dBA.

The Commission continuously reviews public health setbacks related to wind farms to determine if they remain appropriate and reasonable.[85]

Generic 82 MW LWECS

A generic 82 MW LWECS would have noise impacts and mitigation similar to the Black Oak/Getty Wind project. Depending on location, surrounding vegetation, and topography, impacts from noise could be less than those expected of the proposed project.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would create noise during operation from a variety of sources including the turbine/boiler building, conveyor system, hammer mill and bale choppers, front end loaders, and idling trucks. Based on noise studies, the plant would need to be located approximately 2,100 feet from a residence to the meet the daytime L_{50} standard of 60 dB(A), and approximately 6,200 feet from a residence to meet the nighttime L_{50} standard of 50 dB(A). These are conservative estimates – they are based on maximum equipment operation and have not been adjusted for possible noise shielding.

Sound (noise) from the biomass plant could be mitigated by siting. A study would likely be required to ensure that noise standards are met for all local residents. Enclosure of heavy equipment would reduce noise impacts. Vegetative screening, planted to lessen visual impacts, would also reduce potential noise levels. Fuel windrows could provide noise attenuation. Hours of operation, e.g., for fuel delivery or heavy equipment operation, could be managed to reduce noise impacts and meet daytime and nighttime standards.

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[82] Minnesota Department of Health. *Public Health Impacts of Wind Turbines*. May 22, 2009, http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf.

[83] Minn. Rules 7030.0040, Noise Standards, https://www.revisor.leg.state.mn.us/rules/?id=7030.0040

[84] CN Application, at p. 60

[85] *In the Matter of the Commission Investigation into Large Wind Energy Conversion Systems Permit Conditions on Setbacks and the Minnesota Department of Health Environmental Health Division's White Paper on Public Health Impacts of Wind Turbines*, Docket No. CI-09-845, found on eDockets, https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&userType=public , enter "09" for year and "845" for number

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no noise impact.

5.6.5 Property values

Large electric generation facilities have the potential to impact property values. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

Black Oak/Getty Wind
The impacts on property values due to the project are difficult to quantify. Numerous factors influence a property's market value, including acreage, schools, parks, neighborhood characteristics and improvements. A direct influence on property value is often the status of the housing/land market at the time of sale.

The Renewable Energy Policy Project conducted a statistical analysis to determine the extent to which property values are influenced in the vicinity of wind projects.[86] Ten communities in the United States were studied within a five mile radius of a wind project. The study found that property values were not negatively impacted within the viewshed of a wind project. Lawrence Berkeley National Laboratory recently completed a nationwide study on the potential impacts of wind projects on property values.[87] Results indicate that property values near wind projects are not negatively impacted and that home buyers and sellers consider a property's scenic vista when determining a sale/purchase price.

Six counties in southern Minnesota (Dodge, Jackson, Lincoln, Martin, Mower, and Murray counties) with large wind energy conversion systems responded to a Stearns County survey asking about impacts on property values as a result of wind farms.[88] To date, it appears that neither properties hosting turbines nor those adjacent to those properties in the counties listed, are negatively impacted by the presence of wind farms.[89]

Negative impacts to property value due to the proposed project are not anticipated. In unique situations it is possible that specific, individual property values may be negatively impacted. Such impacts can be mitigated by siting turbines away from residences.

Generic 82 MW LWECS
A generic 82 MW LWECS would have property value impacts similar to the Black Oak/Getty Wind.

[86] The Effect of Wind Development on Local Property Values, May 2003, http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf.
[87] The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis, December 2009, http://www1.eere.energy.gov/windandhydro/pdfs/wind_power_projects_residential_property_values.pdf.
[88] Stearns County Board of Commissioners Meeting, June 8, 2010.
[89] Results were based on limited data.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would potentially negatively impact property values near the plant site and possibly along roads used to transport biomass. However, as with the Black Oak/Getty Wind, impacts on property values are difficult to quantify because of the many factors that influence a property's market value. For example, if biomass for the plant were supplied by neighboring land parcels, these parcels might experience an increase in property value.

Because the plant would be sited at a single location, compared to multiple turbine locations, property value impacts could be mitigated by siting, such as in an area zoned to accommodate industrial use.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to property values.

5.6.6 Local Economy

Large energy generating facilities typically generate short-term impacts to local economies through construction jobs and expenditures, such as lodging, food, and some material purchases, during the construction phase of a project. Once the project becomes operational local economies may benefit from more long-term benefits, such as jobs to operate and maintain the facility as well as property or production taxes.

Black Oak/Getty Wind
Short-term and long-term economic benefits would result from the construction of the Black Oak/Getty Wind project. Short-term economic benefits would occur as a result of construction jobs generated by the project and additional expenditures in the local economy. Landowners with turbines or other project facilities on their land would receive an annual lease payment for the life of the project. Long-term benefits would occur through the Wind Energy Production Tax paid to local units of government.

Applicants estimate that construction of the project will require approximately 90 to 135 short-term construction jobs during the second half of 2012. During the operations phase of the project, Applicants anticipate that approximately four to six permanent positions will be created to operate the Project.[90]

Based on a production tax of $0.0012 per kWh produced, annual wind energy production taxes would range from approximately $336, 000 to $388,000.[91] Additionally, payments to landowners would provide income that could add to the local economy.

Generic 82 MW Wind Project
Although the beneficiaries of the project would depend upon the project location, economic benefits would be similar to those of the proposed project.

38.5 MW Biomass Plant
A biomass plant would likely pay property tax, which would benefit local government revenues, but would not pay the Wind Energy Production Tax.

[90] CN Application at p. 61
[91] CN Application at p. 16

No Build Alternative

If the Black Oak/Getty Wind Project is not built, there will be a loss of economic benefits in the project area. Landowners would lose lease payments over the operational life of the project. Local governments would lose wind energy production tax revenues estimated between $336,000-388,000 annually.[92] The Black Oak/Getty Wind Project is expected to generate approximately 90 to 135 temporary construction jobs and approximately four to six permanent operational jobs.[93] These employment opportunities and their associated income would be lost if the project is not built.

5.7 Infrastructure

Large electric generation projects have the potential to impact existing infrastructure, such as electric transmission, transportation and communication.

5.7.1 Associated transmission facilities

Electrical generation facilities typically require construction of transmission facilities such as transmission lines and substations to connect to the transmission grid. This section discusses these associated transmission facilities and their potential impacts.

Transmission lines over 100 kilovolts and longer than 1,500 feet are defined as "high voltage transmission lines" and subject to regulation by the Commission.[94] Wind generation facilities also require construction of lower voltage electric infrastructure (typically 34.5 kV), referred to as feeder and collector lines. These lines collect power generated by the wind turbines and supply the project substation before connecting to the transmission grid.

Electric and magnetic fields (EMF) are invisible regions of force resulting from the presence of electricity. EMF is often raised as a concern with electric transmission facilities. Naturally occurring EMF are caused by the earth's weather and geomagnetic field. Man-made EMF are caused by any electrical device and found wherever people use electricity

- Electric fields are created by the electric charge (i.e., voltage) on a transmission line. Electric fields are solely dependent upon the voltage of a line (volts), not the current (amps). Electric field strength is measured in kilovolts per meter (kV/m). The strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees and buildings.

- Magnetic fields are created by the electrical current moving through a transmission line. The magnetic field strength is proportional to the electrical current (amps). Magnetic field strength is typically measured in milliGauss (mG). Similar to electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. However, unlike electric fields, magnetic fields are not easily shielded or weakened by objects or materials.

[92] CN Application at p. 10
[93] CN Application, at p. 10
[94] Minn. Statute 216E.01, subdivision 4. Under Minn. Statute 216E.05, high voltage transmission lines between 100 and 200 kV may be permitted by local governments.

Although EMF is often raised as a concern with electrical transmission projects, the Commission has consistently found that there is insufficient evidence to demonstrate a causal relationship between EMF exposure and human health effects.

Stray voltage is sometimes raised as an issue associated with electric transmission. Stray voltage is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. This voltage is also called a neutral-to-earth voltage (NEV). Stray voltage is typically experienced by livestock who simultaneously come into contact with two metal objects (e.g., feeders, waterers, stalls). If there is a voltage between these objects, a small current will flow through the livestock. The fact that both objects are grounded to the same place (earth) would seem to prevent any voltage from existing between the objects. However, this is not the case – a number of factors determine whether an object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.[95] Thus, stray voltage can exist at any house or farm which uses electricity, independent of whether there is a transmission line nearby.

Black Oak/Getty Wind

The Great River Energy 400 kV Direct Current powerline passes through the project boundary. There are also two existing 69 kV transmission lines located east and southwest of the project. Electric distribution lines are present but infrequent in the project area.[96]

The Black Oak/Getty Wind project would collect the electrical power generated by turbines through a 34.5 kV collection system to the Project substation. Applicants anticipate that collector lines would be buried underground between turbines; collection lines may occasionally require an above-ground junction box where lines where cables need to be spliced together. Collector lines would generally continue underground when they reach public roads or the edge of farm fields. In certain cases, such as bedrock conditions, conflict with existing underground utilities or infrastructure, LWECS permits provide for overhead collector lines to be constructed along public rights of way.

In addition to collector lines, the Black Oak/Getty Wind project would construct a project substation and a 69 kV overhead transmission line of approximately seven to 8.5 miles linking the project substation to the Black Oak Switching Station. The location of the project substation is currently under consideration and would require approximately one acre of land. The substation would step up the power from 34.5 kV to 69 kV. Black Oak/Getty will seek permitting for the 69 kV transmission line through Stearns County.

The project is not expected to impact existing transmission or distribution facilities in or near the project. Construction impacts would include impacts related to land clearing and materials transport.

The electric collector and transmission lines and transformers associated with the project will create some EMF. Electrical fields from the collector lines and the 69 kV transmission line would be relatively small compared to HVTL lines. Because most of the collector lines will be buried, the ground provides additional shielding from electric fields. Although the ground does not provide the same shield for magnetic fields, the current passing through the collector and 69 kV transmission line is relatively small.

[95] Stray Voltage, NDSU Extension Publication #108, http://www.ag.ndsu.edu/extension-aben/epq/files/epq108.pdf.
[96] Getty Site Permit Application at p. 26

The project would not create stray voltage because the project does not connect directly to residences or farms in the area and does not change on-farm electrical service. However, if a transmission line, such as the 69 kV transmission line associated with the project, parallels a distribution line the transmission line can induce additional current on the distribution lines in the immediate area of the paralleling. For distribution lines and on-farm electrical service that are properly wired and grounded, these induced currents are of no matter. However, for distribution lines and on-farm service that are not properly wired and grounded, these induced currents could create stray voltage impacts. Stray voltage sources can be reduced in three ways: reduce the current flow on the neutral system; reduce the resistance of the neutral system; or improve the grounding of the neutral system. Making good electrical connections and making sure that these connections are maintained by the proper choice of wiring materials for wet and corrosive locations will reduce the resistance of the grounded neutral system, thereby reducing NEV levels.

Siting the project substation near the point of interconnection to the power grid would reduce the extent of electric transmission poles and lines and associated impacts. Construction impacts could be mitigated by minimizing the amount of land cleared for the substation. Visual impacts could be mitigated by placing collector lines underground, while aesthetic impacts from overhead collector and transmission lines can be mitigated through design and pole placement.

Generic 82 MW LWECS
A generic 82 MW LWECS would have transmission facilities similar to the proposed project. Potential impacts and mitigation strategies are also similar. The primary impact would be the length and voltage of the transmission line required to interconnect the wind project with the transmission grid. A relatively longer line or higher voltage would create greater construction and operation impacts.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would have transmission facilities similar to the Black Oak/Getty Wind project; however an electrical collection system and project substation would not be required. The plant would include a transformer at the plant to transform the voltage to transmission levels and a transmission line between the plant and a substation where the power would enter the grid.

Potential impacts and mitigation strategies would be similar to those for the Black Oak/Getty Wind project. Again, the primary impact would be the length and voltage of the transmission line required to connect the biomass plant to the transmission grid. A relatively longer line or higher voltage would increase construction and operation impacts.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no additional transmission.

5.7.2 Roads

Large electric generation facilities may impact roads during the construction phase of the project, both in terms of traffic and wear and tear on the roads. Once operational, wind projects would not be expected to impact roads. Depending upon the method of fuel delivery, traffic impacts could continue once a biomass facility becomes operational.

Black Oak/Getty Wind Project

An established transportation network of state, county and township roads exists in the project area. County and township roads generally follow section lines. Private roads, mostly used for agricultural purposes, are also common. U.S. Highway 71, bordering the eastern edge of the project area, and State Highway 28, crossing through the northern area of the project area, provide the primary truck access to the project area. Traffic volumes in the area are generally low. The highest existing Annual Average Daily Traffic (AADT) counts are approximately 2,400 vehicles per day along State Highway 28 and 2,350 vehicles per day along U.S. Highway 71.[97] Along county highways, AADTs are generally below 225 vehicles per day.[98]

Construction of the proposed project would increase traffic slightly during construction. Additionally, there would be impacts to local roads. Depending on final turbine location and established haul routes, intersections may be temporarily widened to accommodate oversize loads. Any improvements to existing roads would consist of re-grading and filling of gravel surfaces. No additional asphalt or other paving is anticipated. Any temporary modifications to the existing road system would be restored following construction.

Applicants anticipate that approximately 6.6 to 11.6 miles of gravel access roads would be constructed to connect turbine strings or arrays with existing public roads.[99] These roads would be low profile to allow cross-travel by farm equipment and constructed in accordance with state and local requirements. Access roads will consist of graded dirt, overlaid with geotechnical fabric (if needed) and covered with gravel.

To facilitate crane movement and equipment delivery, roads would be approximately 23 to 40 feet in width. Once construction is complete, construction lay-down areas adjacent to turbine pads would be restored and access roads would be restored to their permanent width of approximately 16 feet wide and. Access roads would be improved with class-5 gravel sufficient to support the size and weight of maintenance vehicles.

Construction traffic would use the existing county and state roadway system to access the Project area and deliver construction materials and personnel. During construction peak, it is anticipated that there will be an additional 200 to 240 vehicle trips per day.[100] Because current traffic levels on the roadways in the project area are well below roadway capacities, the increased traffic generated during construction would be perceptible but similar to seasonal variations in traffic, such as autumn harvest. Construction is not anticipated to result in adverse traffic impacts. Operation and maintenance activities will not noticeably increase traffic in the Project area.

Construction of the project would require delivery of heavy equipment, such as cranes, to the project site, as well as delivery of the turbine components. Access roads would be temporarily widened to support the size and weight of heavy-duty cranes and turbine delivery vehicles. Permits issued by the Commission require permittees to notify local state and road authorities of the roads to be used for

[97] Getty Site Permit Application at p. 25
[98] CN Application at p. 57
[99] CN Application at p. 23
[100] CN Application at p. 58

project construction. Permits also require permittees to make arrangements with state or local governments having jurisdiction over roads for repair of roads subject to extra wear and tear.

Generic 82 MW
Impacts would be similar to those of the proposed project. Depending on location, impacts could greater on road systems, particularly on roads with higher daily use. Mitigation would be similar and permittees would be required to make arrangements with state and local road authorities for repair of roads used during project construction.

38.5 MW Biomass Plant
A 38.5 MW Biomass plant would also impact road systems. Impacts during construction would include increased traffic and an increase in use by heavy equipment. For the lifetime of the project, fuel (biomass) would be delivered to the facility. The fuel handling and receiving operations are expected to be truck-traffic (typically multi-axle and/or semi-combination vehicles) operating on a 24-hour per day, 7-day per week basis. The frequency of trucks is dependent on the demand of materials and the available payload of each specific vehicle. An average flow of three to five semi-combination vehicles per hour is anticipated. Peak fuel receiving is anticipated to occur between the hours of 6:00 AM and 5:00 PM. The origin of loaded trucks and destination of empty trucks depends upon the location of the fuel source.

No Build Alternative
Under the No-Build Alternative no project would be built, no roads would be constructed, and there would be no impact from construction traffic.

5.7.3 Communication Systems

Large electric generation facilities have the potential to impact electronic communications (radio, television, internet, cell phone, and microwave) near the proposed facilility.

Black Oak/Getty Wind Project
Wind turbines can cause interference with electronic communications by obstructing the reception of communication signals. Wind turbines do not impact digital signals (e.g., digital television, internet, cell phones), unless the turbines directly obstruct the signal, such as being located in the line-of-sight.[101] Analog signals (e.g., AM and FM radio, microwaves) can be interfered with by direct obstruction and by indirect signal interference, resulting in ghosting of television pictures or signal fading.

Land mobile and radio facilities are wireless communication systems intended for use by users in vehicles, such as those used by emergency first responder organizations, public works organizations, or companies with large vehicle fleets or numerous field staff. FM radio is not impacted by wind turbines or transmission facilities; AM radio can be impacted near transmission facilities, e.g., signal fading underneath a transmission line.

[101] Comsearch. 2009. *Post Digital Television Transition - The Evaluation and Mitigation Methods for Off-Air Digital Television Reception in-and-around Wind Energy Facilities*; http://www.comsearch.com/files/Wind_Energy_White_Paper.pdf.

Microwave Beam Paths

Wind turbines can interfere with microwave paths by blocking or partially blocking the line-of-sight path between microwave transmitters and receivers. To prevent disruption of the microwave beam path, turbines should not be sited the centerline of a beam path. Appropriate turbine siting would mitigate potential impacts. One unique microwave beam path intersects the southwestern portion of the project area.[102] Turbines would be sited to avoid microwave beam paths.

Radar

The federal government has a large number of departments and agencies that operate a set of communication systems that are not part of any public databases. The National Telecommunications and Information Administration (NTIA) coordinates government communication systems for all departments and agencies. [103] A preliminary review of the project area using the screening tool developed by the US Department of Defense to assess potential impacts to Long-Rang and Weather Radar shows the project to be outside of the anticipated impact zones for NEXRAD weather radar and Air Defense and Homeland Security Radars.[104]

Telephone Service

Construction and operation of the proposed wind farm would not impact the telephone service in the Project area. Gopher One Call will be contacted prior to construction to locate and avoid all underground facilities. To the extent project facilities cross or otherwise affect existing telephone lines or equipment, the Applicant will enter into agreements with service providers to avoid interference with their facilities.

GPS

Global positioning systems (GPS) use satellite signals to determine locations on the earth's surface and are commonly used to guide agricultural operations.[105] Because GPS uses multiple digital satellite signals, interference with the signals or subsequent uses is not anticipated. Obstruction of any one satellite signal would require direct line-of-sight obstruction due to a wind turbine. Such an obstruction would be temporary (i.e., there is concurrent GPS receiver movement, satellite movement, and wind turbine blade movement such that the obstruction would be resolved).

Land Mobile Stations

Wind turbines should not adversely affect the signals of land mobile stations if the turbines are placed at least 400 meters (one-quarter mile) from these stations.

Broadcast Facilities

There is a possibility that broadcast facilities (HDTV and digital television) would be impacted by the proposed project. Outdoor antennas pointed through the turbine area, "rabbit ear" antennas, or older HDTV receivers would be more likely to experience signal disruption (in the form of pixilation or

[102] Black Oak Site Permit Application at p. 23 and Figures 8-1through 8-3
[103] For more information on the National Telecommunications and Information Administration, see http://www.ntia.doc.gov/about.html .
[104] US Federal Aviation Administration, DOD Preliminary Screening Tool, https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp
[105] Precision Farming Tools: Global Positioning Systems (GPS), Virginia Cooperative Extension; http://www.pubs.ext.vt.edu/442/442-503/442-503.html.

"freezing" of a picture). Interference would be more likely to occur where there is direct interference with digital broadcast paths of local television stations. The local television stations with the strongest signal are listed in Table 10.[106]

Table 10. Digital Television Signals in the Project Area

Call Sign	Network	City of License	Signal Strength
KCCO	CBS	Alexandria, MN	Strong
KSAX	ABC	Alexandria, MN	Strong
KPXM	ION	St. Cloud, MN	No Signal
KWCM	PBS	Appleton, MN	No Signal
KAWB	PBS	Brainerd, MN	No Signal

Satellite, cable service or receiver upgrades would mitigate negative impacts on broadcast facilities if impacts cannot be avoided through turbine placement. Establishment of a program to respond to interference complaints would help determine necessary mitigation efforts. Impacts on broadcast facilities as a result of the project are not yet known.

No impacts or disruptions to AM or FM radio are anticipated.

LWECS site permits issued by the Commission typically require the Applicant to design a plan for conducting an assessment of television signal reception and microwave signal patterns in the project area. The assessment would provide data that can be used in the future to determine whether the turbines and associated facilities are the cause of disruption or interference of television reception or microwave patterns in the event residents should complain about such disruption or interference after the turbines are placed in operation.

Generic 82 MW LWECS
A generic 82 MW LWECS would have communications impacts similar to the Black Oak/Getty Wind project depending on a variety of factors such as the proximity of homes in relation to the project, number of turbines, and the number of communication facilities and types in the area.

38.5 MW Biomass Plant
A 38.5 MW biomass plant would have fewer or no impacts on communications than the proposed project. A biomass plant would be shorter than the project's wind turbines and sited in one location.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to communication systems.

[106] Black Oak Site Permit Application at p. 24

5.8 Fuel Availability

Large electric power generating facilities require some type of fuel. Depending upon the amount and type of fuel required and the location of the fuel relative to the proposed project, the project can create impacts related to harvesting and delivery of the fuel.

Black Oak/Getty Wind Project

The Black Oak/Getty Wind Project relies on wind, a renewable energy source, to generate electricity. Wind turbine blades extract kinetic energy as the wind passes through the blades and creates turbulence downstream. To operate effectively, turbines must be setback from other turbines to compensate for this turbulence known as wake loss.[107]

Wind capacity varies across Minnesota. Extensive wind measurements have been taken and analyzed by the Minnesota Department of Commerce.[108] As shown in Map 3, these data suggest the mean annual wind speeds at 80 meters across the project area range from 7.7 -8.1 meters per second (mps) (17.2-18.1 mph). Power generation by the project depends not only on wind speed (how much energy it contains), but also the frequency of attaining optimal wind speeds. Wind turbines generate power only when the wind is blowing.[109] This frequency is expressed as capacity factor, which is expressed as how much power the turbine generates compared to how much it could generate if it was operating all the time. Applicants estimate that the Black Oak/Getty Wind Project will have a capacity factor of 39 to 45 percent.[110] In it's comments on the CN Application, the Department's ERP staff indicated that, based on the Department's wind data, the Applicants' estimate of capacity factor is reasonable, if slightly optimistic.[111]

Generic 82 MW LWECS

To be economically feasible, an 82 MW LWECS sited elsewhere in Minnesota would need to be sited in area with sufficient wind resources to meet generation projections. As shown in Figure x, several areas of the state have wind resources that are as good or better than the Black Oak/Getty Project. As shown in Map 3, the highest concentration of existing wind projects in the southwestern Minnesota; related to the good wind resources, the highest concentration of wind turbines is also located in southwestern Minnesota. Because of transmission constraints, as well as advances in turbine technology, wind projects have begun to be proposed throughout the state. The availability of productive, undeveloped wind resources in Minnesota remains high.

[107] The distance between turbines necessary for effective operation is approximately 6 rotor diameters (RD) on the non-prevailing wind axis and 10 RD on the prevailing wind axis. Accordingly, Minnesota requires setbacks of 3 x 5 RD for each turbine. See, PUC Order Establishing General Permit Standards, http://mn.gov/commerce/energyfacilities/documents/19302/PUC%20Order%20Standards%20and%20Setbacks.pdf

[108] Wind Resource Analysis Program 2002, http://www.state.mn.us/mn/externalDocs/Commerce/WRAP_Report_110702040352_WRAP2002.pdf.

[109] See Table 2 of this ER which includes "Cut-in Wind Speeds", i.e., the minimum wind speed necessary for the turbine to operate.

[110] CN Application at p. 25

[111] Department of Commerce, ERP Comments. February 1, 2012, eDocket number 20122-70928-01

38.5 MW Biomass Plant

A combination of wood chips and agricultural biomass would be the primary fuel sources for a 38.5 MW biomass plant. A 38.5 MW biomass plant would use approximately 40,000 tons of wood, wood wastes, and agricultural biomass materials per month.

It is possible that rail could be used for delivery of fuel to the plant, depending on its location. However, the most likely method of delivery for woody and agricultural biomass fuel would be semi-trailer trucks. Trucks would likely deliver wood and agricultural biomass by loads of 20 tons or greater. The biomass facility would operate 24 hours a day, but fuel delivery would be between the hours of 6 and 6. The total number of daily truck trips is estimated to be approximately 100. The origin of the biomass trucks and the total trip length required for delivery would depend on the location of the biomass source relative to the biomass plant.

A back-up fuel source would be required for the biomass plant, to assist with plant start-up and to sustain the plant temporarily when the biomass fuel supplies are low. Natural gas would be used as a backup fuel. The construction of a natural gas pipeline would be required to deliver the natural gas to the biomass plant.

Potential impacts to the environment related to fuel for a biomass plant include possible degradation of the environment due to biomass removal (increased soil erosion and productivity due to removal of agricultural biomass and loss of wildlife habitat), air pollution due to biomass transport, and the impacts associated with building a natural gas pipeline.

Impacts related to harvesting for a biomass plant could be mitigated by using guidelines for biomass harvesting. [112] These guidelines minimize impacts to natural resources. Siting the plant in a location that reduces biomass transportation will reduce the impacts to air quality associated with ground transportation. The Minnesota Forest Resource Council has developed woody biomass harvest guidelines that reduce impacts to wildlife habitat.[113] If harvesting guidelines are used to mitigate impacts to natural resources and wildlife, suppliers of biomass fuels would need to follow biomass harvest guidelines.

No Build Alternative

Under the No-Build Alternative no project would be built and fuel availability is not an issue.

5.9 Agriculture

Large generation facilities in agricultural areas may have impacts on cropland and livestock.

5.9.1 Cropland

Wind farms placed in cultivated areas do remove some acreage from production. However, crop and wind farming are generally compatible uses.

[112] See Minnesota DNR Guidelines for Woody Biomass, 2007. http://www.dnr.state.mn.us/forestry/um/biomass/index.html

[113] Forest Biomass and Biofuels Harvest, http://www.frc.state.mn.us/initiatives_policy_biofuels.html.

Black Oak/Getty Wind Project
Based on GAP land cover data, approximately 83 percent of the project area is cultivated, with the majority of the land in corn and soybean production.[114] Applicants review of land records for parcels under lease, no federal Conservation Reserve Program (CRP), Wetland Reserve, Minnesota Reinvest in Minnesota (RIM) or other federally- or state-funded restoration project conservation easements were identified within the project boundary.[115]

Crops and large scale animal production are common features in the area. Stearns County is a large producer of corn, soybeans and alfalfa. Feed cattle, dairy cattle, and hogs are also a major source of income. [116] Much of the soil in the area is prime farmland, defined as having the best combination of physical and chemical characteristics for producing food, fiber, forage, and oilseed crops.

Depending upon turbines selected and final layout approximately 30-50 acres of farmland would be removed from agricultural production. This includes the construction of access roads, turbine pads, and the project substation. Farming activities would continue on the land surrounding turbines and access roads. Impacts to drain tile in the project area is not anticipated; however, any damages sustained as a result of project construction would be repaired according to agreement with the landowner.

Generic 82 MW Wind Farm
Impacts to farming at a generic wind farm would be similar to those of the proposed project.

38.5 Biomass Plant
Impacts to farming from a biomass plant would be minimal. It is likely that such a facility would not remove land from agricultural production and no mitigation would be necessary.

No Build Alternative
Under the No-Build Alternative no project would be built and there would be no impact to cropland.

5.9.2 Livestock

Large electric generation facilities have the potential to impact domesticated animals and livestock indirectly through environmental impacts. This section discusses potential impacts to livestock due to the operation of a generation facility in the project area. Potential impacts to wildlife are discussed in Section 6.4.

Livestock health depends on ecosystem health (clean water, fresh air, healthy soils and crops). Generation facilities that impair ecosystem functions can also negatively impact livestock health, such as through emissions of hazardous air pollutants or through the contamination of water systems. Potential ecosystem impacts due to generation facilities are discussed elsewhere in this report (Sections 6.1 and 6.2 discussing air pollutants).

[114] Black Oak Site Permit Application at p. 42 and Getty Site Permit Application at p. 39
[115] Getty Wind, LLC letter, April 4, 2012
[116] Black Oak Site Permit Application at p. 33

Other potential impacts to livestock health include annoyance or stress. Stress may result from a variety of impacts related to generation facility operations, such as lights, noise, and stray voltage. Impacts from noise and shadow flicker are discussed in Section 6.5.

Stray voltage, if prevalent in an agricultural operation, can affect livestock health. Stray voltage has primarily been raised as a concern on dairy farms because of its potential to effect milk production and quality. As discussed in Section 5.7.1, stray voltage is by and large an issue associated with electrical distribution lines and electrical service at a residence or on a farm.

The primary concern with stray voltage has been its potential effect on farm animals that are confined in areas where electrical distribution systems supply the farm. A great deal of research on the effects of stray voltage (Neutral to Earth Voltage or NEV) on dairy cows has been conducted over the past 40 years. A comprehensive review of this research is presented in a report to the Ontario Energy Board (Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations, 2008, Prepared by Douglas J. Reinemann, Ph.D.). [117]

Black Oak/Getty Wind

Livestock in and adjacent to the project area would be exposed to noise and shadow flicker created by wind turbines. Exposure levels would depend on factors such as grazing, housing, and the distance between livestock and the turbines. Health impacts from turbine noise and shadow flicker are uncertain. Information about impacts to livestock is anecdotal and indicates that livestock are not impacted by turbine operations. Animals do graze near, under, and up to turbine towers.

The project would not create stray voltage because the project does not connect directly to residences or farms in the area and does not change on-farm electrical service. Because of the type of transformers used at each turbine and the design of the collection system, there are no ground currents in the collection system, whether the system is operating at zero generation or maximum generation. Therefore, under normal operating conditions, the grounding for the wind farm collection system has no current with which to create stray voltage.

Mitigation of potential stray voltage impacts would include that all safety requirements are met during the construction and operation of the project. There are a number of strategies for mitigating stray voltage, including improved grounding.[118] Making good electrical connections and choosing proper wiring materials for wet and corrosive locations will improve grounding and reduce stray voltage levels.

Generic 82 MW LWECS

A generic 82 MW LWECS located elsewhere in Minnesota would have impacts to livestock similar to the Black Oak/Getty Wind.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would likely have fewer impacts to livestock than those of the proposed project. Biomass plant operations would create noise and lighting that could impact livestock health. The biomass plant could have an associated transmission line that produced stray or induced voltage.

[117] See eDockets 08-1233 (Doc. Id. 201010-55392-01).
[118] Id. See also, Stray Voltage, Public Service Commission of Wisconsin, http://psc.wi.gov/utilityinfo/electric/strayvoltage.htm.

The biomass plant, however, would be a concentrated impact that can be sited away from livestock to minimize potential for health impacts. Wind turbines represent a diffuse impact that exists within landscapes utilized by livestock.

No Build Alternative

Under the No-Build Alternative no project would be built and there would be no impact to livestock.

6 Availability and Feasibility of Alternatives

Having analyzed comparative impacts of alternatives, an Environmental Report is required to offer an assessment of the availability and feasibility of those alternatives (Minn. Rule 7849.1500 subp. 1F). This section describes the feasibility and availability of alternatives in the Black Oak/Getty Wind Application.

6.1 Black Oak/Getty Wind

The proposed project is feasible and available to be implemented. Wind resources in the project area are good and the facility study of the project that is required for MISO interconnection has been completed and has identified relatively minor transmission upgrades as necessary for interconnection.

6.2 Generic 82 MW wind project

An alternative to the proposed Black Oak/Getty Wind Project in Stearns County is a large energy conversion system sited elsewhere in Minnesota. Such a project could be a 82 MW project or a combination of smaller dispersed projects. There are wind resources in other parts of the state and wind farms could be placed in these areas (Map 3. Wind Resources in Minnesota). At the time this report was prepared, 13 other projects, ranging in size from 20 MW to 300 MW, with a total nameplate capacity of over 1100 MW have valid LWECS site permits but have not yet commenced construction or filed pre-construction documents. In addition to wind resource availability, access to transmission interconnection is also important for a project to be viable; transmission access has been a constraint in the development of wind energy in Minnesota.

6.3 38.5 MW biomass plant

A 38.5 MW biomass plant is feasible but not likely available. Currently there is a 55 MW biomass plant using turkey litter as a fuel source operating in Benson, Minnesota. Many factors could limit the availability of a 38.5 MW biomass plant, including equipment, financing, and consistently available biomass fuels.

6.4 No-build alternative

The no build alternative is feasible and available.

The project has been proposed to meet growing electric demand in Minnesota and growing demand for additional renewable resources in Minnesota and neighboring states.[119] Minnesota has committed to a renewable energy objective of generating 25 percent of its electricity from eligible renewable sources by the year 2025.[120] Minnesota utilities forecast the need for approximately 270 MW of renewable generation by 2016 and 3,200 MW of additional renewable generation by the year 2025 to meet this objective.[121] In addition to Minnesota's renewable energy objective, there is a regional need and desire for wind energy. As noted in the discussion of a generic 82 MW wind facility, several other projects with a combined nameplate capacity of over 1100 MW have valid LWECS site permits but have not yet commenced construction or filed pre-construction documents. It is not clear what the effect of a no-

[119] CN Application at p. 5
[120] Minn. Statute 216B.1691
[121] Department comments on CN, February 1, 2012, eDocket number 20122-70928-01

build alternative would be on meeting Minnesota and regional demand for electric power, and for renewable generation in particular.

7 Permits

The Black Oak/Getty Wind project would require permits and approvals from entities other than the Minnesota Public Utilities Commission. Federal, state, and local permits or approvals that have been identified for construction and operation of the proposed project are listed below in Table 11.[122]

Table 11. Permits and Approvals

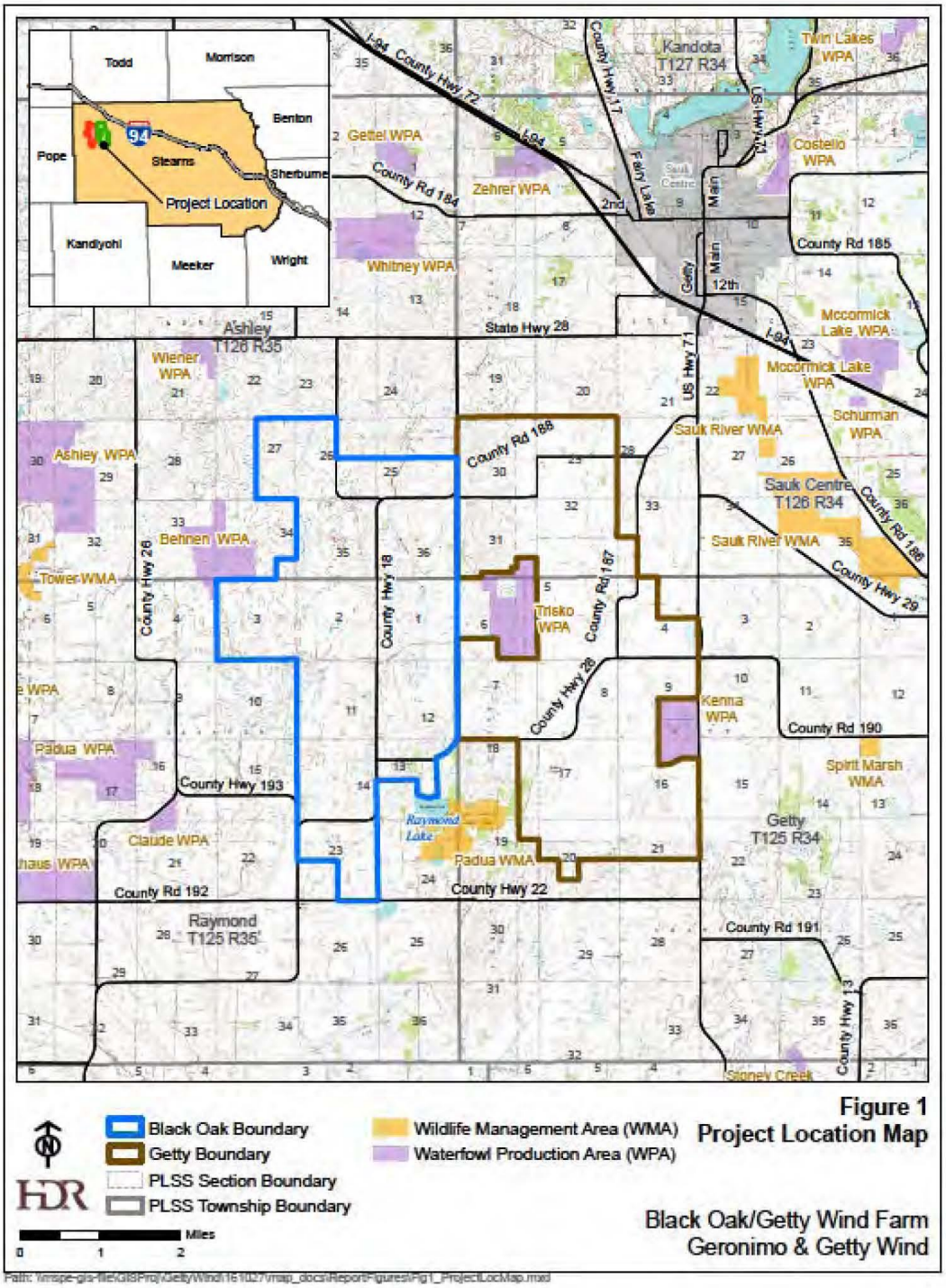
Agency	Type	Description
Federal Approvals		
Environmental Protection Agency	Spill Prevention Control and Countermeasure (SPCC) Plan	May be required if turbine commissioning or construction activities require oil storage in excess of 1320 gallons; or if an oil storage tank is planned for the operations and maintenance facility.
	Phase 1 EA	Project financing may require a Phase 1 ESA
Federal Aviation Administration (FAA)	Notice of Proposed Construction (Form 7461-1) Hazard Determination	Notifies FAA of proposed structures that might affect navigable airspace. FAA reviews possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems.
	Notice of Actual Construction or Alteration (Form 7460-2)	Notifies FAA of construction.
Federal Energy Regulatory Commission (FERC)	Exempt Wholesale Generator Certification (EWG)	Self-Certification – Needed after GIA is completed to sell power
	Market-based rate authorization	Determine if authorization is needed.
Federal Highway Administration	Utility Line Crossing License	May be required for the 69 kV transmission line crossing of US Highway 71
Lead Federal Agency	Federal Section 106 Review	Section 106 of the National Historic Preservation Act may be invoked by a federal agency if the project requires federal land, funding, or permits.
Agency	**Type**	**Description**
United States Army Corps of Engineers (USACE)	Review and Approval of Wetland Delineations	Required to determine extent of USACE jurisdiction, quantify impacts or document avoidance.
United States Army Corps of Engineers (USACE)	Jurisdictional Determination	Project may be eligible for a Letter of No Jurisdiction if wetlands are avoided or impacts are limited to isolated wetlands.

[122] Black Oak Site Permit Application, Section 11.0 and Getty Site Permit Application, Section 11

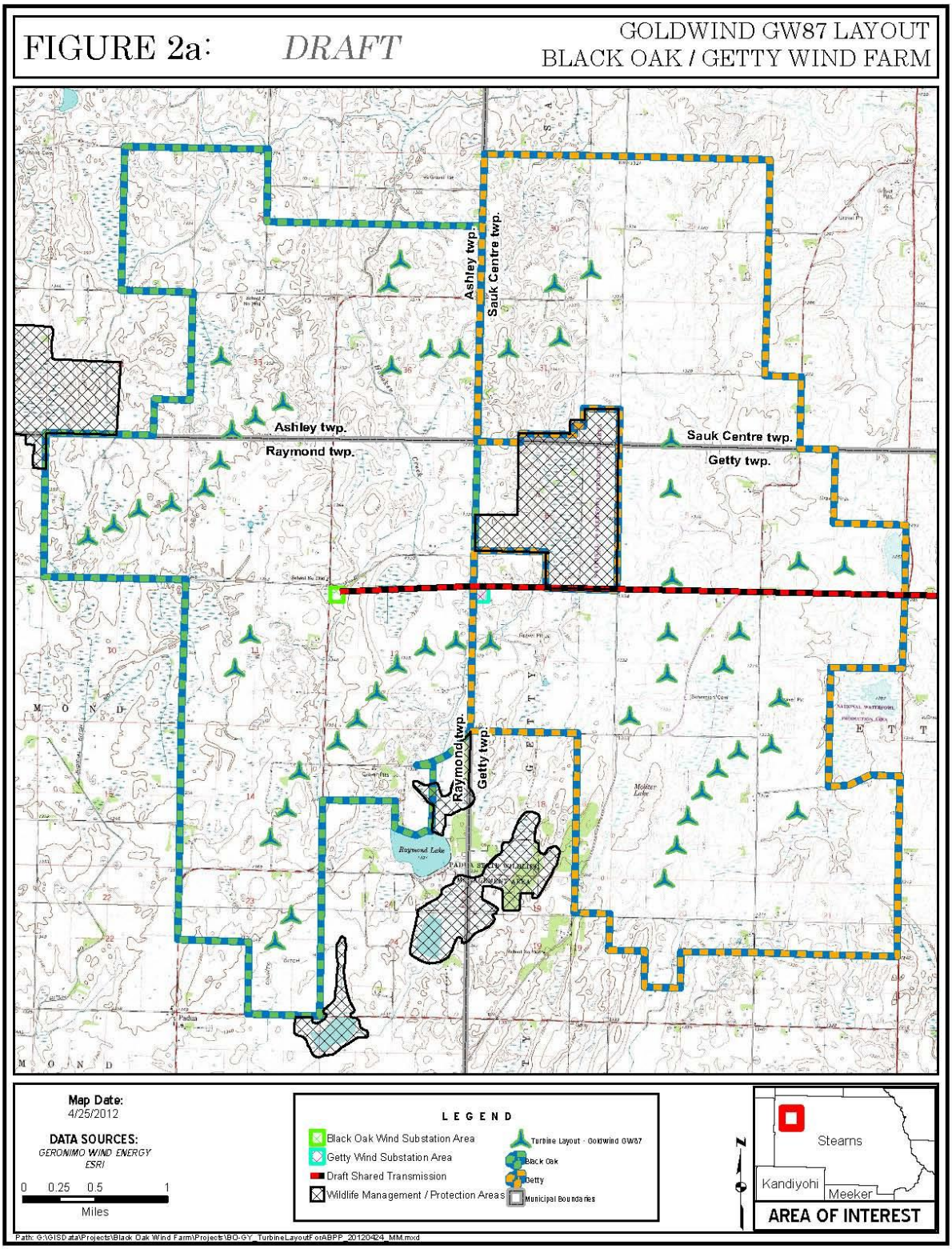
United States Army Corps of Engineers (USACE)	Federal Clean Water Act, Section 404 Permit(s)	Project may require a USACE Regional General Permit or an Individual permit depending upon amount and type of wetland impact proposed. Permit from USACE required if wetlands are jurisdictional and not avoidable.
United States Fish and Wildlife Service	Consultation on Threatened and Endangered Species	Consultation with the USFWS on potential impacts to threatened and endangered species.
State Approvals		
Minnesota Public Utility Commission	LWECS Site Permit	For facilities with greater than 25 MW nameplate capacity; required for Black Oak Wind Farm and Getty Wind Project
	Certificate of Need	Needed for a large energy project in Minnesota. Commission determines basic types of facility to be constructed, size of facility, and the time of the facility
MPCA	Section 401 Certification	Compliance with state water quality standards.
	General Permit (Construction)	For stormwater discharges from construction activities
	License for Very Small Quantity Generator of Hazardous Waste	For discharge of hazardous waste.
	Aboveground Storage Tank Notification Form	May be required if the operations and maintenance facility will need to store more than 1,100 gallons
DNR	License to Cross Public Land and Water	For projects that affect the course, current, or cross-section of DNR Public Waters, or for utility crossings of Public Lands
	Public Waters Work Permit	Required for construction activities that impact waterways, including wetlands, identified on DNR public waters inventory maps
Minnesota Board of Water and Soil Resources	Wetland Conservation Act Approval	For wetland impacts. Ranges from an exemption for small or temporary impacts to a permit and mitigation for greater impacts
MnDOT MnDOT	Access Driveway Permit	Required to provide driveway access to state owned right of way.
	Utility Permit on Trunk Highway Right of Way	Required to install utilities within state owned right of way.
MnDOT	Oversize and/or Overweight Permit	Required to transport oversize loads on state maintained roads.
	Tall Structure Permit	Required for wind turbines and other tall structures
Minnesota Department of Health	Environmental Bore Hole	Contractors drilling bore holes must be licensed by the Minnesota Department of Health
	Water Supply Well Notification	New water supply well construction.

	Plumbing Plan Review	May be required for the operations and maintenance Facility. Required to ensure compliance with Minnesota Plumbing Code
County and Township Regulations		
Stearns County	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with townships)
	Access Road Permits	Required to start construction
	Approval of Wetland Delineations	Onsite review of Wetlands delineation in compliance with Wetland Conservation Act
	Construction Site Permit	Required to start construction of operations and maintenance facility
	Conditional Use Permit	Required for 69 kV transmission line
Townships	Access Road Permits	Required to start construction
	Building Permits	May be required for individual turbines or transmission line
	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with County)
Other		
Midwest Independent System Operator (MISO)	Turbine Change Study	May be required if final turbines differ from interconnection request
	Generator Interconnect Agreement (GIA)	Permission to connect and deliver power on MISO's high voltage transmission system

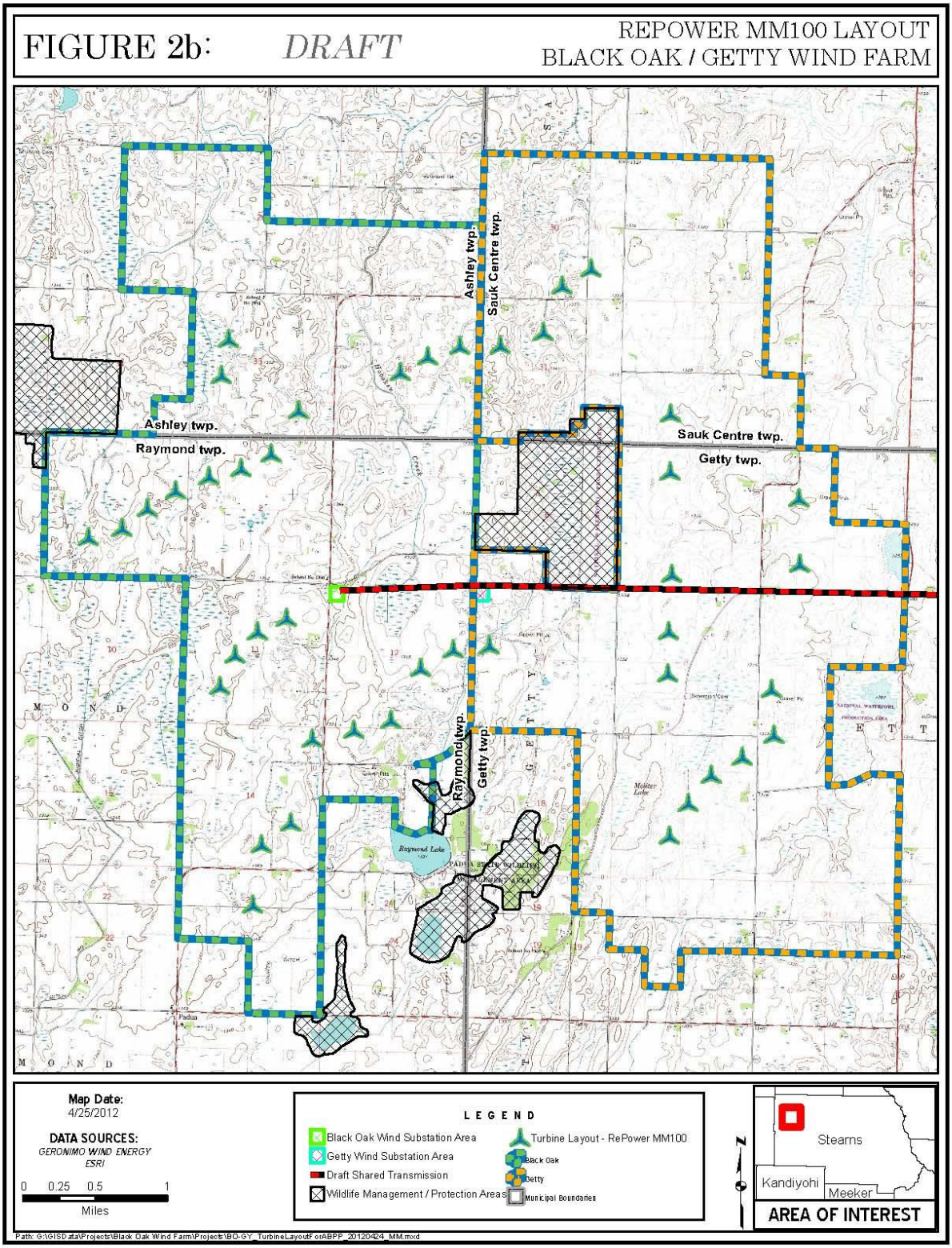
Map 1. Project Vicinity



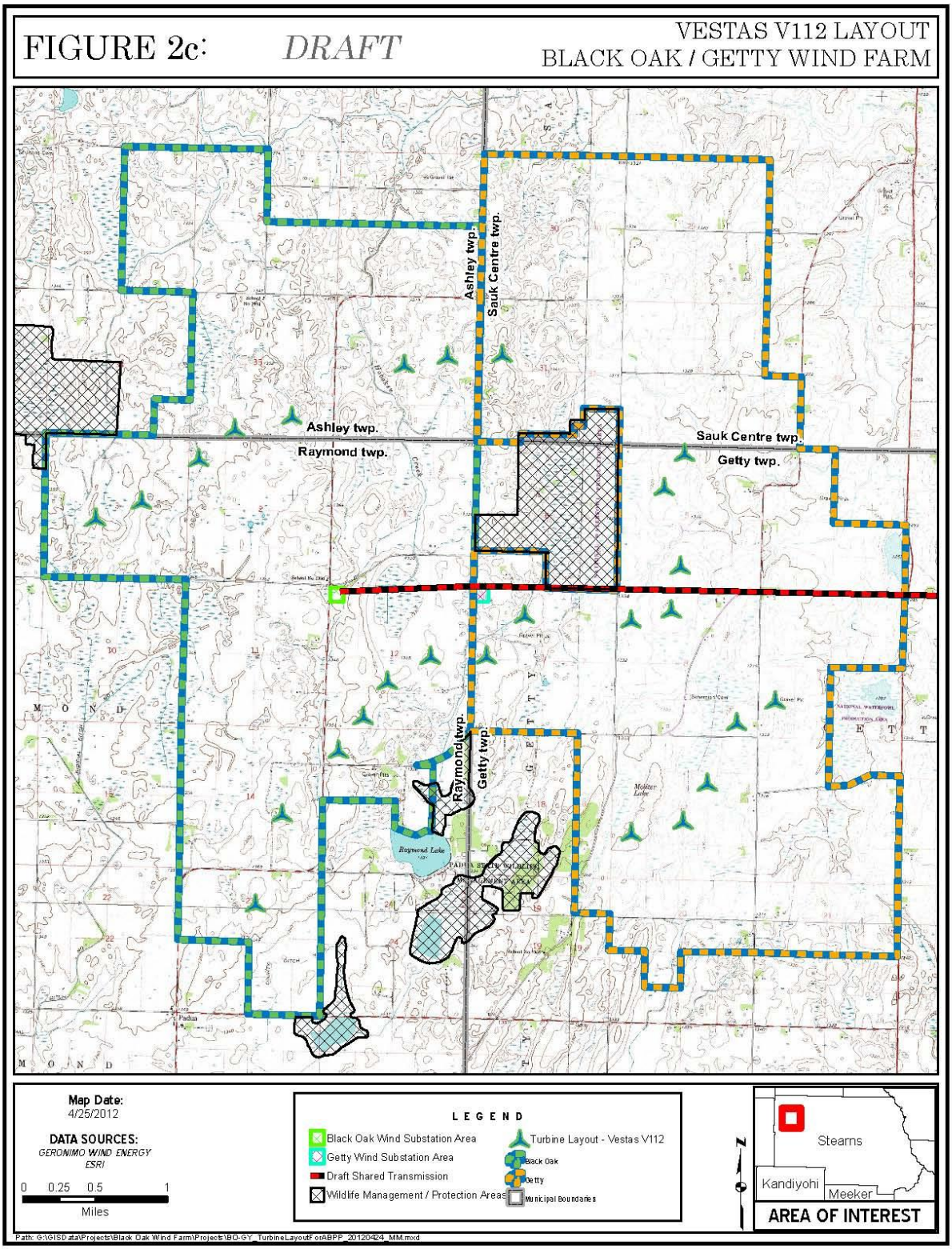
Map 2a. 1.5 MW Turbines – Preliminary Layout



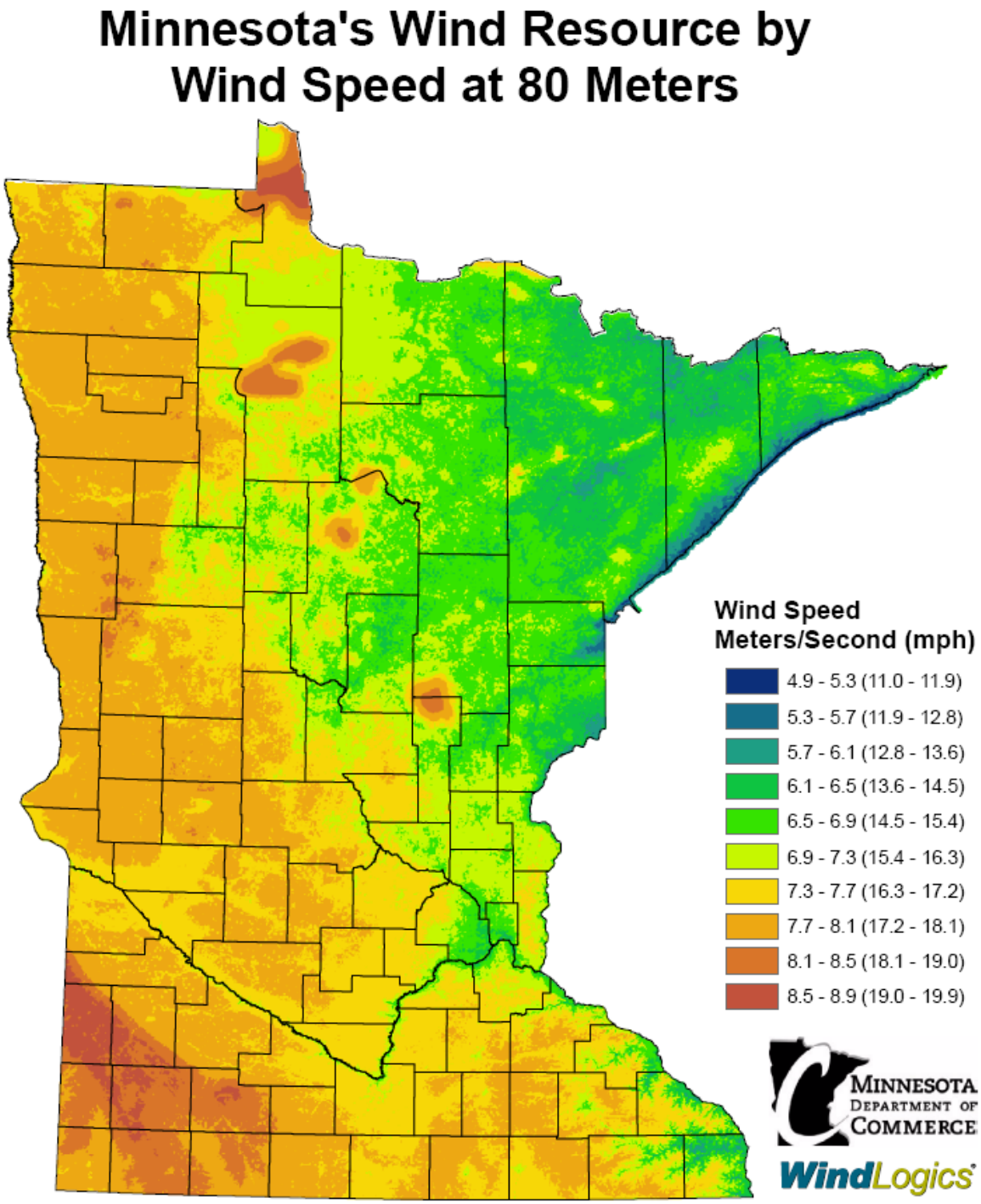
Map 2b. 1.8 MW Turbines. Preliminary Layout



Map 2c. 3.0 MW Turbines – Preliminary Layout



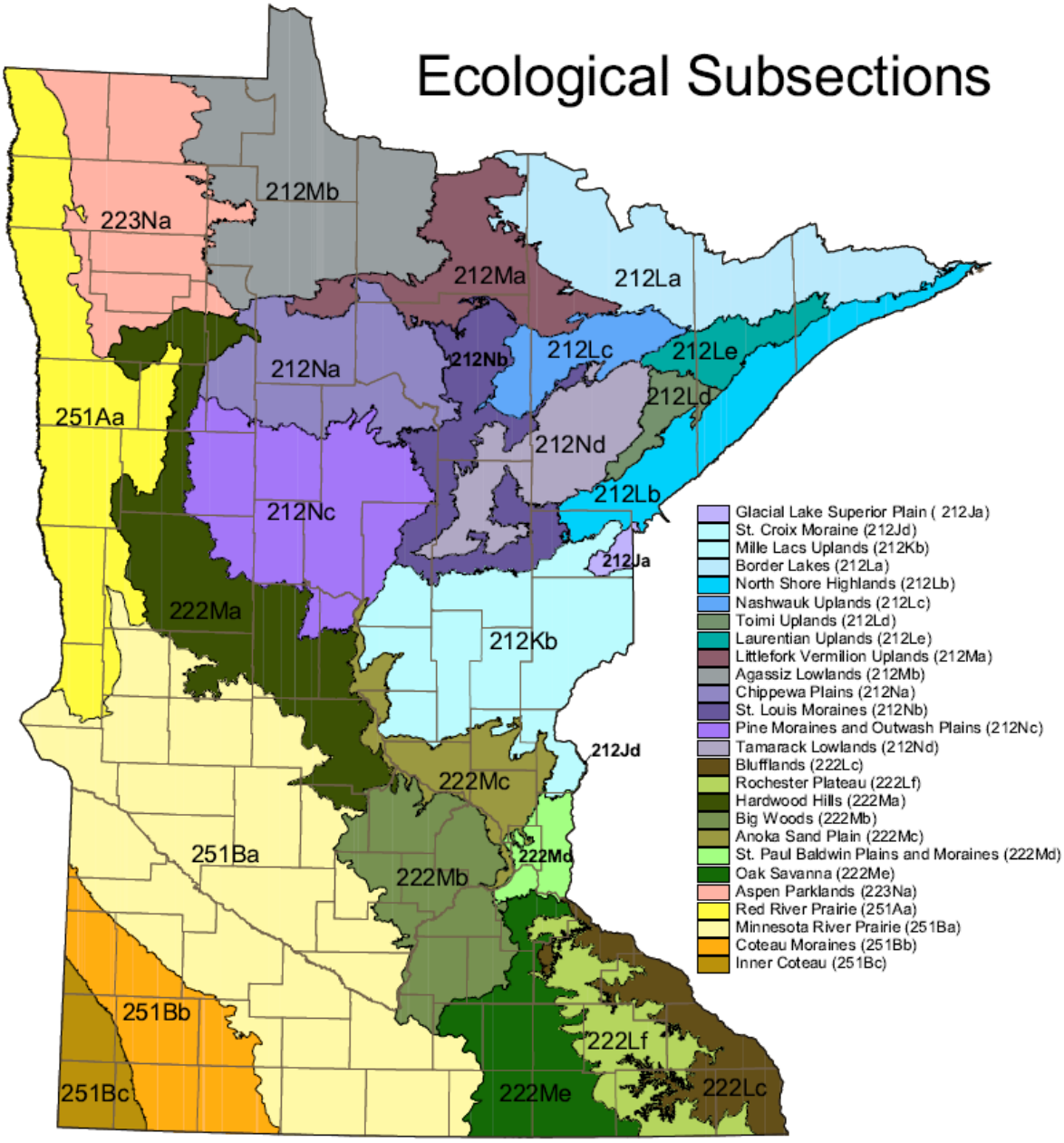
Map 3. Wind Resource



This map has been prepared under contract by WindLogics for the Department of Commerce using the best available weather data sources and the latest physics-based weather modeling technology and statistical techniques. The data that were used to develop the map have been statistically adjusted to accurately represent long-term (40 year) wind speeds over the state, thereby incorporating important decadal weather trends and cycles. Data has been averaged over a cell area 500 meters square, and within any one cell there could be features that increase or decrease the values shown on this map. This map shows the general variation of Minnesota's wind resource and should not be used to determine the performance of specific projects.

January 2006

Map 4. Ecological Subsections



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Beltrami County
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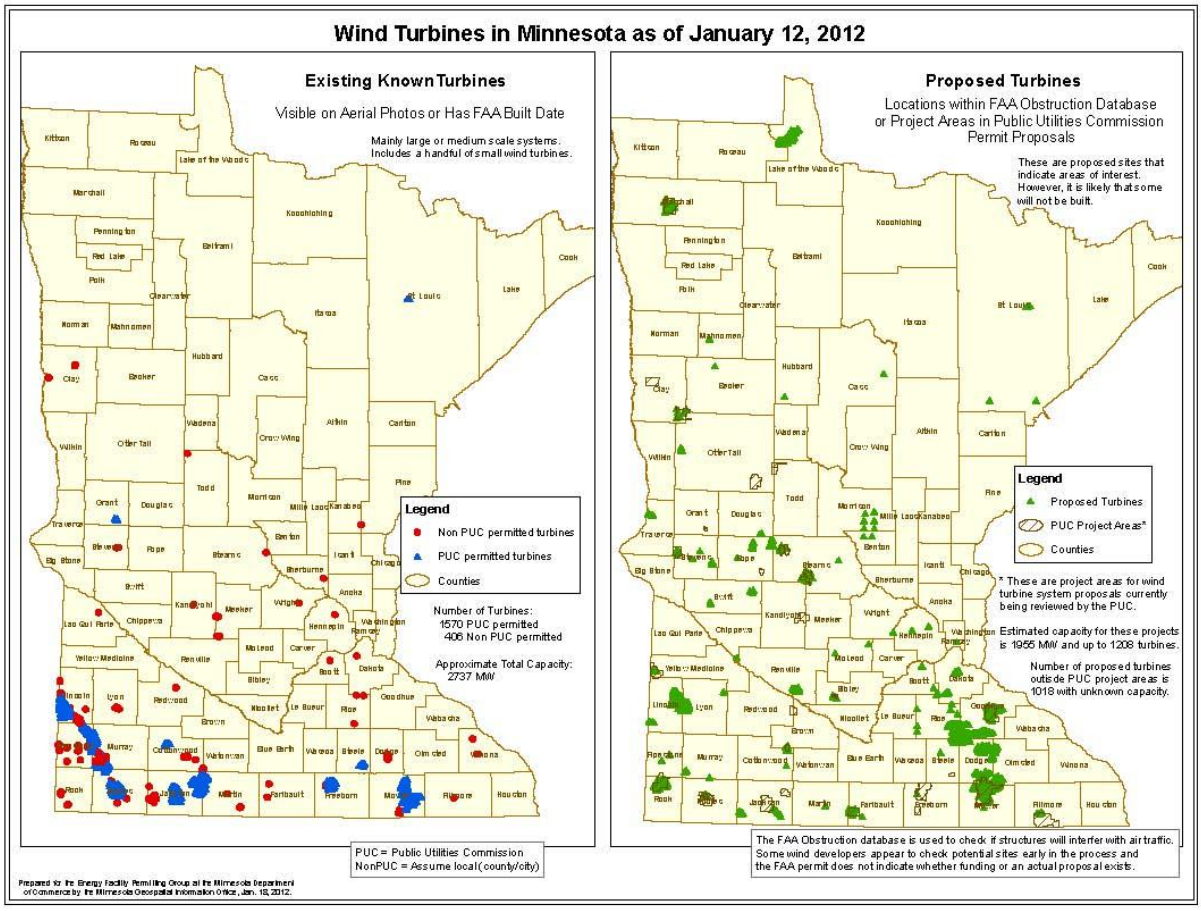
MN DNR, Division of Forestry
Resource Assessment Program
413 SE 13 Street
Grand Rapids, MN 55744
(218) 327-4449 ext 239

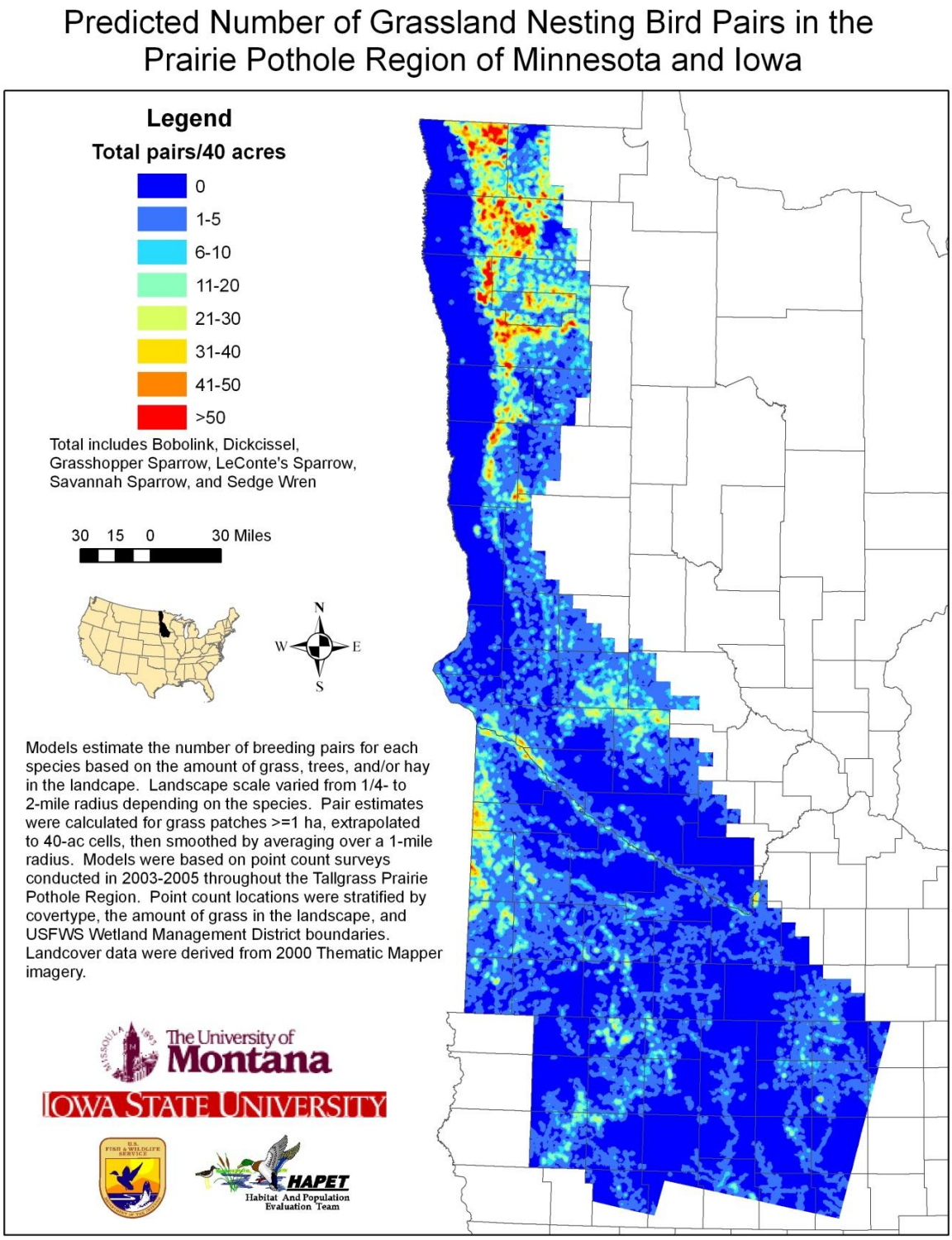
September, 2000

Division of Forestry
Ecological Land Classification Program

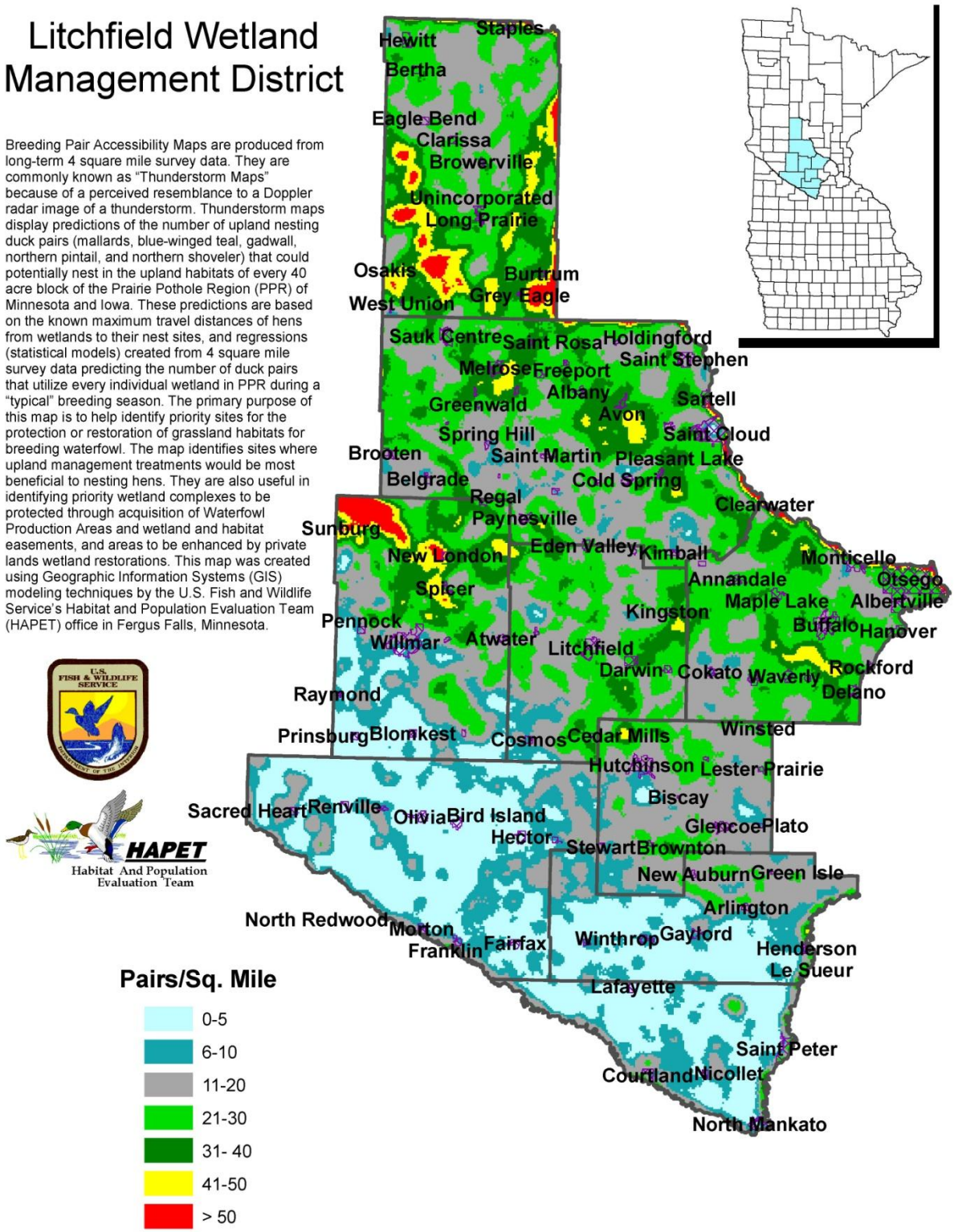
Map 5. Wind Turbines in Minnesota



Map 6. Predicted Grassland Nesting Bird Pairs



Map 7. Predicted Upland Nesting Duck Pairs



Appendix A. Environmental Report Scoping Decision

In the Matter of the Application by Black Oak Wind, LLC and Getty Wind Company, LLC for a Certificate of Need for the 82 MW Black Oak/Getty Wind Project in Stearns County

ENVIRONMENTAL REPORT SCOPING DECISION

PUC Docket No. IP6853 and IP6866/CN-11-471

The above matter has come before the Deputy Commissioner of the Department of Commerce (Department) for a decision on the content of the Environmental Report (ER) to be prepared in consideration of the joint application of Black Oak Wind, LLC and Getty Wind Company, LLC for a Certificate of Need (CN) for the proposed 82 Megawatt (MW) Black Oak and Getty Wind Project (Project) in Stearns County.

A final decision on turbine selection and design has not been made, but the project will consist of turbines with a rated capacity between 1.5 and 3.0 MW in such number and combination as to yield up to 82 MW. Facilities associated with the project include gravel access roads, meteorological towers, a Sonic Detection and Ranging (SODAR) unit or Light Detection and Ranging (LIDAR) unit, a project substation, and an electrical collection system. Applicants intend to seek a permit from Stearns County for an operations and maintenance (O&M) facility and a 69 kV transmission line to connect the Project substation with Xcel Energy's Black Oak Switching Station.

The proposed Project is comprised of two adjacent large wind energy conversion system (LWECS) projects located in Stearns County, approximately 2 miles southwest of Sauk Centre. Black Oak Wind, LLC proposes to construct the Black Oak Wind Farm on a site comprised of approximately 7,100 acres of agricultural land in Ashley and Raymond townships. Getty Wind Company, LLC proposes to construct the Getty Wind Project on a site comprised of approximately 7,600 acres of agricultural land in Sauk Centre and Getty townships.

The project requires a CN for the combined project and separate site permits for the Black Oak Wind Farm and the Getty Wind Project from the Minnesota Public Utilities Commission (Commission). The CN (CN-11-471), the site permits (IP-6853/WS-10-1240 and IP-6866/11-831) are being considered by the Commission in separate dockets.

On October 11, 2011, Black Oak Wind, LLC and Getty Wind Company, LLC jointly filed a CN application with the Commission for the Black Oak and Getty Wind Projects. On December 15, 2011, the Commission issued an order accepting the application as complete and authorizing an informal review process. The proposed project is a large wind energy facility (Minn. Stat. § 216B.2421). As such, it requires the Minnesota Department of Commerce to prepare an environmental report for the project (Minn. Rules 7849.1200).

A public meeting was held on January 26, 2012, in Sauk Centre, Minnesota, to receive comments on the scope of the ER. Approximately 30 persons attended the meeting and three people provided oral comments at the meeting.

A public comment period followed the meeting; nine comments were received before the close of the comment period on February 15, 2012. In addition to statements of support for or opposition to the Project, concerns raised included impacts to birds and other wildlife, avian species and other wildlife, local permitting of certain facilities related to the Project, noise, visual impact and shadow flicker, property values, roads, water contamination. No comments on alternatives to the proposed project were submitted during the comment period.

The proposed project is intended to produce renewable energy in furtherance of Minnesota's renewable energy objectives. Accordingly, alternatives examined in the ER will be limited to "eligible energy technologies" that support these objectives (Minn. Stat. § 216B.1691). These alternatives include: (1) a generic 82 MW wind generation project sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) a "no-build" option. An ER provides a high level environmental analysis of the proposed Project and system alternatives, and reviews environmental impacts associated with named and alternative projects. It is a part of a larger Commission investigation of the CN application. The Commission in its overall review will address all the issues and alternatives required by rule.

Having reviewed the matter, consulted with the Department of Commerce Energy Facility Permitting staff, and in accordance with Minnesota Rules 7849.1400 and 7849.1500, I hereby make the following scoping decision:

MATTERS TO BE ADDRESSED

<u>Black Oak/Getty Wind Project</u>

1.0 Black Oak and Getty Wind Project Description

1.1. Project description and location
1.2. Sources of information

2.0 Alternatives to be Evaluated

2.1 No-build Alternative
2.2 A generic 82 MW Wind Project
2.3 A 38.5 MW Biomass Plant
2.4 Alternative renewable technologies

3.0 Human and Environmental Impacts and Mitigation of Project and Evaluated Alternatives

3.1 Emissions
3.2 Hazardous air pollutants and VOCs
3.3 Aesthetic Impacts and Visibility impairment
- Shadow flicker

- Viewshed
- Lighting

3.4 Ozone formation
3.5 Fuel availability and delivery
3.6 Associated transmission facilities
3.7 Water appropriations
3.8 Wastewater
3.9 Solid and hazardous wastes
3.10 Noise
3.11 Property Values
3.12 Communications signals
3.13 Wildlife
3.14 Natural Environment
3.15 Agriculture

4.0 Feasibility and availability of alternatives

4.1 No-build alternative
4.2 82 MW wind project
4.3 38.5 MW biomass plant
4.4 Black Oak and Getty Wind Farm

5.0 Required permits

ISSUES OUTSIDE OF THE ENVIRONMENTAL REPORT

The environmental report will not consider the following matters:

1. Impacts or mitigative measures associated with specific sites, including specific tower or road locations for the proposed project and alternatives.

2. The negotiation and content of easement agreements by which land owners are paid for property rights, including wind rights.

3. Any alternatives not specifically described in this scoping decision.

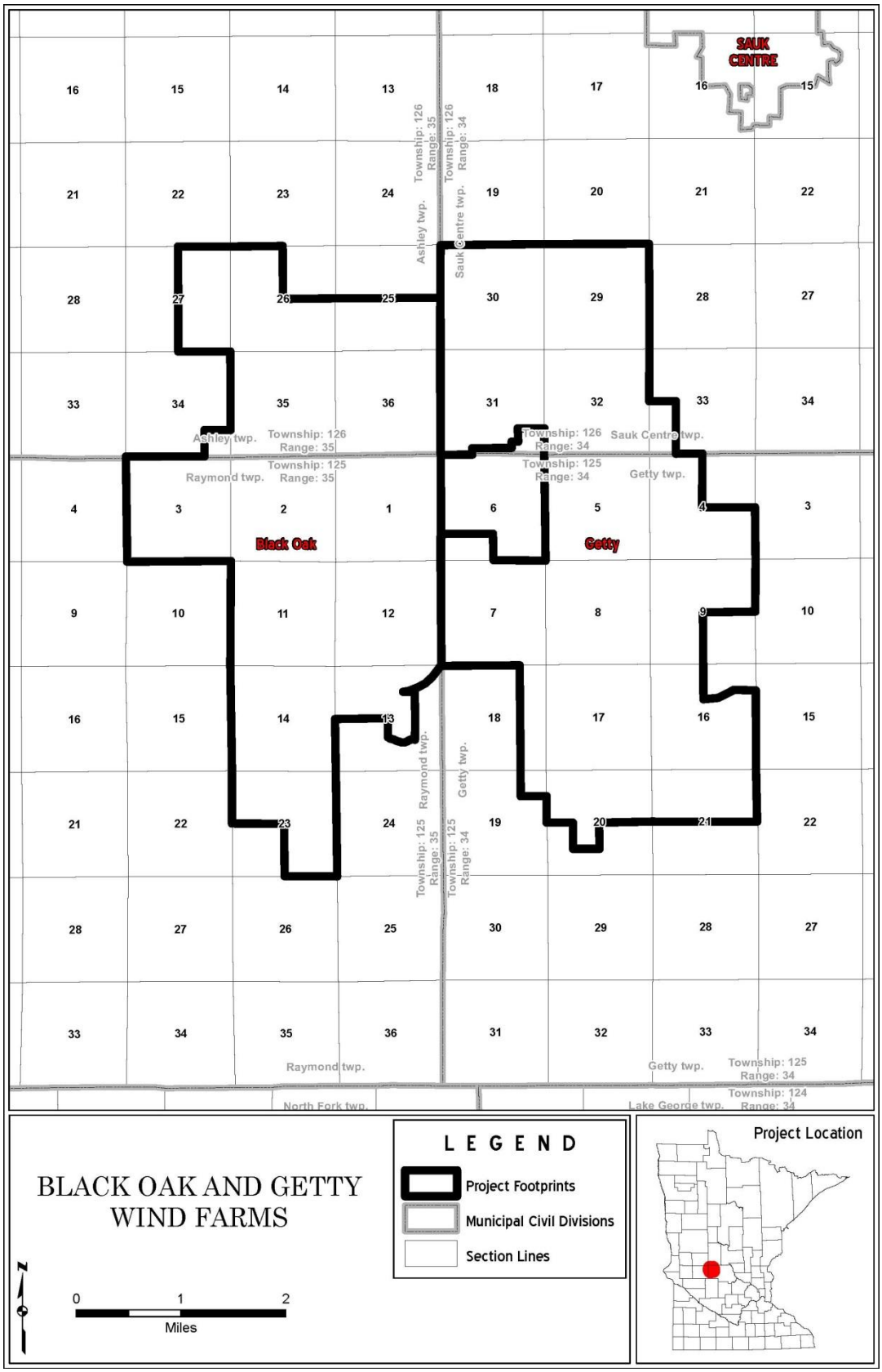
SCHEDULE

The environmental report will be completed in March, 2012. A public hearing will be held in the project area before an Administrative Law Judge after the environmental report has been issued and notice served.

Signed this 27th day of February 2012

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE
DIVISION OF ENERGY RESOURCES

William Grant, Deputy Commissioner


SAUK CENTRE
Ashley twp.
Sauk Centre twp.
Raymond twp.
Getty twp.
Black Oak
Getty
North Fork twp.
Lake George twp.
Township: 126 Range: 35
Township: 126 Range: 34
Township: 125 Range: 35
Township: 125 Range: 34
Township: 124 Range: 34
BLACK OAK AND GETTY WIND FARMS
LEGEND
Project Footprints
Municipal Civil Divisions
Section Lines
Project Location
0 1 2
Miles