

***Exhibit 5:***  
***NRC Avian Study Plan (Preliminary)***



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January 9, 2009

Mr. Don Miller  
EcoEnergy, LLC  
725 Main Avenue North  
Harmony, MN 55939

**RE: *Avian Study Plan – EcoHarmony West Wind Project Area***  
***NRC Project # 008-0107-01***

Dear Mr. Miller:

Per your instructions, Figures 1 and 2 in the subject document show a project boundary that was revised on January 7, 2009. The original document is dated May 2008. The revised boundary, as shown on the cited figures, are the only changes made to the original document. The new boundary reflects changes recently made to the project boundary by EcoEnergy Wind LLC.

Sincerely,

***Natural Resources Consulting, Inc.***

A handwritten signature in cursive script that reads "William R. Poole".

William Poole  
Senior Principal Scientist

Enclosure:

Natural Resources Consulting, Inc.



# AVIAN STUDY PLAN EcoHarmony West Wind Project Area

Fillmore County, Minnesota

NRC Project No. 008-0107-01  
May 2008

**D-R-A-F-T**

PREPARED FOR:

EcoEnergy, LLC  
PO Box 95 • 725 Main Avenue North  
Harmony, MN 55939

PREPARED BY:

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D-R-A-F-T  
AVIAN STUDY PLAN

AVIAN SCREENING ANALYSIS AND PRE-CONSTRUCTION BIRD SURVEYS  
ECOHARMONY WIND PROJECT AREA  
FILLMORE COUNTY, MINNESOTA

May 2008

*Prepared For:*

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**NRC Project # 008-0107-01**



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Brian R. Bub  
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## **1. INTRODUCTION**

### **1.1. Purpose**

Wind energy is one of the fastest growing sources of renewable energy in the United States, and is generally viewed as an environmentally friendly alternative to nuclear and fossil fuel power plants (AWEA 2007). However, construction and operation of wind energy projects has the potential to impact bird and bat populations through habitat fragmentation, displacement, and collision mortalities (IDNR 2007, Minnesota PUC 2001). An important step in the process of siting and developing potential wind energy sites is to evaluate wildlife use for the project area.

Natural Resources Consulting, Inc. (NRC) has been retained by EcoEnergy, LLC (EcoEnergy) to conduct pre-construction bird surveys at the EcoHarmony West Wind Project Area in Fillmore County, Minnesota (Figures 1 and 2). This study plan outlines the avian screening analysis and pre-construction bird survey protocol that will be implemented prior to construction of turbines in the wind project area. It has been adapted from several existing documents that offer guidelines for assessing impacts to wildlife within proposed wind project areas (NWCC 2007, USFWS 2003, and Anderson et al. 1999). Baseline bird data sources and GIS spatial data layers for the project area and adjacent landscape to be used in the avian screening analysis are outlined. In addition, the objectives, methods, timing, effort, and duration of the pre-construction avian surveys are summarized below. Review and concurrence of the screening analysis and pre-construction bird survey study plan by the Minnesota Department of Natural Resources (MNDNR) and the United States Fish and Wildlife Service (USFWS) is recommended. Results of the screening analysis and pre-construction bird surveys will be compiled and summarized in a written report.

### **1.2. Project Description**

EcoEnergy's EcoHarmony West Wind Project Area is approximately 88 square miles in size and is located southeast of Preston and surrounding Harmony in the Townships of Forestville, Carimona, York, Bristol, and Harmony in Fillmore County, Minnesota (Figure 1). The proposed wind project is a 200 MW commercial wind energy facility with 134 - 1.5 MW turbines, an electrical collection system, a substation, a transmission line interconnection, and access / construction roads. The project is in the planning and turbine siting stage. One meteorological tower (MET) has been installed within the project area to collect wind data, assess the wind resource, and to determine the potential for wind turbine performance. Three additional MET towers are planned to be installed within the project area.

## **2. METHODS**

### **2.1. Avian Screening Analysis**

The avian screening analysis will include a literature and database review that will identify bird species known to occur within or in close proximity to each project area. References will include but not be limited to the Breeding Bird Survey and the Christmas Bird Count. The regulatory status (i.e. threatened, endangered, special concern, species of greatest conservation need) of rare birds within or in close proximity to the project area will be reviewed and summarized.

The North American Breeding Bird Survey (BBS) is a cooperative effort between the U.S. Geological Survey's Patuxent Wildlife Research Center and the Canadian Wildlife Service's National Wildlife Research Centre to monitor the status and trends of North American bird populations. BBS data are

collected by volunteers along randomly established roadside routes. Professional BBS coordinators and data managers compile and deliver the data for use by conservation managers, scientists, and the general public. Participants skilled in avian identification survey each 24.5-mile BBS route in June, during the height of the avian breeding season. Observers stop at 0.5-mile intervals and conduct a three-minute point count at each stop. All birds seen or heard within a 0.25-mile radius are recorded. Surveys start one-half hour before local sunrise and take about five hours to complete. The most recent ten years worth of available data from nearest BBS Route will be downloaded from the BBS website, evaluated, and summarized for the EcoHarmony West Wind Project Area (USGS Patuxent Wildlife Research Center 2008).

The Christmas Bird Count (CBC) is an early winter bird survey organized and administered by the National Audubon Society. It dates back to 1900 and like the BBS is conducted by volunteers. The primary objective of the CBC is to monitor the status and distribution of bird populations across North America. The survey area is a 15-mile diameter circle and the count period is one 24-hour calendar day between December 14th and January 5th. Because it is an early winter survey, many birds detected are still on their southward migration. The most recent ten years of available data from the nearest CBC count circle will be downloaded from the Audubon website, evaluated, and summarized for the EcoHarmony West Wind Project Area (National Audubon Society 2008).

In addition to bird data acquisition, a Geographic Information System (GIS) will be used to locate and evaluate land features within each of the project areas. Spatial data layers to be used in the GIS include base orthophotography, the MDNR 24K hydrology layer, National Wetlands Inventory (NWI), USGS 24K topography, Minnesota County Biological Survey (MCBS) native vegetation communities and sites of biological significance, State owned lands (parks, state natural areas, state wildlife areas, other), and Federally owned lands (parks, refuges, other). Physical attributes and sensitive environmental areas within or near each project area that may influence avian movement and concentration patterns will be evaluated. Examples of physical attributes that could influence bird use include project size, topography, weather, infrastructure, and environmental corridors. Examples of sensitive environmental areas include Scientific and State Natural Areas, State Wildlife Management Areas, National Wildlife Refuges, Waterfowl Production Areas, and/or designated Important Bird Areas. The results of the physical attributes and sensitive environmental area evaluation will be summarized in the screening analysis section of the final report.

## **2.2 Pre-Construction Bird Surveys**

The objective of the pre-construction bird surveys is to collect site specific data on general bird use to characterize bird species abundance, richness, and behavior within and immediately adjacent to the EcoHarmony West Wind Project Area. One year of pre-construction roadside point count surveys adapted from Ralph et al. (1995) will be conducted within and immediately adjacent to the project area. The proposed survey effort and approach is intended to be a screening level survey, is considered sufficient to document and characterize general bird use within and adjacent to the project area, and is consistent with bird survey efforts being performed at other EcoEnergy wind project areas in Wisconsin, Iowa, and Illinois. Surveys will be conducted during each season, with the number of survey events per season being four during fall migration, four during winter, four during spring migration, and three during the breeding season (Table 1).

Point count stations will be selected using a stratified random sampling design to sufficiently cover the dominant community types within the project area and will be spaced at approximately one to two mile intervals. Final placement will take into consideration road locations, traffic volume, residence locations,

and representative community types. NRC estimates that up to 34 point count stations will be needed to sufficiently sample the project area (Figure 2). All 34 point count stations will be surveyed during a single survey event (i.e. one day).

Individual point count periods will be five minutes long, and all birds, except three common non-native species (house sparrow, rock pigeon, and European starling), detected by sight or sound (singing / calling) will be identified to species, and tallied at each point count station. To allow for data comparison with other standardized bird surveys (e.g., Breeding Bird Survey, other pre-construction wind energy bird surveys) all bird detections will be partitioned into three-, and five-minute periods respectively, with each bird being recorded in the time interval at which it was first detected. Because the landscape is very open, bird detections will be recorded relative to a variable radius point count station. Birds will be recorded where they are first detected within distance categories of 50, 100, and 400 meters. Birds detected beyond 400 meters may be recorded separately, but will not be included in the summary analysis. Notes on general habitat types within each 100 m radius point count station will be recorded.

To target daily peak bird activity periods, surveys will begin approximately one-half hour before sunrise for the spring and breeding seasons, and approximately one hour after sunrise for fall and winter seasons. Surveys will continue until all point count stations are covered. While the length of each survey event is expected to last beyond peak activity periods, the survey order of point count stations (i.e. beginning and ending points) will be alternated on each visit so that all points are surveyed during the most optimal time of day.

Weather conditions (e.g., temperature, cloud cover, wind) will be recorded at the beginning and end of the survey route for each survey day. In general, surveys will not be completed when it is raining or when the winds are greater than 18- miles per hour (Category 4 on the Beaufort Wind Scale). Wind speeds in open landscapes are seldom stable at or below recommended speeds as given in previous avian survey protocols. Swengel and Swengel (2000) reinterpret the need for early end times and low wind speeds for successful avian surveys in open landscapes, suggesting that it is acceptable to complete surveys later into the day and/or when winds are greater than 12 mph (Category 3 on the Beaufort Wind Scale).

Additional behavioral observations of special status species (i.e., endangered, threatened, special concern or species of greatest conservation need), waterbirds (e.g., waterfowl, grebes, cormorants, cranes, herons, egrets, rails, plovers, shorebirds, and gulls), and raptors will be recorded. These species tend to be at a higher risk of collision with wind turbine blades; therefore, behavior (e.g., flying, perching, hunting, displaying, vocalizing) of these species will be recorded. When individuals from these bird groups are observed flying, an estimate of flight height and direction will be recorded in relation to the proposed wind turbine design (i.e. below, within, or above the rotor swept area). The proposed wind turbines have a hub height of 262 feet above ground and a rotor length of 134 feet. The maximum height is 397 feet and the rotor swept area (diameter) is 268 feet, with 128 feet of clearance from the ground. The zone of the rotor swept area is from a minimum of 128 feet above ground to a maximum of 397 feet above ground. For simplicity, the three flight height zones will be recognized as 0-125 feet, 126-400 feet, and > 400 feet. Known landmarks and features on the landscape such as barns, silos, MET towers, communication towers, transmission line structures, and trees will be used to calibrate height estimates.

The pre-construction bird surveys for the EcoHarmony West Wind Project Area will be coordinated by Brian Bub of NRC. Mr. Bub's experience with bird survey methodologies, habitat assessments, and avian studies qualify him to oversee and conduct the avian screening analysis and field surveys for these projects. He has an MS in Forestry from Michigan Tech University where he studied and published peer-

reviewed research on forest songbird communities. His avian related work experience includes over 14 years of fieldwork conducting nest searches, territory mapping, trapping and banding, behavioral observations, point count surveys, and broadcast call surveys in a variety of different habitats (e.g., forests, grasslands, wetlands) and for a variety of different bird species in the upper Midwest. He has conducted bird surveys for graduate research, other academic research projects, inventory and monitoring projects for the Wisconsin Department of Natural Resources, as well as professional service projects for transportation and utility clients. In addition, he has volunteered as an active participant in the BBS and CBC surveys, and has contributed to the Wisconsin Breeding Bird Atlas through data collection and authoring one of the species accounts. NRC avian ecologists, each with several years of bird survey experience throughout the upper Midwest will conduct the field surveys.

### **2.3 Reporting**

A final report detailing the avian screening analysis and summarizing the pre-construction bird survey results will be prepared. The final report will include supporting tables and figures.

### 3. LITERATURE CITED

- American Wind Energy Association (AWEA). 2007. AWEA Wind Energy Fact Sheets [Online]. Available <http://awea.org/pubs/factsheets.html> accessed August 17, 2007.
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- USGS Patuxent Wildlife Research Center. 2008. North American Breeding Bird Survey Internet data set [Online]. Available <http://www.pwrc.usgs.gov/bbs/retrieval/> accessed May 20, 2008.

**TABLE**

Table 1. Timing and frequency of avian screening survey events for the EcoHarmony West Wind Project Area in Fillmore County Minnesota.

Screening Survey Periods	2008												2009										
	June		July			Aug		Sept		Oct		Nov		Dec	Jan		Feb	Mar		April		May	
Breeding Season	x	x	x																				
Fall Migration							x	x	x	x													
Winter Season														x	x	x	x						
Spring Migration																				x	x	x	x

- Seasonal survey periods for pre-construction bird surveys at proposed wind project areas in the upper Midwest
- x Proposed survey events for the EcoHarmony West Wind Project Area

**FIGURES**

Figure 1.  
Project Location and  
Topography  
EcoHarmony - West



**Location**

Fillmore Co., MN

0 1 2 Miles

**Project Information**

Project Number : 007-0230-01-008  
Modified January 7, 2009

**Legend**

Project Area

USGS 7.5' Canton, Greenleaf, and Harmony Topographic Quadrangles

**NRC**

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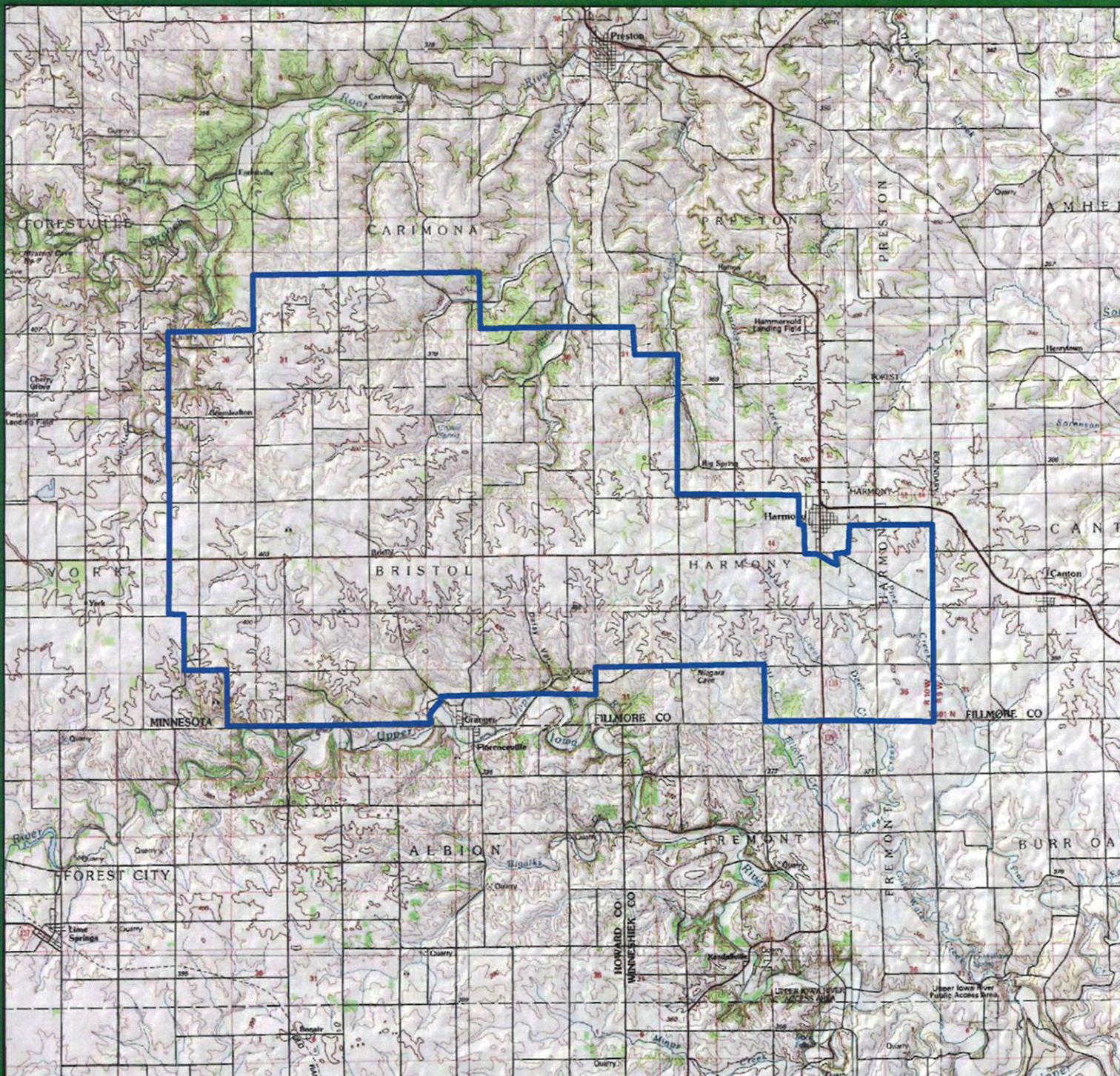
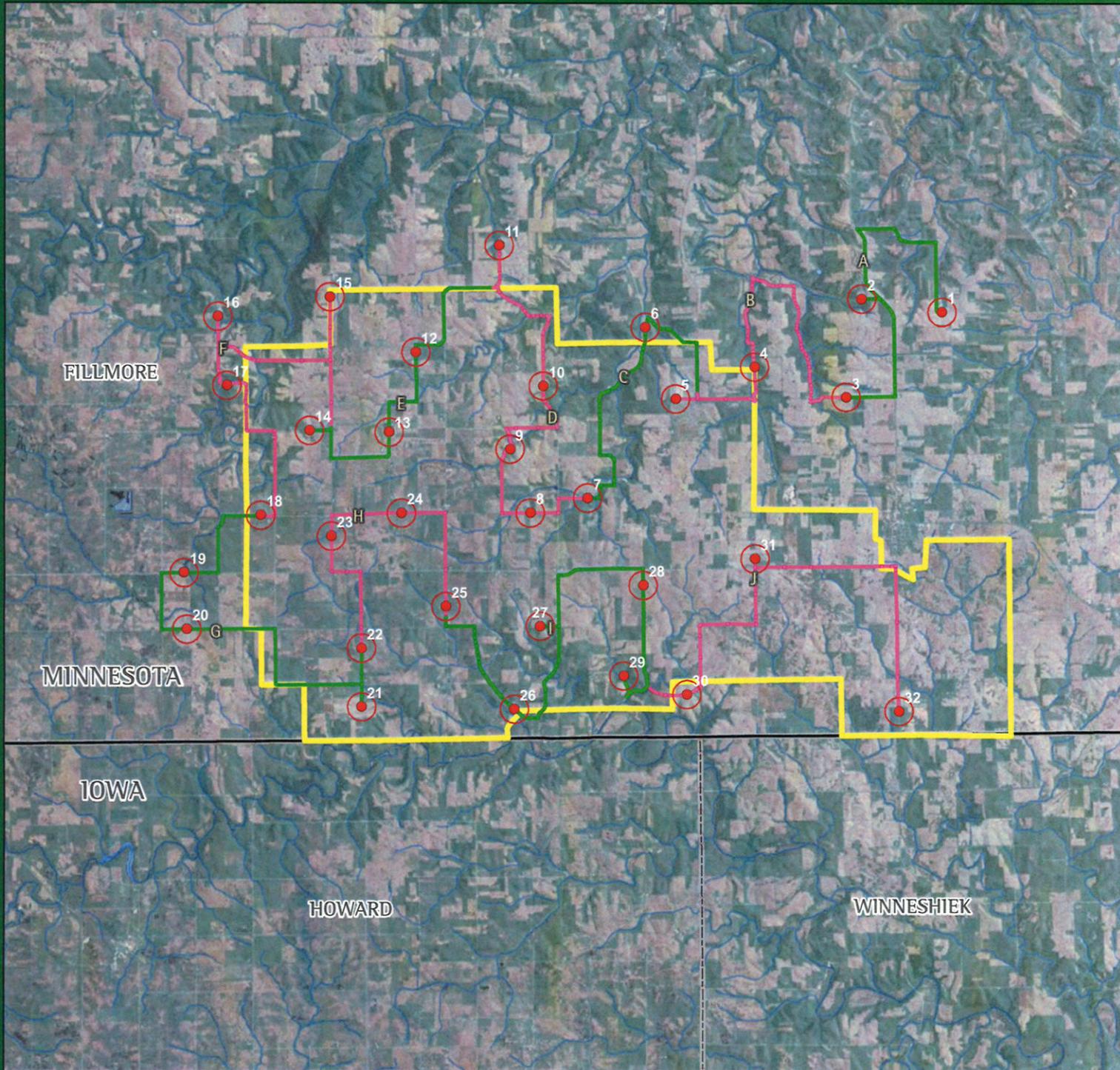


Figure 2.  
Bird Survey Point Layout  
EcoHarmony - West



**Location**

Fillmore Co., MN

0 1 2 Miles

**Project Information**  
Project Number : 007-0230-01-008  
Modified January 7, 2009

**Legend**

- Project Area
- Bird Point Survey Station (1-32)
- Bird Point 400m Buffer
- Bird Survey Route (A-J)
- State Line
- County Line
- Waterbody
- Streams

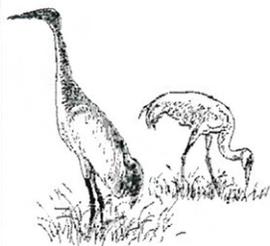
Data Sources Include: MN DNR, USGS.  
Orthophotography: 2005 NAIP

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The information presented in this map document is advisory and is intended for reference purposes only.  
EcoHarmony\_West\_Bird Survey Data 8x11.mxd Map Created by B. Costanza

**EXAMPLE DATA SHEETS**



# Bird Survey Summary Form

## EcoHarmony West Wind Project Area

### Fillmore County, Minnesota



Observer: \_\_\_\_\_

Event: \_\_\_\_\_

Month: \_\_\_\_\_ Day: \_\_\_\_\_ Year: \_\_\_\_\_

Season: \_\_\_\_\_

**Survey Start - Location, Time, and Conditions**

Time: \_\_\_\_\_

**Wind:**

**Sky:**

Station: \_\_\_\_\_

Temp: \_\_\_\_\_ °F

- 0 = none (smoke rises vertically)
- 1 = 1-3 mph (wind direction shown by wind drift)
- 2 = 4-7 mph (wind felt on face; leaves rustle)
- 3 = 8-12 mph (leaves, small twigs in constant motion)
- 4 = 13-18 mph (dust rises, small branches move)
- 5 = 19-24 mph (small trees in leaf begin to sway)

- 0 = clear (< 15% cloud cover)
- 1 = partly cloudy (16-50% cloud cover)
- 2 = mostly cloudy (51-75% cloud cover)
- 3 = overcast (76-100% cloud cover)
- 5 = fog or haze
- 6 = drizzle
- 7 = rain
- 9 = thunderstorm (w or w/out precip.)

**Survey End - Location, Time, and Conditions**

Time: \_\_\_\_\_

**Wind:**

**Sky:**

Station: \_\_\_\_\_

Temp: \_\_\_\_\_ °F

- 0 = none (smoke rises vertically)
- 1 = 1-3 mph (wind direction shown by wind drift)
- 2 = 4-7 mph (wind felt on face; leaves rustle)
- 3 = 8-12 mph (leaves, small twigs in constant motion)
- 4 = 13-18 mph (dust rises, small branches move)
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**Notes:**

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