TABLE OF CONTENTS

1 INTRODUCTION.............................................................................................................. 1
   1.1 Duke Energy Corporate Policy .................................................................................. 1
   1.2 Statement of Purpose ............................................................................................... 1

2 PROJECT DESCRIPTION ................................................................................................ 2
   2.1 History of North Allegheny Wind, LLC ..................................................................... 2
   2.2 Description of North Allegheny Wind, LLC ............................................................ 2

3 REGULATORY FRAMEWORK ...................................................................................... 5
   3.1 Endangered Species Act ........................................................................................... 5
   3.2 Migratory Bird Treaty Act ........................................................................................ 6
   3.3 Bald and Golden Eagle Protection Act ....................................................................... 6
   3.4 Pennsylvania Endangered Species Program (State-Level Threatened and Endangered Species) .................................................................................................................. 7
   3.5 Pennsylvania Wind Energy Voluntary Cooperative Agreement .............................. 7

4 DECISION FRAMEWORK .............................................................................................. 8
   4.1 Land-based Wind Energy Guidelines ........................................................................ 8
   4.2 Eagle Conservation Plan Guidance .......................................................................... 12

5 PRELIMINARY SITE EVALUATION AND CHARACTERIZATION (WEG TERS 1 AND 2) .............................................................................................................. 14
   5.1 Landscape Context and Habitat Characterization ................................................... 14
   5.2 Avian and Bat Species and Species of Concern......................................................... 15
   5.3 Project-specific Tier 1 and Tier 2 Assessments Completed during the Development Phase ...................................................................................................................... 29
   5.4 Summary .................................................................................................................. 29

6 FIELD STUDIES TO DOCUMENT SITE WILDLIFE AND HABITAT AND PREDICT PROJECT IMPACTS (WEG TIER 3)........................................................................................................ 32
   6.1 Nocturnal Bird and Bat Radar Studies ....................................................................... 32
   6.2 Bat Mist Netting and Hibernacula Assessment ........................................................ 33
   6.3 Bald Eagle Nest Survey ........................................................................................... 33
   6.4 Summary .................................................................................................................. 34

7 POST-CONSTRUCTION STUDIES (WEG TIER 4) .................................................... 37
   7.1 Avian and Bat Mortality Monitoring (Tier 4a) ........................................................... 37
   7.2 Studies to Address Impacts of Habitat Loss, Degradation, and Fragmentation (Tier 4b) ................................................................................................................................. 38
   7.3 Summary .................................................................................................................. 38

8 OTHER POST-CONSTRUCTION STUDIES (WEG TIER 5) ........................................... 40
   8.1 Bat Mist Netting ....................................................................................................... 40
8.2 Raptor Migration Survey ............................................................................................................. 40

9 CONSERVATION MEASURES TO AVOID AND MINIMIZE ADVERSE IMPACTS .......................................................... 42
  9.1 Siting and Construction .................................................................................................................. 42
  9.2 Operation ........................................................................................................................................ 43
  9.3 Decommissioning ............................................................................................................................ 45

10 ADAPTIVE MANAGEMENT ........................................................................................................... 46

11 OTHER PLANS GUIDING BIRD AND BAT CONSERVATION ...................................................... 47
  11.1 Indiana Bat Habitat Conservation Plan ..................................................................................... 47
  11.2 Eagle Conservation Plan ............................................................................................................ 49

12 PERMITS ........................................................................................................................................ 50

13 REPORTING .................................................................................................................................... 50

14 TRAINING ..................................................................................................................................... 51
  14.1 New-Employee Orientation Program ..................................................................................... 51
  14.2 Annual Wildlife Training .......................................................................................................... 51

15 WILDLIFE MONITORING AND REPORTING SYSTEM ........................................................... 51
  15.1 Wildlife Hotline Contact Information ..................................................................................... 52

16 INTERNAL AUDITING .................................................................................................................. 52

17 PUBLIC OUTREACH AND EDUCATIONAL PLANS ............................................................... 52

18 KEY RESOURCES ......................................................................................................................... 53

19 REFERENCES ................................................................................................................................. 58

LIST OF FIGURES

Figure 1. Project Location and Site Layout ..................................................................................... 4

Figure 2. Project Area and 10-mile Radius ..................................................................................... 28
LIST OF TABLES

Table 1. Summary of Tiered Process Completed to Date for the NAWF ........................................ 10
Table 2. Avian and Bat Species of Conservation Concern with the Potential to Occur in the Project Area .................................................................................................................. 17
Table 3. WEG Tier 1 and Tier 2 Questions and Responses for the NAWF .................................. 30
Table 4. WEG Tier 3 Questions and Responses for the NAWF ................................................... 35
Table 5. Summary of Bird and Bat Mortality Estimates from 2010 and 2011 .............................. 38
Table 6. WEG Tier 4 Questions and Responses for the NAWF ................................................... 39

LIST OF APPENDICES

Appendix A: Duke Energy Corporate Avian Protection Plan
Appendix B: Wildlife Training Materials
Appendix C: Wildlife Monitoring and Reporting System
Appendix D: Wind Energy Voluntary Cooperative Agreement (WEVCA)
Appendix E: WEG Tier 1 and 2 Reports
Appendix F: WEG Tier 3 Reports
Appendix G: WEG Tier 4 Reports
Appendix H: WEG Tier 5 Reports (Other Post-Construction Studies)
Appendix I: NAW Habitat Conservation Plan
Appendix J: Permits
<table>
<thead>
<tr>
<th>ACRONYMS AND ABBREVIATIONS</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGL</td>
<td>Above Ground Level</td>
</tr>
<tr>
<td>BBCS</td>
<td>Bird and Bat Conservation Strategy</td>
</tr>
<tr>
<td>BBS</td>
<td>Breeding Bird Survey</td>
</tr>
<tr>
<td>BCC</td>
<td>Bird of Conservation Concern</td>
</tr>
<tr>
<td>BCR</td>
<td>Bird Conservation Region</td>
</tr>
<tr>
<td>BGEPA</td>
<td>Bald and Golden Eagle Protection Act</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>ºC</td>
<td>Degrees Celsius</td>
</tr>
<tr>
<td>CBC</td>
<td>Christmas Bird Count</td>
</tr>
<tr>
<td>cm</td>
<td>Centimeters</td>
</tr>
<tr>
<td>DER</td>
<td>Duke Energy Renewables</td>
</tr>
<tr>
<td>Duke</td>
<td>Duke Energy Corporation</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>ECP</td>
<td>Eagle Conservation Plan</td>
</tr>
<tr>
<td>EHS</td>
<td>Environmental Health and Safety</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
</tr>
<tr>
<td>EST</td>
<td>Eastern Standard Time</td>
</tr>
<tr>
<td>ETP</td>
<td>Eagle Take Permit</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>ºF</td>
<td>Degrees Fahrenheit</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>h</td>
<td>Hours</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>HCP</td>
<td>Habitat Conservation Plan</td>
</tr>
<tr>
<td>HMANA</td>
<td>Hawk Migration Association of North America</td>
</tr>
<tr>
<td>HQCWF</td>
<td>High Quality, Cold Water Fishery</td>
</tr>
<tr>
<td>IBA</td>
<td>Important Bird Area</td>
</tr>
<tr>
<td>ITP</td>
<td>Incidental Take Permit</td>
</tr>
<tr>
<td>km</td>
<td>Kilometers</td>
</tr>
<tr>
<td>m</td>
<td>Meters</td>
</tr>
<tr>
<td>MBTA</td>
<td>Migratory Bird Treaty Act</td>
</tr>
<tr>
<td>mph</td>
<td>Miles per Hour</td>
</tr>
<tr>
<td>m/s</td>
<td>Meters per Second</td>
</tr>
<tr>
<td>MSL</td>
<td>Mean Sea Level</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>NAW</td>
<td>North Allegheny Wind, LLC</td>
</tr>
<tr>
<td>NAWF</td>
<td>North Allegheny Wind Facility</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental Organization</td>
</tr>
<tr>
<td>NWI</td>
<td>National Wetlands Inventory</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>PCMM</td>
<td>Post-construction Mortality Monitoring</td>
</tr>
<tr>
<td>PGC</td>
<td>Pennsylvania Game Commission</td>
</tr>
<tr>
<td>PNDI</td>
<td>Pennsylvania Natural Diversity Inventory</td>
</tr>
<tr>
<td>PNHP</td>
<td>Pennsylvania National Heritage Program</td>
</tr>
<tr>
<td>RPM</td>
<td>Revolutions per Minute</td>
</tr>
<tr>
<td>USFWS</td>
<td>U.S. Fish and Wildlife Service</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
</tr>
<tr>
<td>SPCC</td>
<td>Spill Prevention, Control, and Countermeasures</td>
</tr>
<tr>
<td>WEG</td>
<td>U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines</td>
</tr>
<tr>
<td>WEVCA</td>
<td>Wind Energy Voluntary Cooperative Agreement</td>
</tr>
<tr>
<td>WMRS</td>
<td>Wildlife Monitoring and Reporting System</td>
</tr>
<tr>
<td>WNS</td>
<td>White-Nose Syndrome</td>
</tr>
<tr>
<td>WTGAC</td>
<td>Wind Turbine Guidelines Advisory Committee</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

1.1 Duke Energy Corporate Policy

Duke Energy Corporation (Duke) has a long history of natural resource conservation. With over 100 years of experience generating and delivering electricity to customers throughout the Southeast and Midwest, conservation of fish, wildlife, and other natural resources has been a principal driver in Duke’s commitment to operate its utility operations in a sustainable manner. This commitment to conservation of natural resources extends to its subsidiary companies, including Duke Energy Renewables (DER). Duke has a corporate policy on the conservation of birds and other wildlife outlined in its Corporate Avian Protection Plan (Appendix A). This Bird and Bat Conservation Strategy (BBCS) is supported by this overall corporate policy. DER and other subsidiary companies, including North Allegheny Wind, LLC (NAW), are committed to siting, constructing, operating, and decommissioning their facilities in an environmentally responsible and sustainable manner that includes conserving and minimizing impacts to avian and bat species and the habitats they use.

1.2 Statement of Purpose

While wind power projects or “wind farms,” such as the North Allegheny Wind Facility (NAWF), offer a significant environmental benefit by utilizing a renewable-energy resource (wind), there are potential avian and bat impacts resulting from their construction and operation. This site-specific BBCS outlines various processes that DER has employed and continues to employ at the NAWF to: (1) comply with all applicable state and federal avian and bat conservation and protection laws and regulations; (2) document adherence to the U.S. Fish & Wildlife Service (USFWS) Land-based Wind Energy Guidelines (WEG; USFWS 2012) and Eagle Conservation Plan (ECP) Guidance (USFWS 2013); (3) ensure that impacts to avian and bat resources are identified, quantified, and analyzed; and (4) implement various conservation, avoidance, minimization, and mitigation measures to address any impacts that result from the operation of the NAWF.

Bird and bat species found in and around the NAWF are protected under a number of federal and state laws and regulations. Interactions with wind energy generating facilities (including wind turbines, transmission and distribution lines, substations, and other associated structures and equipment) are potentially harmful or fatal to birds and bats. Impacts on birds and bats that occur as a result of DER renewable-energy resource (wind) projects are important to Duke from both a regulatory priority and natural resource conservation priority.
2 PROJECT DESCRIPTION

The NAWF is located on approximately 2,590 hectares (6,400 acres) in Cresson, Portage, and Washington townships in Cambria County and Juniata Township in Blair County, Pennsylvania. The project location and site layout are shown on Figure 1. The project includes 35 Gamesa wind turbines, which each produce 2 megawatts (MW) of electricity.

2.1 History of North Allegheny Wind, LLC

Gamesa Energy developed and constructed the Gamesa Energy project, part of which later became the NAWF. The Gamesa Energy project started construction in 2006, and was originally developed as a 75-turbine project with a total output capacity of 150 MW. Construction of the Gamesa Energy project was completed in 2008, but commercial operations did not begin until nearly a year later.

In 2009, NAW purchased 35 of the Gamesa Energy project’s turbines and began commercial operations in September 2009. All electricity generated at the NAWF is purchased by FirstEnergy. The other portion of the Gamesa Energy project, consisting of 40 turbines and located generally south of the NAWF, is now known as the Allegheny Ridge Wind Site and is owned and operated by Infigen Energy, a third party unaffiliated with DER.

2.2 Description of North Allegheny Wind, LLC

The NAWF has a total output of 70 MW across the 35 wind turbines. The turbine hub height is 78 meters (m; 256 feet) and each weighs approximately 203 tons. The rotor diameter is 87 m (285.5 feet) and the blade length is 42.5 m (139.5 feet). The “start wind speed” or cut-in speed for the units is four meters per second (m/s) (nine miles per hour [mph]). The cut-out wind speed is 25 m/s (56 mph). The turbine elevations at the NAWF range from approximately 670 m above mean sea level (MSL) (2,200 feet MSL) at turbine A-51 to just over 823 m MSL (2,700 feet MSL) at turbine A-60.

In addition to the wind turbines, the site contains a network of electrical collector lines that originate at each turbine and terminate at a centrally located electrical substation where the generated electricity is collected. The majority of these collector lines are located underground. At the substation, the generated electricity is transformed and sent via an overhead transmission line to an interconnection point with the customer, FirstEnergy. The substation is located on the Infigen portion of the project and Infigen has primary responsibility for the substation and its associated equipment.

The site also contains a network of private and public roads that allows vehicular and heavy equipment access to each turbine. Some of the roads are used by both Infigen and NAW and some are only used by one of the companies. The NAW operations and maintenance (O&M) office is located in the town of Cresson, approximately two miles west of the project site.

The 2,590-hectare (6,400-acre) site is composed of leased private lands from 16 different landowners. NAWF landowners continue to have fee title ownership to the land and normal land
uses are enjoyed by these landowners. These land uses include recreational activities, such as hunting, trapping, hiking, off-road vehicle use, and the like; timber management (including timber harvests); firewood cutting; farming; ranching; and other uses compatible with the operation of the wind site. Several tracts of state-owned land (State Game Lands) are located within the NAWF site; however, no wind turbines are located on state-owned land.
Figure 1. Project Location and Site Layout.
3 REGULATORY FRAMEWORK

Bird and bat species are protected under a number of federal and state laws and regulations, which are described further in the following subsections. Specific to the NAWF, these include the Federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), the Pennsylvania State Endangered Species Program, and other state wildlife laws. In addition, the Pennsylvania Wind Energy Voluntary Cooperative Agreement (WEVCA), to which DER is a signatory, provides policies for the conservation of birds and bats at wind energy facilities in Pennsylvania.

3.1 Endangered Species Act

The ESA directs the USFWS to identify and protect endangered and threatened species and their critical habitat, and to provide a means to conserve the ecosystems on which they depend. Section 9 of the ESA prohibits take of federally listed species. Take is defined as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct” (16 U.S.C. § 1532(19)). The term “harm” includes significant habitat alteration that kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 C.F.R. § 17.3). Projects involving federal lands, funding, or authorizations require consultation between the federal agency and the USFWS, pursuant to Section 7 of the ESA. Projects without a federal nexus are recommended to work directly with USFWS to avoid adversely impacting listed species and their critical habitats, or as authorized under Section 10, obtain an Incidental Take Permit (ITP) if take cannot be avoided.

There are two federally listed bat species with the potential to occur at the NAWF: the Indiana bat (Myotis sodalis; endangered) and the northern long-eared bat (Myotis septentrionalis; threatened). As further described in Section 11.1, NAW is currently preparing a Habitat Conservation Plan (HCP) and pursuing an ITP to address potential impacts to the Indiana bat, pursuant to Section 10 of the ESA. The HCP is currently in development and is planned for completion around the fourth quarter 2015/first quarter 2016. Issuance of an ITP is a discretionary federal action and is therefore subject to compliance with the National Environmental Policy Act (NEPA; 42 U.S.C. §§ 4321-4347), Council on Environmental Quality regulations implementing NEPA (40 C.F.R. Parts 1500 - 1508), and Department of the Interior regulations implementing NEPA (43 C.F.R. part 46). NEPA implementing regulations require federal agencies to examine environmental impacts of their actions and possible alternatives and provide for public participation. To comply with NEPA, the USFWS must conduct a detailed analysis of all direct, indirect, and cumulative impacts of issuing the permit on the human environment, not just on the covered species or its habitat. This analysis will take the form of an environmental assessment (EA) or an environmental impact statement (EIS), depending on the significance of the impacts.

The northern long-eared bat was listed as a threatened species on April 2, 2015 and provisions defining what constitutes unlawful take of this species are governed by a final 4(d) rule that was published in the Federal Register on January 14, 2016 (USFWS 2016). The 4(d) rule specifies that purposeful take of the northern long-eared bat is prohibited throughout the species’ range, except in specific circumstances that involve the removal of bats from human structures, defense
of human life, removal of hazardous trees for the protection of human life or property, and authorized capture of bats by individuals with scientific collection permits. Incidental (non-purposeful) take of the northern long-eared bat is not prohibited in the portion of the species’ range not affected by white-nose syndrome (WNS). Within the WNS zone (which includes Pennsylvania), incidental take is only prohibited if:

- It occurs within a hibernaculum or alters the entrance or environment of a hibernaculum.
- It results from tree removal activities and
  - The activity occurs within 0.25 miles of a known hibernaculum at any time of year, or
  - The activity cuts or destroys a known occupied maternity roost tree or other trees within a 150-ft radius of a maternity roost tree during the pup season from June 1 to July 31.

All other incidental take of the northern long-eared bat that does not involve tree removal is allowed under the final 4(d) rule, including incidental take that might result from the operation of a wind energy facility.

3.2 Migratory Bird Treaty Act

The MBTA is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. The statute’s language is clear that actions resulting in a “taking” or possession (permanent or temporary) of a protected species, in the absence of a USFWS permit or regulatory authorization, are a violation of the Act. The MBTA states, “Unless and except as permitted by regulations . . ., it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill . . . possess, offer for sale, sell, . . . purchase, . . . ship, export, import, . . . transport or cause to be transported . . . any migratory bird, any part, nest, or egg of any such bird . . . .” (16 U.S.C. § 703). The word “take” is defined by regulation as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 C.F.R. § 10.12). The USFWS maintains a list of all species protected by the MBTA at 50 C.F.R. § 10.13. This list includes 1,026 species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. As is the case with all wind energy projects, a variety of birds that are protected under the MBTA occur within and/or around the NAWF.

3.3 Bald and Golden Eagle Protection Act

Under authority of BGEPA, bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) are afforded additional legal protection beyond that provided through the MBTA. BGEPA prohibits the take; possession; sale; purchase; barter; offer of sale, purchase, or barter; transport; export; or import, at any time or in any manner, of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof (16 U.S.C. § 668). BGEPA also defines take to include “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb” (16 U.S.C. § 668c). The term “disturb” is defined as agitating or bothering an eagle to a degree that causes,
or is likely to cause, injury to an eagle, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (50 C.F.R. § 22.3).

On September 11, 2009, the USFWS published the Final Eagle Permit Rule (Eagle Permit Rule) establishing new regulations under BGEPA authorizing issuance of permits for non-purposeful take of eagles (Eagle Take Permits, or ETPs) for otherwise lawful activities. The USFWS can authorize limited “individual” take of bald and golden eagles when the take is associated with, but not the purpose of, an otherwise lawful activity, and cannot practicably be avoided (50 C.F.R. § 22.26). The Eagle Permit Rule also authorizes permits for “programmatic” take, which means that instances of take may not be isolated, but may recur. Programmatic take permits are generally the most appropriate permits for wind energy facilities that have a risk of eagle take. In order for a permit to be issued, programmatic permits must be consistent with the goal of stable or increasing eagle breeding populations, and the take must unavoidable despite implementation of advanced conservation practices.

3.4 Pennsylvania Endangered Species Program (State-Level Threatened and Endangered Species)

Chapter 21 (Subchapter D) of Title 34 of the Pennsylvania Statutes contains the state’s protected game and wildlife provisions. In regards to the project, applicable statutes include Sections 2164 to 2167. Section 2164 (34 Pa.C.S. § 2164) regulates the unlawful taking and possession of protected birds. Take is defined under this law to include killing or attempting to conspire to kill or take or attempt, assist, aid or abet in the taking of any protected birds or possess protected birds, or any part thereof. In addition, Section 2165 (34 Pa.C.S. § 2165) renders it unlawful for any person to take or have in possession or under control either the active nest or any egg of any game bird or protected bird or to interfere with or destroy the active nest or egg. Section 2166 (34 Pa.C.S. § 2166) prohibits the unlawful sale of protected birds and plumage. Section 2167 (34 Pa.C.S. § 2167) makes it unlawful for any person to bring into or remove from the Commonwealth, or to possess, transport, capture or kill, or attempt, aid, abet or conspire to capture or kill any wild bird or wild animal, or any part thereof, or the eggs of any wild bird, which are endangered or threatened species. It is the duty of every officer having authority to enforce this title to seize all wild birds or wild animals, or any part thereof, or the eggs of any wild bird, which have been declared endangered or threatened.

3.5 Pennsylvania Wind Energy Voluntary Cooperative Agreement

The Pennsylvania Game Commission (PGC) established the WEVCA in April 2007 for the siting and development of wind farms of five or more turbines. The previous developer, Gamesa Energy, signed the WEVCA on April 18, 2007, and NAW signed on as a cooperator to the WEVCA on February 16, 2010. The WEVCA was amended and updated in 2013, and DER, on behalf of NAW, signed the amended WEVCA on August 27, 2013. The 2013 WEVCA is included in Appendix D. The terms of the agreement state that the developer will inform the PGC of plans to develop 14 months before the start of construction to allow the PGC to review and detail the impacts of the proposed construction. Within 45 days of notification, the PGC will
provide the results of its reviews and information regarding the impacts of development. In addition, the PGC will provide methods to reduce the impact of development on affected species.

The WEVCA requires both pre- and post-construction surveys to assess risk and monitor impacts (such as habitat and behavior modifications, injuries, and mortalities) to protected birds and bats. There is a standard level of surveys required for all sites and additional monitoring may be necessary for those sites deemed to be at a higher risk to birds and/or bats. Risk levels are determined using criteria outlined in the WEVCA (PGC 2007, 2013).

4 DECISION FRAMEWORK

4.1 Land-based Wind Energy Guidelines

DER has adopted the decision framework and “tiered” or stepwise process, as outlined in the USFWS WEG (USFWS 2012) regarding the timing of the site development and construction, to the extent applicable to the NAWF. At the time the NAWF was developed and constructed, the WEG had not been finalized.

The Wind Turbine Guidelines Advisory Committee (WTGAC) was formed under the Federal Advisory Committee Act in March 2007, with members appointed in October 2007, to provide advice and recommendations to the Secretary of the Interior on developing effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy projects. The WTGAC submitted its recommendations to the Department of the Interior on March 4, 2010 (after the NAWF was constructed and had commenced operations). The USFWS used these recommendations to develop the WEG, which were published as final by USFWS in March 2012. Prior to the development of the WEG, the USFWS provided voluntary interim guidelines in 2003 to avoid and minimize wildlife impacts from wind turbines (USFWS 2003). Among other things, the 2003 guidelines recommended multiple years of pre-construction wildlife surveys to inform project site selection and siting. Per a memorandum from then-USFWS Director Steve Williams on April 26, 2004, these guidelines were to be evaluated over a two-year period, and then modified as necessary in cooperation with the wind industry, states, and other stakeholders (USFWS 2004). Thus, the WTGAC was formed, its recommendations were provided to the Secretary, and the USFWS developed the 2012 WEG.

The tiered process from the WEG includes the following.

1) Tier 1: Preliminary evaluation or screening of sites (landscape-level screening of possible project sites);

2) Tier 2: Site characterization (broad characterization of one or more potential project sites);

3) Tier 3: Field studies to document site-specific wildlife conditions and predict project impacts (site-specific surveys and assessments at and around the proposed project site);
4) Tier 4a: Post-construction fatality studies to assess and evaluate direct avian and bat fatalities resulting from turbine blade strikes; and Tier 4b: post-construction studies to assess impacts to species of conservation concern resulting from habitat fragmentation, degradation, displacement, or avoidance.

5) Tier 5: Other post-construction studies or research to assess and evaluate direct and indirect impacts to certain species of concern (e.g., golden eagles), including habitat impacts, nest productivity, and other potential impacts.

This process and decision framework starts out general or broad and becomes more specific as information is gathered and the potential for avian and bat issues is better understood during each tier. Information gathered addressing the potential for avian and bat issues helps to answer questions and formulate additional questions that may need to be addressed in subsequent tiers. The stepwise or “tiered” approach ensures that sufficient data are collected on avian and bat species to enable the developer to make informed decisions regarding the proposed project while ensuring that it is complying with its corporate environmental policy and state and federal laws and regulations. This tiered process will also inform wind developers for the need for wildlife permits, such as an ITP for federally listed species. **Table 1** summarizes the five tiers of the WEG and describes the actions and decisions that were or will be made at each of the tiers for the NAWF.

Note that per the WEG, projects in existence prior to the finalization of the WEG in 2012 are not recommended to go back and perform or redo Tier 1, 2 and 3 studies since these tiers are performed during the siting and development phase. Projects already in operation are advised to consult with USFWS on Tier 4 studies and Tier 5 studies, if needed. Because the NAWF is in the operations phase, the focus for this project is on Tier 4 and Tier 5 moving forward. Subsequent sections of this document provide a summary of the Tier 1, 2, and 3 processes that were utilized for the NAWF during the siting and construction phases of the project. This document then discusses the details of the project’s ongoing Tier 4 and 5 studies. At each tier, the specific studies that are conducted at the NAWF are used to inform and direct subsequent studies and surveys for the NAWF, as well as to identify the potential need for additional conservation measures. This document describes the avoidance and minimization measures that NAW is planning or may implement based on the results of studies conducted to date.
Table 1. Summary of Tiered Process Completed to Date for the NAWF

| Tier 1 – Preliminary Site Evaluation | The previous developer screened potential wind farm sites. | The current project area was selected in part because it is in an area with existing disturbance (strip mining and timber harvest) with a relatively low potential for wildlife impacts. The project proceeded to the next tier. |
|Tier 2 – Site Characterization | The previous developer conducted desktop-level environmental reviews and coordination with resource agencies, including the USFWS, PGC, and Pennsylvania Natural Heritage Program. A Scoping Report was prepared summarizing potential wildlife resource concerns. The Scoping Report is included in Appendix E. | The previous developer determined that the project was unlikely to result in significant adverse impacts that could not be mitigated; therefore, the project proceeded to the next tier. |
| Tier 3 – Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts | The following Tier 3 studies were conducted:  
  - Bat habitat assessment (2006)  
  - Bat hibernacula survey (2006)  
  - Bat mist netting (2005, 2006)  
  - Avian and bat nocturnal migration radar study (2004, 2005)  
  - Bald eagle nest survey (2006)  
  Tier 3 reports are included in Appendix F. | Tier 3 studies determined that the project was unlikely to result in significant adverse impacts that could not be mitigated; therefore, the project proceeded to the next tier. |
Table 1. Summary of Tiered Process Completed to Date for the NAWF

<table>
<thead>
<tr>
<th>Tier</th>
<th>Action</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 4 – Post-construction Studies to Estimate Impacts</td>
<td>An initial two years of avian and bat post-construction mortality monitoring (PCMM) was conducted in 2010 and 2011. Tier 4 reports are included in Appendix G. Additional PCMM will be conducted periodically over the operational life of the project under the project’s HCP (see Section 11.1).</td>
<td>Tier 4 studies documented an impact to a federally endangered species, the Indiana bat. An Indiana bat carcass was found during the 2011 PCMM. Therefore, NAW, in cooperation with the USFWS and PGC, decided to implement additional conservation measures to minimize potential for further take of Indiana bat (these conservation measures likely benefit other bat species also). NAW is preparing an HCP and pursuing an ITP for the Indiana bat. The HCP will detail the conservation measures and further steps being taken to minimize the potential for future project impacts on this species. A brief summary is provided in Section 11.1 of this document.</td>
</tr>
</tbody>
</table>
| Tier 5 – Other Post-construction Studies and Research | The following Tier 5 studies have been conducted to date:  
• Raptor Migration Survey (2010)  
• Bat Mist Netting (2012)  
Under the project’s HCP, studies will be conducted at the selected mitigation site to evaluate mitigation success. | Several Pennsylvania raptors of concern (including bald and golden eagles) were observed migrating over the project area, though no raptor carcasses have been found during PCMM to date. To address potential impacts to birds, including raptors, DER prepared this project-specific BBCS, which was updated in 2016. Forty-two northern long-eared bats were captured during the 2012 mist-netting survey. The northern long-eared bat was subsequently listed as a threatened species. NAW is preparing an HCP and pursuing an ITP for the Indiana bat. The northern long-eared bat is not being included as a covered species in the HCP, but many of the conservation measures included in the HCP for the Indiana bat will also benefit the northern long-eared bat. A brief summary of the HCP is provided in Section 11.1 of this document. Decisions to conduct further Tier 5 studies under the HCP will be made in coordination with the USFWS. |
4.2 Eagle Conservation Plan Guidance

The USFWS’s ECP Guidance (USFWS 2013) provides a framework for evaluating project risk to eagles and is intended to be implemented in conjunction with actions recommended in the USFWS’s WEG. The ECP Guidance is divided into five stages. Each stage builds on the prior stage to provide wind energy developers and operators with a framework to evaluate the potential risk to eagles from the development and operation of a particular wind energy site and configuration. Each stage has (1) an objective, (2) recommended actions, and (3) recommended data sources. This BBCS documents the Stage 1 eagle analysis for the NAWF (which is analogous to Tiers 1 and 2 of the WEG, but specific to eagles) and the Stage 2 eagle analysis for the NAWF (which is analogous to Tier 3 of the WEG).

The components of Stage 1 include the following.

- Stage 1 Objective: Identify potential wind facility locations with manageable risk to eagles at the landscape level.
- Stage 1 Actions: Broad, landscape-scale evaluation.
- Stage 1 Data Sources: Literature, agency files, online databases, and experts.

For the NAWF, the Stage 1 eagle evaluation consisted of initial project scoping and agency correspondence as detailed in Section 5.

The components of Stage 2 include the following.

- Stage 2 Objective: Obtain site-specific data to predict eagle fatality rates and disturbance take at wind-facility sites that pass the Stage 1 assessment. Investigate other aspects of eagle use to consider assessing distribution of occupied nests in the project area, migration, areas of seasonal concentration, and intensity of use across the project footprint.
- Stage 2 Actions: Site-specific surveys and intensive observation to determine eagle exposure rate and distribution of use in the project footprint, plus locations of occupied eagle nests, migration corridors and stopover sites, foraging concentration areas, and communal roosts in the project area.
- Stage 2 Data Sources: Project footprint – 800-meter (m) radius point count surveys and utilization distribution studies. Project area – nest surveys, migration counts at likely topographic features, investigation of use of potential roost sites and of areas of high prey availability. Ideally conducted for no less than two years pre-construction.

It should be noted that the project was developed prior to the issuance of the ECP Guidance; therefore, Stage 2 eagle surveys did not follow the protocols specified in the ECP Guidance. However, surveys were conducted that were consistent with the objectives of Stage 2, including a
bald eagle nest survey (see Section 6.3) and a post-construction raptor migration survey (see Section 8.2).

As part of the staged risk assessment process, the ECP Guidance recommends placing the wind facility into one of three categories to help determine the best path forward for minimizing risk to eagles.

- **Category 1 – High risk to eagles, potential to avoid or mitigate impacts is low.** A project is in this category if it:
  1. Has an important eagle use area or migration concentration site within the project footprint; or
  2. Has an annual eagle fatality estimate (average number of eagles predicted to be taken annually) $>5\%$ of the estimated local area population size; or
  3. Causes the cumulative annual take for the local area population to exceed $5\%$ of the estimated local area population size.

- **Category 2 – High or moderate risk to eagles, opportunity to mitigate impacts.** A project is in this category if it:
  1. Has an important eagle use area or migration concentration site within the project area but not in the project footprint; or
  2. Has an annual eagle fatality estimate between 0.03 eagles per year and $5\%$ of the estimated local area population size; or
  3. Causes cumulative annual take of the local area population of less than $5\%$ of the estimated local area population size.

- **Category 3 – Minimal risk to eagles.** A project is in this category if it:
  1. Has no important eagle use areas or migration concentration sites within the project area; and
  2. Has an annual eagle fatality rate estimate of less than 0.03; and
  3. Causes cumulative annual take of the local area population of less than $5\%$ of the estimated local area population size.
5 PRELIMINARY SITE EVALUATION AND CHARACTERIZATION (WEG TIERS 1 AND 2)

Consistent with Tiers 1 and 2 of the WEG and Stage 1 of the ECP Guidance, this section addresses the landscape context of the NAWF, characterizes the habitat types present at the site, and discusses the potential for species of concern to occur in the project area. For the purposes of this BBCS, “species of concern” are defined as those species that are federally listed (endangered, threatened, proposed, or candidate), state listed (endangered or threatened), or Birds of Conservation Concern (BCC). BCC are bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS. In USFWS (2008), BCC are listed by Bird Conservation Regions (BCRs), which are broad, ecologically distinct geographic regions in North America that have similar bird communities, habitats, and resource management issues. The project area is located within BCR 28, Appalachian Mountains.

This section also provides a summary of the work that was conducted in the development phase of the project to characterize the site and assess potential risk to species of concern. This work was conducted by the previous developer and predated the WEG and ECP Guidance; however, it was still consistent with the objectives outlined in these guidance documents.

5.1 Landscape Context and Habitat Characterization

The project area is located within the Central Appalachian Broadleaf Forest-Coniferous Forest-Meadow Ecological Subregion (McNab et al. 2007). Within this Subregion, the project area is located along the Allegheny Front, which separates the Allegheny Mountains and Northern Ridge and Valley ecological sections. The Allegheny Front extends northeasterly from eastern West Virginia through western Maryland and into central Pennsylvania.

The project area’s geography is characteristic of the Allegheny Front section, with undulating hills sloping away from escarpment. This section of the Allegheny Front typically has a moderate to high topographic relief, with elevations of 165 to 884 m (540 to 2,900 feet; Sevon 2000). Local site relief is moderate, with an easterly facing aspect.

The climate of the project area is characterized by cold winters and cool summers with significant seasonal variability, due to its high elevation. The project area receives moderate amounts of precipitation, with 89 to 137 centimeters (cm; 35 to 54 inches) of annual rainfall and up to 254 cm (100 inches) of annual snowfall. This climate supports mixed hardwood forest, which is the primary habitat type in the project area. The dominant hardwood trees in the project area are black cherry (Prunus serotina), red maple (Acer rubrum), red oak (Quercus rubra), chestnut oak (Q. prinus), beech (Fagus spp.), and striped maple (A. pensylvanicum). Understory plants include mountain laurel (Kalmia latifolia), rhododendron (Rhododendron spp.), various grasses, ferns (especially hay-scented fern [Dennstaedtia punctilobula]), herbaceous plants, and a variety of wildflowers. Tracts of eastern hemlock (Tsuga canadensis) are found along waterbodies and waterways throughout the project area. Open habitats within the project area include small parcels of shrub/scrub habitat created by wetland features or historic clear-cutting activities. Agricultural
lands are limited to small parcels of pasture. Historic mining, timber harvest, and open spaces such as parking lots are the predominant land uses on the developed lands in the project area. Light uses, such as residential developments, compose a small amount of the project area.

The project area also includes approximately 0.01 hectares (0.025 acres) of National Wetland Inventory (NWI)-classified palustrine forested wetland. Under Pennsylvania’s environmental regulations, waterways are classified according to water quality and other important characteristics (25 PA Code § 93.9). Drainage to the north and east predominantly flows into Blair Gap Run and Blair Run (High Quality, Cold Water Fishery [HQCWF]); drainage to the south and west predominantly flows into Bens Creek and Bear Rock Run (HQCWF in the lower reaches). These waterways are encompassed in 12 watersheds within the Allegheny and Susquehanna River drainages.

5.2 Avian and Bat Species and Species of Concern

Publicly available databases can be used to characterize the general avian communities that may be found in the region encompassing the project area. Participants in the annual United States Geological Survey (USGS) North American Breeding Bird Survey (BBS) conduct surveys of birds during the peak of the nesting season (typically June) along fixed 39.4-kilometer (km; 24.5-mile) long routes throughout North America. Each route includes 50 stops located at 805-m (0.5-mile) intervals. A three-minute point-count is conducted at each stop, during which the observer records all birds heard or seen within 402 m (0.25 miles) of the stop. The BBS route closest to the project area is the Martinsburg route, located approximately eight km (five miles) south of the wind turbines. From 1966 to 2013, the ten most abundant bird species observed along this route were the common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), house sparrow (*Passer domesticus*), red-winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), chipping sparrow (*Spizella passerina*), red-eyed vireo (*Vireo olivaceus*), mourning dove (*Zenaida macroura*), and barn swallow (*Hirundo rustica*) (Sauer et al. 2014).

The Christmas Bird Count (CBC) is an early-winter bird census administered by the National Audubon Society, where thousands of volunteers across the U.S., Canada, and many countries in the Western Hemisphere count birds over a 24-hour period between December 14 and January 5. Count volunteers follow specified routes through a designated 24-km (15-mile) diameter circle, counting every bird they see or hear over the course of one calendar day. The project area is closest to the Culp CBC circle, located approximately 22.5 km (14 miles) to the northeast of the wind turbines. The ten most abundant species observed in this CBC circle between 1969 and 2013 were the European starling, rock pigeon, dark-eyed junco (*Junco hyemalis*), house sparrow, American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Poecile atricapillus*), house finch (*Haemorhous mexicanus*), mourning dove, tufted titmouse (*Baeolophus bicolor*), and northern cardinal (*Cardinalis cardinalis*) (National Audubon Society 2014).

Information on bat species occurrence is less readily available than information on bird species, because, in general, bat surveys are less commonly conducted than bird surveys. Studies at other wind farm sites have shown that bat species with the highest wind turbine associated mortality
rates are tree-roosting, migratory species, including hoary bats (*Lasiurus cinereus*), silver-haired bats (*Lasionycteris noctivagans*), and eastern red bats (*Lasiurus borealis*) (Strickland et al. 2011; NWCC 2010; Arnett et al. 2008; Cryan 2008; Kunz et al. 2007). These three species could potentially use the project area as part of their summer range or during their migration between winter and summer ranges (NatureServe 2014; Cryan 2003). Other bat species that have been documented at the site during Tier 3 and Tier 4 studies include the big brown bat (*Eptesicus fuscus*), tricolored bat (*Perimyotis subflavus*), little brown bat (*Myotis lucifugus*), northern long-eared bat, and Indiana bat. Many of Pennsylvania’s cave-hibernating bats have had their populations decimated in recent years by White-Nose Syndrome (WNS) (White-Nose Syndrome.org 2015), so populations of some bat species in the project area may be greatly reduced compared to their historic numbers.

Bird and bat species of concern with potential to occur in the project area are summarized in Table 2. Eagles are discussed separately in Section 5.2.1.
### Table 2. Avian and Bat Species of Conservation Concern with the Potential to Occur in the Project Area

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Habitat Type and Occurrence</th>
<th>Potential for Occurrence in the Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Bittern (<em>Botaurus</em> lentiginosus)</td>
<td>SE</td>
<td>Habitat includes herbaceous wetland and riparian areas. Breeds primarily in large waterbodies including lake and pond edges where cattails, sedges, or bulrushes are abundant. Sometimes nests in sparsely vegetated wetlands or dry grassy uplands. There are a few small waterbodies near the project area that could provide potential habitat. American bitterns have been observed in Blair County (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td>Black-billed Cuckoo (<em>Coccyzus erythropthalmus</em>)</td>
<td>BCC</td>
<td>Habitat includes riparian, forest-conifer, forest-hardwood, forest-mixed, old field, shrubland/chaparral, woodland-conifer, woodland-hardwood, and woodland-mixed habitat. Breeding habitat includes forest edge and open woodland. There is potentially suitable forest habitat within and near the project area. Black-billed cuckoos have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>Black-capped Chickadee (<em>Poecile atricapillus</em>)</td>
<td>BCC</td>
<td>Found primarily in forest-hardwood, forest-mixed, old field, shrubland/chaparral, suburban/orchard, woodland-hardwood, woodland-mixed, riparian, and standing snag/hollow trees habitats. There is potentially suitable forest habitat within and near the project area. Black-capped chickadees have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and along the Martinsburg BBS route (Sauer et al. 2014), and are one of the most abundant birds in the area during the winter (National Audubon Society 2014).</td>
<td>High</td>
</tr>
<tr>
<td>Black-crowned Night-Heron (<em>Nycticorax nycticorax</em>)</td>
<td>SE</td>
<td>Habitat includes shallow water, forested wetland, herbaceous wetland, and riparian areas. There are a few small waterbodies near the project area. Black-crowned night-herons have been observed in Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Blackpoll Warbler (<em>Setophaga striata</em>)</td>
<td>SE</td>
<td>Found primarily in forest-conifer, forest-hardwood, forest-mixed, old field, shrubland/chaparral, woodland-conifer, woodland-hardwood, and woodland-mixed habitats. There is potentially suitable forest habitat within and near the project area. Blackpoll warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015). One blackpoll warbler carcass (likely a migrant) was incidentally observed in the project area during PCMM in fall 2010.</td>
<td>High</td>
</tr>
<tr>
<td>Black Tern (<em>Chlidonias niger</em>)</td>
<td>SE</td>
<td>Habitat includes herbaceous wetland, riparian, and grassland/herbaceous areas. Breeding typically occurs at sites with mixture of emergent vegetation and open water. There are a few small waterbodies near the project area that may provide marginal habitat. Black terns have been observed in Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Blue-winged Warbler (<em>Vermivora pinus</em>)</td>
<td>BCC</td>
<td>Found primarily in old field, shrubland/chaparral, and woodland-hardwood habitats. Breeding primarily occurs in brushy hillsides, second growth, and stream edges. There is potentially suitable woodland habitat within and near the project area. Blue-winged warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>Canada Warbler (<em>Wilsonia canadensis</em>)</td>
<td>BCC</td>
<td>Habitat includes forested wetland, riparian, scrub-shrub wetland, forest-hardwood, forest/woodland, shrubland/chaparral, woodland-conifer, woodland-hardwood, and woodland-mixed. Breeding habitat includes thickets of woodland undergrowth and deciduous second growth. There is potentially suitable forest and woodland habitat within and near the project area. Canada warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>----------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Cerulean Warbler (<em>Dendroica cerulea</em>)</td>
<td>BCC</td>
<td>Found primarily in forested wetland, riparian, forest-hardwood, forest-mixed, woodland-hardwood, and woodland-mixed habitats. Breeding occurs primarily in a structurally mature hardwood forest in a mesic or wetter situation with a closed canopy. There is potentially suitable forest and woodland habitat within and near the project area. Cerulean warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>Common Tern (<em>Sterna hirundo</em>)</td>
<td>SE</td>
<td>Habitat includes herbaceous wetland, riparian, and sand/dune. There are a few small waterbodies near the project area, but this habitat is probably marginal at best. Common terns have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Dickcissel (<em>Spiza americana</em>)</td>
<td>SE</td>
<td>Primarily found in cropland/hedgerow, grassland/herbaceous, old field, and savanna habitats. Breeding habitat includes grassland, meadows, savanna, cultivated lands, and brushy fields. There are a few cultivated lands near the project area, but the project area is primarily forested and does not provide ideal habitat.</td>
<td>Low</td>
</tr>
<tr>
<td>Golden-Winged Warbler (<em>Vermivora chrysoptera</em>)</td>
<td>BCC</td>
<td>Habitat includes forested wetland, riparian, old field, shrubland/chaparral, woodland-hardwood, and woodland-mixed habitats. Breeding habitat includes deciduous woodlands, woodland edge with low cover, and hillside scrub. There is potentially suitable forest and woodland habitat within and near the project area. Golden-winged warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
</tbody>
</table>
## Species Status Habitat Type and Occurrence

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Habitat Type and Occurrence</th>
<th>Potential for Occurrence in the Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Egret <em>(Ardea alba)</em></td>
<td>SE</td>
<td>Habitat includes forested wetland, herbaceous wetland, riparian, scrub-shrub wetland, and grassland/herbaceous. Nests in tall trees near water. There are a few small waterbodies near the project area that could provide marginal habitat. Great egrets have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Henslow’s Sparrow <em>(Ammodramus henslowii)</em></td>
<td>BCC</td>
<td>Habitat includes large, flat fields with no woody plants and with tall, dense grass, a dense litter layer, and standing dead vegetation. There are a few scattered grassland areas near the project area, but the project area is primarily forested and does not provide ideal habitat. The Henslow’s sparrow has been documented in Cambria county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Kentucky Warbler <em>(Oporornis formosus)</em></td>
<td>BCC</td>
<td>Habitat includes forested wetland, riparian, forest-hardwood, shrubland/chaparral, and woodland-hardwood habitat. Breeding habitat includes humid deciduous forest, dense second growth, and swamps. There is potentially suitable forest and woodland habitat within and near the project area. Kentucky warblers have been documented in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>King Rail <em>(Rallus elegans)</em></td>
<td>SE</td>
<td>Primarily found in herbaceous wetland, and scrub-shrub wetlands. There are a few small waterbodies near the project area that may provide marginal habitat. King rails have been observed in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Least Bittern <em>(Ixobrychus exilis)</em></td>
<td>BCC, SE</td>
<td>Habitat includes bog/fen, herbaceous wetland, riparian, and scrub-shrub wetlands. Breeding occurs in tall emergent vegetation in marshes, primarily freshwater. There are a few small waterbodies near the project area that may provide marginal habitat. Least bitterns have been observed in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Loggerhead Shrike</strong> (Lanius ludovicianus)</td>
<td>SE</td>
<td>Found primarily in cropland/hedgerow, desert, grassland/herbaceous, old field savanna, and shrubland/chaparral habitats. There are a few grassland areas near the project area, but the project area is primarily forested and does not provide ideal habitat.</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Long-eared Owl</strong> (Asio otus)</td>
<td>ST</td>
<td>Habitat includes herbaceous wetland, riparian, forest-conifer, forest-hardwood, forest-mixed, old field, shrubland/chaparral, woodland-conifer, woodland-hardwood, and woodland-mixed. There is potentially suitable forest and woodland habitat within and near the project area. Long-eared owls have been documented in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Louisiana Waterthrush</strong> (Parkesia motacilla)</td>
<td>BCC</td>
<td>Found primarily in forested wetland, riparian, forest-hardwood, and woodland-hardwood habitats. Breeding habitat includes moist forest, woodland, and ravines along streams; mature deciduous and mixed floodplain; and swamp forest habitats. There is potentially suitable forest and woodland habitat within and near the project area. Louisiana waterthrushes have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Northern Harrier</strong> (Circus cyaneus)</td>
<td>ST</td>
<td>Habitat includes bog/fen, herbaceous wetland, alpine, cropland/hedgerow, and grassland/herbaceous. Breeding habitat includes marshes, meadows, grasslands, and cultivated fields. There is potentially suitable forest and woodland habitat within and near the project area. Northern harriers have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015). Twenty northern harriers were observed during the 2010 raptor migration survey in the project area.</td>
<td>High</td>
</tr>
<tr>
<td><strong>Northern Saw-whet Owl</strong> (Aegolius acadicus)</td>
<td>BCC</td>
<td>Habitat includes forest-conifer, forest-mixed and standing snag/hollow trees. There is potentially suitable forest habitat within and near the project area. Northern saw-whet owls have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Osprey (<em>Pandion haliaetus</em>)</td>
<td>ST</td>
<td>Primarily found in forested wetland, riparian, cliff, and standing snag/hollow tree habitats. Closely associated with open water. There are a few small waterbodies near the project area that may provide marginal habitat but no known nests. Ospreys have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015). Seventeen ospreys were observed during the 2010 raptor migration survey in the project area.</td>
<td>High</td>
</tr>
<tr>
<td>Peregrine Falcon (<em>Falco peregrinus</em>)</td>
<td>SE</td>
<td>Habitat includes herbaceous wetland, riparian, cliff, shrubland/chaparral, woodland-conifer, woodland-hardwood, and woodland-mixed habitat. Nests on steep cliffs and rock outcrops. There is potentially suitable woodland foraging habitat within and near the project area. Peregrine falcons have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015). Eight peregrine falcons were observed during the 2010 raptor migration survey in the project area.</td>
<td>High</td>
</tr>
<tr>
<td>Pied-billed Grebe (<em>Podilymbus podiceps</em>)</td>
<td>BCC</td>
<td>Primarily found in herbaceous wetland habitats. There are a few small waterbodies near the project area that could provide marginal habitat. Pied-billed grebes have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Prairie Warbler (<em>Dendroica discolor</em>)</td>
<td>BCC</td>
<td>Habitat includes forested wetland, riparian, old field, shrubland/chaparral, and woodland-conifer. There is potentially suitable woodland habitat within and near the project area. Prairie warblers have been observed in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td>Red-headed Woodpecker (<em>Melanerpes erythrocephalus</em>)</td>
<td>BCC</td>
<td>Primarily found in riparian, woodland-hardwood, woodland-mixed, and standing snag/hollow tree habitat. There is potentially suitable woodland habitat within and near the project area. Red-headed woodpeckers have been documented in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Sedge Wren (Cistothorus platensis)</td>
<td>SE</td>
<td>Habitat includes herbaceous wetland, riparian, cropland/hedgerow, grassland/herbaceous, and savanna. Breeding habitat includes grassland and savanna. There are a few grassland areas near the project area; however, the project area is primarily forested. Sedge wrens have been documented in Blair county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Short-eared Owl (Asio flammeus)</td>
<td>BCC, SE</td>
<td>Primarily found in herbaceous wetland, cropland/hedgerow, grassland/herbaceous, old field, and savanna habitats. There are a few cropland and grassland areas near the project area; however, the project area is primarily forested and does not provide ideal habitat. Short-eared owls have been documented in Cambria county (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Low</td>
</tr>
<tr>
<td>Upland Sandpiper (Bartramia longicauda)</td>
<td>SE</td>
<td>Primarily found in cropland/hedgerow, grassland/herbaceous and old field habitats. Breeding habitat includes extensive, open tracts of short grassland habitat. There are a few cropland and grassland areas near the project area, but the project area is primarily forested and does not provide ideal habitat. Upland sandpipers have been documented in Cambria county (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Low</td>
</tr>
<tr>
<td>Wood Thrush (Hylocichla mustelina)</td>
<td>BCC</td>
<td>Habitat includes forested wetland, riparian, forest-hardwood, forest-mixed, shrubland/chaparral, woodland-hardwood, and woodland-mixed. Breeding habitat includes deciduous or mixed forests with a dense tree canopy. There is potentially suitable forest and woodland habitat within and near the project area. Wood thrushes have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014). One wood thrush fatality was documented during PCMM in 2010.</td>
<td>High</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Worm-eating Warbler (<em>Helmitheros vermivorum</em>)</td>
<td>BCC</td>
<td>Primarily found in riparian, forest-hardwood, shrubland/chaparral, and woodland-hardwood habitats. Breeding habitat is upland deciduous forests. There is potentially suitable forest and woodland habitat within and near the project area. Worm-eating warblers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014).</td>
<td>Medium</td>
</tr>
<tr>
<td>Yellow-Bellied Flycatcher (<em>Empidonax flaviventris</em>)</td>
<td>SE</td>
<td>Habitat includes forested wetland, riparian, forest-conifer, forest-hardwood, forest-mixed, woodland-conifer, woodland-hardwood, and woodland-mixed. There is potentially suitable forest and woodland habitat within and near the project area. Yellow-bellied flycatchers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015).</td>
<td>Medium</td>
</tr>
<tr>
<td>Yellow-Bellied Sapsucker (<em>sphyrapicus varius</em>)</td>
<td>BCC</td>
<td>Primarily found in riparian, forest-conifer, forest-hardwood, forest-mixed, woodland-conifer, woodland-hardwood, and woodland-mixed habitats. There is potentially suitable forest and woodland habitat within and near the project area. Yellow-bellied sapsuckers have been documented in both Blair and Cambria counties (National Audubon Society and Cornell Lab of Ornithology 2015) and have been observed along the Martinsburg BBS route (Sauer et al. 2014). One yellow-bellied sapsucker fatality was documented during PCMM in 2010.</td>
<td>High</td>
</tr>
<tr>
<td>Yellow-Crowned Night-Heron (<em>Nyctanassa violacea</em>)</td>
<td>SE</td>
<td>Habitat includes forested wetland, herbaceous wetland, and riparian. There are a few small waterbodies near the project area that may provide marginal habitat.</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Bats</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Small-footed Bat (<em>Myotis leibii</em>)</td>
<td>ST</td>
<td>Habitat includes riparian, forest-conifer, forest-hardwood, forest-mixed and standing snag/hollow trees. During the summer, roosts in caves, mines, hollow trees, rock crevices, and talus fields. Hibernates in caves and mines. There is potentially suitable forested habitat within and near the project area; however, this species has not been documented at the site during Tier 3 or Tier 4 surveys.</td>
<td>Medium (pre-WNS) Low (post-WNS)</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Habitat Type and Occurrence</td>
<td>Potential for Occurrence in the Project Area</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Indiana bat (<em>Myotis sodalis</em>)</td>
<td>FE, SE</td>
<td>A detailed description of habitat preferences can be found in the project’s HCP (see Section 11.1). There are no known maternity colonies or hibernacula in the project area. One Indiana bat carcass was documented in the project area during PCMM in 2011.</td>
<td>High (pre-WNS) Medium (post-WNS)</td>
</tr>
<tr>
<td>Northern Long-Eared Bat (<em>Myotis septentrionalis</em>)</td>
<td>FT</td>
<td>Habitat includes riparian, forest-conifer, forest-hardwood, forest-mixed and standing snag/hollow trees. Forms maternity colonies in large trees during the summer. Hibernates in caves and mines. Northern long-eared bats are known to occur in the project area because they were captured during pre-construction mist-netting studies.</td>
<td>High (pre-WNS) Medium (post-WNS)</td>
</tr>
</tbody>
</table>

FE=Federally Endangered, FT=Federally Threatened, PE = Proposed Endangered, SE=State Endangered, ST = State Threatened, BCC=USFWS Bird of Conservation Concern
5.2.1 Eagles

5.2.1.1 Bald Eagle

Both bald and golden eagles have potential to occur in the project area. Bald eagles nest in, winter in, and migrate through Pennsylvania. The state’s nesting population has increased dramatically from three pairs in 1980 to more than 270 pairs in 2013. Most of the bald eagles nests in Pennsylvania are located in Crawford, Pike, Lancaster, and York counties (Gross and Brauning 2014). Bald eagles are primarily found near large, perennial waterbodies, and they nest in tall trees near lakes, reservoirs, and rivers. Fish are a major component of their diet, particularly during the breeding season, though they also forage on waterfowl, small mammals, turtles, and carrion.

Pennsylvania locations with wintering concentrations of bald eagles include the Delaware River between Matamoras and Hancock, New York, the Lackawaxen River in Pike and Wayne counties, the lower Susquehanna River south of Harrisburg, and Pymatuning Reservoir in Crawford County. During spring and fall migration, two distinct populations of bald eagles pass through the state, including eagles that nest in the southern U.S. and move into Pennsylvania to winter in the state and eagles that nest in Canada and the northern U.S. and pass through Pennsylvania to reach southern wintering grounds. Raptors migrating through Pennsylvania (including bald eagles) tend to use terrain-derived uplifts generated by topographic features such as ridgetops and escarpments (including the Allegheny Front) to assist their migration flight. Bald eagles also migrate along large rivers as they are attracted to open water even during migration (Gross and Brauning 2014).

The project area and a 16-km (10-mile) radius lack large perennial waterbodies surrounded by tall trees that could provide suitable nesting habitat for bald eagles (Figure 2). Due to the lack of large waterbodies that would attract bald eagles, they are more likely to occur in the project area during spring and fall migration as they move between nesting and wintering habitats. Bald eagles are regularly observed as migrants at the Allegheny Front HawkWatch site, located approximately 32 km (20 miles) south of the project area. At this HawkWatch site, peak bald eagle migration occurs in March and September and more bald eagles are counted as migrants in the fall (n = 128 in fall 2014) than in the spring (n = 13 in spring 2014) (HMANA 2015). During a project-specific raptor migration survey conducted in the project area in spring and fall 2010, one bald eagle was observed in the spring and eight bald eagles were observed in the fall.

5.2.1.2 Golden Eagle

The golden eagle has the potential to occur in the project area during winter and migration. Two distinct golden eagle populations exist in North America, east and west of the Mississippi River. The eastern population, estimated to number 1,000 to 2,500 individuals, breeds in eastern Canada and migrates through and winters in the Appalachians. Winter habitat use of these eagles is poorly understood; they are primarily found in mountains where they seem to prefer large blocks of forested habitat. During migration, they follow ridgetlines and escarpments, including Pennsylvania’s Allegheny Front, to move between summer and winter habitat. The parallel ridges
and valleys of southern Pennsylvania seem to act as a migration “funnel” as relatively large numbers of golden eagles pass through this area (Katzner et al. 2012a; 2012b). At the Allegheny Front HawkWatch site, peak golden eagle passage typically occurs in March and November, with more birds observed in fall (n = 127 in fall 2014) than in spring (n = 56 in spring 2014) (HMANA 2015). During the 2010 project-specific raptor migration survey, three golden eagles were observed in the spring and four golden eagles were observed in the fall.
Figure 2. Project Area and 10-mile Radius.
5.3 Project-specific Tier 1 and Tier 2 Assessments Completed during the Development Phase

Shoener Environmental Consulting Inc. was hired by Gamesa Energy in 2006 to do a pre-construction scoping of environmental issues for what was then called the Allegheny Ridge Wind Project. This study was focused on 12 proposed turbines located north of the 23 turbines that were previously permitted and studied. To conduct the scoping, Shoener Environmental Consulting Inc. queried the Pennsylvania Natural Heritage Program (PNHP) Pennsylvania Natural Diversity Inventory (PNDI) database and also requested input on the project site from the PGC and USFWS. The report and associated agency correspondence can be found in Appendix E.

At the time of the project scoping, the main concerns identified by the USFWS and PGC were the potential impacts on the bald eagle (which was federally listed as threatened at that time) and the Indiana bat. The scoping report noted that the project area contains potential habitat for the Indiana bat, but noted that the project area’s habitats are likely unsuitable for the bald eagle. To address the concerns related to the bald eagle and Indiana bat, as well as birds and bats more generally, the agencies recommended that the following pre-construction studies be completed:

- Mid-winter survey for bald eagle nests
- Survey of cave and mine openings for potential bat hibernacula
- Survey with marine radar to assess use of airspace over the project area by migrating birds and bats

The developer took these recommendations into consideration (as well as the requirements outlined in the 2007 WEVCA) when designing the Tier 3 pre-construction studies for the project.

5.4 Summary

The WEG recommend that Tier 1 and 2 evaluations be conducted to answer several questions, which are included in Table 3, along with their responses.
Table 3. WEG Tier 1 and Tier 2 Questions and Responses for the NAWF

<table>
<thead>
<tr>
<th>Tier</th>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1/ Tier 2</td>
<td>Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?</td>
<td>Species of concern potential present within the project area are summarized in Table 2. There is no designated critical habitat for federally listed species present in the project area. Bird and bat species identified by the USFWS and PGC as a potential concern during the Tier 2 review process included the Indiana bat and bald eagle.</td>
</tr>
<tr>
<td></td>
<td>Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally designated critical habitat; high-priority conservation areas for nongovernment organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations.</td>
<td>The landscape surrounding the project area does not contain lands where development is precluded by law. The project area is located within the Allegheny Front Important Bird Area (IBA), which was designated as such by Audubon Pennsylvania in 2006 (when the NAWF was already in development). There are state game lands present in the project area, but no wind turbines are located on these lands. Beyond the presence of state game lands, the Tier 2 review process did not identify any designated sensitive lands.</td>
</tr>
<tr>
<td></td>
<td>Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?</td>
<td>The project area does not contain known maternity roosts, hibernacula, staging areas, winter ranges, raptor nests, or migration stopovers; however, it is located along the Allegheny Front, which is a known migration corridor for raptors, including bald and golden eagles.</td>
</tr>
<tr>
<td>Tier 1</td>
<td>Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?</td>
<td>Prior to development as a wind energy project, the project area and surrounding landscape did not contain large areas of intact habitat due to prior land uses such as strip mining, timber harvest, roads, residential development, and agricultural uses.</td>
</tr>
<tr>
<td>Tier</td>
<td>Question</td>
<td>Response</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tier 2</td>
<td>Are there plant communities of concern present or likely to be present at the site(s)?</td>
<td>The Tier 2 review did not identify any plant communities of concern in the project area; however, it identified several individual plant species of concern, including the American bugbane (<em>Cimicifuga americana</em>), Torrey’s rush (<em>Juncus torreyi</em>), bushy bluestem (<em>Andropogon glomeratus</em>), and Marguerite’s clubmoss (<em>Lycopodiella margueritae</em>). Three of these four plant species are found on wetlands, and one (the American bugbane) is found in moist woodlands. To DER’s knowledge, impacts to these habitats were minimized during project siting and construction.</td>
</tr>
<tr>
<td></td>
<td>Using best available scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?</td>
<td>The Tier 2 review did not identify any species of habitat fragmentation concern with the potential to occur in the project area.</td>
</tr>
<tr>
<td></td>
<td>Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?</td>
<td>Numerous bird and bat species have the potential to be found within the project area. Species of concern with the potential to be found in the project area are summarized in Table 2. At the time the Tier 2 review was completed, only the bald eagle and Indiana bat were identified as individual species of concern that could potentially occur within the project area.</td>
</tr>
<tr>
<td></td>
<td>Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?</td>
<td>The Tier 2 review did not identify the potential for the project to have significant adverse impacts that could not be avoided, minimized, or mitigated.</td>
</tr>
</tbody>
</table>
6 FIELD STUDIES TO DOCUMENT SITE WILDLIFE AND HABITAT AND PREDICT PROJECT IMPACTS (WEG TIER 3)

The following Tier 3 studies were conducted to address concerns that were identified during the Tier 2 site evaluation process:

- Fall 2004 and spring 2005 nocturnal radar studies
- Summer 2005 and summer 2006 bat mist-netting studies
- 2006 bat hibernacula assessment
- January 2006 bald eagle nest survey

These studies are summarized in greater detail below and copies of the reports are provided in Appendix F.

6.1 Nocturnal Bird and Bat Radar Studies

In the fall of 2004 and spring of 2005, ABR, Inc. was contracted to conduct radar and visual studies of nocturnal bird and bat migration in the project area (which at the time of the 2004 study was called the Martindale Wind Power Project and at the time of the 2005 study was called the Allegheny Ridge Wind Farm). The goal of these studies was to collect information on the migration characteristics of nocturnal birds (particularly passerines) and to assess the extent to which bats use the project area.

ABR, Inc. conducted radar and visual observations on 28 nights between August 15 and October 15, 2004 (fall season) and on 22 nights between April 13 and May 27, 2005 (spring season). Fall surveys occurred between ~2000 hours (h) and 0230 h, and spring surveys occurred between ~2100 h and 0315 h, to cover the peak hours of nocturnal passerine migration during each of these seasons. The surveys used a marine radar to scan the airspace above the project area for migrating birds and bats (“targets”) coupled with spotlights and night-vision goggles to visually assess relative numbers of birds and bats flying within the rotor-swept area (defined as the area below 125 m above ground level [AGL]). The range of the radar used in the study was 1,500 m (1.5 km).

According to ABR, Inc., the overall fall and spring passage rates of passerines and bats were average as compared to other sites studied in the region (see radar study reports in Appendix F). In the fall, the mean nightly passage rates ranged from 13 to 958 targets/km/h, and in the spring, the mean nightly passage rates ranged from 16 to 840 targets/km/h. In the fall, approximately 7 percent of targets passed below 125 m AGL, and in the spring, approximately 11 percent of targets passed below 125 m AGL. Estimated mean passage rates for targets flying below 125 AGL were 15.5 targets/km/h in the fall and 35.4 targets/km/h in the spring. These passage rates were similar to those observed in other radar studies in the eastern U.S. (see summary of comparative data in the radar study reports in Appendix F). In the fall, the estimated turbine passage rate index was 0.9 to 6.5 birds and bats passing within the area occupied by each proposed turbine each night. In the spring, the estimated turbine passage rate index was 1.7 to 12.4 birds and bats passing within the area occupied by each proposed turbine each night.
Moderate-to-large movements of birds were observed on 11 nights (September 22 and October 2 and 4, 2004, and April 17, 19, and 25 and May 1, 6, 10, 14, and 26, 2005), interspersed with nights with lower migration rates. Peak numbers of bats occurred in mid-August during the fall study and mid-April during the spring study.

### 6.2 Bat Mist Netting and Hibernacula Assessment

Two seasons of pre-construction mist netting were conducted within or near the NAWF, one in 2005 and one in 2006. In August 2005, four mist-net sites were sampled at the NAWF to cover the linear turbine line proposed for the project at the time. Mist netting was conducted by a qualified Indiana bat surveyor approved by the USFWS and PGC to conduct and interpret the results of mist-net surveys. Sampling techniques followed the protocol outlined in the 2007 Draft Indiana Bat Recovery Plan (USFWS 2007). Bats were captured using mist nets with a minimum of two separate net sets being run per site. Each site was run for two nights for two hours starting at dusk. Nets were checked for bats every 15 minutes. Areas selected for netting were relatively high quality, with good flight corridors and/or large puddles. Weather conditions for mist-net surveys were within USFWS guidelines (USFWS 2007), with no rain and no temperatures under 10 degrees Celsius (°C; 50 degrees Fahrenheit [°F]) throughout the survey periods. A total of 84 bats were captured with an average of 21 bats captured per mist-net site. Bats captured included six species, with individual captures consisting of 34 little brown bats, 16 northern long-eared bats, 23 big brown bats, seven eastern red bats, three tri-colored bats, and one hoary bat.

A second round of mist netting was conducted in August 2006. Four mist-net sites were sampled at the NAWF to cover the linear turbine line proposed for the wind facility. The 2006 mist-net sites were in different locations from the 2005 mist-net sites, but methods were the same as those used in 2005. A total of 74 bats were captured with an average of 17.8 bats captured per mist-net site. Bats captured included four species, with individual captures consisting of 34 little brown bats, 24 northern long-eared bats, 11 big brown bats, and two eastern red bats.

In 2006, Shoener Environmental (in coordination with Sanders Environmental, Inc.) assessed the site for the potential presence of caves or mines that could provide suitable bat hibernacula. This assessment was based on a combination of field observations within the proposed disturbance footprint and a review of the Pennsylvania Department of Environmental Protection Bureau of Mines Reclamation Database. The assessment concluded that there are no abandoned mines or caves that could provide suitable hibernacula within the area planned for disturbance.

### 6.3 Bald Eagle Nest Survey

A bald eagle nest survey was conducted in January 2006 by Kathy Michell, an independent contractor with bald eagle nest survey and monitoring expertise. To conduct the survey, Ms. Michell visited the project area on January 10 and 11, 2006, drove the pre-existing roads in the project area, and walked the ridges where the proposed project infrastructure was planned to be located. In addition, she surveyed trees surrounding nearby reservoirs (the Portage Reservoir and the Lilly Reservoirs) for potential eagle nests.
Ms. Michell noted that the project area had been heavily logged in the past and consisted of young growth trees; too small to support an eagle nest. Nearby bodies of water were too small to provide foraging habitat and lacked large trees that could support nests. Ms. Michell concluded that there were no bald eagle nests or potential foraging areas near the project site (see eagle nest survey report in Appendix F).

6.4 Summary

The WEG recommend that Tier 3 studies be conducted to answer several questions, which are included in Table 4, along with their responses. These responses are based on the Tier 3 studies described above.
**Table 4. WEG Tier 3 Questions and Responses for the NAWF**

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do field studies indicate that species of concern are present on or likely to use the proposed site?</td>
<td>Tier 3 studies identified the presence of one species of concern, the northern long-eared bat, which was captured during mist netting (however, this was not a species of concern at the time that the 2005 and 2006 studies were conducted as it was not proposed for federal listing until 2013). Radar studies (which do not provide species-level information) concluded that moderate numbers of birds and bats pass over the project area during spring and fall migration (compared to other sites in the region).</td>
</tr>
<tr>
<td>Do field studies indicate the potential for significant adverse impacts on affected population of species of habitat fragmentation concern?</td>
<td>The Tier 3 studies did not identify any species of habitat fragmentation concern that could be impacted by the project.</td>
</tr>
<tr>
<td>What is the distribution, relative abundance, behavior, and site use of species of concern identified in Tiers 1 or 2, and to what extent do these factors expose these species to risk from the proposed wind energy project?</td>
<td>Species of concern identified during Tiers 1 and 2 were the bald eagle and Indiana bat, neither of which was documented using the project area during Tier 3 studies.</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>What are the potential risks of adverse impacts of the proposed wind energy project to individuals and local populations of species of concern and their habitats? (In the case of rare or endangered species, what are the possible impacts to such species and their habitats?)</td>
<td>The Tier 3 studies did not identify potential risks to individual species of concern (at that time). Forty northern long-eared bats were captured during mist-netting surveys in 2005 and 2006, indicating that this species is present on the site and may therefore be at some degree of risk from the operating wind turbines (though none have been found during PCMM to date, see Section 7.1). Radar studies indicate that nocturnally migrating birds and bats pass through the rotor-swept zone during spring and fall migration and may therefore be at risk of collision with the operating wind turbines. In the fall, the estimated turbine passage rate index was 0.9 to 6.5 birds and bats passing within the area occupied by each proposed turbine each night. In the spring, the estimated turbine passage rate index was 1.7 to 12.4 birds and bats passing within the area occupied by each proposed turbine each night. The radar study reports acknowledged that the passage rate index does not necessarily correlate with collision risk due to other factors that might affect risk, such as weather and avoidance behavior.</td>
</tr>
<tr>
<td>How can developers mitigate identified significant adverse impacts?</td>
<td>The Tier 3 studies did not identify the potential for significant impacts to species of concern (at that time); therefore, no mitigation measures were developed at the Tier 3 stage.</td>
</tr>
<tr>
<td>Are there studies that should be initiated at this stage that would be continued in post-construction?</td>
<td>The Tier 3 studies did not indicate the need for additional studies that should begin during the pre-construction stage and continue after construction.</td>
</tr>
</tbody>
</table>
7  POST-CONSTRUCTION STUDIES (WEG TIER 4)

7.1  Avian and Bat Mortality Monitoring (Tier 4a)

The primary objective of avian and bat post-construction mortality monitoring (PCMM) studies is to estimate avian and bat mortality at the NAWF and determine whether the estimated mortality is significant enough to impact bird and bat species population levels, to determine whether species of concern are being impacted, and to determine whether additional studies or impact avoidance, minimization, and/or mitigation measures are necessary. Two initial years of PCMM were completed in 2010 and 2011, after all the turbines were fully operational (Appendix G), in accordance with the requirements of the WEVCA.

PCMM was intended to be conducted in 2010 from March 1 through December 15. However, due to deep snow in March, which precluded the searchers’ ability to access the wind facility, searches could not start at the turbine sites until April 1, 2010. With approval from the PGC, the 2011 monitoring period was shortened to April 1 through November 15. The duration of surveys for the 2011 season was abbreviated because of poor site conditions in March and the lack of mortality during December of the first year of surveys. Consistent with the WEVCA, 10 out of 35 (28.5 percent) turbines were monitored daily for bird and bat carcasses during each year of the study. Searches and related procedures followed the WEVCA Protocols to Monitor Bat & Bird Mortality at Industrial Wind Turbines Sites.

Over the two years of PCMM, the searchers recovered 294 carcasses (259 bats and 35 birds). Twelve bird species were identified. The majority of the bird carcasses were passerines. Raptor mortalities at the NAWF were very low with no raptor fatalities discovered during mortality surveys. Two incidental raptor fatalities were found during the 2010 season, a Cooper’s hawk (Accipiter cooperii) and a broad-winged hawk (Buteo platypterus). No raptors were found during the 2011 monitoring season.

No federally endangered or threatened bird species were found during the standardized PCMM. One state endangered bird, the blackpoll warbler, was incidentally found in October 2010 by a maintenance crew working at Turbine A-6. There is a strong probability that this species was a migrant since it was found in non-typical breeding habitat for the species and during the fall (October 7, 2010), which is the typical migratory period for blackpoll warblers.

Seven bat species were identified during PCMM. Tree bats, such as the red bat, hoary bat, and silver-haired bat, made up 87 percent of the overall bat mortalities for the two-year study period. One federally endangered bat species, the Indiana bat, was found during the PCMM. This bat, a juvenile female, was found on September 26, 2011, at Turbine A-55. No other threatened or endangered bat species were found during this mortality monitoring. Due to the discovery of this carcass, turbine operations were curtailed nightly from September 27 through November 1, 2011.

Mortality estimates calculated for the 2010 and 2011 PCMM studies are summarized in Table 5. Through mortality estimates factoring in searcher efficiency, scavenger rate, and searchable area, it was determined that the NAWF had an overall estimated mortality of 2,180 individuals (2,046 bats and 134 birds) in 2010 and 1,288 individuals (1,057 bats and 231 birds) in 2011. Using an
alternative estimate of mortality, which adjusted the carcass counts proportionally based on searchable area and carcass distance, the site’s overall mortality estimate dropped from 2,180 to 1,580 individuals in 2010 and from 1,361 to 776 individuals in 2011. A small portion of the decrease in overall estimated mortality from 2010 to 2011 may be due to the nighttime curtailment in place during the end of the 2011 season; however, during the same period in 2010, only 8 of the 155 bat carcasses were found. Thus, the decrease in estimated mortality cannot wholly be explained by the curtailment of the turbines during this period.

### Table 5. Summary of Bird and Bat Mortality Estimates from 2010 and 2011

<table>
<thead>
<tr>
<th></th>
<th>Mortality Estimate (No Searchable Area/Distance Adjustment)</th>
<th>Mortality Estimate (Adjusted for Searchable Area and Carcass Distance)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td>Birds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Total</td>
<td>134</td>
<td>231</td>
</tr>
<tr>
<td>Per Turbine</td>
<td>3.8</td>
<td>6.6</td>
</tr>
<tr>
<td>Per MW</td>
<td>1.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Bats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Total</td>
<td>2,046</td>
<td>1,057</td>
</tr>
<tr>
<td>Per Turbine</td>
<td>58.5</td>
<td>30.2</td>
</tr>
<tr>
<td>Per MW</td>
<td>29.2</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Source: Post-Construction Bird/Bat Mortality Monitoring Final Report (2010 and 2011), North Allegheny Wind Farm (report included in Appendix G; the methods used to derive these estimates are described therein)

Several trends were seen through the analysis of the mortality data. The majority of the bat kills (78 percent in 2010 and 61 percent in 2011) were in the months of August and September. The few bird kills were more concentrated in the late-summer and early fall of both years. In 2011, however, there was an increase in bird kills during the spring period of April and May. The majority of the carcasses (90 percent in 2010 and 82 percent in 2011) were found within 40 m of the turbine base, with bird carcasses found closer to the turbine bases than bat carcasses.

### 7.2 Studies to Address Impacts of Habitat Loss, Degradation, and Fragmentation (Tier 4b)

No Tier 4b studies have been conducted to date. Tier 4b studies may be conducted as necessary under the HCP as referenced in Section 11.1. Other Tier 4b studies will be initiated as conditions warrant.

### 7.3 Summary

The WEG recommend that Tier 4 studies be conducted to answer several questions, which are included in Table 6, along with their responses. These responses are based on the Tier 4 studies described above.
Table 6. WEG Tier 4 Questions and Responses for the NAWF

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the bird and bat fatality rates for the project?</td>
<td>Bird and bat fatality rates are presented in Table 5.</td>
</tr>
<tr>
<td>What are the fatality rates of species of concern?</td>
<td>Species of concern found as fatalities during the 2010 and 2011 PCMM include one Indiana bat (further details on the predicted fatality rates of this species are in the project’s HCP; see Section 11.1), one blackpoll warbler (state endangered), one yellow-bellied sapsucker (BCC), and one wood thrush (BCC).</td>
</tr>
<tr>
<td>How do the estimated fatality rates compare to the predicted fatality rates?</td>
<td>Quantitative fatality rates were not predicted for the project prior to the Tier 4 studies. Tier 3 radar studies conducted during the spring and fall migration periods observed moderate passage rates of birds and bats, and the Tier 4 studies similarly concluded that fatality estimates for birds and bats are moderate compared to other wind farms in the region.</td>
</tr>
<tr>
<td>Do bird and bat fatalities vary within the project site in relation to site characteristics?</td>
<td>The number of bat fatalities decreased with increasing wind speed and increased with increasing temperature. No such weather correlations were found for bird mortality. No correlation with other site characteristics was found during the 2010 or 2011 PCMM.</td>
</tr>
<tr>
<td>How do the fatality rates compare to the fatality rates from existing projects in similar landscapes with similar species composition and use?</td>
<td>Bat and bat fatality rates were found to be higher than the average reported from other wind farms in Pennsylvania, but similar to those reported from other wind farms in the eastern U.S. (see Appendix G).</td>
</tr>
<tr>
<td>What is the composition of fatalities in relation to migrating and resident birds and bats at the site?</td>
<td>The majority of bat mortality occurred during the fall migration season (August and September) and consisted of migratory tree bats; this suggests that most of the bats killed were migrating and not local residents. Similarly, many of the bird carcasses were likely migrants as they were found during spring and fall migration.</td>
</tr>
<tr>
<td>Do fatality data suggest the need for measures to reduce impacts?</td>
<td>Yes; because a federally listed species (Indiana bat) was found during the 2011 PCMM, DER implemented additional measures to reduce impacts on the Indiana bat (these measures likely reduced impacts on other bat species as well). These measures are further detailed in the project’s HCP (see Section 11.1).</td>
</tr>
</tbody>
</table>
8 OTHER POST-CONSTRUCTION STUDIES (WEG TIER 5)

According to the WEG, Tier 5 studies may need to be conducted when:

1. Realized fatality levels for individual species of concern reach a level at which they are considered significant adverse impacts by the relevant agencies.
2. There is the potential for significant fatality impacts or significant adverse impacts to habitat for species of concern, there is a need to assess the impacts more closely, and there is uncertainty over how these impacts will be mitigated.
3. Fatality and/or significant adverse habitat impacts suggest the potential for a reduction in the viability of an affected population, in which case studies on the potential for population impacts may be warranted.
4. A developer evaluates the effectiveness of a risk reduction measure before deciding to continue the measure permanently or whether to use the measure when implementing future phases of a project.

NAW proceeded with a Tier 5 bat mist-netting study due to the unexpected discovery of the Indiana bat carcass during Tier 4a PCMM, to help assess the significance and potential future risk of further Indiana bat mortality. A Tier 5 raptor migration study was also conducted in light of concerns brought forth by the USFWS in 2009 that the project may adversely impact migrating eagles and other raptors.

8.1 Bat Mist Netting

Because the level of effort in the 2005 and 2006 mist-netting surveys did not cover the entire current area of the NAWF, a third season of mist netting was conducted in summer 2012. Mist netting conducted in 2012 met and exceeded the minimum specified in USFWS guidelines (USFWS 2007); the sampling techniques, methods, and protocols used in 2012 followed the more intensive 2012 PGC “Standard and Minimum Effort Requirements for Qualified Indiana Bat Surveyor Netting within the Commonwealth of Pennsylvania” document (PGC 2012). Thirty-four mist net sites were sampled between May 31 and June 24, 2012, at the NAWF. A total of 156 bats were captured with an average of 4.7 bats captured per mist-net site, which was much lower than that documented during 2005 and 2006, likely due to the effects of WNS. Five species were captured, including one little brown bat, 42 northern long-eared bats, 84 big brown bats, five hoary bats, and 27 eastern red bats.

8.2 Raptor Migration Survey

In a letter dated April 30, 2009, the USFWS stated that golden eagles may pass through the project area during spring and fall migration and recommended that eagle migration surveys be conducted to document use of the project area by migrating eagles. The USFWS letter also stated that the migration surveys should conform to the methods described in the WEVCA. The 2007 WEVCA required that at least one year of raptor migration surveys be conducted following Hawk Migration Association of North American (HMANA) standards to assess risk to migrating raptors. In response to these concerns, DER contracted Shoener Environmental to conduct spring and fall raptor migration surveys in 2010.
The raptor migration surveys were conducted in accordance with guidelines set forth in the WEVCA Exhibit A: Protocols to Monitor Bird Populations at Industrial Wind Turbine Sites. To conduct the surveys, biologists scanned the visible sky from predetermined survey stations using unaided vision, binoculars, or a spotting scope and recorded data for each migrating raptor observed. In accordance with the survey dates specified in the WEVCA, surveys were conducted from March 1 to 31 and August 15 to December 15, 2010, at an average frequency of five days per week. Surveys were conducted between the hours of 08:00 and 16:00 Eastern Standard Time (EST) between March 1 and 14 (inclusive) and November 15 through December 15; and 09:00 and 17:00 EST from March 15 through 31 and August 15 through November 14.

In 841.6 hours (111 days) of observation, 891 migratory raptors representing 15 species and five unknown categories were observed. Additionally, eight species and one unknown category were observed and recorded as not migrating, but utilizing the area within 200 m of the rotor swept zone. The majority of raptors observed were turkey vultures (*Cathartes aura*), red-tailed hawks (*Buteo jamaicensis*), and broad-winged hawks (*Buteo platypterus*). A total of 17 migrating eagles were observed (nine bald eagles, seven golden eagles, and one eagle of undetermined species), as well as eight peregrine falcons (state endangered), 17 ospreys (state threatened), and 20 northern harriers (state threatened).

Six-hundred and twenty migrating raptors comprising 14 species and two unknown categories were observed migrating within 200 m of the rotor-swept zone, including five bald eagles, four golden eagles, one peregrine falcon, 10 ospreys, and 13 northern harriers. Raptors observed in the immediate vicinity of turbines appeared to avoid them easily, and a few appeared to investigate the rotors from a distance. There was not a clear flight path of migrating raptors (e.g., along a certain tree corridor or drainage); however, most appeared to fly a southerly trajectory.

The raptor migration survey, coupled with the results of Tier 4 PCMM studies, concluded that there appears to be little or no correlation between raptor observations from on-site raptor surveys and raptor mortality. While numerous raptors were observed in the vicinity of the site, the lack of observed fatalities during standardized PCMM searches indicates there is a low potential risk to raptors, including eagles, at the NAWF.

To date, DER is not aware of any wind turbine-related golden eagle fatalities that have been documented in the eastern U.S. Risk factors to golden eagles include foraging behavior as well as breeding behavior, and mortality of golden eagles engaging in these behaviors has been documented at wind farms in the western U.S. (Pagel et al. 2013; Kochert et al. 2002). Less is known about the potential impacts of wind turbines on bald eagles in the eastern U.S.; to date, DER is aware of one reported bald eagle mortality at a wind facility in Maryland (Pagel et al. 2013). However, wind turbine collision risk is thought to be minor compared to risk of mortality from other sources. Bald eagle mortality has been documented in the eastern U.S. in the form of vehicular collision, poisoning, and collision with power lines, among other sources (Buehler 2000). Collision impacts are usually related to the act of scavenging near power lines or along highways. The fact that forested ridge tops like those found at the NAWF do not provide optimal foraging or scavenging habitat for eagles supports the notion that they are less at risk of mortality,
largely because they will be less likely to perform those behaviors (such as foraging and courtship rituals) that might put them at risk.

9 CONSERVATION MEASURES TO AVOID AND MINIMIZE ADVERSE IMPACTS

The following sections describe the conservation measures being implemented at NAWF to avoid, minimize, and mitigate potential adverse impacts on birds and bats. The NAWF has been operating since 2009; therefore, only the operation and decommissioning phase measures are currently applicable to the project. However, the measures that were incorporated by the previous developer during the siting and construction phase are also summarized below to provide context.

9.1 Siting and Construction

Siting for the Gamesa Wind Energy facility began prior to the implementation of the PGC’s WEVCA in 2007. DER purchased the 35 turbines now known as NAW in 2009. Other than documentation cited in previous sections of this BBCS, it is unknown what specific best management practices (BMPs) were implemented during siting. It is assumed that the site-specific baseline wildlife information as well as consultations with the PGC and the USFWS resulted in BMPs that were implemented during the siting phase of the project to avoid and minimize impacts to avian and bat species. At a minimum, the following general USFWS recommendations were implemented at the NAWF:

- Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas - much of the land in the project area had already been altered by past land uses including strip mining, timber harvests, roads, utility corridors, and residential development.

- To reduce habitat fragmentation, co-locate roads, fences, and other infrastructure in or immediately adjacent to already-disturbed areas (e.g., existing roads, pipelines, agricultural fields). Where this is not possible, minimize roads, fences, and other infrastructure – many of the project’s access roads and other facilities were co-located with existing roads or located in other previously disturbed areas, such as former strip mines. In addition, some of the project’s access roads are used both for the NAWF and Infigen Energy’s Allegheny Ridge Wind Farm, which helps to minimize the disturbance footprint of both projects on the landscape.

- Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting – the turbines selected for use at the NAWF have tubular supports and lack external structures that could be used by perching or nesting birds.
During the construction phase, as determined by the information provided to DER, Gamesa Energy employed all BMPs as outlined in the PGC WEVCA protocols to avoid, minimize, and mitigate impacts to the environment including flora and fauna resources.

9.2 Operation

Operation-phase conservation measures were developed for the NAWF in order to address the primary risks identified during Tiers 1 through 5; namely, risk to raptors (including eagles) and bats. The project is developing an HCP that will address risks to the Indiana bat specifically (but will include conservation measures that are protective of all bats). Section 11.1 summarizes the potential conservation measures that may be included in the HCP, once it is finalized. This section focuses on summarizing the conservation measures that NAW will implement above and beyond those that will be included in the HCP.

- **Operational Curtailment** – In the interim period prior to issuance of an ITP, NAW is implementing operational curtailment measures to minimize the potential for mortality of Indiana bats. From July 1 to October 15, NAW is operating the project at a 6.9 m/s (15.4 mph) wind cut-in speed from a half-hour before sunset to a half-hour after sunrise. During periods when the wind speeds are below the nighttime cut-in speed of 6.9 m/s, NAW feathers the turbine blades so the blades rotate at less than two rotations per minute (rpm). Raising the wind turbine nighttime cut-in speed is likely protective of all bat species, because such measures have consistently been shown to reduce overall bat mortality by 40 percent or more (Arnett et al. 2011; Arnett et al. 2013).

- **Raptor Nest Relocation** – Although not expected at the NAWF, if raptor nests are found on or near project facilities, a DER biologist will consult with the USFWS Ecological Services to determine appropriate actions if necessary.

- **BMPs to Reduce Raptor Collision Risk** – BMPs for minimizing and mitigating raptor collision risk at NAW have been developed and are outlined below. These suggested BMPs are intended to reduce the number of raptor mortalities or injuries resulting from wind turbine collisions at the NAWF. Many of these BMPs require cooperation and coordination with the landowners who may undertake a variety of activities on the NAWF site including farming, ranching, hunting, and other forms of recreation. The project site manager, along with assistance from others within DER, shall be primarily responsible for implementing these BMPs.

  These BMPs primarily address potential food or prey sources for raptors. Raptors such as turkey vultures are attracted to and will eat carrion. Other raptors such as red-tailed hawks prey heavily on mice, rabbits and other small rodents. Eliminating or minimizing these food sources will lessen the likelihood that raptors will be attracted to the project site. BMPs include:

  1. **Wildlife Carcass Removal**: Wildlife carcasses (except birds and bats) found on the site shall be removed from the site to prevent the carcass from being an attractant to raptors.
For example, if a road-killed cottontail rabbit is found in close proximity to roads or a turbine (under the horizontal extent of a turbine rotor), it shall be collected and removed from the site. Bird and bat carcasses likely resulting from wind turbine collision will be removed from the site according to the specific permit granted from the appropriate agencies and according to DER’s Wildlife Monitoring and Reporting System (WMRS; see Section 15). NAW obtained permits to allow for the removal of birds and bats as described in Section 12 of this BBCS.

2. Hunting: While hunting may be allowed on the project site, the project site manager shall work with the landowner, hunt manager, or hunting outfitter to ensure that large game is not field dressed or partially processed on the project site (i.e., skinned and quartered). Large game animals harvested on the site will be immediately removed and field dressed or processed off site.

3. Small Rodents or other Prey: Human-caused attractions of prey (i.e., creation of rock, debris, or brush piles) will be minimized on the project site.

Note that DER has limited legal rights under its wind power lease agreements to restrict or otherwise control the use of the land by the landowners. Therefore, the use of BMPs listed above may have limitations dictated by the landowner.

In addition to the voluntary BMPs described above, NAW also has implemented and will continue to implement the following BMPs during operation of the project per the 2013 WEVCA:

- Reduce project road access to the extent practical and consistent with safety needs, environmental concerns, legal requirements, and the requests of the landowner.
- Reduce vehicle collision risk to wildlife by instructing project personnel to drive at appropriate speeds, be alert for wildlife, and use additional caution in low visibility conditions.
- Instruct employees, contractors, and site visitors to avoid harassing or disturbing wildlife, particularly during reproductive seasons.
- Implement a Wildlife Monitoring and Reporting System (WMRS) for the life of the project. A WMRS is a specific set of processes, procedures, and training for monitoring and responding to bird or mammal injuries and fatalities and reporting those injuries and fatalities to the PGC and USFWS. DER’s WMRS is further described in Section 15.
- Turbine lighting has been minimized to that which is required by the FAA and red pulsating lights are being utilized, consistent with the WEG (USFWS 2012);
- To further minimize potential impacts to avian species, there is no additional at lighting at individual turbines (other than the FAA-required lighting), and substation lighting is only used when needed. The O&M building is not equipped with outdoor lighting therefore not posing a risk to avian species.
• On project-maintained land, limit mowing to the fullest extent possible between April 1 and July 31.

• Implement the Spill Prevention, Control, and Countermeasure (SPCC) plan that NAW has in place as required under Pennsylvania Department of Environmental Protection regulations to avoid and minimize impacts to wildlife.

9.3 Decommissioning

NAW will implement the following BMPs during the decommissioning phase per the 2013 WEVCA:

• Except where otherwise required by an applicable regulation or an agreement with the landowner, NAW will, at its expense, complete decommissioning of the wind energy facility within 18 months after the end of the useful life of the facility to reduce the likelihood of additional wildlife collisions with the non-operational structures.

• Except where otherwise required by an applicable regulation or an agreement with the landowner, decommissioning will include removal of all facilities, including turbine foundations to a depth of 36 inches, except that facilities may be left in place at the request or with the consent of the landowner.

• During decommissioning of the wind energy facility, additional wildlife habitat loss will be minimized by utilizing existing rights-of-way and previously disturbed corridors to the fullest extent practicable.

• Prior to decommissioning, and in coordination with the landowner, NAW will develop a revegetation plan that favors Pennsylvania native plant species in order to enhance the wildlife habitat value of the project area.
10  ADAPTIVE MANAGEMENT

Over the life of the project, it is possible that risks will change or observed impacts will exceed predicted levels, which may warrant alterations or additions to the conservation measures described in Section 9. NAW will use an adaptive management approach to promote flexibility to respond to changing conditions during project operations. As described in the 2012 WEG (USFWS 2012), passive adaptive management is the process of assessing various management options, and the management option determined to be the most appropriate for the situation is designed and implemented. The management action is then assessed through monitoring and evaluation to determine if the desired results are being met or if adjustments to the management action are warranted.

DER, in coordination with the PGC and the USFWS, has assessed and will continue to assess the results of the PCMM and other post-construction studies at NAW. The effectiveness of the management decisions made to date (e.g., siting decisions, wildlife avoidance measures, and BMPs) will be evaluated throughout the post-construction monitoring efforts and through the WMRS (see Section 15).

Depending on the results of the post-construction monitoring studies, no further action may be warranted if impacts are determined to be minor and species of concern are not being impacted. If impacts are determined to be at an unacceptable level or if species of concern are being impacted, an assessment of why impacts are occurring will be conducted to aid in developing appropriate mitigation actions. If causation for impacts is unknown, further monitoring efforts may be implemented to help understand impacts. The determination of acceptable level of impact will be discussed with the USFWS, PGC, and DER biologists. Once the mitigation measures are determined and put into place, additional monitoring to determine the effectiveness of the mitigation measures will be conducted, and, depending on the results, further remedial measures may or may not be necessary.

In the event that there is a high degree of uncertainty surrounding the appropriate management action or mitigation measure to implement, several alternative management strategies or mitigation measures may be designed, implemented, and tested to determine their effectiveness. This process is called active adaptive management (in contrast to the passive adaptive management approach described above; USFWS 2012). This approach would help to determine the best management action or mitigation measure to be implemented over the long term by testing several options and eventually selecting the one that is deemed most successful. An example might be to implement a variety of mitigation measures in some portions of the NAWF but not in others. To test the effectiveness of the various mitigation measures/management approaches, observational or other technology deployment (i.e., radar, visibility monitors, or cameras) may be utilized in conjunction with a fatality monitoring effort to determine which of the implemented practices appear to be most effective in reducing impacts and achieving the desired result.

Adaptive management specifically targeted towards reducing incidental take of Indiana bats will be included as a component of the project’s HCP (see Section 11.1).
11 OTHER PLANS GUIDING BIRD AND BAT CONSERVATION

11.1 Indiana Bat Habitat Conservation Plan

On September 26, 2011, during post-construction bird and bat mortality monitoring, an Indiana bat carcass was discovered near NAW turbine A55. Upon confirmation that it was an Indiana bat, NAW immediately notified the USFWS and the PGC and ceased nighttime operations to avoid further take of Indiana bats. Based on ongoing communication with the USFWS and in order to prevent additional possible take of Indiana bats, NAW did not operate at night from September 27 to October 31, 2011. Some limited nighttime operations of the NAWF occurred from November 1 to November 15, 2011, during periods of below-freezing temperatures, high winds, or heavy snowfall. Though no specific criteria were set regarding the specific weather conditions under which turbines were allowed to operate normally, NAW coordinated with USFWS during times when turbines were allowed to operate normally to ensure that risk to Indiana bats was not present.

To further minimize and mitigate the impacts of take of Indiana bats and to obtain an ITP from the USFWS authorizing future incidental take of Indiana bats, NAW began development of an HCP, pursuant to Section 10 of the ESA. NAW also considered including the northern long-eared bat as a covered species in the HCP. However, the final 4(d) rule for the northern long-eared bat clarifies that incidental take of this species from wind energy facilities is not a primary threat that would jeopardize the species’ conservation, and thus incidental take from operation of wind turbines is not prohibited. Therefore, NAW decided to exclude the northern long-eared bat from the HCP, with the recognition that the conservation measures contained therein for Indiana bat will also serve to minimize impacts on the northern long-eared bat.

While the HCP was in preparation, NAW continued to work cooperatively with USFWS to employ operational measures to avoid take of Indiana bats. These measures included operating the wind turbines at a 6.9 m/s (15.4 mph) wind cut-in speed from a half-hour before sunset to a half-hour after sunrise. During periods when the wind speeds were below the nighttime cut-in speed of 6.9 m/s, NAW implemented turbine feathering (adjusted the pitch of turbine blades) so the turbine blades rotated at less than two rpm. However, NAW operated turbines at full capacity when ambient temperatures were below 38.3°F (3.5°C). This strategy was employed during the following time periods:

- April 1 to November 15, 2012
- April 1 to November 15, 2013
- July 1 to October 15, 2014

This strategy will continue to be employed from July 1 to October 15 each year until the ITP has been issued, at which point the conservation measures specified in the HCP will be followed. The HCP is currently in preparation and will be included in Appendix I when complete. When complete, it will include the following sections:
- **Introduction**: Information on the project background and regulatory framework

- **Purpose and Need**: A description of the purpose and need for the HCP and the project.

- **Description of the Area to be Analyzed**: A detailed description of the area to be included in the permit coverage (“permit area”).

- **Project Description and Covered Activities**: A detailed description of the project activities that have the potential to impact the covered species.

- **Analysis of the Impacts that will Likely Result from the Taking**: A detailed description of the biology of the Indiana bat and an analysis of potential impacts on those species.

- **Conservation Plan**: A description of measures that will be used to minimize and mitigate potential future take of the Indiana bat, including monitoring and adaptive management that will be used to ensure the effectiveness of minimization and mitigation measures.

- **Changed Circumstances, Unforeseen Circumstances, and Permit Amendment**: A description of situations that may warrant a reevaluation of the impact minimization and/or mitigation measures being implemented.

- **Funding**: A description of how the permittee will cover the costs that will be incurred by implementing the HCP.

- **Alternatives to the Taking**: An evaluation of project alternatives that would avoid the take of Indiana bats.

- **Plan Implementation and other such Measures that the Secretary May Require**: A description of how the HCP will be implemented over the term of the ITP.

The conservation plan that will be implemented under the HCP may include the following components:

- Adjusting turbine operational parameters to raise the nighttime cut-in speed during seasonal and weather conditions when bats may be active.

- Avoiding the cutting of potential bat roost trees during the roosting season, or, if necessary, surveying trees for roosting bats prior to cutting.

- Implementing an offsite mitigation project to protect, enhance, and/or restore important Indiana bat roosting or swarming habitat in the region.

- Implementing an ongoing monitoring program whereby PCMM will be conducted periodically over the life of the project to determine levels of take of Indiana bats.
• Implementing adaptive management whereby if observed levels of take exceed pre-selected thresholds, additional monitoring and/or conservation measures will be implemented to ensure that take remains lower than permitted levels.

• Implementing ongoing monitoring of the offsite mitigation project to ensure that the habitat has been effectively protected and/or enhanced and is suitable for use by Indiana bats.

It should be noted that while the measures outlined in the HCP will be tailored toward reducing take of the Indiana bat, they are also anticipated to benefit other species (including the northern long-eared bat). For example, raising the wind turbine nighttime cut-in speed would likely be protective of all bat species, because such measures have consistently been shown to reduce overall bat mortality by 40 percent or more (Arnett et al. 2011; Arnett et al. 2013). Protection, enhancement, and/or restoration of forest habitat in an offsite mitigation project may benefit both non-covered bat species and migratory birds using that habitat. In addition, the ongoing PCMM that will be conducted under the HCP, while focused on bats, will also help to document the take of avian species of concern over the life of the project.

11.2 Eagle Conservation Plan

At this time, NAW is not developing an ECP. As discussed in Section 5.3, both bald eagles and golden eagles may winter in and migrate through the region. The Stage 1 and Stage 2 evaluations completed for the NAWF confirm this; however, PCMM conducted to date has indicated a low potential risk to raptors, including eagles, and operation-phase BMPs are practiced at the project to further reduce this risk (see Section 9.2).

This BBCS will be maintained by NAW as a living document and risk to eagles will continue to be evaluated over the life of the project. Periodic PCMM that will be conducted under the Indiana bat HCP will continue to document incidental avian mortalities. In addition, DER’s WMRS (see Section 15) will be implemented at the site to allow for ongoing operational monitoring and reporting of wildlife incidents. If an eagle carcass is observed at the NAWF, it will be reported to the USFWS and PGC within 24 hours of discovery, and NAW will work collaboratively with these agencies to develop further impact avoidance, minimization, and mitigation measures, if determined to be necessary.
12 PERMITS

DER and Shoener Environmental have obtained special use permits from the PGC to allow for collection of avian and bat fatalities found during PCMM (Appendix J). DER has also received a Special Purpose – Utility permit from the USFWS for past mortality monitoring and will pursue permits whenever formal mortality monitoring is performed. These permits allow for the handling of dead or injured birds that may be encountered during PCMM. Under the permits, employees may temporarily possess a dead bird to bury it. If an injured bird is found, site personnel would report it to a Duke biologist. Subsequent actions will depend on the species of the bird (i.e., species of conservation concern), extent of the injury, and other factors. Duke may contact the USFWS and/or PGC to confer and discuss a course of action. Permits require that NAW keep records of bird incidents throughout the year and provide these data annually to the USFWS.

The MBTA allows for the disposal of inactive bird nests, provided that no possession of the nest occurs during its destruction. NAW personnel may therefore remove inactive nests where they pose a potential safety hazard or interruption of electrical service. However, no nests of listed species or eagles will be removed without authorization from the USFWS and PGC. The MBTA also allows the use of non-lethal control techniques such as perch guards, plastic spikes, etc., to discourage birds from nesting or roosting in undesirable areas.

13 REPORTING

Reporting to the USFWS and PGC will be conducted in accordance with the specific scientific and special purpose permits, as well as with the requirements specified in the WEVCA (see Appendix D) and HCP. Further, DER will report the discovery of any migratory bird carcasses to the PGC on a monthly basis. If an eagle carcass is discovered, a report will be made and the USFWS and PGC will be notified within 24 hours of discovery. The results of the PCMM will be reported to the PGC and the USFWS to determine whether additional post-construction monitoring and/or mitigation measures are warranted.

Self-monitoring of the site by NAW personnel will follow the WMRS program described below. Reporting of bird and bat fatalities documented through the WMRS will be determined through consultation with the USFWS and PGC.

Per the project’s HCP, ongoing communication with the USFWS will occur over the life of the project per the terms of the ITP, to coordinate on issues related to the Indiana bat.
14 TRAINING

14.1 New-Employee Orientation Program

The workforce at NAW is required to attend a new-employee orientation program. Employees are provided information to enhance wildlife awareness, minimize impacts to wildlife, and understand their role in compliance with the NAW permit conditions and commitments. Additionally, personnel are instructed on what to do when encountering dead or injured wildlife, per the requirements of the WMRS. Turnkey contract employees will be required to read and sign an awareness document that outlines DER’s expectations when working at a DER facility. Copies of training materials are provided in Appendix B.

14.2 Annual Wildlife Training

All wind site personnel and contractors, except temporary contractors that are escorted by trained personnel, are required to have DER’s Wildlife Monitoring and Reporting System training. In addition to this training all Duke Energy Corporation employees are required to take Migratory Bird Treaty Act training. The WMRS training consists of an initial instructor-led training with an annual refresher computer-based training.

15 WILDLIFE MONITORING AND REPORTING SYSTEM

The WMRS is a voluntary program developed by DER to provide its operating wind fleet with the tools to support a responsible wildlife management program through adaptive management measures as necessary to reduce impacts. The WMRS is not a static program but will evolve as information is provided by the site personnel and the wind industry on data collection methods, frequency of surveys, and the value provided by the program to the wind site and the industry in general.

The WMRS, through operational monitoring, is intended to build on the baseline of data provided by PCMM. The data gathered through the WMRS provides further information on trends, approximations on the number of fatalities, the location of those fatalities, and the overall species composition of the wildlife at risk. This information will provide data to allow the wind sites to adapt to wildlife issues and prevent them in the future.

Operational monitoring is a series of long-term standardized surveys using operations personnel. It systematically monitors and reports wildlife fatalities and incidents to assess long-term operational impacts (trends) of the project. Data collected during each year of surveys is compared to previous years’ data to assess inter-year trends. Trends are monitored to assess impacts of the project and evaluate the value of continued monitoring.

For NAW, surveys consist of incidental and monthly observation monitoring and reporting. Monitoring is tracked through an in-house environmental data management system. Information will be gathered using global positioning systems (GPS), cameras, trained operations technicians, and Duke Energy Environmental Services biologists and biological consultants. See Appendix C for a detailed description of the WMRS program.
15.1 Wildlife Hotline Contact Information

The Duke Wildlife Hotline should be contacted per the reporting criteria given in the WMRS.

- Greg Aldrich 704-430-7946
- wildlife@duke-energy.com

16 INTERNAL AUDITING

NAW will be subjected to auditing by the Duke Energy Corporate Environmental Health and Safety (EHS) auditing group. This group will audit various aspects of NAW by examining training records, ensuring posters are visible, and quizzing employees about their knowledge of bird and bat reporting requirements. This audit may also include examination of the record keeping of reported bird mortalities. Any audit findings will follow Duke Energy Corporate EHS audit procedures that include follow-up and corrective action measures.

17 PUBLIC OUTREACH AND EDUCATIONAL PLANS

It is continually important that DER operates its facilities in an environmentally responsible manner. This includes siting, engineering, constructing, and operating its electric generation system in a manner that minimizes its impact on wildlife. Public displays of indifference toward wildlife by DER employees will not be tolerated by DER or the public, and could result in negative media coverage and/or regulatory action by the agencies. This is particularly true with high-profile raptors, such as golden eagles, hawks, and owls. During migratory bird training sessions, instructors discuss public awareness issues with DER employees. Examples of how to effectively handle high-profile bird problems are discussed.

DER will continue to strive to educate the public on the environmental benefits of renewable wind energy. This may include partnerships with NGOs, local educational institutes, or academia to develop educational programs related to wind energy facilities. DER may allow tours or field trips with local schools, host open houses, and/or invite the public for visits to NAW. DER may distribute material in the media, such as local newspapers or radio stations. In addition, DER will strive to continue to work closely with resource agencies, conservation organizations, the media, and the general public on bird and bat conservation projects.
18 KEY RESOURCES

Key avian and bat resource personnel involved with NAW include the following:

**Duke Energy Environmental Services**
Greg Aldrich
Lead Environmental Scientist
Natural Resources
13339 Hagers Ferry Rd
Huntersville, NC 28078
Cell: (704) 430-7946 (call or text)

**Duke Energy Renewables**
Dirk Gard
Lead Environmental Specialist
Environmental Health & Safety
Siting & Licensing Support
526 South Church St.
Charlotte, NC 28202
Cell: 980-307-3053

**Duke Energy Renewables**
Tim Hayes
Director, Environmental
550 S. Caldwell St. Suite 600
Charlotte, NC 28202
Cell: (317) 902-2432

**Shoener Environmental**
W. Brad Romano
Wind Energy Project Manager/Wildlife Biologist
Shoener Environmental, Inc.
www.Shoener.com
o: 814.736.3080

**Sanders Environmental**
Chris Sanders
P.O. Box 185 / 314 North Pennsylvania Ave
Centre Hall, Pennsylvania 16828
814-364-8776
United States Fish and Wildlife Service (USFWS) - Law Enforcement

Preston Fant
USFWS- Resident Agent in Charge (NJ and PA)
Office of Law Enforcement
SeaLand Building, 1st floor
1210 Corbin Street
Elizabeth, NJ 07201-2951
Phone: 908/787-1321, ext. 319
Fax: 908/787-1334

Randy Cottrell
Senior Special Agent
U.S. Fish and Wildlife Service
Office of Law Enforcement
P.O. Box 11788
Harrisburg, PA 17108
Phone: (717) 221-4425
Fax: (717) 221-4419

USFWS- Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, PA 16801
814-234-4090
FAX: 814-234-0748

USFWS - Migratory Birds and State Programs
Division of Migratory Birds
Northeast Region
300 Westgate Center Drive
Hadley, MA 01035
Phone: 413-253-8643
Fax: 413-253-8424

Pennsylvania Game Commission
PGC Southeast Regional Office (Cambria County)
4820 Route 711
Bolivar, PA 15923
(724) 238-9523, (724) 238-9524, (724) 238-5639

Southcentral Regional Office (Blair County)
8627 William Penn Highway
Huntingdon, PA 16652
(814) 643-1831, (814) 643-1835, (814) 643-9635
Pennsylvania Licensed Wildlife Rehabilitators

Acme, PA
**Windy Ridge Wildlife Refuge, Inc.**
Specialties: small mammals, passerines, and raptors.
Call (724)455-7176 or E-mail wrwr@helicon.net

Emmaus, PA
**Pool Wildlife Sanctuary**
Specialties: songbirds, raptors, waterfowl, mammals.
Call (610)965-4397 ext. 39.

Harrisville, PA
**Skye's Spirit Wildlife Rehabilitation**
Raptors, mammals, passerines - Holistic medicines and infrared laser light therapy.
Call (814)786-9677 or E-mail skyespirit@pathway.net.

Milford, PA
**Delaware Valley Raptor Center**
Raptor Rehabilitation and public education programs.
Call (570)296-6025 or E-mail dvraptors@yahoo.com.

Pittsburgh, PA
**Pennsylvania Wildlife Center**
Call (412)793-6900 or E-mail pwc@nb.net.

Pittsburgh, PA
**Flying Mammal Wildlife Rehabilitation Center**
Small mammal rehabilitation
Call (412)343-3819 or E-mail fmwrc@voicenet.com.

Saegertown, PA
**Tamarack Wildlife Rehabilitation and Education Center, Inc.**
Specialties: success with rehabilitating nighthawks, raptor neck injuries, turtle shell repair; experienced in waterfowl rescue.
Call (814)763-2574 or E-mail Tamarack@alltel.net.
Summit Hill, PA

**Carbon County Environmental Education Center**
Specialties: bat rehabilitation and education, preparation of salvaged specimens for education.
Call (570)645-8597 (w) or (570)929-3084 (h) or E-mail  myotis31@yahoo.com.

**General Supplies**

**Nesting platforms, etc.**
Zena designs
P O Box 137
Odenville, Alabama 35120
Phone: 970-663-3980
http://www.zenadesign.com/index.htm

**Perch discouragers**
National Transformer Sales, Inc.
2613 B Discovery Dr
Raleigh, NC 27616
Phone: 919-850-3222

**Line marking devices**
Tyco Electronics Energy Division
Customer Service
Phone 800 327 6996
Fax 800 527 8350
http://www.energy.tycoelectronics.com

**Other Avian Protection Products**
Wildlife Outage Protectors
37 Appletree Lane, P.O. Box 450
Plumsteadville, PA 18949
Phone: 888-414-2398
http://www.wildlifeoutageprotectors.com/

**Wildlife Removal**
S and S Professional Wildlife Control Services
Phone: 1-866-758-6523

**United Wildlife Control**
Phone: 1-888-488-1415
<table>
<thead>
<tr>
<th>Town</th>
<th>Name</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangor</td>
<td>Tegwyn Hughes</td>
<td>610-504-6156</td>
</tr>
<tr>
<td>Canonsburg</td>
<td>Paul Dunn</td>
<td>724-747-5615</td>
</tr>
<tr>
<td>Douglassville</td>
<td>Rick Shervais</td>
<td>610-385-4405</td>
</tr>
<tr>
<td>Drexel Hill</td>
<td>Greg Seitz</td>
<td>610-999-2606</td>
</tr>
<tr>
<td>Export</td>
<td>Peter Cappa</td>
<td>724-733-4608</td>
</tr>
<tr>
<td>Harrisburg</td>
<td>Kelly Thompson</td>
<td>717-232-0593</td>
</tr>
<tr>
<td>Huntington</td>
<td>Ernest Smith</td>
<td>814-599-1277</td>
</tr>
<tr>
<td>Lewistown</td>
<td>Ken Barnett</td>
<td>717-248-0983</td>
</tr>
<tr>
<td>Lititz</td>
<td>Mike Miller</td>
<td>717-627-4108</td>
</tr>
<tr>
<td>Malvern</td>
<td>Dennis Hiller</td>
<td>610 640 1217</td>
</tr>
<tr>
<td>Moon Township</td>
<td>Mike Barcaskey</td>
<td>412-849-1207</td>
</tr>
<tr>
<td>Red Lion</td>
<td>Jerry Pickel</td>
<td>717-309-4160</td>
</tr>
<tr>
<td>Scranton</td>
<td>Nelson Carter</td>
<td>570-877-2420</td>
</tr>
<tr>
<td>Transfer</td>
<td>Keith VanTassel</td>
<td>724-646-2283</td>
</tr>
<tr>
<td>Willow Street</td>
<td>William Kilby</td>
<td>717-872-6575</td>
</tr>
</tbody>
</table>
19 REFERENCES


