DRAFT

Criterion Wind Project
Avian Protection Plan

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Pre-Decisional Draft Document

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1.0 INTRODUCTION

1.1 Purpose of the Avian Protection Plan

Criterion Power Partners, LLC. (CPP) is voluntarily developing an Avian Protection Plan (APP) for the Criterion Wind Project (Project) with the goal of reducing or eliminating avian impacts and mortality caused by the Project. This APP has been designed to address potential impacts of the Project operations on species protected under the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA).

CPP is voluntarily applying for an Incidental Take Permit (ITP) for Indiana bat (*Myotis sodalis*) under Section 10 of the Endangered Species Act (ESA) and has developed a draft Habitat Conservation Plan (CPP 2010) as part of the application for this ITP. The HCP contains detailed measures for avoiding, minimizing, and mitigating potential impacts to bats including potential take of Indiana bat. The act of issuing an ITP is a federal action that requires compliance with the National Environmental Policy Act (NEPA).

Conservation measures outlined in this APP document are primarily designed to avoid or minimize potential impacts to avian resources occurring within the Project. These measures were identified in the scientific literature and through discussion and documents provided by the USFWS. As such, we consider these to reflect the best management practices available to minimize avian mortality from the project. Avian mortality from collision with wind turbines occurs to some extent at all wind projects, but mortality rates at wind projects in the Appalachian Mountain area is low compared to that in other areas, especially raptor mortality which can be high in some western states (AWCC 2010). However, it is our intention to minimize features of the project that would be attractive to birds, minimize avian mortality to the extent possible, and keep this mortality rate at or below the rates typical for this region. Should monitoring indicate that these measures are not working and mortality is exceeding the expected rate, we have added adaptive management measures, including mitigation, that would be implemented at that time.

1.2 Regulatory Environment

Regulations under which this APP have some applicability include the three Federal statute requirements referred to in Section 1.1 (NEPA, MBTA, and BGEPA), and the Maryland Nongame and Endangered Species Conservation Act.

1.2.1 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) was passed in 1969 and requires Federal agencies to examine environmental impacts of their actions and provide for public participation. Issuance of an ITP is a Federal action subject to compliance with NEPA. To comply with NEPA, the USFWS must conduct detailed analyses of all direct, indirect, and cumulative impacts of the federal action (issuing the permit as conditioned by the agreed-upon conservation measures in the HCP) on the human environment, not just on the covered species or resources. If the agency determines that issuance of the ITP does not have significant impacts, then the agency will issue a Finding of No Significant Impact (FONSI). If the agency determines that the issuance of the ITP, including any mitigation or conservation measures, is likely to have a significant impact, then the agency will issue a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), which involves a more detailed evaluation of the effects of the Federal action and alternatives to the Federal action.

1.2.2 Bald and Golden Eagle Protection Act (BGEPA)

The Bald and Golden Eagle Protection Act of 1940 (BGEPA), as amended (16 USC 668; 50 CFR 22) provides additional protection to bald and golden eagles such that it is unlawful to take an eagle. In this statute the definition of "take" is to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." In September, 2009 the USFWS issued Final Rule on Eagle Permits (FR Vol. 74 No. 175) to "authorize limited take of bald eagles and golden eagles under the BGEPA, where the take to be authorized is associated with otherwise lawful activities." Until this Final Rule there was no regulatory mechanism in place under BGEPA to permit take of bald or golden eagles comparable to incidental take permits under the ESA. Under this rule a "Programmatic Permit" could be issued which, as explained in the preamble to the rule, "can be extended to industries, such as electric utilities …, that currently take eagles in the course of otherwise lawful activities but who can work with the Service to develop and implement additional, exceptionally comprehensive measures to reduce take to a level where it is essentially unavoidable." The standard for the issuance of such a permit is whether the eagle take authorized by the permit would be compatible with the preservation of bald and golden eagles,

As described throughout this APP, CPP has adopted selected measures described in existing guidelines available at the time of drafting and has developed this APP to reduce potential impacts to all birds, including eagles. The relevant guidance includes a number of USFWS documents (USFWS 2003, 2010) and recommendations developed by the Wind Turbine Advisory Committee, which included participation by the USFWS (WTGAC 2010). When the Criterion Project was constructed, the Draft Eagle Conservation Plan Guidance of the USFWS (USFWS 2011) was not available to assist with an eagle risk assessment. However, CPP did implement measures consistent with the guidelines during the project development and construction phases such as pre-project studies to assess risk to avian resources including raptors

and eagle and best management practices (BMPs) during construction such as use of existing roads and Project design to minimize land disturbance.

In the absence of final guidance being available, this APP shows "good faith" effort by CPP to conserve migratory birds, including eagles, during the operation of the Project. As such, the document identifies and implements all reasonable, prudent, and effective measures to avoid the take of any bird bald and golden eagles covered under BGEPA and the MBTA (below).

1.2.3 Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act of 1918, 16 U.S.C. § 703, *et seq.* (MBTA), prohibits the take of migratory birds, including any part, nest, or eggs of these birds. A list of birds protected under MBTA implementing regulations is provided at 50 C.F.R. § 10.13. The MBTA does authorize the Secretary of the Interior to determine when, to what extent, if any, and by what means it is compatible with the terms of the related treaties "to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any . . . [protected] bird, or any part, nest, or egg thereof" and to adopt regulations governing the same. But, unlike the ESA, the USFWS has not promulgated MBTA rules that would expressly authorize the issuance of permits for incidental take. Thus, although wind energy facilities kill MBTA-listed birds, there is no mechanism to obtain MBTA take coverage. Typically, USFWS does not prosecute companies adhering to "best management practices" to avoid and minimize impacts. Executive Order 13186 on Migratory Birds provides direction to federal agencies, including USFWS, to minimize their negative impacts on migratory birds, promote the conservation of migratory bird populations, and carry out certain actions to further the migratory bird conventions (Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001, William J. Clinton).

Through this APP, CPP commits to undertake actions to avoid and minimize the take of MBTA listed species. CPP has incorporated applicable measures from USFWS Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines (USFWS 2003, 2011), the Wind Turbine Guidelines Advisory Committee Recommendations (WTGAC 2010), and USFWS 2011 Wind and Eagle Guidance (USFWS 2011). These guidelines contain materials to assist in evaluating possible wind-energy facilities, wind turbine design and location, and pre- and post-construction research to identify and/or assess potential impacts to wildlife (USFWS 2011). In addition, while some of the avoidance and minimization measures are specifically intended to benefit MBTA-listed species, others are being incorporated for other reasons and may provide incidental conservation benefits. The APP contains provisions that would consider mitigation for take of migratory birds under adaptive management if specified thresholds are triggered.

1.2.4 Maryland Nongame and Endangered Species Conservation Act

Under the Maryland Nongame and Endangered Species Conservation Act (MD Code, Natural Resources (NR), §10-2A-01 – 09) any species designated under the federal ESA is deemed an endangered species as are other species designated by the state secretary based on habitat and population factors. According to NR §10-2A-05 (c) "Except as provided in subsection (f) of this section and §10-2A-05.1 of this subtitle, with respect to any endangered species of wildlife, a person may not: (2) take the species within the State;" Subsection (f) states "The Secretary may permit, under the terms and conditions prescribed, any act otherwise prohibited by subsections (c) and (d) of this subsection for scientific purposes or to enhance the propagation or survival of the species." In this case the definition of "take" is the same as the definition under the federal ESA. In the State ESA statute, however, there is no general provision for an incidental take permit. An incidental take permit may only be issued for the endangered Puritan tiger beetle (*Cicindela puritan*; NR §10-2A-05.1) or the endangered Delmarva fox squirrel (*Sciurus niger cinereus*; NR §10-2A-05.2).

1.3 Project Description

The Project is a 70 MW wind-energy facility consisting of 28 WTGs which extends along Backbone Mountain from Turkey Rock southward to Allegheny Heights (elevation 3,228 ft [984 m]) which is located in the Allegheny Mountain physiographic region of western Maryland (Robbins and Blom 1996) and extends northward into southwestern Pennsylvania and southward into West Virginia. The region is a high plateau with ridges and valleys extending in a predominantly northeast-southwest orientation, and is characterized by rolling and steep hillsides (Kerlinger 2002). Historically, the Allegheny Mountain region was entirely forested; dominated by deciduous trees with some large stands of hemlock (*Tsuga canadensis*) and to a lesser extent white pine (*Pinus strobus*). Trees found at higher elevations within the Project include northern red oak (*Quercus rubra*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), striped maple (*Acer pensylvanicum*), and a small amount of yellow birch (*Betula alleghaniensis*). Lower elevation trees include sugar (*Acer saccharum*) and red maple, black birch (*Betula lenta*), black cherry, shagbark hickory (*Carya ovata*), and red and white oak (*Quercus alba*).

The Project is situated on largely undeveloped, previously logged forestland interspersed with some open farmland and consists of rugged terrain traversed with old logging roads and dotted with seasonally used camps. Land use in the vicinity of the Project is dominated by forest and agriculture, consistent with the rural character of Garrett County, and access to the Project is via Gorman Road, Eagle Rock Road, and Bethlehem Road. As part of the construction of the project, CPP cleared approximately 50 acres of forested area to install turbine pads and widen roads in the project area.

1.3.1 Facility Design Measures that Benefit Birds and Related Habitat

During the early project development and design phases, the Project coordinated and consulted with resources agencies including the Maryland Department of Natural Resources (MDNR) and the USFWS. The intent of the agency coordination was to determine appropriate studies for assessing potential impacts and resources of concern that should be studied. These consultations assisted with the design and siting of the project and facilities to minimize impacts to wildlife resources including birds.

During project design, one WTG was eliminated from the layout and the limits of disturbance of several other WTGs were adjusted to avoid and reduce any further impact to the state-endangered southern rock vole (*Microtus chrotorrhinus carolinensis)*. This may have incidental benefit to bird resources by preserving unique habitat features within the overall general deciduous forest habitat. Unique habitat features can provide resources to wildlife, including birds, that may otherwise be limited on the landscape. Unique habitat features may also increase and maintain diversity of wildlife in an area by providing the additional habitat types suitable for other species.

Existing hardtop and existing forest roads (such as Eagle Rock Road, Bethlehem Road, Boiling Spring Road, and Maryland Route 560) were used for the facility infrastructure when possible and new roads were only constructed when necessary. Prior to construction of the wind-energy facility, the majority of the ridgetop had been logged, mined, or farmed by the property owners and there were areas of vegetation and soil degradation from off-road vehicles at Eagle Rock. Use of existing roads benefits wildlife, including birds, by minimizing the amount of new disturbance and conversion of natural areas to project facilities such as roads.

2.0 ENVIROMENTAL BASELINE

2.1 Source Information and Background

Environmental baseline information included in the following document was collected based on recommendations provided by the USFWS in the white paper on development of specific Avian Protection Plans (APPs) for renewable energy facilities released on August 3, 2010 (USFWS 2010). Data were collected from on-site wildlife monitoring studies, federal and state agency personnel, published literature, and internet-based resources.

2.2 On-Site Wildlife Monitoring and Surveying

Extensive pre-construction wildlife surveys were conducted within the Project area between 2002 and 2004 (Table 2.1). In addition, during the construction phase of the Project in 2010 supplementary acoustic and mist-netting surveys for bats were carried out. Specifics of these surveys are discussed in the following sections discussing birds and bat resources at the Project and in the surrounding area.

Table 2.1 Monitoring and Survey Efforts

Study	Date
Phase I Avian Risk Assessment (Kerlinger 2002)	July 2002
Spring and Fall Migration Point Counts (Gates *et al.* 2006)	2003-2004
Breeding Bird Point Counts (Gates *et al.* 2006)	2003-2004
Spring, Summer, and Fall Observational Bird Surveys (Gates *et al.* 2006)	2003-2004
Bat Mist-netting Surveys (Gates *et al.* 2006, Gruver 2011)	September 2003, May, June 2004, and June, July, August 2010
Acoustic (Anabat) Bat Surveys (Gates *et al.* 2006, Gruver 2011)	June 2004 and April-Nov 2010

2.3 Birds

2.3.1 Important Bird Areas

Important Bird Areas (IBAs) are areas listed by the Audubon Society as sites which provide essential habitat for one or more species of bird [www.audubon.org/bird/iba/]. These include areas providing breeding, wintering, and/or migrating habitat for bird species and may range from a few to thousands of acres in size. The closest IBA to the Project, Cranesville Swamp, is located approximately 15 miles to the north (Table 2.2). There are three Important Bird Areas (IBA) listed in Garrett County, Maryland: Cranesville Swamp IBA, Finzel Swamp IBA, and Wolf Swamp IBA (Table 2.2).

Table 2.2. Characteristics of Important Bird Areas located in Garrett County, Maryland.

Important Bird Area	Area (acres)	Distance from Project	Description
Cranesville Swamp	1,648	15 miles north	Peatland bog supporting vegetation including sphagnum bog, hemlocks, and tamaracks. Species include: alder flycatcher, northern waterthrush, Nashville warbler, Canada warbler, golden-crowned kinglet, red-breasted nuthatch, hermit thrush, and magnolia warbler.
Finzel Swamp	348	20 miles northeast	Rare mountain bog habitat – a palustrine wetland with a relict forest community of tamarack, spruce, and alder. Similar species as Cranesville Swamp, also breeding state-listed sedge wren and Henslow's sparrow.
Wolf Swamp	267	30 miles northeast	Rare mountain bog habitat, including some old-growth spruce-hemlock. Species include golden-crowned kinglet, winter wren, purple finch, and state-listed Blackburnian warbler.

2.3.2 USFWS Birds of Conservation Concern

The Project is within the Appalachian Mountains Bird Conservation Region 28 (USFWS 2008). There are 25 bird species listed as USFWS Birds of Conservation Concern (BCC) within BCR 28 (Appendix A). Although BCC species do not receive special protection unless they are also listed by the state of Maryland or under the Federal ESA, they are recognized by the USFWS as species, subspecies, or populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Federal ESA. Species are listed as BCC based on assessment scores derived from three major bird conservation plans: the Partner in Flight North American Landbird Conservation Plan (Rich *et al.* 2004), the United States Shorebird Conservation Plan (Brown *et al*. 2001, USSCP 2004), and the North American Waterbird Conservation Plan (Kushlan *et al*. 2002, USFWS 2008). While the reasons for concern for these species varies and typically includes large scale changes in habitat, it is recommended by the USFWS (2008) that these lists be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds" and as such it is appropriate that these species be included as species listed within this ABPP, a goal of which is to reduce impacts to species protected under the MBTA (see Section 1.2).

2.3.3 State-Listed Bird Species

Twenty-two bird species, listed as rare, threatened, endangered by the MDNR are documented as occurring in Garrett County, Maryland (Table 2.3). State rare, threatened, and endangered species documented during the breeding season during 2003 -2004 pre-construction surveys included the state endangered mourning warbler (*Oporornis philadelphia*), and the state rare dark-eyed junco (*Junco hyemalis*) and winter wren (*Troglodytes troglodytes*; Gates *et al*. 2006).

Table 2.3 Rare, Threatened, and Endangered Bird Species Listed in Garrett County, Maryland.

Common Name	Scientific Name	Maryland	
		Rank	Status
Northern goshawk	*Accipiter gentilis*	S1B	E
Upland sandpiper	*Bartramia longicauda*	S1B	E
Sedge wren	*Cistothorus platensis*	S1B	E
Olive-sided flycatcher	*Contopus cooperi*	SHB	E
Mourning warbler	*Oporornis philadelphia*	S1B	E
Bewick's wren	*Thryomanes bewickii altus*	S1B	E
Henslow's sparrow	*Ammodramus henslowii*	S1S2B	T
Blackburnian warbler	*Dendroica fusca*	S1S2B	T
Nashville warbler	*Vermivora ruficapilla*	S1S2B	I
Alder flycatcher	*Empidonax alnorum*	S2B	I
Least bittern	*Ixobrychus exilis*	S2B	I
Bachman's sparrow	*Aimophila aestivalis*	SHB	X
Northern saw-whet owl	*Aegolius acadicus*	S1B	-
Red-breasted nuthatch	*Sitta canadensis*	S1B	-
Sora	*Porzana carolina*	S1B	-
Hooded merganser	*Lophodytes cucullatus*	S1B	-
Sharp-shinned hawk	*Accipier striatus*	S1S2B	-
Dark-eyed junco	*Junco hyemalis*	S2B	-
Golden-crowned kinglet	*Regulus satrapa*	S2B	-
Northern harrier	*Circus cyaneus*	S2B	-
Winter wren	*Troglodytes troglodytes*	S2B	-
Bald eagle	*Haliaeetus leucocephalus*	S3B	-

Source: Maryland Department of Natural Resources, Wildlife and Hertiage Service, April 2010.

Maryland Rank S1=Highly State rare; S2=State rare; S3=Rare to uncommon; -B=breeding status only; SH=Historically known from Maryland. Maryland Status E=Endangered; T=Threatened; I=In Need of Conservation; X=Endangered Extirpated.

2.3.4 Raptors

Fifteen diurnal raptor species and two vultures [black vulture (*Coragyps atratus*) and turkey vulture (*Cathartes aura*)], have the potential to occur within the Project at some time during the year, based on raptor migration data (Hawk Migration Association of North America [HMANA] website [www.hmana.org]), Maryland breeding bird data 2002-2006 [www.pwrc.usgs.gov/bba], and pre-construction bird surveys conducted at the Project (Gates *et al*. 2006). Based on information from these sources, as well as the location and vegetation composition of the Project, the most abundant raptor species likely to breed within or migrate over the Project are common species such as red-tailed hawk (*Buteo jamaicensis*) and broad-winged hawk (*Buteo platypterus*).

The closest Hawk Watch Site recognized by the HMANA is the Allegheny Front Site in Pennsylvania (Appendix B). The Maryland Ornithological Society identifies Backbone Mountain as a good place to observe migrant raptors during the fall, however, it is unclear whether formal hawk migration surveys have been conducted at the site and data from the site is not publically available (http://www.mdbirds.org/sites/mdsites/hawks/hawkwatch.html). Low to moderate raptor use was observed during fall bird surveys conducted at the Project during 2003 and 2004 (Gates *et al*. 2006).

3.0 RISK ASSESSMENT

An initial Phase I Risk Assessment was carried out by Curry & Kerlinger, LLC in 2002 (Kerlinger 2002); followed by on-site bird point count and observational surveys conducted by Gates *et al.* from the University of Maryland Center for Environmental Sciences (UMCES) in 2003 and 2004 (Gates *et al.* 2006; Table 1.1).

3.1 Species Protected Under MBTA

The most likely impact to birds from the wind-energy facility is direct mortality from collision with the turbine blades or towers. Collisions may be by resident birds flying within the Project or by migrant birds moving through the area during spring or fall migration. Substantial data on bird mortality exists from wind-energy facilities in the vicinity of the Project and this data provides the most reliable impact assessment for the Project. The closest wind-energy facility with comprehensive post-construction mortality monitoring is the Mt Storm Wind Project in Tucker County, West Virginia (Mt Storm; Figure 3.1). Monitoring studies have been conducted at the Mt. Storm project from July 15 through October 15, 2008; March 15 through June 15 and July 15 through October 15, 2009; and April 15 through October 15, 2010 (Young *et al* 2009a and b, Young *et al* 2010a and b).

The Mt Storm facility consists of 132 WTGs – a project considerably larger than the Project. Other wind-energy facilities where post-construction fatality monitoring has been conducted from approximately April through October within 30 miles of the Project include the Mountaineer Wind Project in Preston and Tucker Counties, West Virginia, and the Casselman Wind Project, Somerset County, Pennsylvania (Table 3.1).

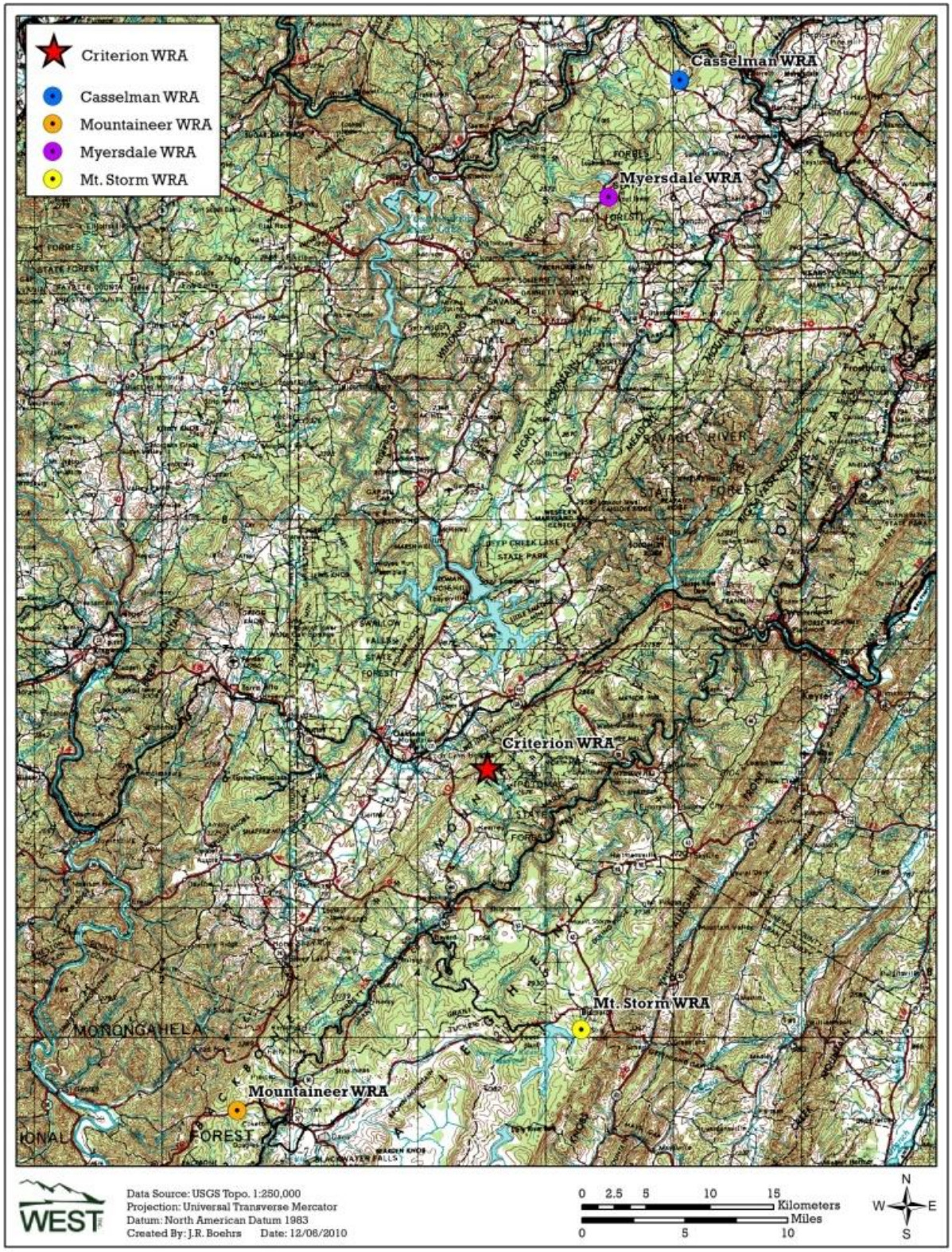


Figure 3.1 Location of the closest wind-energy facilities to the Project where post-construction fatality monitoring studies have been conducted.

Table 3.1 Summary of bird casualties from post-construction fatality monitoring studies conducted at wind-energy facilities in the vicinity of the Project[1].

Project Name, State	Project size (Turbines)	No. of Turbine Searches	Estimated Number birds/turbine /study period[1]	Estimated Number birds/ 1000 m^2 RSA/ study period[1]	90% CI	Study Year	Reference
Mountaineer, WV	44	998	4.04	0.99	0.59, 2.04	2003	Kerns & Kerlinger 2004
Casselman, PA	23	2,040	4.69[2]	1.01	0.27, 3.07[3]	2008	Arnett *et al.* 2009
Casselman, PA	23	nr	4.30	0.92	0.58, 1.37[3]	2009	Capouillez and Mumma 2010
Mt Storm, WV	132	2,520	8.74[4]	1.74[4]	1.02, 2.54	2009	Young *et al.* 2009b, 2010a
Mt Storm, WV	132	4,401	6.74[4]	1.34[4]	0.78, 2.00	2010	Young *et al.* 2010b, 2011a
Mt Storm, WV	132	3,794	8.04[4]	1.60[4]	1.31, 2.46	2011	Young *et al.* 2011b, 2012
Average			**6.15**	**1.27**			

nr = not reported

[1]study period is approximately the period from April through October which is similar to the monitoring period for the Criterion project [2]based on the Huso estimator; [3]estimated based on the reported as 95% CI. ; [4]estimate was derived by combining the results from two non-overlapping study periods (spring and fall) which used the same study plots

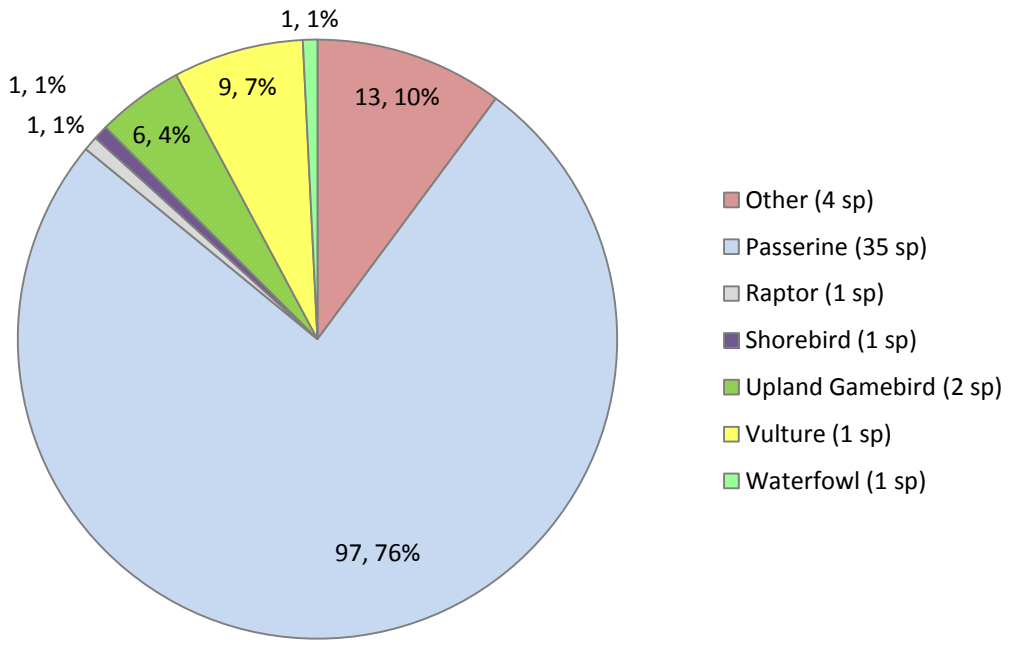
Patterns in impacts to bird types at regional sites (Table 3.1 and Figure 3.2) are consistent with national patterns where passerines comprise the majority of bird fatalities (Erickson *et al.* 2001). Due to differences in turbine dimensions at the studied wind projects, the bird mortality estimate was standardized to 1000 m^2 of rotor swept area (RSA) (Table 3.1) to standardize the estimates by area of risk and provide a more direct comparison based on the area of risk between projects.

Results of the fatality monitoring studies, indicate the majority of bird fatalities were passerines (97 casualties of 35 species comprising 76% of fatalities), with small numbers of other birds (13 casualties of 4 species comprising 10% of fatalities), turkey vultures (9 casualties comprising 7% of fatalities) and other bird types reported (Figure 3.2). Both migrant and resident passerine fatalities have been observed. Based on species and date information, in some U.S. studies up to 70% of fatalities found were believed to be migrants (Howe *et al.* 2002); however, the estimates are highly variable and range from 0 to 70%. In general, the number of migrant fatalities is higher in wind projects in the eastern United States (see Erickson *et al.* 2002). The overall

[1] RSA equivalent was determined by dividing the total estimated bird mortality by total RSA for the project as determined by the rotor dimensions for the specific turbines at that site.

national average for passerine fatalities at wind projects has been approximately 2.2 birds/turbine/year (Erickson *et al.* 2002).

The studies of nearby wind projects (Table 3.1) included a total of 152 fatalities from 57 species (Appendix C). The vast majority of the species had one bird killed per year from turbines associated with these projects. The largest number killed of any one species was 24 red-eyed vireos killed from the four projects. Red-eyed vireos are one of the most common forest birds in the Eastern U.S. Red-eyed vireo relative abundance in the Appalachian Mountains are comparable to the relative abundance of American robins; as both average 30-100 birds counted per Breeding Bird Survey route between 1994 and 2003 (http://www.mbr-pwrc.usgs.gov/bbs/htm03/ra2003_red).



Other includes: hummingbirds, cuckoos, and swifts.

Figure 3.2 Summary of bird casualties (n, %), by bird type, found during post-construction fatality monitoring at wind-energy facilities in the vicinity of the Project.

Fatalities from wind turbines would be of greatest concern to rare species with declining populations. Only two species of birds that are listed as part of the fatalities at nearby wind projects are on the BCR list for the Appalachian region; the wood thrush and the Kentucky warbler. One individual of each species was reported as a fatality at the Mt Storm project in 2009 (Appendix C). Because most of these birds are being killed during migration, the take of individuals is likely of birds coming from more northern locations in the Atlantic flyway. One estimate of the total number of wood thrushes and Kentucky warblers in the Appalachian Mountain BCR (Partners in Flight BCR 28) was 4,500,000 wood thrushes and 250,000 Kentucky warblers in this area (http://rmbo.org/pif_db/laped/PED2.aspx). The area that migrating birds are coming from is likely larger than the Appalachian Mountain BCR. If Criterion is similar to Mt Storm and took one individual of each species each year, this impact would not result in population effects.

Three state-listed rare, threatened, or endangered species have been found as casualties during post-construction fatality monitoring surveys in the region. One mourning warbler and one golden-crowned kinglet were found at Mt Storm, one sharp-shinned hawk was found at Mountaineer, and three golden-crowned kinglets were found at Casselman. The mourning warbler is the least common of these and only 15,000 are estimated to occur in the Appalachian Mountain BCR (http://rmbo.org/pif_db/laped/PED2.aspx). However, most of this species range occurs along the Canadian border and only 0.2% of the global population for this species occurs in the Appalachian Mountain BCR. Only one raptor fatality has been documented regionally, and raptor collision rates with WTGs have been generally lower on a per MW basis at facilities located in the eastern U.S. compared with the western U.S.

The presence of wind turbines may alter the landscape so that wildlife habitat use patterns are altered, thereby displacing wildlife away from site facilities. Indirect impacts, such as disturbance or displacement, caused by operation of the wind-energy facility are considered unlikely but may result in the short term or on a small scale to some species, based on available information (Erickson *et al.* 2003, Howell and Noone 1992; Johnson *et al*. 2000a; Johnson *et al.* 2003c; Madders and Whitfield 2006, Piorkowski 2006). Some birds are considered more sensitive to indirect impacts such as disturbance or displacement, including nesting raptor and sensitive species. Birds displaced from a wind-energy facility might move to areas with fewer disturbances, but lower quality habitat, with an overall effect of reducing breeding success. There have been few studies on bird displacement at wind-energy facilities, and most of these have suggested indirect effects to be negligible or immeasurable (see above references). Decreased habitat quality in the immediate vicinity of WTGs could be considered beneficial as decreased use may decrease risk of collision with turbines.

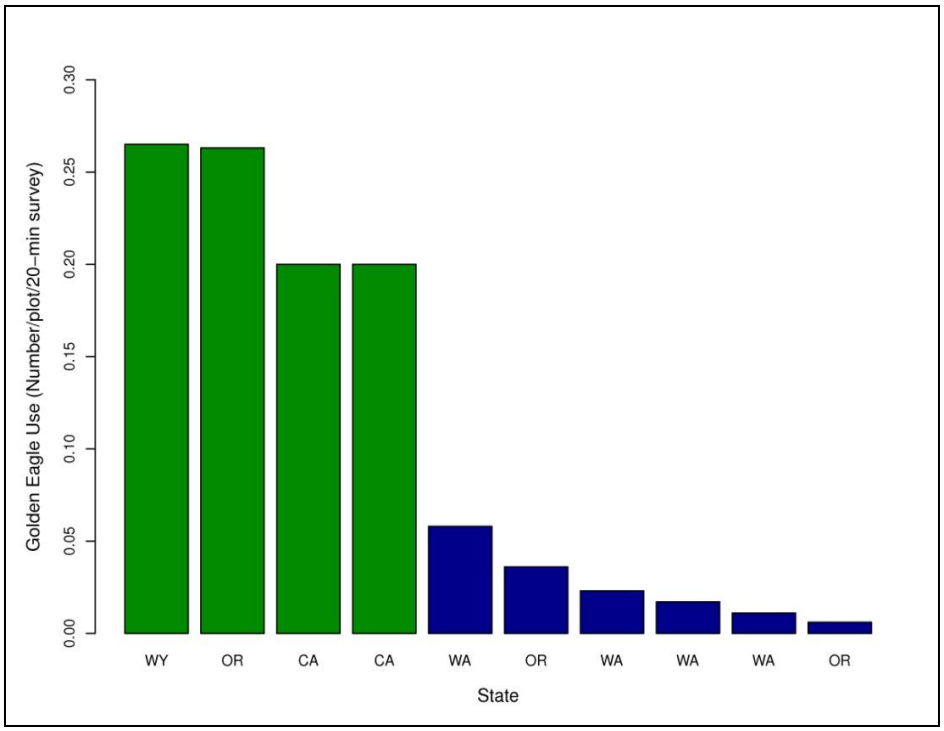
3.2 Species Protected Under BGEPA

Risk to bald and golden eagles are considered low and their use of the project area is limited, but likely to vary seasonally. Bald eagles may be transient over the Project throughout the year; golden eagles, however, are only likely to occur near the Project either during migration or during the winter.

Bald Eagle: There is no nesting or foraging habitat for bald eagles within the Project. The species has, however, been expanding its range from the Chesapeake Bay into western Maryland along major rivers and the closest known bald eagle nest is on the Savage Reservoir approximately 12 miles northeast of the Project. Although it is possible that bald eagles will be transient over the Project at any time during the year the risk to bald eagles by the Project is likely to be low. The Mount Storm Wind Project is adjacent to the Mount Storm Lake which provides roosting, foraging, and wintering habitat for bald eagles. Over the three years of post-construction fatality monitoring at Mt Storm, no bald eagle casualties have been documented. In addition, no bald eagles have been reported as casualties at wind-energy facilities within the United States. The most likely time for bald eagles to utilize the Project is during migration, particularly during the fall. Indeed, two bald eagles were observed during preconstruction avian surveys within the Project during fall 2004 (Gates *et al.* 2006).

Golden Eagle: Golden eagles are most likely to be transient over the Project during the fall migration or winter periods (Katzner in prep), and one golden eagle was observed during preconstruction avian surveys within the Project during fall 2004 (Gates *et al.* 2006). Unlike bald eagles, golden eagles are known casualties at wind-energy facilities in the west; however, there have been no casualties recorded for this species in the eastern United States. Golden eagle fatalities in the western U.S. have been associated with both nesting and wintering eagles. A meta-analysis of data from wind-energy facilities in the western United States where both standardized pre-construction use surveys and post-construction fatality surveys have been conducted shows a strong relationship between pre-construction use and post-construction mortality for breeding or wintering golden eagles. Data suggest that a use-estimate greater or equal to 0.20 birds/plot/20-min survey is suggestive of likely mortality following construction of a wind-energy facility (Figure 3.4; Johnson *et al.* 2000b, 2002, 2003a, 2003b, 2006; Young *et al.* 2003a, 2003b, 2007, 2009c; WEST 2005, 2006, 2008; Jeffrey *et al.* 2009; Kerlinger *et al.* 2005, 2006; Erickson *et al.* 2003b, 2008; NWC and WEST 2005; Kronner *et al.* 2007; Enz and Bay 2010; Gritski *et al.* 2009). Methods used for pre-construction surveys at the Project do not allow the number of birds/plot/20-min survey to be determined; and the Draft Eagle Conservation Plan Guidance (USFWS 2011) does not provide a method of quantifying potential take of migrating eagles.

Risk Assessment for Eagles: Using the Draft Eagle Conservation Plan Guidance (USFWS 2011) we would classify this project as having low risk to both bald and golden eagles for the following reasons. There are no known nesting pairs within 10 miles of the project area and the use of the site is limited to migrating birds. There is no model available for estimating any take of migrating birds in the available guidance documents (USFWS 2003 2011) and eagle mortality has primarily occurred on sites where there are breeding and wintering eagles that forage in the vicinity of the turbines. Nearby wind turbines projects have not found eagle mortality though migrating birds are likely in the vicinity of these projects as well. Eagles are diurnal migrants with good vision and may be able to avoid collision with wind turbines as long as there is not food underneath the turbines. We consider it likely that as long as food does not become abundant under the wind turbines, eagles will be able to avoid the turbines. Therefore, due to these factors suggesting low risk; a permit for potential take is not being sought at this time. However, if there is take of an eagle in the future, the response would be to investigate the situation surrounding that fatality and apply for a permit, as it would indicate a higher risk than initially thought.



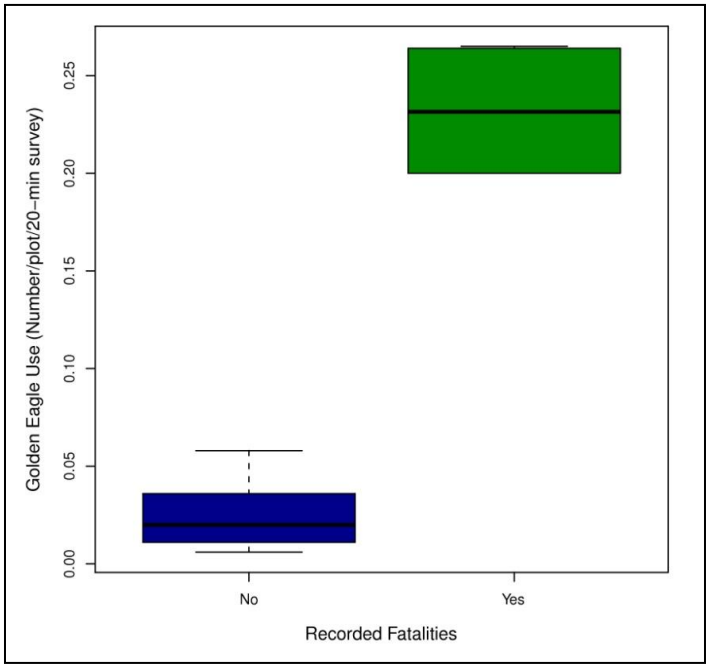


Figure 3.4 Comparison of pre-construction use within post-construction mortality for golden eagles within wind-energy facilities within the U.S.

4.0 AVOIDANCE, MINIMIZATION, AND MITIGATION

Measures designed to avoid, minimize and potentially mitigate impacts to avian resources have been specifically developed for the Project (Table 4.1). In addition, there are a number of other facility design or industry standards that may provide incidental conservation benefits for birds. These measures included the use of a lattice/non-guyed meteorological tower, use of FAA-approved lighting that does not attract birds to the turbines, and the reduction of lighting use at the substation and O&M building. In addition, all collection lines between the WTGs and substation were buried below ground to prevent collision or electrocution risk, in particular to raptors. The number of storm water control features in the immediate vicinity of WTGs will be minimized to the extent practicable to reduce habitat-attractiveness to birds near turbines along with providing local hunter education during the first year of operations.

As with any energy generation or electric transmission project, there is a low risk to eagles of collision with, or electrocution from, overhead power lines. For the Project, overhead power lines include the inter-collection line used to distribute electricity from the substation to the existing transmission line and the transmission line itself. To avoid or minimize potential avian (including eagles) collisions and electrocutions along Project power lines, CPP has: (1) buried all collection lines used to transfer electricity from the turbines to the substation, (2) used an

existing transmission line so that no new construction is required, and (3) will implement local hunter education to promote the importance of carcasses and/or gut pile removal from the area. CPP will conduct post-construction turbine fatality monitoring at the Project (HCP Appendix D) and should an eagle fatality be discovered, CPP will review the circumstances surrounding that fatality, take any measures possible to avoid this in the future, initiate discussions with USFWS to determine whether a BGEPA Permit is necessary for project operations, and consider the potential mitigation measures if no further ways to minimize take are identified. This includes working with Allegheny Power to review, and to the extent possible, implement the following mitigation measures: (1) retrofit the inter-collection lines and poles, and a portion of the existing transmission line, owned by Allegheny Power, that does not currently adhere to Suggested Practices for Avian Protection on Power Lines (APLIC 1994, 2006) and (2) place visual markers on a portion of the existing transmission/power line.

A three-year monitoring study has been designed that will determine specific impacts of the Project to bird (and bat) species (Habitat Conservation Plan Appendix D) and will be implemented beginning in the first year of Project operations. The first year of monitoring will take place in 2011 and it is anticipated that the second and third year of monitoring will occur the first two years after issuance of the ITP. Results from the three years of monitoring studies and the follow-up HCP compliance monitoring (years 8, 13, 18), will be assessed and the impact levels analyzed relative to regional findings from other wind-energy facilities where post-construction fatality monitoring studies have been conducted. If impacts reach trigger levels as identified below (Table 4.2), then additional mitigation measures will be implemented as part of an Adaptive Management Plan (Section 4.1). A tiered approach to implementation of this protection plan has been adopted where Tier 1 measures are those that have already been implemented, primarily avoidance and minimization measures that were incorporated into the project design, construction, and operation (Table 4.1). Tier 2 measures are those that will be implemented if a trigger is exceeded (Table 4.2) to offset or further minimize the impact. Tier 3 measures are those that are to be implemented as further avoidance or minimization, in the event that additional measures may be needed above Tier 2 measures and/or it is determined that the Tier 2 measures are not effective in further reducing the impacts. Mitigation for the take of migratory birds – permanently conserving bird habitat through a fee simple acquisition or an easement -- is contemplated in Tier 3. In the event that Tier 2 or 3 measures are implemented, CPP intends to evaluate monitoring needs in consultation with the agencies to determine their efficacy.

Table 4.1 Summary of avoidance, minimization, and adaptive management conservation measures. .

	Avoidance/Minimization that are in place (Tier 1 measures)		**Examples of additional conservation measures that will be implemented in response to fatalities exceeding triggers (Tier 2); Tier 3 are measures that may be added subsequent to Tier 2 measures if needed.**
	Planning/Construction	Operations	Adaptive Management -
Birds	(1) Lattice/non-guyed MET tower. Birds have been documented colliding with guy wires so eliminating these decreases collision risk. (2) FAA approved lighting that does not attract birds to turbines. The current FAA lighting recommendations of red strobes at night with long off intervals do not appear to increase risk of collision for nocturnal migrant birds. (3) Bury all collection lines from turbines to the substation. Above ground lines create perching opportunities for birds which may increase exposure to turbines by creating nearby perch sites. Above ground lines may also create collision and/or electrocution hazards to birds.	(1) Local hunter education to promote the importance of carcass and gut pile removal from the area. Gut piles and carcasses may attract raptors and thus increase exposure to these birds. (2) Lights on substation & O&M building will be on motion sensors or equivalent at night and facing downward. Bright lights on foggy nights are known to attract nocturnal migrants. Bright continuous shining lights may attract nocturnal migrants and thus increase exposure to these birds. 3) Lights inside turbines will be turned off at night and turbine maintenance staff will be trained /informed to understand the importance of this procedure	(1) Evaluation in coordination with state agencies and USFWS to determine circumstances leading to exceedance of threshold, potential significance of take, or new information and need for additional avoidance or minimization measures. The purpose of the agency coordination will be to determine practicable measures to minimize fatalities. (Tier 2). (2) Any mass casualty event will be reported and thoroughly investigated. Any identified causes will be rectified, to the extent possible, and long term solutions implemented for the life of the project. (Tier 2). (3) Fee simple acquisition and subsequent donation with permanent restrictions, or perpetual conservation easement on habitat for bird types most affected, the terms of which will be reviewed and approved by USFWS. This measure insures long-term protection of habitat for potentially impacted species. (Tier 3). (4) Retrofit to APLIC guidelines existing transmission poles[a]. This measure reduces existing hazards and sources of impacts to birds and in particular raptors (Tier 3). (5) Placement of visual markers on existing transmission lines[a]. This measure reduces existing hazards and sources of impacts to birds (Tier 3). (6) Conduct additional studies to test possible ways to reduce fatalities from wind turbines and implement tested measures that proves to be effective. This measure would increase the body of knowledge regarding impacts to birds and potential measures to off-set impacts (Tier 3).
Eagles	(1) Bury all collection lines from turbines to the substation. Above ground lines create perching opportunities for eagles	(1) Local hunter education to promote the importance of carcass and gut pile removal from the area.	(1) If an eagle is injured or killed, the USFWS will be notified within 24 hours so they can examine the scene and try and determine the circumstances leading up to the

Table 4.1 Summary of avoidance, minimization, and adaptive management conservation measures. .

	Avoidance/Minimization that are in place (Tier 1 measures)		Examples of additional conservation measures that will be implemented in response to fatalities exceeding triggers (Tier 2); Tier 3 are measures that may be added subsequent to Tier 2 measures if needed.
	and other raptors which may increase exposure to turbines by creating nearby perch sites. Above ground lines may also create collision and/or electrocution hazards to eagles.	Gut piles and carcasses may attract eagles and thus increase exposure to these birds.	fatality. CPP will work with USFWS to try and remove any causes of fatalities that can be practicably removed or changed. In addition, CPP coordinate with USFWS on the need to obtain a BGEPA permit (Tier 2). (2) Retrofit to APLIC guideline on existing transmission poles[a]. This measure reduces existing hazards and sources of impacts to eagles and other raptors (Tier 3). (3) Placement of visual markers on existing transmission lines[a]. This measure reduces existing hazards and sources of impacts to eagles (Tier 3). (4) Conduct additional studies to test possible ways to reduce fatalities from wind turbines and implement tested measures that proves to be effective. This measure would increase the body of knowledge regarding impacts to eagles and potential measures to off-set impacts (Tier 3).

[a] This action needs consultation and concurrence with Allegheny Power, the company that owns the transmission line, prior to implementation.

Table 4.2 Summary of triggers linked to avoidance, minimization, and mitigation measures outlined in Table 4.1

	Avoidance/Minimization (Tier 1 Conservation measures)	Triggers for Tier 2 and Tier 3 Conservation Measures (See Section 4.1 for details)
Birds	All aspects of the avoidance phase will be carried out no matter what the impact is.	(1) Death of one individual of a state-sensitive bird species (Table 2.3). (2) The initial three year average impact for all birds is statistically greater than the regional average impact (1.27 birds/1000m^2 RSA/yr) [a] (3) At years 8, 13, or 18, statistically significant greater bird mortality from the initial three year average impact. (4) Twenty-five or more fresh casualties found at one turbine at one time.
Eagles	All aspects of the avoidance phase will be carried out no matter what the impact is.	(1) Death or injury of one eagle.

[a] "Average impact" is defined as the average impact to birds from the four wind-energy facilities outlined in Section 3.0 (Figure 3.1; Mt Storm, Mountaineer, and Casselman). The estimated impact for the four sites was determined by correcting for fatality recovery biases such as carcass removal and searcher efficiency. "statistically greater" is determined if the three year average falls outside the 90% confidence intervals for the regional studies.

4.1 Adaptive Management Plan

Adaptive management is an iterative process that promotes flexible decision making as outcomes from management actions or project operations become better understood (WTGAC 2010). The primary reason for implementing an adaptive management process in the APP is to address uncertainties in the assessment of impacts and protection of the target species, and to allow for changes in the mitigation strategies that may be necessary to reach the desired objectives of the plan. Under the adaptive management strategy, the impacts of the Project will be monitored for significance and when triggers are hit, different levels (Tiers) of minimization and mitigation activities outlined in the APP will be implemented, if necessary, and monitored and analyzed to determine if they are producing the desired results. For example, Tier 1 activities are avoidance and minimization measures already in place (Table 4.1). Tier 2 activities would be the next set of conservation measures implemented if a trigger is hit (Table 4.2). If the desired results are not being achieved after the Tier 2 conservation measures, then adjustments or additional activities identified as Tier 3 responses are considered through the adaptive management process.

The following Adaptive Management Plan is based on the results of the three years of monitoring outlined in the Habitat Conservation Plan (HCP Appendix D, "Monitoring Plan"). Due to the inherent yearly variation in fatality levels, all three years of monitoring will be assessed before mitigation will be implemented, if needed. However, it is possible that a trigger could be exceeded after year one or two of the monitoring. For example, if the combined

estimated annual bird mortality for the first two years of monitoring exceeds 3.82 birds/1000m^2 RSA/year, the trigger of three year average being greater than 1.27 birds/1000m^2 RSA/year will have been met. In such a circumstance the Tier 2 conservation measures will be implemented prior to the end of the three years of monitoring. The triggers chosen for determining the need for an adaptive management response was the average casualty rate for birds from the other regional wind projects (Figure 3.1). These projects provide representative data on impacts from wind development in relatively close proximity to the Criterion project. The expectation is that impacts from the Project will likely be within the range of impacts seen from the other regional wind projects, and therefore the average impact from these projects (Tables 3.1 and 3.2) was chosen as the threshold for which additional minimization and potentially mitigation (Tier 2 and Tier 3) would be implemented. In essence, if the Project impacts are above average for the region, CPP will implement additional minimization, and potentially mitigation, in order to reduce the avian take and its impacts.

Annual reports of the following will be provided to the USFWS: the total number of bird found of each species, and the estimated number of total birds killed after adjusting for search area, searcher efficiency and scavenger removal, and reports of any mass casualty events. CPP will submit a draft monitoring report to the USFWS no later than January 15 of the years following monitoring studies (approximately 60 days following completion of the monitoring studies).

The following descriptions are designed to clarify the information contained in Tables 4.1 and 4.2.

1. If the annual average casualty rate, as determined over the initial three year monitoring and the follow-up HCP compliance monitoring (years 8, 13, 18), of all birds is *below* the triggers identified in Table 4.2, then no further minimization or mitigation measures will be implemented for birds above those already in place.

2. If the annual average casualty rate, as determined over the initial three year monitoring and the follow-up HCP compliance monitoring (years 8, 13, 18), of all birds is *above* the triggers identified in Table 4.2, CPP will implement Tier 2 and 3 on-site minimization and/or off-site mitigation measures as identified in Table 4.1 in consultation with the USFWS and based on results of the monitoring and the most current data or other study results available at the time.

3. If one individual listed as a state rare, threatened, or endangered bird species (Table 2.3) is found during post-construction fatality monitoring, CPP will report this to Maryland Department of Natural Resources and USFWS and develop and implement a response through consultation with the MDNR. Response would depend on the

species, time of year, and evaluation of the significance of the impact, but could include one or more of the measures identified in Table 4.1.

4. If 25 casualties are found at one turbine at one time (and are suspected to be from a mass casualty event), either during a monitoring study carcass search or as incidental finds during routine operations and maintenance, CPP will investigate the incident and salvage all the casualties. CPP will report the event to the USFWS within 24 hours and rectify any identified causes, to the extent practicable. In addition, CPP will implement measures, to the extent practical (e.g., ensuring lights are turned off), for the life of the project to reduce the occurrence of future casualty events.

5. If one eagle (bald or golden) is found as a fatality during post-construction fatality monitoring, the Tier 2 response will be initiated and CPP will report the fatality to the USFWS within 24 hours to enable evaluation of the circumstances surrounding the fatality and an assessment of whether there are practicable ways to reduce or remove attractants to the site (e.g. potential deer carcasses or prey populations). In addition, CPP coordinate with USFWS on the need to obtain a BGEPA permit. If, through discussion with the Service, additional off-site mitigation appears necessary, Tier 3 level responses could be implemented.

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APPENDIX A: Birds listed within the Appalachian Mountains Bird Conservation Region 28 (USFWS 2008).

Common Name	Scientific Name	Common Name	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*	Blue-winged warbler	*Vermivora pinus*
Peregrine falcon	*Falco peregrinus*	Golden-winged warbler	*Vermivora chrysoptera*
Upland sandpiper	*Bartramia longicauda*	Prairie warbler	*Dendroica discolor*
Northern saw-whet owl	*Aegolius acadicus*	Cerulean warbler	*Dendroica cerulean*
Whip-poor-will	*Caprimulgus vociferous*	Worm-eating warbler	*Helmitheros vermivora*
Red-headed woodpecker	*Melanerpes erythrocephalus*	Swainson's warbler	*Limnothlypis swainsonii*
[a]Yellow-bellied sapsucker	*Sphyrapicus varius*	Louisiana waterthrush	*Seiurus motacilla*
Olive-sided flycatcher	*Contopus cooperi*	Kentucky warbler	*Oporornis formosus*
Loggerhead shrike	*Lanius ludovicianus*	Canada warbler	*Wilsonia canadensis*
[b]Black-capped chickadee	*Poecile atricapilla*	Henslow's sparrow	*Ammodramus henslowii*
[c]Bewick's wren	*Thryomanes bewickii altus*	[d]Rusty blackbird	*Euphagus carolinus*
[d]Sedge wren	*Cistothorus platensis*	[b]Red crossbill	*Loxia curvirostra*
Wood thrush	*Hylocichla mustelina*		

[a]S. Appalachian breeding population; [b]S. Appalachian population; [c]*bewickii* ssp.; [d]non-breeding population.

APPENDIX B: Summary of raptor migration data collected at the Allegheny Front HawkWatch sites in Pennsylvania.

Site	Hours	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	SW	UR	Total
2010 F	769	23	280	116	84	77	774	233	10	91	2,896	1,547	1	145	78	38	20	1	228	6,642
2009 F	735	9	297	84	103	38	620	164	5	53	2,954	1,460	0	204	43	22	22	0	159	6,237
2008 F	765	15	347	111	69	52	1,000	194	7	56	3,887	1,284	4	154	55	29	15	0	206	7,485
2007 F	773	24	416	118	76	85	1,732	505	3	93	3,217	2,429	6	139	99	39	32	0	342	9,355
2006 F	911	20	459	125	70	61	1,179	191	5	81	13,974	1,548	4	222	75	32	48	0	254	18,328
2010 S	356	27	268	61	14	24	135	89	6	68	288	431	2	87	22	7	3	0	37	1,569
2009 S	412	9	384	61	32	28	220	57	7	36	853	465	0	81	39	9	3	0	93	2,377
2008 S	430	12	410	185	35	29	171	56	9	110	433	478	1	94	26	4	4	0	104	2,161
2007 S	455	26	268	135	26	31	265	85	4	72	324	489	4	76	27	3	1	0	133	1,969
2006 S	508	7	240	148	14	29	92	56	1	36	636	279	0	37	23	5	0	0	125	1,728

APPENDIX C: Number and percentage of bird species found as casualties during post-construction fatality monitoring studies conducted at wind-energy facilities in the vicinity of the Project.

Species	Mountaineer, WV [2003-2004][1]		Mt Storm, WV [2008-2011][2]		Meyersdale, PA [2004][3]		Casselman, PA [2008][4]		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Acadian flycatcher	-	-	1	0.3	-	-	-	-	1	0.2
American crow	-	-	3	0.9	-	-	1	6.25	4	0.9
American goldfinch	-	-	-	-	1	7.7	-	-	1	0.2
American redstart	2	2.4	7	2.1	-	-	-	-	9	2.0
American robin	1	1.2	1	0.3	-	-	-	-	2	0.4
American woodcock	-	-	1	0.3	-	-	-	-	1	0.2
Bay-breasted warbler	-	-	6	1.8	-	-	-	-	6	1.3
Bicknell's thrush	-	-	1	0.3	-	-	-	-	1	0.2
Black-and-white warbler	-	-	2	0.6	-	-	-	-	2	0.4
Black-billed cuckoo	4	4.8	2	0.6	1	7.7	-	-	7	1.6
Blackburnian warbler[MD]	1	1.2	1	0.3	-	-	-	-	2	0.4
Blackpoll warbler	3	3.6	16	4.8	-	-	-	-	19	4.3
Black-throated blue warbler	1	1.2	15	4.5	-	-	-	-	16	3.6
Black-throated green warbler	1	1.2	5	1.5	-	-	-	-	6	1.3
Blue-headed vireo	-	-	1	0.3					1	0.2
Blue-winged warbler[BCC]	-	-	1	0.3					1	0.2
Broad-winged hawk	-	-	1	0.3					1	0.2
Canada warbler[BCC]	1	1.2	3	0.9	-	-	-	-	4	0.9
Cape May warbler	-	-	4	1.2	-	-	-	-	4	0.9
Cedar waxwing	-	-	3	0.9	-	-	-	-	3	0.7
Chestnut-sided warbler	1	1.2	9	2.7	-	-	-	-	10	2.2
Chimney swift	-	-	2	0.6	2	15.4	-	-	4	0.9
Common yellowthroat	1	1.2	7	2.1	-	-	-	-	8	1.8
Eastern wood-pewee	-	-	2	0.6	-	-	-	-	2	0.4
European starling	1	1.2	2	0.6	-	-	-	-	3	0.7
Field sparrow	-	-	1	0.3	-	-	-	-	1	0.2
Golden-crowned kinglet	-	-	3	0.9	-	-	3	18.8	6	1.3
Gray catbird	1	1.2	5	1.5	-	-	-	-	6	1.3
Gray-cheeked thrush	-	-	4	1.2	-	-	-	-	4	0.9
Hooded warbler	1	1.2	-	-	-	-	-	-	1	0.2
House Sparrow	1	1.2	-	-	-	-	-	-	1	0.2
Indigo bunting	1	1.2	-	-	-	-	-	-	1	0.2

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Species	Mountaineer, WV [2003-2004][1]		Mt Storm, WV [2008-2011][2]		Meyersdale, PA [2004][3]		Casselman, PA [2008][4]		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Kentucky warbler[BCC]	-	-	2	0.6	-	-	-	-	2	0.4
Lincoln's sparrow	-	-	1	0.3	-	-	-	-	1	0.2
Magnolia warbler	5	6.0	14	4.2	-	-	1	6.2	20	4.5
Mourning dove	-	-	1	0.3	-	-	-	-	1	0.2
Mourning warbler[MD]	-	-	1	0.3	-	-	-	-	1	0.2
Northern parula	-	-	1	0.3	-	-	-	-	1	0.2
Ovenbird	-	-	12	3.6	-	-	-	-	12	2.7
Palm warbler	-	-	-	-	-	-	1	6.2	1	0.2
Philadelphia vireo	-	-	2	0.6	-	-	-	-	2	0.4
Pine warbler	-	-	1	0.3	-	-	-	-	1	0.2
Red-eyed vireo	23	27.7	68	20.4	2	15.4	1	6.2	94	21.1
Red-tailed hawk	1	1.2	2	0.6	-	-	-	-	3	0.7
Rock Dove	1	1.2	-	-	-	-	-	-	1	0.2
Rose-breasted grosbeak	3	3.6	2	0.6	-	-	-	-	5	1.1
Ruby-crowned kinglet	-	-	3	0.9	-	-	1	6.2	4	0.9
Ruby-throated hummingbird	1	1.2	4	1.2	1	7.69	-	-	6	1.3
Ruffed grouse	1	-	3	0.9	-	-	-	-	4	0.4
Scarlet tanager	-	-	2	0.6	-	-	-	-	2	0.4
Sharp-shinned hawk	1	1.2	2	0.6	-	-	-	-	3	0.7
Swainson's thrush	-	-	6	1.8	-	-	-	-	6	1.3
Swamp sparrow	1	1.2	-	-	-	-	-	-	1	0.2
Tree swallow	-	-	2	0.6	-	-	-	-	2	0.4
Turkey vulture	3	3.6	21	6.3	-	-	-	-	24	5.4
Unidentified bird	9	10.8	10	3.0	3	23.1	6	37.5	28	6.3
Unidentified corvid	-	-	4	1.2	-	-	-	-	4	0.9
Unidentified flycatcher	-	-	4	1.2	3	23.1	-	-	7	1.6
Unidentified passerine	1	1.2	5	1.5	-	-	-	-	6	1.3
Unidentified thrush	1	1.2	1	0.3	-	-	-	-	2	0.4
Unidentified vireo	-	-	3	0.9	-	-	-	-	3	0.7
Unidentified warbler	1	1.2	4	1.2	-	-	-	-	5	1.1
Veery	1	1.2	1	0.3	-	-	-	-	2	0.4
Whip-poor-will[BCC]	-	-	1	0.3	-	-	-	-	1	0.2
White-eyed vireo	-	-	1	0.3	-	-	-	-	1	0.2

APPENDIX C: Number and percentage of bird species found as casualties during post-construction fatality monitoring studies conducted at wind-energy facilities in the vicinity of the Project.

Species	Mountaineer, WV [2003-2004][1]		Mt Storm, WV [2008-2011][2]		Meyersdale, PA [2004][3]		Casselman, PA [2008][4]		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Wild turkey	-	-	9	2.7	-	-	-	-	9	2.0
Winter wren	-	-	1	0.3	-	-	-	-	1	0.2
Wood duck	1	1.2	1	0.3	-	-	-	-	2	0.4
Wood thrush[BCC]	3	3.6	7	2.1	-	-	-	-	10	2.2
Yellow-bellied flycatcher	-	-	1	0.3	-	-	-	-	1	0.2
Yellow-bellied sapsucker[BCC]	-	-	2	0.6	-	-	1	6.2	3	0.7
Yellow-billed cuckoo	5	6.0	19	5.7	-	-	1	6.2	25	5.6
Yellow-rumped warbler	-	-	1	0.3	-	-	-	-	1	0.2
Total	**83**	**100**	**334**	**100**	**13**	**100**	**16**	**100**	**446**	**100**

[MD] = Maryland State listed species

[BCC] = BCC species for the Appalachian BCR

[1] Kerns and Kerlinger 2004, Arnett et al. 2005

[2] Young et al. 2009a, 2009b, 2010a, 2010b, 2011a, 2011b, 2012

[3] Arnett et al. 2005

[4] Arnett et al. 2009